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15 November 2021

Roger Kennard
Accent Superannuation Pty Ltd
Via email: [redacted]

RE: Issues for IPC hearing for Kariong Sand and Soil Supplies - Air Quality

Dear Roger,

Todoroski Air Sciences (TAS) has previously reviewed the *Kariong Sand and Soil Supplies Air Quality Assessment – RTS* prepared by Northstar Air Quality (dated 10 December 2020) on behalf of five nearby landowners of Acacia Road and Debenham Road, Somersby (Lot 3 239 Debenham Rd East, Somersby, 252 Debenham Rd East, Somersby, 242 Debenham Rd East, Somersby, 10 Acacia Rd, Somersby, 12 Acacia Rd, Somersby).

In my letter to you dated 11 March 2021 I reviewed the response to submissions (RTS) by Northstar that responded to my peer review undertaken (dated 22 September 2020) of the *Kariong Sand and Soil Supplies – Proposed Development Air Quality Impact Assessment* (**Northstar Air Quality, 2020a**). My letter to you is a useful outline of our original review, the Northstar response to the review and our comments on this response. It provides the full response comments from TAS and Northstar in the correct context.

You have very recently made us aware that there have been two subsequent reviews since our 11 March letter. These are a peer review by ERM who were engaged by the proponent, and also by EMM, engaged by the Department of Planning Industry and Environment (DPIE). I have only had a very limited time to review the reports by ERM and EMM, and can only provide limited comments. Due to the situation, this letter is not well edited, referenced or structured, and we trust the reader can overlook this and focus on the key issues at hand.

The following outlines my opinion on the key unresolved issues and the key factors that one should consider in any deliberations about potential air quality effects of this proposal.

1. Uncertainty in the Meteorology applied will affect the results

Five separate technical experts have considered the meteorological modelling for this proposal, (EPA, Northstar, ERM, EMM, and TAS), and all five technical experts concur there is significant uncertainty in the meteorological aspects of the assessment.

In my opinion, a key issue that has not been adequately explained in the documentation to date (by all five technical experts) is to that the meteorological model is a critically vital factor that greatly affects the air dispersion modelling predictions and hence the degree of any predicted impact.

By way of analogy to a say a building, the meteorological model like the foundation and the air dispersion model is the building constructed upon that foundation. In this case, there is no reliable meteorological foundation upon which to build the air dispersion assessment, making the modelling results unreliable.

In my experience, a lack on site specific meteorological data is quite common, and there are numerous ways to deal with this, but what is most irregular in this case are the steps taken to ensure the meteorological modelling is **not** representative of the site, but would instead be representative of a dissimilar site at Gosford, that will have dissimilar meteorological conditions due to the different local influencing factors I pointed this out in my original review, where I said; *"…the Gosford AWS station is located in flat terrain near sports fields, north of a large body of water, and south of a steep wooded ridge which runs approximately east-west. On the other hand, the project site is positioned on the western ridgeline or plateau* [running north-south] *at a significantly greater elevation to the Gosford meteorological station, and does not have elevated terrain to the north, or flat level terrain nearby or to the south.*

Due to these significantly different geographical features, the winds at the project site will be significantly different to those as Gosford AWS. These different features will necessarily cause the project site and monitoring station to experience significant meteorological conditions, that is, wind speed and wind direction will be affected by different anabatic and katabatic processes, differing nearby land surfaces and will be subject to different southerly and northerly flow and wind speeds."

Contrary to reviewers assertions that my statements are unsupported etc, I also detailed exactly how and why the meteorological data used in the Northstar assessment reflects the physical features near Gosford, and not near the site, (see my letter dated 11 March 2021), and went on to point out that by applying various modelling assumptions and settings to make the data most closely resemble that at Gosford, this simply ensured it is not representative of the site. (I note however that in the 11 March letter, my discussion about high-wind speed bias was erroneously drafted and refers to data at Gosford. I was intending to refer to the high wind speed bias due to AEMET meteorological modelling which uses the Gosford data, but unfortunately this was not correctly worded. Even more unfortunately, both ERM and EMM focus on this perhaps obvious mis-drafting, instead of the substantive issue, which is most regrettable).

The key issue (that the meteorological component is specifically not representative of the site) is not tackled by Northstar, ERM or EMM in any substantive or direct way other than to offer concurrence about significant uncertainty in this regard, and to speculate that the issue can be dealt with via the proponent's suggestion for a staged development and an on-site weather station. This simply adds to the uncertainty for the community and the proponent, without tackling a relatively common or routine issue that consultants like ourselves, EMM, ERM and Northstar deal with on a daily basis when conducting air dispersion modelling studies. The issue being that it is rare to have site specific data, and so care needs to be taken in the model settings and assumptions to ensure the meteorological data input to the model reflects what would arise at the site.

I wish to be very clear that based on my experience, in my opinion the meteorological conditions at this site will be significantly different to those at Gosford, and this will result in a material difference in the predicted impacts, if the meteorological data were to be corrected. for the reasons outlined above and in my previous correspondence.

The effect of unrepresentative meteorological data cannot be quantified using only the available information; re-modelling would be needed. It is unreasonable to expect the community to pay for the cost of such an air quality monitoring study for this project, simply to reasonably quantify the project impacts using appropriate representative meteorology. The uncertainty could have been resolved by the proponent providing a more reliable study, as would ordinarily be the case.

The uncertainty is far more significant than NorthStar, ERM or EMM have bothered to investigate before making their assertions on the matter. For example, Part 4 of the the EPA Approved Methods says (emphasis added) ;

"The meteorological data used in the dispersion model is of fundamental importance as it drives the transport and dispersion of the air pollutants in the atmosphere. The most critical parameters are wind direction, which determines the initial direction of transport of pollutants from their sources; wind speed, which dilutes the plume in the direction of transport and determines the travel time from source to receptor; and atmospheric turbulence, which indicates the dispersive ability of the atmosphere.

4.1 Minimum data requirements

The meteorological data used in the dispersion modelling is one factor that determines the level of assessment.

***Level 1** impact assessments are conducted using 'synthetic' worst-case meteorological data. Table 4.1 lists the wind speed and stability class combinations that need to be included in the synthetic worst-case meteorological data file. Level 2 impact assessments are conducted using at least one year of site-specific meteorological data. The meteorological data must be 90% complete in order to be acceptable for use in*

***Level 2** impact assessments (i.e. for one year, there can be no more than 876 hours of data missing). If site-specific meteorological data are not available for a Level 2 impact assessment, at least one year of site-representative meteorological data must be used. The site-representative data should be:*

- *preferably collected at a meteorological monitoring station. Where measured data is unavailable or of insufficient quality for dispersion modelling purposes, a meteorological data file may be generated using a prognostic meteorological model such as TAPM (Section 4.5)*

- *correlated against a longer-duration site-representative meteorological database of at least five years (preferably five consecutive years) to be deemed acceptable. It must be clearly established that the data adequately describes the expected meteorological patterns at the site under investigation (e.g. wind speed, wind direction, ambient temperature, atmospheric stability class, inversion conditions and katabatic drift)."*

It is mandatory that for any site-representative data used in a Level 2 assessment (as we have presented in this matter) *"It must be clearly established that the data adequately describes the expected meteorological patterns at the site under investigation (e.g. wind speed, wind direction, ambient temperature, atmospheric stability class, inversion conditions and katabatic drift)."* (emphasis added).

This has not been done. In fact the opposite has been done, given that all five technical experts in this matter agree the meteorological data is uncertain and thus it is not "*clearly established*" the data is representative of the site.

More broadly, I note that the requirements in the Approved Methods also permit a Level 1 Assessment to be made, thus either a worst-case Level 1 assessment, or a valid Level 2 assessment can be made to demonstrate compliance. Part 2.1 of the Approved Methods says: *"The two levels of impact assessment are:*

- *Level 1 – screening-level dispersion modelling technique using worst-case input data*

- *Level 2 – refined dispersion modelling technique using site-specific input data.*

The impact assessment levels are designed so that the impact estimates from the second level should be more accurate than the first. This means that, for a given facility, the result of a Level 1 impact assessment would be more conservative and less specific than the result of a Level 2 assessment. It is not intended that an assessment should routinely progress through the two levels. If air quality impact is considered to be a significant issue, there is no impediment to immediately conducting a Level 2 assessment. Equally, if a Level 1 assessment conclusively demonstrates that adverse impacts will not occur, there is no need to progress to Level 2."

Generally, where a valid/ certain Level 2 assessment cannot be made (as arises in this case), a Level 1 assessment (the only other option in this case) would normally be attempted. But no mention of this is made.

Given that a Level 1 assessment can be made easily if one already has a Level 2 assessment model, (it would take approx. 15 minutes), it is unclear why it was not done/ not mentioned other than perhaps it is likely to show unacceptable impacts.

No part of the EPA Approved Methods countenances the acceptability of a project on the "promise" of meteorological monitoring being done later when the meteorology in the assessment is uncertain. The requirements in this regard are absolute, but are not being followed. If this were a mine or large quarry, it would not be approved before a valid assessment was provided, even if it took a year or more to collect any required data. (on the other hand it is not permitted to have such activity this close to land used for residential use).

To investigate more closely what the effect of the incorrect meteorology used in the modelling may have, one can consider the resident's submissions, my meteorological data (from previous studies in Somersby) the NorthStar meteorology and the orientations of dust sources relative to receptors, and these differences in these two meteorological data sets.

On Wednesday 10 November, residents at the site inspection made comments to the effect that:

- There has been significant dust from the earthworks at the current site of the project, (caused by westerly winds).
- The westerly winds were problematic/ associated with dust and impacts on the residents.
- Winds from the east were not so severe, brought the sea-breeze, which is gentle and pleasant.
- No noticeable impacts had arisen from the existing quarry nearby.

A comparison of the NorthStar meteorology used in the modelling and my own meteorology derived for a location nearby is set out in the figure below. The NorthStar windrose on the left uses 36 x 10 degree segments, and the TAS wind rose on the right uses the standard compass directions (16 x 22.5 degree segments).

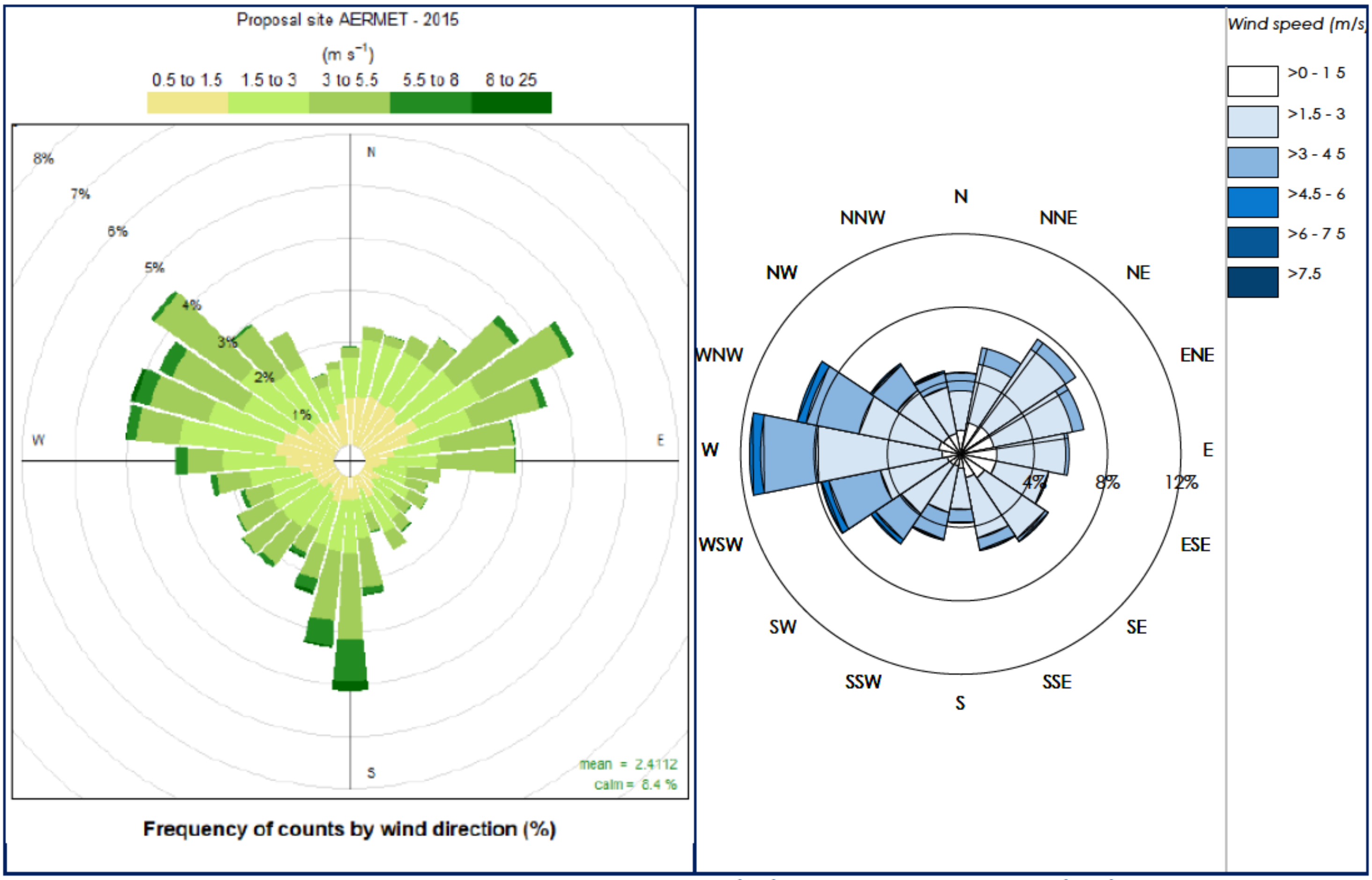

Figure 1: AERMET meteorological data used in the model (left) vs. TAS anticipated nearby data (right)

It is significant that the figure shows the NorthStar data used in the modelling does not contain the predominant strong westerly winds reported by the residents modelling data but these winds do arise in the TAS wind rose. The NorthStar data shows approximately 4-5% of its westerly winds are above 3m/s, compared to approximately 14% in the TAS wind rose. This shows that the westerly winds of most relevance for assessing the impacts are underestimated by a factor of approximately three fold in terms of their frequency of occurrence. The modelling would thus significantly underestimate the frequency and amount of dust blowing towards residents due to wind erosion from the open stockpiles and open roads, and open material transport and handling areas.

I note that ERM/ EMM point out the Gosford data has approximately 30% calms, vs. approximately 8.4% in the AERMOD modelling by NorthStar and also refer to the model documentation about the model inherently overestimating impacts from "area sources" under calm conditions, (meaning almost still conditions). However, they use this information without assessing whether it is relevant or not, and without considering the full context of the situation (and to also state that I have been misleading in this regard. While in hindsight I agree my statement in this regard should have been better explained to be referring high wind speed bias due to AERMET meteorological modelling, and as may be relevant to the hours of activity during the daytime that are most relevant, It may help explain, but does not excuse that the reviewers failure to consider the situation adequately, for example do adequately consider the following as it applies in this case;;

- They are comparing AERMOD modelling at the site with Gosford data, but do not compare it with my estimates of the likely Metrological conditions (from CALMET) as set out in my letter. It is clear that the Gosford data is not representative, and making this comparison is not directly relevant.
- The AERMOD "overestimation" under calm winds as referred to by NorthStar and EMM when citing the AERMOD model documentation is associated with very low wind speeds conditions when dust can only arise due to mechanical activity (not wind erosion), (which is not disputed) and whilst RERM does provide figures to show the diurnal cycle of wind conditions, they still somehow overlook the key point that these calm conditions predominantly occur at night, whereas dust from mechanical activity will only ever occur in the day-time due to site activity, and not at night. Only wind erosion may occur at night, when there are manly low winds that do not cause wind erosion.
- There is a larger proportion of high winds overall (all directions) relative to low winds in the NorthStar data, especially in the daytime (time does not permit graphs to be shown), and these high winds are biased in the incorrect directions to represent the conditions at the site; they greatly overestimate the high winds from the south, northwest and north east (which are clearly governed by the geography at Gosford, and not that at this location), leading to an underestimation of actual prevailing wind directions that matter the most for assessing impacts at this site.

Overall, the NorthStar modelled data underestimates the frequency of the most critically relevant winds from the west, both the high and low wind speeds.

We see unrealistic southerly winds (both frequency and speed) in the NorthStar modelling (caused by high-speed winds blowing across open water towards the Gosford site), and we do not hear this from the residents or see it in my modelling. Similarly, the Northstar modelling over-represents the northwest and northeast winds (as caused by winds funnelling around the prominent ridge north of the Gosford stations), yet, again, such winds are not reported by residents, nor do they appear in my modelling.

In the Northstar modelling, we also see almost nil wind speeds above 5.5 m/s form the south east, but more winds between 3 and 5,5 m's form this direction. Wind erosion tends to start at wind speeds above 5.4 m/s, and air dispersion improves when wind speeds are above 3m/s, and so this will tend to underestimate the impacts from the existing quarry (there is more discussion about this later).

In essence, all of this means that in the Northstar modelling there are insufficient winds in the right directions, at the right times and under the right wind speeds. So how big an effect can it have?

In my experience, I have modelled and assessed several thousand significant dust generating projects, very often in the absence of site-specific weather data. I have re-modelled these same activities once site-specific weather data has become available on hundreds of occasions. From this experience I observe that when the meteorological input data is changed, the 24-hour PM_{10} impacts due to the facility alone will often halve or double (or more) at various receptors. Specifically, I point to cases for coal mines in the Hunter Valley, where the subsequent re-modelling with site specific weather data generally (collected only approximately 5 to 10 km from the source of the previously used weather data) has lead to a doubling of the maximum incremental 24-hour PM_{10} impacts at most of the receptors (for example the predicted isopleth line at 25µg/m^3 increased to approximately 50µg/m^3 , which required halving of the mine activity rate). Unlike this situation however, there was a smaller degree of difference in the environmental factors affecting the meteorology, and it is reasonable to expect more significant differences in this case than may typically arise.

(This proposal's predicted incremental impact (proposal in isolation) for 24-hr PM_{10} is 22.6µg/m^3 and this is similar to the maximum impacts arising from a large coal mine at its nearest privately owned receptors. This should not be overlooked when considering the potential impacts this proposal may have on the community nearby. That the EPA raised concerns about this scale of this impact, and pointed to it as an issue to DPIE is not surprising.).

In my opinion, the meteorological issue alone has potential to lead to more than double the predicted incremental impacts for the proposal. It should be noted that only a relatively modest increase in the predicted impacts would be needed to cause unacceptable cumulative impacts, given that the predicted cumulative impacts already exceed the criteria (on a high dust day) or are relatively close to it otherwise. Also, as outlined later, there are many other factors that are likely to cause even higher than predicted impacts, and when the combined effects of these factors are considered, the impacts may not be adequately dealt with by staged operations staring at half scale.

In providing my opinions above on the potential effects of the non-representative meteorology used (and later where I comment on the scale of dust impacts from this site and the nearby quarry), I also draw on my experience in post-approval verification of dust impacts, and of post operational verification of my modelling of dust from such activities. I have conducted such studies for dozens of locations, and in every case the measured data align very closely with my predicted dust levels. The poorest correlation coefficients between my modelled impacts and those measured once the facility was operational are better than 0.85, and the best were better than 0.999. Whilst a correlation co-efficient was not the only performance metric considered, the studies in this regard have always confirmed that my approaches to predicting dust levels form new development achieve a very high level of precision. To the best of my knowledge, none of the other technical experts involved in this matter possess an equivalent depth and breadth of specialised experience in matters relating to modelling dust impacts.

2. The design of the facility is far from best practice, and such a design should not be permitted at the edge of a rural-residential area

There are many aspects of the facility design that will cause excess and otherwise avoidable particulate impacts. None of these are adequately addressed in the responses, the final design of the ERMN and EMM reviews, which only consider mitigation of specific individual aspects, whilst neglecting the inherently poor overall design that is the key cause of the problem.

The most direct and simple means to illustrate this issue is by way of comparison with the previously proposed Bingo material handling and recycling facility across the road. See: https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=PDA-380%2120190312T061317.982%20GMT. A figure to illustrate the Bingo design is provided further below, but in essence, as outlined in my 11 March Letter, *"Overall, the design of the facility is poor in regard to minimising dust, as can be seen by direct comparison with design of the Bingo site (formerly proposed) across the road. The Bingo facility for example, had tipping, sorting and handling activities fully within an actual building with closable doors, and all roads were fully sealed allowing them to be swept, washed and flushed.*

The reviewer's fundamental issue that the site is poorly designed, and that this leads to unnecessarily higher emissions is not adequately addressed. For example, why must the clean and dirty travel paths cross, why cannot sealed roads, (which can be swept and flushed) be used instead of roads made of processed concrete rubble? How will material track-out be prevented when trucks must travel over dirty areas, on roads that cannot be swept, and the road itself, due to its design, is a significant generator of dust."

Figure 2. Design of (withdrawn) Bingo Somersby Resource Recovery Facility across the road form the proposal

The other issues raised in this regard include that there is no full enclosure on any of the main dust generating activities, despite this claim being made by the proponent and various others a structure where the long side is fully open offers only a small benefit, and is far from offering the mitigation that a full enclose would provide, (for example, approximately 30% vs, 90% control, which is 70% emitted vs 10% emitted, or in plain English it leads to seven times less emissions reduction compared with the same plant operating within a full enclosure).

This is of course much worse however because the main, actual dust generating activities occur outside or at the edge of the open side, and so are not controlled adequately. Whilst some shielding is provided on the crusher, this must be for reasons other than dust control (such as noise mitigation) as it does very little as a modern crusher which would have built-in water sprays and thus makes little dust. The dust from "crushing" comes predominantly from the peripheral activity, such as the loading and unloading of material to and from the crusher. The shielding thus does nothing tangible for dust control for a modern crusher, and leaves the main dust generating activities outside of the "enclosure": This design/ layout also forces plant to have longer travel paths when handling materials causing more dust than necessary, results in unnecessary double handling, which unnecessarily doubles handling emissions. The layout overall is very poorly designed, for example the tip and spread area is located far away from the recycling plant and also far away from the crusher where the material ends up. This material will have to be picked up, transported, dumped near the plant, picked up again and processed, causing unnecessary additional particulate emissions at each step.

Furthermore, because these material handling activities mostly occur outdoors, the site will become muddy when it rains. This will cause mud to be tracked all around the site and out onto public roads (noting that no wheel wash is shown in the design or is required by the conditions). Whilst the conditions do include a requirement to prevent silt track-out, this condition cannot be complied with because of the poor design of the proposal.

In any case, ERM, and EMM's reviews and conditions imposed all miss the key point that best practice design is needed, and for example would dictate that all track out, even that occurring within the site needs to be minimised. A best practice design would have these activities fully indoors, and would not generate mud in a controlled indoor environment in the first place, and would separate the clean "road-going" truck wheels from dirt, and would also include a wheel wash to remove and lower level silt etc than may arise at the rear wheels when dumping.

(It is relevant to note that a wheel wash is different to a wheel bath or a wheel spray, A good wheel wash includes a long, >6m section where the wheels travel above a raised grid and the track chassis and wheels a cleaned with high-pressure jets., allowing mud and silt to drop below the grid.)

Even with a very good wheel wash, track out cannot be prevented within an open site, especially one like that proposed that does not have fully sealed roads that cannot be washed, where the activity areas a spread out far and wide causing longer than necessary travel and hence unnecessary dust, and also where the road is made of broken concrete rubble, that itself generates dust just by vehicles and plant driving over it and grinding the rubble together.

In this regard I note that the Jackson Environment claim that a concrete road is not durable enough relative to a concrete rubble road is complete nonsense. Whilst this is an obvious cost-saving measure and no more needs to be said, it leads to another relevant point, which is that the proposed design sets a low benchmark; saving costs on best-practice fully sealed roads and material handing areas, and on nil or incomplete enclosures, leading to the generation of more dust as a result. This cost saving, which comes at the expense of greater impact on the neighbours, gives the proponent an unfair commercial cost-advantage over others (e.g. operators like Bingo say) that aim to achieve best practice design. If this proposal is approved, it will set a poor precent which others will have a strong commercial cost imperative to follow in order to be able to compete cost wise. For these reasons, approving this facility will make it harder for the authorities to require and enforce best practice on others, and this multiplies the problem more widely than just at this site and the neighbours alone.

I add that I have conducted recent audits and inspections of approximately eight such facilities in the Greater Metropolitan Region, and all of these sites have such activities indoors, clean and dirty wheels separated, compact layouts, minimal double handling, wheel washes etc. In my opinion, this is further, current evidence of the poor overall design of this proposal, but current stands in NSW.

Whilst the previously proposed Bingo facility did represent best practice, as I understand the situation, it was withdrawn because it was unable to mitigate the impacts sufficiently at the same receptors in the same general proximity. Whilst the Bingo facility did have a higher activity rate, it nevertheless begs the question as to why this clearly not best-practice proposal, with uncertain and underestimated impacts is being countenanced in the same general locality where even a best-practice facility cannot meet criteria?

In this context, (the proposal causing far higher impacts than is necessary because it has an inherently poor design), it is important to note that EPA policy is that best practice for materials handling is for it to be fully enclosed. For example for a project located 1,300 metres from the nearest sensitive receptor, (where similar 3-sided enclosures, and open stockpiles, but sealed roads and other better controls on material handling were proposed), the EPA Direction Metropolitan, wrote to the Local Council in July 2015 saying: *"For new developments the EPA has required bulk materials to be stored and handled within an enclosed building. For example, the EPA has issued licence conditions prohibiting external stockpiling of bulk material for Cement Australia, Port Kembla (EPL No 20101)."* The EPA also stated "…*the EPA does not support a proposal for open stockpiling. The EPA advised that for several years, the EPA has been implementing a "no open stockpile" approach ….for all new developments where the EPA has regulatory control or influence."* In that instance, there was no tangible prospect for impacts to occur at a receptor so far from a much smaller scale site (activity was 30,000 tonnes over a much smaller area), but the EPA still pursued its policy. In this case, there is much higher scope for impact, e.g. 210,000 tonnes of activity within approximately 100 metres of residential dwellings.

The EPA policy position is consistent with NSW Health objectives to minimise particulate impacts on the community.

It is also relevant to observe that in 2021, the World Health Organisation (WHO) halved its Air Quality Guidelines (AQG) for annual average $PM_{2.5}$ from 10 to 5 µg/m^3 (vs. the EPA criteria of 8 µg/m^3) and reduced its PM_{10} guideline to 15 µg/m^3 as an annual average and 45 µg/m^3 as a 24-hour average (vs. 25 and 50 µg/m3 per the NSW EPA criteria respectively).

The WHO says: "*The overall objective of the updated global guidelines is to offer quantitative health-based recommendations for air quality management, expressed as long- or short-term concentrations for a number of key air pollutants. Exceedance of the air quality guideline (AQG) levels is associated with important risks to public health. These guidelines are not legally binding standards; however, they do provide WHO Member States with an evidence-informed tool that they can use to inform legislation and policy. Ultimately, the goal of these guidelines is to provide guidance to help reduce levels of air pollutants in order to decrease the enormous health burden resulting from exposure to air pollution worldwide. "*

Whilst the DPIE assessment report outline the 24-hour PM_{10} impacts, it does not list the annual average PM_{10} levels, which are <u>not below the WHO guidelines at any of the surrounding receptors</u> and are <u>above the WHO criteria at all of the nearby receptors</u>. This indicates that per the current WHO air quality guidelines the predicted impacts would be harmful to human health. It is noted that the WHO guidelines are not mandatory, but in this regard, no compelling public good or other such reason is provided to sanction such an avoidable and unnecessary impact upon the nearby receptors.

Overall, the ERM and EMM reviews focus on individual components of mitigation or control and do not consider the overall design.

Similarly, the conditions of approval focus on individual components and do not consider the overall design that will cause unnecessarily high emissions and impacts due to its inherent short-comings.

3. Various technical issues that underestimate impacts

A range of these issues is identified in my 11 March letter. I have read the ERM and EMM reviews and generally reject almost everything is stated by ERM and much of what EMM state (I outline one aspect above where my comments on high/ low bias in the meteorology were poorly drafted, causing confusion).

Time does not permit a full reply to be made, but I outline some of the issues raised below, and note that that in general ERM and also EMM did not consider the big picture and instead dissect the issue by looking at only one component and mostly ignoring its inter-relationship with the whole. There is also a significant element of mis-quoting what I have said by both ERM and EMM, who use their own mis-quote to bolster erroneous claims about the issues I have raised. Where EMM do this, it is about construction dust, and it is not really important, (I simply note that what I have said is correct; but EMM appears to be reading something different into it).

The mis-quoting is however more relevant where ERM alleges I have been misleading when I point out that the site layout is poor and mixes clean and dirty wheel paths, "*in light of the considerable lengths the proponent has gone to mitigate emissions at the source*". To this I say it is precisely because the design is so poor that the proponent has been forced to consider additional controls that would otherwise not be needed if the proposed design and layout were best practice. I would further add that in any case the controls proposed are themselves poor, and far from best practice, for example, there is no wheel wash, the roads and surfaces are not all sealed, facilities are not enclosed, etc., etc. EMM points out that a crushed concrete surface is not best practice, and recommends paving the surface to improve performance, i.e. EMM says: *"The design of the Facility to feature areas of crushed concrete over geotextile fabric, as illustrated in Figure 6 of the AQIA is also questioned. It is the experience of EMM that best practice for a materials recycling facility includes the use of hardstand wherever vehicle movements, including FEL, are proposed to occur. It is recommended that the paving of the site is considered to improve dust mitigation performance*." EMM also state that they "….*consider that the areas of the Facility currently proposed for crushed concrete over geotextile fabric should be altered to hardstand (concrete or asphalt) to better align with observed industry best practice. At a minimum, this should be extended to the areas of FEL activity."* This is not consistent with best practice, and unfortunately it does not appear to be a requirement in the conditions either. .

In this situation, for ERM to further claim that "…*the measures proposed appear to go above and beyond what an operation of this nature would generally undertake, and represent best practice*" is contrary to what EMM recommends, and my experience with designing and auditing many such facilities in recent times. It is contrary to EPA Policy, NSW Health aims, and the practice and design of new such developments I have been involved with. In this regard, I point to a current matter for Aussie Skips involving TAS and ERM as opposing experts. EMM proposed to fully enclose the facility, and TAS ad ERM agreed that that this, along with the additional of a wheel wash and somewhat smaller openings represents best practice. EMM took samples of road silt in this matter, and their results aligned with my initial estimates based on past experience, so it is not surprising to find that EMM agrees with the issues I have raised in this regard.

ERM's (and in some parts EMM's) statements about emissions not being correlated directly to impacts are not correct. In any hour or in any year or in any day that the emissions are double, the modelled impacts in that hour, year or day will also double, if they do not, a valid, like-for-like compassion has not been made. (The only situation this may not occur is for the chemical transformation of NO_X, but this is not the issue in this case).

This will be the case for wind generated emissions also, given that the quantum of emission is a direct function of the wind erosion surface area (and other factors) irrespective of any of the factors, the issue is being raised in the context of the wind erosion area being underestimated. In this context, if the area doubles, the emissions double. If the emissions double, the predicted impacts (for that source) also double. ERM and EMM appear to have become confused in how they (erroneously) consider that wind erosion emissions and air dispersion are proportional wind speed. Given that the wind speed does not change in any valid like for like comparison for any hour, day or year at the same place, and because only the underestimated erodible area is in question the statements by ERM and EMM are incorrect. For example, if the area doubles, the same winds act on double the area and will generate double the emissions, the same winds also disperse the emissions and because there are double the emissions from double the area, there will be double the impacts also. (ERM appears to misunderstand the issue and instead appears to be considering different levels of wind erosion from the same area at different times under different wind speeds). The only aspect where there may be a small difference is where the larger erodible area spreads out so far that it is no longer upwind of the receptor. This might only affect very close receptors to a source, and is a rather fine technical issue that does not apply here because there are wind erosion sources of dust in all areas, and it is the in-fill areas that were erroneously not included in the modelling, or in other words, the additional wind erosion areas that were not modelled do not spread out to new, not upwind areas in this case. These areas will have a fine layer of dust deposit on them every day, and this dust will be lifted off when winds speeds increase. Thus, the whole area needs to be adequately considered.

Fundamentally however ERM and EMM miss the key point being made, which is <u>the assessment is based on an approximate 2.5 fold underestimation in the exposed wind erosion areas</u> in the modelling, and <u>this will directly lead to a 2.5 fold underestimate in the wind erosion</u> emissions and their <u>impacts</u>.

<u>Cumulative impacts and related issues</u>
The ERM assertions about cumulative impacts for receptors between the existing quarry and a new dust generating development do not appear to comprehend the issue, and are wrong. My 11 March letter outlines this in detail, and there are several inter-related issues to consider, none of which ERM mentions or appears to have understood. These are the background data, the position of the quarry, how the quarry impacts were considered, and the very small contribution ascribed to the quarry impacts.

I used wind erosion calculations to illustrate the issue because these are a readily quantifiable measure (i.e. they are dependent on the surface area, which can be measured reliably from an aerial photo). It is reasonable to assume the same wind will act on the quarry and at the site., and thus because the wind erosion will occur at essentially the same time and place, the quarry and site wind erosion emissions will be approximately the same <u>per unit of area</u>. Where the area is larger the emissions will also be larger. The quarry has approximately double the site areas susceptible to wind erosion, and so should have double the wind erosion impacts.

In terms of the background level that relates to this issue, there are two factors, the first is general, and I note that I provide compelling and cogent reasons in my 11 March letter where I explain why the Wyong data will underestimate the background level in this locality (i.e. it is away from a major motorway, away from exposed dusty areas and is not near any industry but instead it is in a marshy and grassed area and near a golf course that is kept watered and mown, and thus it is in a location with low dust levels relative to the site). I wholly refute the Northstar analysis (which ERM and EMM support) suggesting that because the Wyong data and that three other DPIE stations have a similar Pearson coefficient, this is any credible evidence the Wyong data (and for that matter the Wallsend, Morriset and Macquarie Park data also it would seem) is representative of this location. This analysis is completely misleading and irrelevant because all DPIE monitoring station are situated in locations well away from major dust sources such as a motorway or quarry, which is why they have such similarities. The DPIE stations are specifically designed to measure the underlying low levels of pollutants that are inescapable by the population, but they do not measure the more elevated background levels representative of locations like this, where there is an large existing quarry, a major motorway etc. Due to this, to make the assessment reliable, any significant sources (such as a quarry or motorway say) need to be added into the assessment by explicitly modelling the other significant sources. I point to the last approximately 30 years of modelling assessments that I have completed where I have done just this, and I also point to the work of many other respected dust experts in this regard also. I also point to the EPA correspondence that specifically required this to be done so that the assessment is in accordance with the EPA Approved Methods for the Modelling and Assessment of air Pollutant sin NSW (EPA, 2016).

The second key point is that the Wyong background dust levels are lowest when the wind direction is from the proposal site towards the key receptors. This is because there are damp, grassy, dust absorbing areas in that direction relative to the Wyong monitor, causing a bias in the background dust levels according to the wind direction. Unfortunately, this means the short term impacts from the proposal are only added with the lowest of the already low background levels that occur when the winds blow towards receptors, which is inappropriate, and underestimates the true impacts that would arise.

The reason these two background data factors are important is in connection with exactly how the existing 6.5 Hectare quarry was "included" in the assessment. TAS and the EPA suggested that the quarry be included in the modelling because it is a big source of nearby dust, and its emissions cannot possibly be present and reflected in the Wyong data. The quarry will elevate impacts at the receptors when the wind blows the other way (thus the key receptors in the middle will get the elevated impacts from two directions, instead of just the one direction from the quarry as presently occurs). Anyhow, the quarry was not modelled in its actual location and Northstar instead added some additional dust in their modelling of the proposal site, which would increase the site impacts only. Northstar used this add-on to the existing modelling to represent the quarry. This is not reasonable in this case where the receptors are sandwiched between the two main dust sources. It has many problems, including that the quarry and site impacts will occur at the same time, and only occur when the background levels are at their lowest (due to the biases in the Wyong data set). Thus, only the lowest (of the already low) background levels are being added when the winds blow from the site to the receptors, (and this ignores particulate from the motorway) and zero additional quarry impacts arise when the wind blows from the quarry towards receptors. This distorts and significantly biases the frequency and absolute level of the impacts at the receptors.

It is important to properly consider the direction and frequency and scale of any elevated impacts in this case, as one of the nearby receptor dwelling houses three children that suffer from asthma and other such illnesses, and another has an elderly gentleman. The fact that the proposal would mean that more elevated impacts will occur much more frequently from a wider range of wind directions is significant. It means that known sensitive receptors will have less respite from particulate impacts, which adds to the existing morbidity impacts in this community).

But it gets much worse than this. The next key point the analysis in my 11 March letter made was that the predicted contribution from the quarry was extremely low. I find it hard to find words to describe just how low the claimed 0.1µg/m^3 particulate contribution from this quarry really is, and am astonished that ERM and EMM would not comment such a blatantly gross underestimation of impact. The quarry impact is 1/36th of that from the site, and is not consistent with any possibly realistic value for particulate impacts from a 6.5 Hectare quarry covering an area twice the size of the site, and in relatively similar proximity to receptors.

The next part of my analysis is where I use the statement from Northstar that the quarry impacts were modelled per those from the site. To make my calculation I singled out the wind erosion fraction of the emissions, given that I can quantify these for the quarry and for the site reasonably precisely based on their exposed surface area. Any plausible results should have shown that the quarry would have approximately double the wind erosion emissions because it has approximately double the area. However, in the Northstar assessment instead of being double, the quarry impacts are 1/36th of those from the site. This means that there is an approximate 2 x 36 = 72 fold underestimation the impacts from the quarry, and this greatly affects the conclusions of the assessment.

However, inspection of the quarry on 10 November shows that it is a cut-stone (dimension stone) quarry, meaning there is little handling of loose material, and sandstone blocks are the primary product. So it is incorrect to model it per the proposed site as NorthStar says it did. This means that wind erosion (which is primarily related to the size of the area exposed to the wind) from quarry will be a more significant component of the total dust relative to dust from material handling. Thus, the above 72 fold factor would overestimate the impacts, but equally the predicted impact being 1/36th of that of the site would still grossly underestimate the impact This is relatively consistent with residents observations of no noticeable impacts from the quarry.

My analysis also makes rational sense, as in my experience, a total annual a particulate level of up to approximately 7.2 µg/m^3 would not be unrealistic for a 6.5 Ha quarry (where wind erosion is nominally approximately to 25% of the total emissions). However, for a cut-stone quarry wind erosion would be a larger fraction of the emissions (nominally over 50%) and so a contribution of nominally 1.5 to 2.0µg/m^3 would be realistic, whereas a level of 0.1µg/m^3 is implausibly low. Whilst not as high as the underestimation that should have been shown in the modelling results per the stated assumption in the NorthStar assessment, this is still a large 15 to 20 fold underestimation, and still indicates a significant fault exists in the modelling, sufficient to add significantly to the other underestimations and to affect the conclusions.

Other technical matters

ERM's opinion about the silt levels on the roads is not consistent with my experience and the direct measurements I have made. I know that EMM has made such measurements for similar facilities and they can independently attest to this. No surprisingly then, the EMM report points out that the issues I have raised in this regard are correct, which is contrary to ERM's assertions.

The ERM statements about the Front End Loader (FEL) wheel generated emissions when moving and travelling are incorrect. These emissions are not modelled at all, and thus there is an underestimation, (irrespective of whether the ERM reviewer has never modelled these emissions correctly for the past 20 years, as they say). The facts are neatly described by EMM at page 9 of their report where they quote the emissions factor documentation, which is in agreement with the issue I have raised. However, it would have been preferable for EMM to have considered not only the speed to FEL's will be higher than 5km/hr (they can travel at 45 to 60 km/hour, depending on the model) but that FEL's operate inherently on dirt, where there is an unlimited supply of silt at the surface, and at this site there are unnecessarily long travel distances over which FEL's will inherently track mud and will spill material along the way, making the road extra silty and dusty. If EMM had considered this, along with more detailed consideration of the cumulative effects of all of the other underestimating factors, it is unlikely that they would say that the conclusions of the assessment would not alter. (Whilst it may be correct to say that due to one of the factors in isolation the conclusions may not alter, is not reasonable to make such a statement in a situation where there are many concurrently acting factors for underestimation, and without considering these factors as a whole). [1]

Similarly, EMM also contradicts ERM further and corroborates the issues I have raised about the underestimations stemming from how the emission factors and mitigation controls were applied, for example when assuming a blanket 70% additional control for a crusher where the dust generating components are not even enclosed.

It is however puzzling how EMM can in recommend paving unsealed surfaces with concrete or asphalt *"to better align with observed industry best practice*", (end of their page 9) and in the next paragraph on page 10 say the mitigation measures represent best practice.

EMM's experience is that daily peak activity rates (i.e. a busy day) relative to the amount of activity on an annual average day being up to up to five time higher are extreme. I would agree with this in a metro area where there are many smaller projects for a facility to service and where large projects can be serviced by multiple facility operators. But I do not agree that it is extreme at this location. I set out that in my experience the range is generally between 2 to 5 fold, and point out that originally a factor of 3.3 was claimed to have been used, but this was in fact only a factor of 1.7 times the average rate (about half that claimed).

The upscaling rate for a peak activity data relative to the average day is now claimed to be just 1.2 for hauling materials, and 2.2 and 2.5 for materials handling and processing. This limits the operation of the project because all of the material handling and processing entail the same amount of hauling, and all material entering and exiting the site occurs via haulage of the material.

In my experience, these revised peak daily rates are too low for a facility like this, in this locality. Facilities like this by necessity may have to receive a much larger than average amount of material in a short period during say a local demolition or road excavation project, or may have to dispatch a large amount of material for a construction or landscaping project. In my experience they can operate at up to five times the annual average rate on a given (peak activity) day, but most commonly will operate at around three times the annual rate on a given high activity day, and have some days with very minimal below average rates of activity. The largest, higher than average daily rates of activity are more common where the facility runs at a smaller annual throughput, and where the is further out from the metro area where there are more sporadic, intermittent but sometime large projects for it to service, and limited other local facilities to service the project. This situation applies at this site, and in my experience, the peak daily activity rates used in the revised final assessment are unrealistically low and would significantly underestimate the impacts on a given day.

If the peak rates of activity are correct as claimed, there should be a simple condition to enforce site operation within the peak daily rates of activity that were assessed, given that the claimed maximum 24-hour impacts are based on these rates of activity.

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As all material entering and leaving the site must be hauled, the claimed 120% peak daily haulage limit is most directly and easily enforced by limiting the total material receival and dispatch haulage quantity to the proposed 120% of the daily average value, (which in-turn proportionally limits the on-site haulage once the material enters the site). This can be enforced by maintaining daily weighbridge records, which are readily available, so there should be no issue with such a condition. The condition should include a requirement to cease additional activity once the 120% peak daily throughput record on the weighbridge is reached.

For 6 days per week operation, the Stage 1, 100,000 t.p.a. of activity equates to an average daily total input and output quantity of 100,000 / (52 x 6) = 320.5 tonnes per day, and for a peak day, this would be 20% more, i..e 385 tonnes per day. Similarly at 150,000 t.p.a. the peak daily rate would be 577.5 tonnes, and at 200, 000 t.p.a., it would be 770 tonnes.

Model choice

Whilst I consider the above issue are more significant, I note that EMM questions the basis for my statement that AERMOD generally displays poor model performance under all wind conditions., and comments that without corroborating evidence, it is difficult to comment on the validity of the statement. (I would expect any user of the model to understand it's limitations to be able to form an independent view). Nevertheless, I point out there are numerous studies that compare AERMOD with the simpler ISC-3 model it replaces, and these studies in general show that AERMOD has superior performance to this older, simpler model. However, this does not make it a superior model relative to other commonly used advanced models. There are relatively few validation studies that compare AERMOD with other advanced models such as CALPUFF, and especially for the near-field case (close to the source). Relevant findings from such studies find the model does not perform as well as other advanced models, for example from the Department of Environmental Protection in New Jersey following a four-part validation in the near-field are set out below (emphasis added);

Part 1, *…"comparison of predicted model concentrations with the network-wide actual high and second-high monitored values….The results suggest that AERMOD has a greater tendency to underpredict actual maximum concentrations than CALPUFF."* Part 2, *"…robust high concentration (RHC)…. Although both models made fairly accurate predictions of the maximum 3- and 24-hr RHCs on a network-wide basis, CALPUFF's performance is superior to AERMOD's because its ratios are closer to 1. AERMOD shows a tendency to underpredict."* Part 3,*"…follows guidance in the EPA document "Protocol for Determining the Best Performing Model."… For the complex terrain monitors, Table 5 shows that CALPUFF is relatively accurate in predicting the 1-hr RHCs during unstable and stable conditions but overpredicts during neutral conditions. <u>AERMOD's performance is erratic. It severely underpredicts the 1-hr RHC during unstable conditions</u>, the stability during which the highest 1-hr RHC occurred at the monitors. AERMOD shows overprediction of the monitors' RHCs during neutral and stable conditions."* Part 4, *" …model validation study used the BOOT Statistical Model Evaluation Software Package….The values of FBFP and FBFN demonstrate a more even distribution between under- and overprediction of 1-hr concentrations by CALPUFF as compared with AERMOD, the predictions of which for a given stability are dominated by underprediction (unstable and neutral) or overprediction (stable). The overprediction by AERMOD in the stable case exceeds a factor of 2 (FB = 0.683). These results suggest that AERMOD may be producing the right overall concentration distribution for the wrong reasons."* Conclusions, *"…AERMOD showed a bias toward underpredicting during unstable and neutral conditions and overpredicting during stable conditions. Although CALPUFF tended to overpredict during unstable conditions, its accuracy in predicting 1-hr concentrations during neutral and stable conditions was excellent…When judged on various comparisons and statistical measures applied in this validation study, the overall performance of CALPUFF at this location was superior to that of AERMOD."*

In essence, AERMOD will overpredict under stable conditions which predominate at night (TAS, ERM, EMM and Northstar all say this), however only TAS also points out that AERMOD underpredicts during unstable conditions, which are only associated with not calm winds and predominate in the daytime. The over and under-predictions balance each other out, which makes AERMOD look good statistically, but "*for the wrong reasons*". This might be acceptable if one is only concerned with annual average impacts for a facility operates 24-hours per day, however, in this case, we only have activity in the daytime, and AERMOD is only associated with underprediction under low-wind conditions, when there is no wind erosion (wind erosion is the only possible cause of dust from the facility outside of working times).

It is relevant to add some further context, and note that AERMOD is a steady state model, and it is a relatively simple model in terms of user operability, and there are good reasons for having such easy to use models. For example, in a performance evaluation of CALPUFF, AERMOD and other dispersion models by Rood, he explains this as follows *"…a compelling reason to use steady-state models for regulatory compliance demonstration is the fact that they are simpler to run, require less user judgment, and are less prone to error than Lagrangian puff models. The CALMET/CALPUFF model simulation in this paper required numerous iterations using different values of RMAX1, RMAX2, and other parameters so that the wind field matched what was expected."*

In other words, better models can be harder to use correctly, which should not be surprising. My analogy is that AERMOD is a bit like a bicycle with training wheels. Whilst training wheels can be of assistance to a beginner on a level even path, careering down a steep hill on a bike with training wheels will generally end in disaster, and a bike without training wheel is the better, safer option. Or in this case, a more reliable model that may be harder to use but that does represent the expected metrological and thus dispersion conditions adequately should have been used (and oddly, was was initially used but then superseded).

This is entirely consistent with my own independent evaluations of the generally poor model performance when predicting dust from sources at ground level.

Conditions

In my opinion the conditions are not adequate for reasons including:

- Not requiring best practice in terms of the <u>design</u> of the facility, for example a layout that eliminates or minimises the crossing of clean and dirty wheel paths, that minimised travel distances and double handling, paving all surfaces, enclosing all activities and sources (not just some parts of them), and (simple normal-practice things like having) a proper wheel-wash.
- Not specifying that monitoring (of dust) be done per the EPA Approved Methods, both upwind and downwind, and not providing real-time third-party access to the data, and some independent oversight.
- Not specifying what weather parameters are to be measured, or where
- Not limiting the activity to that claimed, e.g. peak daily haulage activity should be limited to the assessed 120% of the daily average rate. For example, there is no condition such as:
    - o The daily total input and output quantity hauled over the weighbridge is limits to 385 tonnes per day (Stage 1), 577.5 tonnes per day (Stage 2), and 770 tonnes per day (Stage 3).
    - o Once this daily limit is reach, all hauling activity on the site must cease for the day

- Not specifying exactly what dust parameters are to be measured, and where, or for how long (it should be continuous at all times).
- Not specifying for example, per recent mine approvals that if the monitoring equipment (dust or weather) fails to operate, the facility must cease to operate until the monitoring resumes correct operation.
- Not specifying third-party independent overview of any management plan, monitoring or verification studies etc
- Not specifying that the approved first-stage operations must permanently cease where the limits cannot be met.
- Approve an activity when there is no certainty that compliance is possible (even at Stage 1 half-rates of activity), and as written, the conditions do not provide certainty of verifiable, (by a third-party) compliance being adequately demonstrated per the conditions for Stage 2 or Stage 3 (albeit it would be less uncertain by using site specific data).
- Approve an activity on a relatively heavy industrial scale immediately next to areas where residential dwellings are permitted.
- Approve an activity with impacts beyond its boundary such that it would sterilise the otherwise legitimate residential use of the surrounding area.

Summary

Overall, the air assessment for this facility is not reliable due to significant uncertainties in the meteorological aspects of the modelling, but also underestimations in the emissions from the site, in the background data and other major sources (the quarry), and how the nearby quarry was considered.

All of these factors considered together indicate there could be unacceptable impacts if the proposal is approved.

Also, and more importantly, the inherent design of this facility is far from best practice, which is a key factor why the emissions are underestimated. The facility has the majority of the main dust causing sources located outdoors, or at least sticking outside of "enclosures", a poor layout that result sin in excess travel distances, dirty and clean travel paths that overlap and cross, unnecessary double handling, unsealed travel and material handling areas, excess wind erosion from an excessively large outdoor footprint, etc.

The other key concern is that it is located at the boundary of rural-residential land, where there are numerous, sensitive receptors. The site appears to be inappropriate for this type of activity, but especially when the proposed design is not consistent with best practice, and forgoes more expensive dust controls such as paved surfaces and full enclosure, at the expense of greater impacts on the community. Allowing this design to proceed in such a location gives the proponent an unfair commercial advantage over competitors that are willing to implement best practice controls and sets a poor precedent for the wider area that others would need to follow to stay competitive cost-wise. This can only be incorrect if the additional costs for a best practice design are small, in which case the proponent should implement a best practice design for the facility.

Of particular concern is the receptors sandwiched between the existing quarry and this development. The nearby quarry emissions have been grossly underestimated, a factor of approximately 70-fold underestimation is likely (a level of 0.1µg/m3, relative to an estimated contribution of approximately 7µg/m^3). Nevertheless, given that there is a known receptor between the quarry and this site where there are three asthmatic children, and another receptor where there is an elderly gentlemen residing in the nearest dwelling. It is fair to say that there is a particularly sensitive group of receptors in the vicinity, and they would suffer increased morbidity due to this proposal as it adds elevated dust impacts more frequently, from a range of different wind directions and this gives less respite to the residents.

The conditions of approval do go some way to mitigate the issues, for example numerous specific controls are included, but ultimately the conditions fail because they do not require best practice design for the facility, as would be reasonable in this situation, or at any other industrial/ residential interface. In any case, some of the migration measures specified in the conditions are not achievable due to the poor design of the facility, (e.g. requirements for no silt track on a site without completely paved cleanable roads, where dirty and clean wheel paths are overlapping and crossing and there is no wheel wash, etc.)., which simply highlights the core problem with the design in this location.

The staged development aspects of the conditions, whilst good in concept fail because details of how the monitoring should be done are uncertain, and an independent, robust assessment process is not specified for how to determine if compliance is achieved or not. Having very recently been part of a process to check by measurement whether a coal mine is in compliance as envisioned by the conditions, I note this is an intense and costly exercise to complete objectively and scientifically, taking approximately 18 months and costing more than $500,000.

I thus respectfully submit that conducting an objective and reliable validation assessment of the dust impacts (measured per unspecified methods in unspecified locations) as envisioned by the conditions is not in the league of a facility that has not yet been able to develop and commit to implementing a best practice design in the first place. (or to yet submit a valid air dispersion assessment without unanimously expert agreed uncertainty at its core). Due to this, I have no faith that this aspect of the conditions can be enforced and actioned objectively and reasonably should the proposal be approved.

If the facility is to progress further, I would recommend that the first thing needed is to propose a design and controls that are consistent with best practice, rather than to approve a poor design in the hope that the problems will be resolved somehow. Once a poor design is built, it can be impossible to adequately correct it, and this creates an unnecessary community impact and ongoing conflict. I also consider it necessary to first submit a valid, and accurate air assessment to demonstrate compliance (of the best practice design).

Please feel free to contact me if you would like to clarify any aspect of this letter.

Yours faithfully,
Todoroski Air Sciences