# Comments on the Responses by Tritax Symmetry (Hinckley) Ltd to my Written Representation to the Examining Authority (ExA) regarding the Environmental Statement submitted by Tritax Symmetry (Hinckley) Ltd in respect of their proposed Hinckley National Rail Freight Interchange and with particular reference to Chapter 10: Noise and vibration

Deadline for receipt of Comments to Responses: Tuesday 14th November 2023

Unique Reference Number: 20040614

## Introduction

On the 10th October 2023, I submitted a Written Representation to the Examining Authority regarding the Environmental Statement submitted by Tritax Symmetry (Hinckley) Ltd in respect of their proposed Hinckley National Rail Freight Interchange and with particular reference to Chapter 10: Noise and vibration.

The Responses that Tritax Symmetry (Hinckley) Ltd made to those Interested Parties who had registered as individuals appear to be grouped in the "Applicant's Comments on Written Representations [Part 4 of 4 Residents Businesses]" [REP2-066].

I here make my Comments upon the Responses made by Tritax Symmetry (Hinckley) Ltd.

For reasons of brevity, I have in these Comments used "Tritax" to refer both to the contents of the Applicant's Responses and to the contents of the Applicant's Environmental Statement.

My Written Representation was a technically-based document that identified and discussed several serious failures and shortcomings in Tritax's Noise and vibration report. It ran to 38 pages and comprised 12 main Sections.

In these Comments, I have passed through those same 12 Sections in order, summarising what I said in my Written Representation, and providing additional detail where appropriate to reflect Tritax's Responses and to update on more recent events.

In each of these Sections, I have indicated any Responses that Tritax have made, wherever it appeared that their Response might possibly have been directed to me. For many Sections, there was no Response. For other Sections, despite looking closely, there appears to be no engagement with what I had written.

In my Written Representation I drew particular attention to two separate methodological errors ***that link together to misdirect data and so invalidate much of the remainder of the Noise and vibration report.***

The first such error has the effect of greatly inflating the ambient noise levels at many of the NSRs, by up to 16dB. This was described in Section 1 of my Written Representation and also now in Section 1 of this Comments document.

The second error changes the comparison between the Operational noise levels and the background noise levels at the NSRs so that it is made instead with the ambient noise levels at the NSRs. Owing to the inflation of the ambient noise levels that I have just described, for many of the NSRs these ambient noise levels are in fact over 20dB higher than the background noise levels they replace. This was described in Section 5 of my Written Representation and also now in Section 5 of this Comments document.

So, what is actually happening in Tritax's Noise and vibration report is that what the Operational noise levels are actually being compared with is not the background noise levels at the NSRs, nor even the ambient noise levels at the NSRs, but actually the ambient noise levels measured at the Noise Monitoring Positions close by the sides of the track and roads!

Needless to say, these two grave interconnected errors greatly favour Tritax's Proposed Development. Their rightful removal from the Noise and Vibration report, and the introduction of the increased rating penalties that would inevitably follow, will have the effect of washing away all of the latter part of Tritax's Noise and vibration report and its results.

Neither of the two errors Tritax have made is technically justifiable, and both are in contravention of British Standard BS 4142:2014+A1:2019 "Methods for rating and assessing industrial and commercial sound".

Yet here they lie, still hidden in plain sight in Tritax's Noise and vibration report, seemingly undiscovered by the Examining Authority, Blaby District Council, Hinckley and Bosworth Borough Council, or indeed by anyone else!

This is a game changer, and this Comments document is yet another attempt to have my voice heard.

Dr David Moore

MA (Cantab) PhD

David Moore is a Chartered Engineer, and a Fellow of the Institution of Mechanical Engineers. He has some 25 years experience in Industrial Design Consultancy. Clients have included 3M, Procter & Gamble, GSK, London Underground, Johnson & Johnson, Ricardo, Monsanto, DePuy, AstraZeneca, BAE Systems, Unilever, Reckitt, Sanofi and Alstom. Now retired, his technical interests include Mechanical Design, Mathematical Modelling, Computational Fluid Dynamics and Digital Signal Processing.

## Section 1. Failure to Determine Baseline Conditions

In Section 1 of my Written Representation, which ran to 5½ pages, I described in detail how Tritax had taken the ambient ($L_{Aeq}$) noise levels they recorded at the Noise Monitoring Positions (NMPs) adjacent to the trackside (or roadside), and simply imposed them upon the Noise Sensitive Receptors (NSRs) without applying any attenuation to the ambient noise levels for the train pass bys, even though some of those NSRs are hundreds of metres away from the track (or road).

I explained that this was a flagrant, fundamental and extremely grave failing that rendered very much of the remainder of Tritax's Noise and vibration report invalid, that it contravened every relevant Acoustic Theory, was in breach of every British and International Standard, and also defied common sense. Those same remarks also applied to the maximum noise levels ($L_{Amax,f}$ ).

For reasons of accessibility, in my Written Representation I adopted a descriptive rather than mathematical approach.

In the latter part of Section 1, I also described in detail how Tritax had failed to indicate the distance at which the Noise Monitoring Positions (NMPs) had been placed away from the trackside (or roadside) and that the ambient ($L_{Aeq}$) and maximum ($L_{Amax,f}$ ) noise levels they recorded were dependent upon that distance, and so had no real meaning unless those distances were known. I explained that my observation of the site indicated that NMP4 was placed at no more than 12 metres from the nearside rail of the closest trainline.

Finally, I outlined that once those distances were confirmed, it would be possible to calculate the ***actual*** ambient ($L_{Aeq}$) and maximum ($L_{Amax,f}$) noise levels at the NSRs from the NMP data already available from the Noise and vibration report.

Tritax's sole response to all of this was :

"As set out in Table 10.1 of the ES Noise and vibration chapter, the noise monitoring methodology has been detailed within the technical note NTT2814 –Hinckley Survey Method Statement_Issue_P02 (document reference: 6.2.10.5, APP-184), which has been submitted to and agreed with Blaby District Council and Hinckley and Bosworth Borough Council – in both cases it was agreed by suitably qualified technical officers."

As you will see, Tritax did not engage with any of the points I raised. The Method Statement to which they refer (of which of course I was already aware) is purely a procedural document, that can have no sway upon the ambient ($L_{Aeq}$) and maximum ($L_{Amax,f}$ ) noise levels that NSRs actually experience. Also, Tritax do not indicate that they support the Method Statement, rather, their aim seems to be to pass a measure of responsibility for their Noise and vibration report to Blaby District Council and Hinckley and Bosworth Borough Council.

As Tritax had given no meaningful response, I attempted to raise this matter in the Issue Specific Hearing 3 – Environmental Matters, Agenda Item 5 in respect of Noise and vibration.

I also presented an Oral Submission to the Open Floor Hearing 2 as an Interested Party. This was necessarily very condensed at just 3 minutes long, but describes Tritax's grave error in imposing the ambient ($L_{Aeq}$) noise levels measured at the NMPs directly upon the NSRs, and gives an example of the error of 16 dB that results in the case of three NSRs located at a distance of 430 metres away from the nearside rail. The text is shown below.

I also show on the following pages a sample calculation in accordance with "Calculation of Railway Noise" (CRN) that demonstrates that an attenuation of 16 dB needs to be applied in the case of

these three NSRs at a distance of 430 metres from the nearside rail, exactly as I described in my Oral Submission. I have also included some words of explanation.

# Text of Oral Submission to Open Floor Hearing 2 – Dr David Moore

I am Dr David Moore and I am an Interested Party. I am a Chartered Engineer, and a Fellow of the Institution of Mechanical Engineers.

I submitted a 38-page Written Representation on the 10th October in respect of Tritax's Noise and vibration report. The approach and questions from the Examining Authority I heard yesterday strongly suggest that nobody with an Acoustics background has properly understood either Tritax's report or my Written Representation.

In view of this, I am concentrating here on just one of Tritax's failings, which in itself is grave enough to wash away all of the latter part of Tritax's report and results. The errors I am talking about here are of the order of 15 to 20dB, which is a game changer.

Much of Tritax's report depends upon the values of the existing noise levels at the Noise Sensitive Receptors, or NSRs. There are two key parameters here, called background noise and ambient noise.

Tritax's report first gathers noise data at six Noise Monitoring Positions or NMPs positioned beside the rail track or the road and from which it derives those same two key parameters of background noise and ambient noise. Of course these values are **local** to the track (or road). Let's talk track here.

Tritax then apply both of those values directly to the NSRs. Now, for the background noise, this is an accepted thing to do. But for the ambient noise it is certainly not the accepted thing to do and in fact it is gravely wrong. This is because an attenuation must be applied to reflect that the NSR is further away from the track than the Noise Monitoring Position where the **local** measurement was made.

Three of these NSRs for example are located at approximately 430 metres away from the track, and so an attenuation of 16dB needs to be applied. So the ambient noise attributed by Tritax to those NSRs of 59.2dB should in fact be 43.2dB.

This methodological error percolates down through the remainder of Tritax's report, and in fact would inevitably grow in dB stature because of the effect upon the rating values that are subsequently applied. So, a new Noise report.

I beseech you, in the strongest possible terms, get Tritax's report and my Written Representation in front of somebody with a strong technical Acoustics background.

Now would be best, while there is still time for Tritax and Interested Parties to respond, and the Proposed Development is not yet built.

I have only a 3 minute window, and so have described only one thing.

Thank you.

**Calculation of the Attenuation of the Ambient Sound Level between the Noise Measuring Position NMP4 and a Noise Sensitive Receptor NSR located at 430 metres away from the rail track.**

Ambient Sound Level at NMP4 = 59.2 dB
Residual Sound Level at NMP4 = 42.0 dB

First, subtract the Residual Sound Level at NMP4 from the Ambient Sound Level at NMP4, to arrive at the Specific Train Sound Level at NMP4:

Specific Train Sound Level at NMP4 = $10 \log (10^{5.92} - 10^{4.20}) = 59.116$ dB

Now, in accordance with CRN, apply attenuation corrections to the Specific Train Sound Level at NMP4 to arrive at the Specific Train Sound Level at the NSR located at 430 metres distance from the nearside rail. (Note that Charts 3, 4, 5 and 7 are Charts and Calculation Formulae provided in CRN).

Specific Train Sound Level at NMP4 (carried down from above) = 59.116 dB

*Now subtract the following to apply the necessary attenuations*

Attenuation for Distance (Chart 3) $- 10 \log_{10} (430/12)$ dB = -15.543 dB
d' is 430 metres
NMP4 is at 12 metres

Attenuation for Air Absorption (Chart 4 ) $0.2 - 0.008 \times (430+(25-12))$ dB = -3.344 dB
d' is 430 metres
NMP4 is at 12 metres

Attenuation for Ground Absorption (Chart 5) $-0.6 \times 1.0 \times (6 - 2.3) \log_{10} (430/25)$ dB = - 2.743 dB
d is 430 metres
H is mean height 2.3 metres
I is all soft ground 1.0

Attenuation for slight local Track Curvature – Angle of View (Chart 7) = - 0.164 dB
$\alpha_1$ is 45° $\theta_1$ is 90°
$\alpha_2$ is 62° $\theta_2$ is 57°

Specific Train Sound Level at the NSR located at 430 metres away from the nearside rail = <u>37.322 dB</u>

Finally, add back the Residual Sound Level at the NSR, which is taken to be the Residual Sound Level at NMP4, to arrive at the Ambient Sound Level at the NSR located at 430 metres distance from the nearside rail:

Ambient Sound Level at the NSR = $10 \log_{10} (10^{3.732} + 10^{4.20})$ = <u>43.272 dB</u>

**Compared with the Ambient Sound Level of 59.2 dB at NMP4, the Ambient Sound Level at the NSR located at 430 metres away from the nearside rail is 43.272dB and has therefore been attenuated by 15.928 dB, which I rounded to 16 dB in my Oral Submission.**

In the way of explanation for the above calculation:

For the Ambient Sound Level at NMP4 I used Tritax's own Weekday averaged value.
For the Residual Sound Level at NMP4 I used Tritax's own Weekday Background Sound Level +3dB.
NMP4 is placed at 12 metres from the nearside rail.

At distances over 300 metres, CRN may ***underestimate*** the attenuation over open soft ground, so that the ambient noise level at the NSR of 43.272dB that I arrived at in the calculation may actually be slightly lower still at 41dB or 42dB.

But, in order to allay any possible concerns, I have also calculated, for those same NSRs, the ambient noise level at intermediate distances of 300 metres, 200 metres, 150 metres and 100 metres from the rail track, as shown below. You may see that at 300 metres, the attenuation is almost the same as that indicated at 430 metres.

| Distance from track | Attenuation | Ambient noise level | |
|---|---|---|---|
| 430 metres | 15.9 dB | 43.3dB | |
| 300 metres | 15.0 dB | 44.2dB | |
| 200 metres | 13.5 dB | 45.7dB | |
| 150 metres | 12.3 dB | 46.9dB | |
| 100 metres | 10.5 dB | 48.7dB | |
| **12 metres** | **0.0dB** | **59.2dB** | **Unattenuated!** |

**The ambient noise level of 59.2dB is the ambient noise value measured at NMP4, which is at 12 metres from the trackside. It is this unattenuated ambient noise level that Tritax have imposed upon all of the 11 NSRs associated with NMP4 in their Noise and vibration report. This is wrong.**

The median distance from the rail track of those 11 NSRs associated with NMP4 is 330 metres.

As well as the attenuation in respect of the ambient noise level at NMP4 and its NSRs that I have considered above, broadly similar attenuation of the ambient noise level will also apply in respect of NMP3 and its NSRs on Burbage Common. So the ambient noise levels on Burbage Common have been similarly overestimated.

As I described in my Introduction, the result of Tritax's error here is that the ambient noise levels at the NSRs that are arrived at in Tritax's report are greater, and in many cases very much greater than the ambient noise levels at the NSRs actually are.

As we shall see in Section 5, Tritax then go on to compare the Operational noise levels, not with the background noise levels at the NSRs, but instead with the ambient noise levels at the NSRs.

Because, as we have seen above, no attenuation has been applied to these ambient noise levels, they are actually the ambient noise levels measured at the Noise Monitoring Positions close by the sides of the track and roads! And for many of the NSRs these ambient noise levels are in fact over 20dB higher than the background noise levels they replace!

If you wish to maintain the continuity of this discussion, please move on now to Section 5.

## 2. Failure to Heed Consultation Response Warnings

In Section 2 of my Written Representation, which ran to 1¼ pages, I described how in my Consultation Response of the 7th April 2022 I had warned Tritax that in their PEIR Chapter 10 Noise and vibration report of January 2022 that they had made the gross error that the noise levels measured local to the track were being directly used as the noise levels local to the NSRs without attenuation, and also that they had failed to provide important NMP positioning data.

And that now we find, as I indicated in Section 1 of my Written Representation, that those same failings have been carried over into their Chapter 10 Noise and vibration submission to the Examining Authority. And that they really only have themselves to blame.

Tritax made no response to this.

## 3. Failure to Determine Construction Noise

In Section 3 of my Written Representation, which ran to 3 pages, I described that, in their assessment of Construction Noise, Tritax had investigated two scenarios, which they termed “worst case” and “average case” respectively.

In Tritax’s “average case” scenario, the construction plant is all operating at the approximate centre point of the closest area of construction to each NSR. This gives an “average case” ($L_{Aeq}$) value of 58dB, which is very much smaller than their “worst case” ($L_{Aeq}$) value of 90dB.

This reduction can only have been caused by the noise having been attenuated over a considerable distance, which means in turn that Tritax’s “closest area of construction” must be very large.

Simple calculations I performed indicated that this attenuation of 32 dB between the “worst case” and “average case” is achieved only when the centre point at which the construction plant is operating is 300 metres distant from the NSR. This in turn means that Tritax’s “closest area of construction” must be around 600 metres across, which roughly corresponds to the dimension of whole of the main site.

Tritax’s “average case” scenario is therefore unrepresentative, because it means that no item of construction plant would ever be allowed closer to the NSR than 300 metres.

I then referred to the authoritative ISO-9613-2-1996 “Acoustics – Attenuation of sound during propagation outdoors” - Part 2: General method of calculation, which states that:

“a group of point sources may be described by an equivalent point sound source situated in the middle of the group, in particular if”…….“the distance d from the single equivalent point source to the receiver exceeds twice the largest dimension $H_{max}$ of the *sources* ($d > 2H_{max}$)”

and:

“If the distance d is smaller ($d \leq 2H_{max}$), or if the propagation conditions for the component point sources are different (e.g. due to screening), the total sound source shall be divided into its component point sources.”

In our case, assuming the area is 600 metres square, then the diagonal $H_{max}$ is approximately 850 metres. This means that d, the distance of the NSR from the centre of the site, would need to be in excess of 1.7 kilometres for Tritax’s “average case” calculation to be applicable! For the NSRs that are considered here, d is of course in all cases very much less than 1.7 kilometres, and so the items of plant need to be considered individually.

As a way forwards, I performed simple calculations in accordance with BS5228 Part 1, based upon more realistic “average case” assumptions for the first construction phase, which I described in some detail. The results obtained from this more realistic “average case” noise were in the region of 77 dB to 83 dB.

A further consideration was that this much higher construction noise, as well as dominating the existing noise climate, would have strong tonality, impulsivity, and intermittency characteristics that are entirely out of character with the true existing noise climate.

In the latter part of Section 3 of my Written Representation, I took strong issue with Tritax regarding their extremely selective misrepresentation of BS 5228 Part 1, which in their Noise and vibration report they had used to justify excluding from their Table 10.28 all NSR receptors that lie more than 300 metres away from the site boundary. In fact, BS 5228 makes no mention at all of excluding such receptors. Tritax's decision to remove NSRs from their Table 10.28 is to be deplored as it effectively disenfranchises those residents from the assessment process.

Tritax's response was as follows:

"The ES Noise and vibration chapter (document reference: 6.1.10, APP-119) adopts a standard approach for assessing "average case" and "worst case" construction noise levels. Only one NSR is predicted to have a significant adverse effect during two phases without mitigation.

The worst case assessment shows some much greater noise levels in some phases at some NSRs prior to mitigation. In each case, the actual activity generating the noise levels is likely to be of a short duration and localised. Given that the worst case assessment assumes that stages 1, 2 and 4 could take place within 5m of the DCO limits, in many cases the activity simply will not take place as close as assessed.

Notwithstanding this, the framework CEMP incorporates a range of noise control techniques and strategies to reduce noise, many of which are referenced in "British Standard 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites parts 1: Noise" as effective noise control measures."

As you will see, Tritax did not engage with any of the points I raised. I was of course already aware of the Construction Environmental Master Plan (CEMP), and had made extensive reference to BS5228 in this Section 3 of my Written Representation to them.

## 4. Completed Development Model

In Section 4 of my Written Proposal, which ran to half a page, I described that the CadnaA noise models for the Completed Development were set to G=0.5 (50% acoustically absorptive ground). But that, in contrast, the CadnaA noise model for Off-Site traffic noise was set to G=0.0 in order to, as Tritax explained "reflect the areas of hard standing across the site".

From the "Illustrative Masterplan" it is evident that the Main Site is overwhelmingly acoustically reflective (i.e. G=0.0), and particularly so in the critical area to the North West of Units 7, 8, and 9 that projects noise forwards across the tracks towards the affected NSRs.

This is one of the very few areas of the CadnaA modelling work that is accessible.

Tritax's sole response to this was :

"All noise model inputs, data sources, calculation methodologies, settings and software have been reported on, and noise contour outputs have been provided in the ES (document ref 6.1.10 App - 119).

Evidently, Tritax did not engage with any of the points I raised, and made no reference to correcting their CadnaA model in this critical area.

## 5. Failure to Properly Compare the Completed Development Noise Levels

In Section 5 of my Written Proposal, which ran to 3¼ pages, I described how Tritax compared the predicted Operational noise levels they had obtained from the CadnaA noise models with the prevailing noise climate at the NSRs.

British Standard BS 4142:2014+A1:2019 "Methods for rating and assessing industrial and commercial sound" describes methods for rating and assessing sound of an industrial and/or commercial nature.

In Tables 10.39 to 10.42, Tritax compare their predicted Operational noise levels with the measured background noise levels in accordance with British Standard BS 4142:2014+A1:2019.

But the results, shown in Tables 10.39 to 10.42 are unfavourable to the Proposed Development because High "Magnitudes of Impact" are indicated at many of the NSRs.

***I would state in passing here that I strongly disagree with the rating penalties that Tritax have apportioned in these Tables and consider them to be too low, or far too low, so that the Magnitudes of Impacts would in truth be yet more serious than those shown in their Tables. But because, as we shall see, Tritax quickly forget these results anyway as they move on to other comparisons, I will not pursue this matter any further now, but anticipate that it would arise again in any future Noise and vibration report.***

Faced with this serious problem, Tritax then look around for other things to do, and it is fascinating to see what happens next.

In my Introduction and my Section 1, I have already described that in Tritax's Noise and vibration report the ambient noise levels at the NSRs are greater, and in many cases very much greater, than the ambient noise levels at those NSRs actually are.

And that this is because no attenuation has been applied to these ambient noise levels at the NSRs, to reflect the fact that the NSRs are at a (in some cases very considerable) distance from the NMPs at which those ambient noise levels were actually measured.

As a result, in Tritax's report the ambient noise levels indicated at the NSRs are actually the same ambient noise levels as those measured at the Noise Monitoring Positions close by the sides of the track and roads!

What Tritax now try to do is to compare their predicted Operational noise levels not with the background ($L_{A90}$) noise levels at the NSRs, but instead with their ambient ($L_{Aeq}$) noise levels at the NSRs.

In their sub-sub-Section on Context Tritax try to build a case for doing this in just two short paragraphs 10.173 and 10.174 which I here quote verbatim:

"10.173 The results of the assessment indicate that adverse impacts may be experienced at NSRs during the periods under consideration. However, BS 4142 states that 'the significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound

occurs'. Therefore, the context has been considered below for those receptors that may experience adverse impacts as a result of Operational noise associated with the Proposed Development."

"10.174 BS 4142 goes on to state that 'where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background'."

Tritax then go directly on to switch from the background noise levels to their ambient noise levels in paragraph 10.175:

"10.175 The sound rating levels have been compared to the existing noise climate at each receptor where an adverse impact is predicted, for the daytime and night-time for both the weekday and weekend period."

What Tritax actually mean by the innocently-sounding "existing noise climate" is their ambient ($L_{Aeq}$) noise levels at the NSRs.

***And Tritax's noise problems largely go away!***

It is however very difficult to discern any logical argument in paragraphs 10.173 and 10.174 that leads to or in any way justifies the action Tritax take in paragraph 10.175 of switching from background levels to their ambient levels.

But for the moment, let's take it at face value, and see where it leads.

Taken together, paragraph 10.173 and 10.174 simply suggest that, as well as the ***relative*** levels of the Operational noise and background noise being considered, their ***absolute*** levels might also be considered when those ***absolute*** levels are low.

This immediately poses the question "how low?", but unfortunately BS4142 provides no guidance here.

Much more useful is the BS4142:2014+A1:2019 "Technical Note" published by the Association of Noise Consultants Good Practice Working Group in March 2020. As its authors explain in their introduction, it is "designed to assist readers with a reasonable interpretation and application of BS 4142 as a whole".

Regarding absolute levels, the BS4142 "Technical Note" covers this matter very fully, and for reasons of clarity this is shown below in its entirety:

"The standard states that the absolute level of sound can be of significance, where the residual values are low and where they are high, and should be taken into account when determining the overall impact of a particular specific sound source.

The second paragraph notes that absolute levels may be as, or more, important than relative outcomes where background and rating levels are low. ***It is important to note that both background and rating levels would need to be low for this particular caveat to apply.***

BS 4142 does not indicate how the initial estimate of impact should be adjusted when background and rating levels are low, only that the absolute levels may be more important than the difference

between the two values. It is likely that where the background and rating levels are low, the absolute levels might suggest a more acceptable outcome than would otherwise be suggested by the difference between the values. ***For example a situation might be considered acceptable where a rating level of 30dB is 10dB above a background sound level of 20dB, i.e. an initial estimate of a significant adverse impact is modified by the low rating and background sound levels.***

***BS 4142 does not define 'low' in the context of background sound levels nor rating levels. The note to the Scope of the 1997 version of BS 4142 defined very low background sound levels as being less than about 30 dB $L_{A90}$, and low rating levels as being less than about 35 dB $L_{Ar,Tr}$.***

***The WG suggest that similar values would not be unreasonable in the context of BS 4142, but that the assessor should make a judgement and justify it where appropriate."***

The italics are mine.

Particularly important here is the statement:

"The second paragraph notes that absolute levels may be as, or more, important than relative outcomes where background and rating levels are low. ***It is important to note that both background and rating levels would need to be low for this particular caveat to apply."***

In Tritax's Noise and vibration report, Table 10.39 indicates both the background levels and the rating levels ruling on Weekday daytimes.

With reference to Table 10.39, careful investigation reveals that all of the NSRs listed have either a background level or a rating level of 45dB or more. Compared with the numbers discussed above, these are by no means low values, which means of course that the case that Tritax have tried to make does not apply. Indeed, some of the background levels and rating levels in Table 10.39 are actually quite high, ranging up to 51dB and 67dB respectively.

Additionally, I would mention here that neither BS4142:2014+A1:2019, nor indeed the BS4142:2014+A1:2019 "Technical Note" published by the Association of Noise Consultants Good Practice Working Group in March 2020, from which I have extensively quoted either discusses, considers, nor even mentions the possibility that the background noise levels might be replaced, or even supplemented, by any other parameter whatsoever.

And certainly not by ambient noise levels that are actually the same ambient noise levels that were measured at the Noise Monitoring Positions close by the sides of the track and roads!

As an example of the advantage Tritax have been trying to secure here, it is instructive to compare Tritax's (inflated) ambient noise level with their background noise level at each of the 11 NSRs relating to NMP4. For all of these NSRs, for Weekday daytimes, their (inflated) ambient noise level is 59.2dB, and their background noise level as indicated in Table 10.39 is 39.0dB. This gives Tritax a direct advantage of 20.2dB. If you also take into account the reduction in the rating penalties that would also come about, this advantage is probably around 25dB or more.

What Tritax are attempting to do here is to rewrite the rules as they please without any technical justification. And it is happening in plain sight!

Comparison of the Specific Sound level (which here translates to the Operational noise level) with the background noise level is the cornerstone of BS4142:2014+A1:2019 and is there to protect the public. Tritax's Tables 10.43, 10.44 and 10.45, which compare the Operational noise levels with Tritax's inflated ambient noise levels are all invalid and should be removed from the Noise and vibration report.

Anyone who has lingering doubts about what I have written in Sections 1 and 5 above should consider the effect of Tritax's Proposed Development ***when no trains are passing by. During that great (90%+) majority of time,*** it is inconceivable that the noise environment at the NSRs associated with NMP4 could be characterised by an ambient noise level of 59.2dB. Yet in their Noise and vibration report, it is that value of 59.2dB that Tritax have chosen to compare with the Operational noise from their Proposed Development. Should this Proposed Development be approved, the ramifications for those NSRs and for considerable areas of Burbage Common are therefore not difficult to predict, and will not be long in coming.

***We have now arrived at the key point in the whole of Tritax's Noise and vibration report, and maybe too in the Examining Authority's recommendation on Tritax's Proposed Development.***

***Because what we have here are two interlocking failures that act together to radically change the outcome of Tritax's Noise and vibration report, to Tritax's great advantage.***

***The first is that, as described in Section 1, and without technical justification, Tritax have not applied to the ambient noise levels the necessary attenuation with distance between the NMPs and the NSRs.***

***The second is that, as just described in this Section 5, and again without technical justification, Tritax have moved from background noise levels at the NSRs to their inflated ambient noise levels at the NSRs.***

***So, overall, what the Operational noise levels are actually being compared with is not the background, $L_{A90}$ , levels at the NSRs, nor even the ambient, $L_{Aeq}$ , levels at the NSRs, but actually the ambient, $L_{Aeq}$ , levels measured at the Noise Monitoring Positions NMP1 to NMP6 close by the sides of the track and roads!***

***This is a game changer that will require the rewriting of the whole of Tritax's Noise and Vibration report.***

## 6. Failure to Include all Noise Sources caused by the Proposed Development

In Section 6 of my Written Representation, which ran to 1¼ pages, I described that in Tritax's Noise and vibration report the CadnaA "Completed Development" models were actually incomplete, and that the "Magnitudes of Impact" that were arrived at from these models did therefore not take account of additional noise sources from :

Fixed plant, equipment and break-out noise
Gas-fired combined heat and power plant
Off-Site rail movements
Off-Site road traffic noise impacts

Instead, the first two of these additional noise sources were somehow awarded additional "noise allowances", whilst the second two were considered individually, in a piecemeal fashion, and each was talked away as insignificant, and lost.

The Noise and vibration report therefore provides ***no form of repository where the many noise inputs caused by the Proposed Development are accumulated and assessed.***

I also described that, whilst it is common practice to consider Construction and Operational activities separately, this is justifiable because they usually occur sequentially and the Construction activities are usually of short duration.

But in the Proposed Development, both the Construction and the Operational activities will be underway simultaneously, and for a period of perhaps 10 years. Those affected by the Proposed Development will care nothing for any distinction between Construction and Operational noise, and the two should clearly be considered together in Tritax's Noise and vibration report.

Tritax made no response to this.

## 7. Failure to Determine Baseline Train Operations

In Section 7 of my Written Representation, which ran to 3¼ pages, I demonstrated that Tritax had wildly overstated the number of freight train movements by a factor of between 200 and 250 percent. This is because Tritax have assumed that the daily online timetable provided retrospectively by Realtime Trains describes trains that all ran. Whereas in fact, only a minority of the freight trains that Realtime Trains list daily do actually run. These running trains can easily be identified by the presence of the running time data which Realtime Trains supply only for the running trains, and also by the absence of the "Q" designation, which they apply only to non-running trains.

This means that Tritax's Table 10.49 includes a large number of freight trains that actually do not run. And, on the face of it, it would seem intuitively obvious that this represents the "worst case" situation. But in fact, because of the particular way that Tritax have then chosen to proceed, far from it being the "worse case", it actually represents the "best case" situation because it serves to ***minimise*** Tritax's later calculation of the additional noise from Off-Site rail movements.

This is because it makes the additional freight trains caused by the Proposed Development to be a much smaller ***percentage increase*** than it actually should be. And it is upon that ***percentage increase*** that Tritax have based their additional noise calculations.

For example, for Weekday daytimes, Tritax have indicated the existing number of freight trains to be 41, whereas the actual number is approximately 16. So the percentage increase caused by the 21 additional freight trains visiting the site is actually 131% rather than 51%.

Similarly, for Weekday night-times Tritax have indicated the existing number of freight trains to be 21, whereas the actual number is approximately 8. So the percentage increase caused by the 11 additional freight trains visiting the site is actually 138% rather than 52%.

A further and extremely unfortunate effect of Tritax adopting their inflated number of freight trains is that, in paragraph 10.106 of their Noise and vibration report they use it as evidence that the train noise data that Tritax gathered on Saturday the 24th April at NMP4 is "not considered typical" on the grounds that there were no trains on the rail line during the night-time period between 23.00 and 07.00. Tritax then go on to replace that data with the data they measured on the night of Sunday the 25th April.

In actual fact, proper examination of Realtime Trains data for Saturday nights reveals that it is entirely typical that no trains run on a Saturday night-time. The last train on Saturday typically passes Elmesthorpe at almost exactly 23.00 on the Saturday night, and there are typically no more trains until after 07.00 on the Sunday morning.

So what Tritax have done here is to replace a condition on the Saturday night, where no trains are running, with another on the Sunday night where at least some trains are running from about 04.00 on the Monday morning. Doing this has applied an inappropriate skew to the data that Tritax use to establish the noise levels at the local NSRs. And it has removed from Tritax's Noise and vibration report all evidence that NSRs, and indeed all those residents in both directions along those several kilometres of line, enjoy undisturbed Saturday nights.

In the latter part of Section 7, I also explained that the Class 66 diesel-engined Freight Trains each generate a noise contribution, $L_{Aeq}$ , that is much higher (+10.3dB) than the Turbostar Class 170 Passenger trains, which means that 11 Turbostar Passenger trains are required to generate the same noise contribution as a single Freight train. Also, the maximum sound level, $L_{Amax,f}$ , of the Freight trains is also correspondingly higher. So the major factor in play here is the number of Freight trains, rather than the number of Passenger trains.

Tritax's response to this was :

"Paragraph 10.207 of the ES Noise and vibration (document reference 6.1.10, APP-119) chapter states that the assumed existing train movements have been confirmed by the project Rail Consultant"

and:

"Paragraphs 10.106 to 10.108 of the ES Noise and vibration chapter (document reference 6.1.10, APP-109) fully discusses the noise survey results and consider whether the Saturday night measured noise data at NMP4 is considered representative of weekend night-time conditions"

As you will understand, Tritax did not engage with any of the points I had raised.

I was of course already aware of the contents of paragraph 10.207 of the Noise and vibration report and indeed, it was exactly this same paragraph 10.207 that I put to Tritax at the start of Section 7 of my Written Representation.

And I was of course already aware of the contents of paragraphs 10.106 to 10.108 of the Noise and vibration report, and had referred directly to 10.106 and its following paragraphs in Section 7 of my Written Representation.

Overall, then, Tritax simply repeated what they had already written in the Noise and vibration report. A less appropriate response from Tritax is difficult to imagine.

## 8. Failure to Determine Noise from Off-Site rail movements

In Section 8 of my Written Representation, which ran to 1½ pages, I demonstrated that Tritax had underestimated the additional noise from Off-Site rail movements. This was in large part because, as I described in Section 7, Tritax had failed to properly determine the Baseline Train conditions.

This meant that Tritax had seriously underestimated the percentage increase in the number of freight train movements that would be caused by their Proposed Development, and it largely is this percentage increase that determines the increase in noise from Off-Site rail movements.

I also explained that Passenger trains produce much less noise, and so are less important.

The result of all this is that, with reference to Tritax's Figure 10.50, the Change (increase) in rail traffic noise levels for (Weekday) daytimes, which Tritax gave as +1.6dB, should in fact be +3.2dB. And for (Weekday) night-times, which Tritax gave as +1.8dB, should in fact be +3.8dB.

Moreover, Tritax failed to consider the increase in the rail traffic noise levels at Weekends, both daytime and night-time, which are much higher again than those I have indicated above. The exact levels depend slightly upon the assumptions made in the CRN calculations, but are around 5.1dB for Weekend daytimes and 10.0dB for Weekend night-times.

These increases will of course not apply just to the short length of line local to the HNRFI main site, but will also apply to the extensive lengths of line running towards Hinckley and Leicester.

For those NSRs local to the HNRFI main site, and including Burbage Common, additional factors will also apply, including the installation of sets of railway points that need to be negotiated at speed by through rail traffic, diesel freight locomotives accelerating on Full Power condition as they leave the site and accelerate slowly up to full speed, and the introduction of the very extensive acoustic barriers that will reflect the Off-Site rail noise towards the local affected NSRs.

CRN specifies that an additional +1.5dB penalty should be applied for such reflective barriers. This alone would bring up the increase in noise from Off-Site rail movements that I have described above to 4.7dB, 5.3dB, 6.6dB and 11.5dB respectively.

Tritax offered no response to the above points that I had raised.

Finally, I would like to make the point here that these Off-Site rail noise figures are not included into any sort of total accumulating pot of additional noise inputs that will result from the Proposed Development. In Tritax's Noise and vibration report, no such total pot exists. Instead, along with several other noise inputs, such as road noise, they are kept separate, are considered piecemeal, and have been individually rejected as insignificant, and lost.

This practice is unsound.

## 9. Failure to Define study area

In Section 9 of my Written Representation, which ran to half a page, I related that, as described in paragraph 10.12 of Tritax's Noise and vibration report, for Off-Site rail movements, an initial assessment was undertaken for a notional receptor, 25 metres away from the line, in accordance with "Calculation of Railway Noise" (CRN). And where that initial assessment identified an effect of moderate adverse and above, then the study area would be extended to include Stoney Stanton to the northeast and the outskirts of Hinckley to the southwest.

As it had been established in Sections 7 and 8 of my Written Representation that Tritax had failed properly to determine both the Baseline Train operations and the noise from Off-Site rail movements, it appeared very likely that Tritax's definition of the study area was wrong, and should be investigated.

Tritax offered no response to the above points that I raised.

## 10. Failure to Consider Context

In Section 10 of my Written Proposal, which ran to 2 pages, I described that, except for the possible exception of two paragraphs, Tritax did not consider ***Context*** at all.

I explained that, given the industrial composition and the size of their Proposed Development, compared with the peaceful and secluded nature of the site and its surroundings, this was a grave omission.

So, with reference to HM Government's website Noise and vibration management: environmental permits - GOV.UK , I proceeded to write a suitable ***Context*** Section for Tritax's Noise and vibration report.

The content of that ***Context*** Section was telling.

***However, what was even more telling, was that Tritax left it out.***

Tritax made no response to this.

## 11. Failure to Consider Uncertainty

In Section 11 of my Written Proposal, which ran to 1¼ pages, I described that British Standard BS 4142:2014+A1:2019 "Methods for rating and assessing industrial and commercial sound" includes information on Uncertainty and its application to acoustics.

It states that "The extent to which uncertainty is considered should be proportionate to the scale and nature of the assessment. In situations that are marginal, the level of uncertainty is likely to be more important than situations that are clear."

Tritax's Noise and vibration report mentions uncertainty in only one paragraph, and does not address uncertainty in any meaningful way. And this in Tritax's Noise and vibration report for a Nationally Significant Infrastructure Project.

With regard to the Proposed Development, the Noise and vibration report has been largely based upon the site layout indicated in the ES Figure 3.1 "Illustrative Masterplan" [APP-230], but the actual specification of buildings, equipment and plant has of necessity been assumed, as too have the construction plant and activities.

As a result of the above, and the varying and interactive nature of the noise components from many sources, it is inevitable that Tritax's predicted noise levels will all be subject to a broad statistical Standard Deviation about the nominal values that Tritax have arrived at in their report.

In the latter Sections of their report in particular, Tritax examine in considerable detail nuanced variations in dB levels. Given that no attention has been given to uncertainty, these are unlikely to be meaningful.

Tritax made no response to this.

## 12. Discussion and Conclusions

In Section 12 of my Written Proposal, which ran to ¾ page, I described that critical formative sections of the Noise and vibration report contain fundamental and significant methodological errors that have the effect of invalidating much of the remainder of the report.

And it turns out that all of those errors that I identified would favour the Proposed Development.

Particular attention was drawn to two separate methodological errors that, ***by linking together to misdirect data***, had the effect of invalidating much of the remainder of the report.

In comparison with other similar reports available online that I have studied, this present report stood out as lacking openness, objectivity and professional rigour. Its contents appeared to be selective and to follow its own agenda.

If the present procedures for Nationally Significant Infrastructure Projects are not to be undermined, then Applicants have a duty to provide information to the Examining Authority that is fair, objective, rigorous and correct.

I wrote that in its present form, Tritax's Noise and vibration report did not offer appropriate guidance to the Examining Authority in their assessment of Tritax's Proposed Development.

Tritax made no response to this.

Dr David Moore