

Submission ID: [REDACTED]

This combined Deadline 7 submission from Stop Lime Down contains:
Post Hearing Submission
and
Comments on Deadline 6 and 6B Submissions.



LIME DOWN SOLAR PROJECT

DEADLINE 7 SUBMISSIONS STOP LIME DOWN

October 2026





TABLE OF CONTENTS

Contents

1. Introduction	3
2. Post Hearing Submissions.....	4
3. Comments on Deadline 6 and 6B Submissions	75
4. Conclusion.....	103
5. Appendixes.....	104



1. Introduction

1.1.1. This document and the attached papers comprise Stop Lime Down's (**SLD('s)**) Deadline 7 submission. This document will address:

- Post hearing submissions, including responses to Action Points (**AP(s)**);
- Comments on any submissions received at Deadline 6 and Deadline 6B;

1.1.2. This written submission uses the document reference for the tracked version of documents where multiple versions of the document exist in the Examination Library.

1.1.3. SLD's expert has reviewed the RIES and has no comments, and thus that document is not addressed here.

1.1.4. This submission has not been produced with the use of AI.

1.1.5. The following appendices are attached to this submission:

Appendix	Title
A	Site Selection Report, Marrons
B	Effect of Traffic Noise on Horses at Pasture

2. Post Hearing Submissions

2.1. ISH5: matters relating to landscape and visual impact, cultural heritage, and hydrology, flood risk and drainage

Item 2.1.1 Cotswolds National Landscape - Tranquillity

2.1.1. [REDACTED] stated that the ISEP Guidelines require that traffic data be passed on to Landscape experts for impact to be assessed. The ISEP Guidelines, in Section 4 '*Links to other assessments*' state, '*Changes to the type or volume of traffic may give rise to effects on views and/or landscape character (particularly where there is an increase in larger vehicles). The perception of tranquillity which is a characteristic of some landscapes, may be affected by increased vehicle numbers, movement and noise, and the increased presence of lights at night may affect characteristically dark landscapes. These are less likely to give rise to significant effects than physical changes to the road network, but may require assessment, such as in areas within or close to nationally designated landscapes. In order to understand the assessment, the competent landscape expert will not need detailed traffic data, but will require a clear description, readily understood by the non-expert reader, of what the changes to the traffic would include (for example types of vehicles, frequency, duration, traffic volume)*' (para. 4.38).

2.1.2. The Applicant characterised the passage of HGVs as 'fleeting' as well as being temporary. This would suggest that any number of 'fleeting' HGV movements would be acceptable in a tranquil landscape.

2.1.3. [REDACTED] referred to paragraph 3.12 of the ISEP guidelines, which provides (emphasis supplied):

'A critical feature of an environmental assessment is determining whether a given effect is significant. Having quantified the magnitude of the impact (i.e. the level of change), there are various ways of interpreting whether or not the resulting outcome is considered significant. There is no definition of a

'significant effect' in the EIA Regulations. Furthermore, for many effects, there are no simple rules or formulae that define appropriate assessment thresholds and therefore there is a need for interpretation and judgement on the part of the competent traffic and movement expert, backed up by data or quantified information wherever possible. Such judgements will include the assessment of the numbers of people experiencing an impact and the sensitivity of those people, as well as the assessment of the damage to various natural and cultural resources. The competent traffic and movement expert will need to make it clear how they have defined whether a change (and the resultant effect) is considered significant or not.

The Department for Transport has historically set out a range of indicators for determining the significance of severance. Changes in traffic flow of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' changes in severance respectively. Although these thresholds no longer appear in Department for Transport guidance, they have not been superseded by subsequent changes to guidance and are established through planning case law. However, caution needs to be observed when applying these thresholds as very low baseline flows are unlikely to experience severance impacts even with high percentage changes in traffic.'

2.1.4. [REDACTED] then summarised the percentage increases in traffic movements and HGV movement within the CNL. They are set out below:

Scenario	Baseline total vehicles	Baseline HGV movements	Lime Down total vehicles	Lime Down HGVs (% increase)	Notes
Applicant's original calculations	2,868	66	268 (+9.1%)	50 (+76%)	Excludes cable route traffic
Applicant's revised	2,868	66	334 (+11.6%)	70 (+106%)	Includes cable route



Stop Lime Down Deadline 7

calculations					
SLD calculations	2,868	66	351 (+12.2%)	87 (+132%)	Includes cable route

Notes: The baseline HGV movements are those surveyed (and factored up to the assessment year of 2028) on the B4039 east of Acton Turville. Existing HGV movements further east on the B4039 but still within the CNL (east of Burton) are lower (49 per day). The percentage impact of construction HGVs is therefore higher in this location than shown above.

The figures shown in the above table relate to the period when work is ongoing at Lime Down A, B and C. Overlap occurs for 2 months according to the current estimated timescales. Lime Down A and B generate construction movements for the first nine months of the construction period. Based on the Applicant's revised trip generation, this leads to the generation of 45 daily HGVs on the B4039, an increase of 68%. Lime Down C that is due to be constructed over 17 months, generates 38 daily HGVs on the B4039, an increase of 58%. These figures make allowance for the ongoing construction of the cable route.

The Applicant's latest figures suggest that during the two-year construction period the level of increase in HGVs on the B3049 through the CNL will vary between 58% and 106%.

2.1.5. [REDACTED] noted that the ISEP guidelines provide the appropriate context in which to consider the Applicant's assessment, given the assessed increase in the levels of HGVs experienced in the CNL over 100%. [REDACTED] noted that the percentage increase was significantly above the 10% threshold for the sensitive receptors, well beyond the 30% threshold for people to notice the change – and well beyond the 60% and 90% thresholds which are used for considering the levels of magnitude.

2.1.6. A change in vehicle flows of 10% or more is greater than normal day to day variations and a change of 30% or more is generally perceived by someone in the area. The changes that are being predicted are far in excess of these

thresholds and will therefore be perceived as real and significant changes. Every passage of an HGV is 'fleeting' but repeated passages constitute something more than a passing perception.

2.1.7. [REDACTED] disputed [REDACTED] suggestion that because HGVs are a 'fleeting' experience and would be encountered infrequently as users experience the landscape, the impacts were of a lower level of magnitude than that asserted by SLD. [REDACTED] expressed the concern that the Applicant's transport expert (obliged to assess impacts on people, natural and cultural resources (ISEP, para. 3.12 – see above)) was overlooking transport impacts and passing the responsibility to the landscape expert and the landscape expert was correspondingly dismissing any potential impact as 'fleeting'. The potential for adverse impacts on tranquillity is therefore being overlooked.

2.1.8. Post-hearing: The Applicant states in the Transport Chapter **[REP4-015]** that both the B4039 and the B4040 are 'already well used by HGVs' (paras. 13.7.23 and 13.7.25). The Applicant cannot, therefore, also sustain an argument that the substantial increases in daily HGV flows through the CNL are the result of low baseline HGV flows.

2.1.9. From the discussions, [REDACTED] understands that the highways works required to facilitate construction access for HGVs and AILs are likely to involve road widening / new passing bays, and the removal of sections of existing grass verges, hedgerows, and mature hedgerow trees, including along the sections of the construction route that run through the CNL.

2.1.10. If that is the case, the concern is that the landscape and visual (and ecological) effects arising from these and associated works have not been assessed.

2.1.11. SLD would be grateful for clarification as to:

- Whether the 'improvements' would remain for the duration of the operation including decommissioning. If not, would the 'improved' areas be returned to the baseline condition once the construction works are over? If so, would the 'improved' areas be returned to the baseline condition at the end of the decommissioning phase?
- Whether the Applicant will assess these effects prior to the close of the Examination, and if so, whether SLD will have the opportunity to comment on the submissions.

Item 2.1.2 Cotswolds National Landscape – Wildflower Meadow

2.1.12. SLD has no further comment under this item.

Item 2.2: Sequential Visual Assessment

2.1.13. [REDACTED] submitted that the Applicant has not properly assessed cumulative effects by focussing solely on nearby solar developments. Rather, the correct approach would be to look at projects which share features. GLVIA3 para. 7.34 explains that *"At one viewpoint someone looking at the view in one direction may see all the projects at the same time, or someone turning through the whole 360 degrees may see different developments in different directions and sectors of the view in succession. Users of linear routes, especially footpaths or other rights of way, or transport routes, may potentially see the different developments revealed in succession as a series of sequential views. Both types of experience need to be considered where they are relevant"*.

2.1.14. Thus, people may not see multiple solar / similar forms of developments in one view, but would experience them sequentially as they travelled along the route.

- 2.1.15. SLD is concerned that the assessment [REP6-062] has not included all the identified cumulative development sites (i.e. extending beyond renewable energy developments) which would be industrialising / urbanising in nature. If development other than that identified would / could be visible from the assessed sequential visual routes, the predicted levels of adverse effects are likely to be higher than the assessment has assumed.
- 2.1.16. Other cumulative development sites on the Applicant's shortlist [APP-073] which SLD suggests should have been considered include CD Sites 3 (45 dwellings), 5 (GP surgery and associated development), 58 (71 dwellings), and 357 (warehouse development). Applying paras 7.9 - 7.12 of GLVIA3, these are developments which share some characteristics with the proposal, and those CD Sites should be considered in cumulative assessment.
- 2.1.17. In addition, the Applicant has not assessed the cumulative / sequential effects of glint and glare. This is a concerning omission. Under certain light conditions, solar panels appear dark grey. Although much depends on the colour palette of the landscape context within which panels are viewed, generally, in long-distance views, dark grey is relatively well integrated. However, when glint or glare are experienced, the eye is drawn to the source of the light, and the effect is noticeable and discordant.
- 2.1.18. SLD Three Routes Between Villages: The Applicant assessed cumulative sequential visual effects on three routes between villages identified / shown on maps in SLD's Deadline 4 post-hearing submissions [REP4-132]. [REDACTED] has no comments to make on this part of the assessment.
- 2.1.19. In respect of SLD Route 1, [REDACTED] agrees that cumulative sequential visual effects along SLD Route 1 would not be 'significant' adverse, but that is on the assumption that all the current screening afforded by existing vegetation would remain for the duration of the operation, which is unlikely to be the case; without all of the screening vegetation, the level of effect could increase from the

LVIA's Minor, to Moderate Adverse, and thus could potentially be 'significant', if assessed on a reasonable worst-case basis.

ISH5 Action Points 3 and 4: Sequential Visual Assessment

2.1.20. By Action Point 3, Wiltshire Council and SLD are asked to *"provide specific details of where sensitivity and/ or magnitude of change has been downplayed in the sequential visual assessment and the implications that this would have on the conclusions on the assessment"*.

2.1.21. Action Point 4 following ISH5 asks the Applicant to *"respond to the detailed comments [REDACTED] (SLD) made on the sequential visual assessment of the route named SLD Route 2 in the Additional Sequential Visual Assessments [REP6-062]."* In order to assist the Applicant, SLD provided the Applicant a note of its comments on the sequential visual assessment on 25 September 2026. SLD will consider the Applicant's response for Deadline 7 at Deadline 8, and address any remaining issues in its closing submissions if appropriate.

2.1.22. The sequential visual assessment reports the levels of visual receptor sensitivity as assessed for the relevant transport routes in the LVIA. Sections 5.2 and 10 of SLD's LVIR [REP1-170] explains why, in [REDACTED] opinion, the LVIA underestimates levels of visual receptor sensitivity (in GLVIA3, levels of visual sensitivity are based on the combination of levels of visual susceptibility, and visual value), and the implications. In summary:

- The LVIA states that the level of visual receptor susceptibility is dependent upon the specific change being proposed. However, GLVIA3 explains that visual susceptibility is **not** related to change, it is specifically about *"the occupation or activity of people experiencing the view at particular locations"*, and *"the extent to which their attention or interest may therefore be focused on the views"*. Therefore, someone who goes for a walk with the main purpose of enjoying the visual / other experiences along the way is of High visual

susceptibility, regardless of whether the landscape they are travelling through / seeing along the route is of Low or High visual value.

- In terms of levels of visual value, the LVIA does factor in the presence of the National Landscape. However, as previously explained, the LVIA uses a four-point scale for levels of value, susceptibility and sensitivity, with a Very Low category but not Very High. Therefore, Moderate is not in the middle where it should be, so the results are skewed. The problem with the four-point scale is illustrated where the LVIA confers a High level of value not just to the CNL but to parts of its setting, whereas designated landscapes should normally be of higher value than the setting (ie Very High on a balanced five-point scale), unless there are factors within the setting that raise the level (none were identified in the LVIA).
- Also, the sequential visual assessment does not consider value in terms of heritage / historic landscape character. GLVIA3 para. 6.5 explains that *“interrelationships with the cultural heritage topic area need to be borne in mind when developing the visual baseline and identifying visual effects. Specialist input from cultural heritage professionals is likely to be required to interpret the range of relevant cultural heritage studies that may help to identify important viewpoints”*.

2.1.23. Having regard to Route 2, the Additional Sequential Visual Assessment [REP6-062] at para. 1.1.10 states that *“there is one CD Site associated with SLD Route 2”* ie CD Site 243. However, SLD Route 2 passes c. 600m east of CD Site 221 – possibly the site mentioned in para. 1.1.12: *“There is one CD Sites to the south of the M4 motorway”* (location shown on Drg. No. P4443_LPR_ZZ_XX_DR_Z_EXA_390 in Appendix A of the report). It appears that this site has not been included in the Applicant’s Route 2 assessment.

2.1.24. [REDACTED] has requested clarification from the Applicant. If not included, the assessment should be revised accordingly, as the presence of this development could result in an increase in the levels of adverse cumulative

sequential visual effects. If it is included, the assessment should clarify what if any effect it has.

2.1.25. Effects on Route 2 Sections 2 1 – 2: This section runs through the CNL from Sherston to Foxley Road, which delineates the CNL boundary. Para. 5.1.19 states that “*There is no visibility of the Lime Down Scheme from this section of the route*”. However, the Applicant’s ‘augmented’ ZTV plans in [APP-098], which include screening from existing vegetation, show intervisibility between this section of the route and Lime Down A (which is likely to still be the case with the removal of infrastructure from the southern part of Lime Down A1), and also, intervisibility with the rest of the Lime Down sites (B, C, D and E). However, due to the distances of the identified CD sites from this section of the route, it is unlikely that any would be visible with the naked eye.

2.1.26. Effects on Route 2 Sections 2 – 3: [REDACTED] agrees that effects on receptors using this part of the route, which runs through Lime Down A and to the Fosse Way, would be significant adverse for the duration of the operation. However, levels of adverse effects may be higher than assumed, as the ‘augmented’ ZTV plans also show the potential for intervisibility with the rest of the Lime Down sites, which the assessment does not factor in. Due to the distances of the identified CD sites from this section of the route, it is unlikely that any would be visible with the naked eye.

2.1.27. Effects on Route Section 3 – 4: This section runs between the Fosse Way and the railway line, through Lime Down C.

2.1.28. [REDACTED] does not agree with the conclusion in para. 5.1.27, which states that in terms of Lime Down C, “*There will be no adverse effects on this section of the route*”, and notes that this is contradicted in para. 5.1.37 which states that “*Moderate/ Minor Adverse effects [were] recorded in in Section 3-4*”. Also, the ‘augmented’ ZTV plans show the potential for intervisibility with the rest of the Lime Down sites, which the assessment does not factor in: as a result,



Stop Lime Down Deadline 7

levels of adverse effects may be higher than assumed. Due to the distances of the identified CD sites from this section of the route, it is unlikely that any would be visible with the naked eye.

2.1.29. Effects on Route 2 Sections 4 – 5: This section runs between the railway line and the M4, the northern part crossing Lime Down C.

2.1.30. Para. 5.1.30 concludes that due to the visibility of Lime Down C “There would be Moderate/Minor Adverse effects during construction and Year 1 reducing to Minor Neutral and No Effect at Year 1 and Decommissioning (as assessed for Receptor TR166)”. However, this assumes that all of the current screening afforded by existing vegetation would remain for the duration of the operation, which is unlikely to be the case; without the screening vegetation, the level of adverse effect would increase.

2.1.31. Also, the ‘augmented’ ZTV plans show the potential for intervisibility with the rest of the Lime Down sites, which the assessment does not factor in: levels of adverse effects may be higher than assumed.

2.1.32. The assessment does not note whether the existing solar development adjacent to the southern edge of Lime Down C would be visible from the route. Nor does it include the potential for views of CD Site 221, which lies c. 600m west of the southern end of the route (see above). Nor does it state whether CD Site 243 which lies c. 1.2km to the south east of the southern end of this section would be visible, or theoretically visible in the absence of existing screening vegetation. [REDACTED] considers that the assessment should be clear one way or another so that its conclusions can properly be understood.

2.1.33. Effects on Route 2 Sections 5 – 6: This section of the route runs between the M4 and Chippenham.

2.1.34. The assessment does consider the visibility of CD Site 243, which is in close proximity to this part of the route. Para. 5.1.34 concludes that “*given the limited appreciation of DC [sic] Site 243 combined with the distance between it and the Lime Down Scheme, there are no sequential visual effects on this section of the route*”. [REDACTED] agrees that currently at least, CD Site 243 is relatively well screened (although it may not be in future), and that due to distance, it is unlikely that CD 243 and the Lime Down complex would be intervisible along this section of the sequential route. However, the assessment does not note whether CD Site 221, and the existing solar development lying c. 1.5km west of the route, would be visible. As explained above, the assessment should be clear on this issue.

2.1.35. In summary, in [REDACTED] opinion, the levels of magnitude of visual change would be higher than stated in the sequential visual assessment at Route 2 for the following reasons:

- The assessment does not consider views of CD Site 221, nor CD Site 243 from SLD Route 2 Section 4 – 5, nor does it appear to consider views of the existing solar developments.
- The assessment does not acknowledge that the Applicant’s ‘augmented’ ZTV plans, which factor in existing vegetation, show intervisibility between all the Lime Down sites and sections of SLD Route 2.
- In addition, the ‘augmented’ ZTV plans demonstrate that there is intervisibility between Lime Down E, CD Site 243, and Section 4 – 6 of SLD Route 2.
- The assessment reports low levels of magnitudes of visual change, or no change, along certain sections of SLD Route 2 due to the presence of mature vegetation which currently screens or filters views of the Lime Down and the identified cumulative development sites. The Applicant does not agree with SLD that a reasonable worst-case scenario is to assume that a) a certain proportion of the existing off-site screening vegetation would be lost during the 60-year operational period; and b) a certain proportion of the proposed on-site screening vegetation may not establish successfully, or may be lost

once established (the reasons for such losses are set out in Section 7.5 of SLD's LVIR).

Item 3.1: Badminton Airfield

2.1.36. Firstly, SLD reiterated its four specific concerns in respect of Badminton Airfield, as expressed in SLD's appendix G to its Written Representation [**REP1-178**].

2.1.37. Secondly, [REDACTED] expressed his concern that sensitivity to glint and glare is only being assessed by reference to user numbers. SLD's main concern is how the Applicant quantifies and qualifies whether there is an unacceptable effect or not for glint and glare. The Applicant's approach is apparently based on the frequency of use of a receptor, as opposed to the (among other things) severity of risk the vulnerability of the receptor. Badminton Airfield is a clear example of this. [REDACTED] also referred to sensitivity of roads as a further example (which is explored below in more detail); the Applicant appears to be suggesting that where a road is a single track local road (even where there are no painted lines) glint and glare is somehow less of an issue. The issue is around the severity of an event if it occurs, and the vulnerability of the receptors on the road. The other point about the severity of the road usage – the Applicant has made no qualifying statement about what is considered busy and what is not. Many of these minor roads have the same level of speed restrictions as more major ones. Given their nature, these roads ultimately have a range of users using them, and provide a higher potential for head on collision due to their shape and speed.

2.1.38. Pilots at Badminton Airfield, in particular, rely on visual cues in the landscape to position them self around the airport and known where to land. Generally, the Applicant has understated the sensitivity of Badminton Airfield. Connectedly, the definition of operationally accommodatable has not been fleshed out with the users of the airfield – that is where the focus needs to be. It is surprising that the Applicant considers that it can conclude that the risk of glint

and glare is “operationally accommodatable” without having spoken to the operators of the Airfield.

2.1.39. [REDACTED] made one further final point, noting that there has not been a quantification of the yellow glare at Badminton Airfield. If a view is going to be taken as to what is accommodatable, the number of minutes of yellow glare should be provided to the operator: is it hundreds of minutes of yellow glare or thousands? The operator’s consultation must be informed by qualitative/quantitative prediction.

2.1.40. In the absence of a response from the operator of Badminton Airfield, the ExA should adopt a precautionary approach and conclude that, in the absence of information, there is likely to be a significant adverse effect at Badminton Airfield as a consequence of the scheme.

Item 2.3.2 – Road and Rail Receptors

2.1.41. The Applicant was asked to identify which other solar DCO projects have used the Pager Power guidance to support a similar approach to assessing impacts on road and rail receptors. The Applicant began to provide a long list of DCOs where the Pager Power guidance had been relied upon. SLD accepts that the guidance is commonly used, however (and as noted by [REDACTED] for the ExA) there remains no formally adopted guidance on glint and glare in the UK. The fact that the Pager Power Guidance has not been challenged does not mean that its approach must be reliable. This is a field which will be subject to continual professional development.

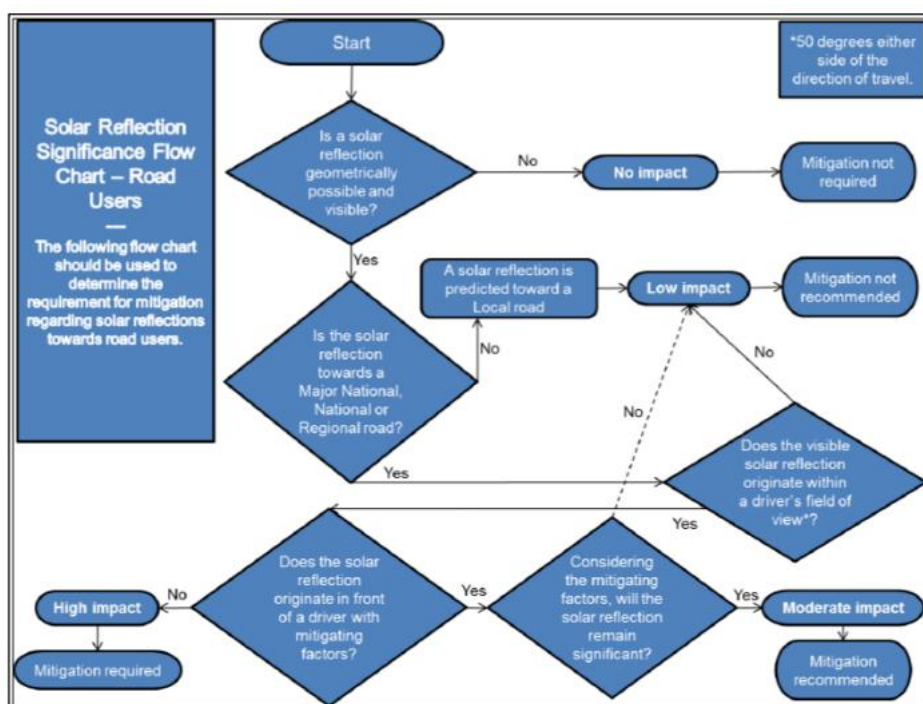
2.1.42. [REDACTED] emphasised that in the circumstances of this DCO, real issues have been raised with the Pager Power guidance and in reaching its recommendation, the ExA will need to look at the matter afresh. While SLD acknowledge the general principle that like cases should be decided alike (see for example, *North Wiltshire DC v Secretary of State for the Environment* (1993)

65 P&CR 137 (CA)), the relevant authorities are clear that any decision-maker must exercise their own judgment and is free to disagree with an earlier view, provided they give reasons (*R (King's Cross Railway Land Group) v Camden LBC* [2007] EWHC 1515). As observed in *St Albans City and District Council v Secretary of State for Communities and Local Government* [2015] EWHC 665 (Admin) (at [26]):

“Having regard to “the importance of consistency” (per Mann LJ) will often involve deciding how much weight to give to an earlier relevant decision. Where a decision-maker accepts that its earlier decision involved a very careful evaluation of the merits of an application, *a fortiori* after thorough testing, it may well decide *as a matter of judgment* that it should not come to a different evaluation, for example on visual impact, without having “weighty” or “very weighty” grounds for doing so. A judgment of that nature would be a perfectly permissible outcome when applying the consistency principle.”

2.1.43. In the present circumstances, the facts of this case are necessarily not the same as any other solar DCO. Thus, the weight that should be given to previous applications of the Pager Power guidance must be appropriately caveated anyway. However, in any event, SLD and [REDACTED] have raised genuine challenges with the Pager Power guidance, which the ExA is now seized of as an issue. The issues raised by SLD require determination and a decision by the Secretary of State.

2.1.44. One of the central issues is the approach to sensitivity of receptors. There are only snippets of the Pager Power guidance provided in the assessment. This is evident in the flow chart presented at page 113 of **[APP-261]**:



Road receptor impact significance flow chart

2.1.45. The full Pager Power guidance has not been made available by the Applicant (and it includes a confidentiality clause on internal p.3). However, it has been published in other DCOs (see the Rosefield Solar Farm DCO (EN010158) [REP5-046] at Annex C). The ES Glint and Glare Study here [APP-261] notes that “technical modelling is not recommended for local roads, where traffic densities are likely to be relatively low, under Pager Power’s Glint and Glare Guidance.” It explains that “any solar reflections from the Scheme that are experienced by a road user along a local road would be considered low impact in the worst case in accordance with the guidance presented in Annex D, due to the relative traffic densities and potential impacts.” In effect, applying the guidance means that any roads which are neither Major National, National, or Regional roads will not require any mitigation.

2.1.46. A key example is the Fosse Way. Adopting the approach of the guidelines, the Fosse Way was not assessed as it was treated as a local road. As a result, the guidance directed that mitigation was not required no matter the outcome of an assessment of glint and glare, and as a result there was no

assessment undertaken. This approach appears to be justified on the basis of user count of local roads. In SLD's view, this conflates an aspect of susceptibility with sensitivity; however, susceptibility is merely one factor taken into account when assessing sensitivity. The reasonable worst case for a car on a minor road is a car crash. Low numbers of users and high severity does not give rise a low sensitivity. In EIA terms, the Applicant's approach is essentially eliding sensitivity with an aspect of susceptibility. It fails to consider the severity of the outcome and therefore the importance of the receptor, and the lack of capacity to accommodate the change.

2.1.47. In effect, Pager Power's guidance as applied here says that there is, for local roads, low sensitivity and therefore necessarily a low level of effect. SLD considers that these roads should be at least moderate level sensitivity when low user numbers is taken into account alongside the severity and importance of the receptor and effects, and the lack of capacity to accommodate change are taken into account.

2.1.48. Post-hearing: [REDACTED] underscores the submissions already made in SLD's Relevant Representation [REP1-168] and Section 11 of the LVIR [REP1-170], where concerns are expressed about the GGS method in respect of assessing effects on landscape and views. In particular, whilst the GGS considers effects on certain aspects of safety, and residential amenity, it does not consider effects on the visual and social / recreational amenity of people using both roads and PRowS.

2.1.49. Furthermore, Ref. O-05 of Table 2-15 in the Applicant's response to Relevant Representations, [REP1-117] states that embedded mitigation measures include "*the use of fixed-tilt panels at a maximum height of 2.5 metres where required*" (as opposed to the proposed 4.5m high panels). However, it is not clear how this measure has been taken into account when assessing the reasonable worst case. Clarification of this point would be helpful.



Stop Lime Down Deadline 7

2.1.50. Additionally, the Applicant has also not clarified whether the GGS accounted for equestrians' higher eye-level (request at para. 11.19 of the LVIR).

Action Point 8

2.1.51. Action Point 8 requested SLD *"to provide specific details of the road and rail receptors that SLD consider should be allocated a different sensitivity and whether this would result in a different effect to that determined by the applicant."* Generally, an underlying issue across the receptors is that sensitivity should relate to the consequences of visual distraction for the task being undertaken and thus the importance/value of the receptor. SLD's previous submissions made the point that intensity, duration, frequency, timing, workload and the potential consequence of missing an operational cue all need to be considered. A generic methodology or receptor label should not replace that assessment.

2.1.52. Road 1 / Fosse Way: [REDACTED] considers that describing it simply as a "local road" is not, in itself, a sufficient basis for assigning a lower sensitivity. The issue is not simply the road classification, but the nature and duration of the predicted visual effect, and the risk that drivers will be unable to safely maintain the visual task. The Applicant's assessment of sensitivity does not properly consider the risk to the road users, both drivers and any non-motorised users. As a consequence, [REDACTED] considers that the sensitivity of the receptor is 'Medium', having regard to the susceptibility of drivers and the corresponding risk of injury. Likewise, [REDACTED] considers that 47,246 minutes of yellow glare gives rise to a 'Medium' magnitude of effect on the receptor. Ultimately, this gives rise to a 'Moderate' significant effect, having regard to the Applicant's EIA assessment methodology.

2.1.53. Road 2 / Bradfield Cottages: SLD's assessment identified approximately 47,503 minutes of yellow glare per annum, almost entirely associated with D1-2. This is comparable with the overall exposure identified at Road 1 and likewise gives rise to a 'Medium' magnitude of effect. Likewise, [REDACTED] is

therefore reluctant to accept a low sensitivity conclusion simply because the road is local, or because mitigation is assumed to make the effect readily manageable. As above, [REDACTED] considers Road 2 to be a 'Medium' sensitivity receptor, ultimately giving rise to a 'Moderate' significant effect.

2.1.54. Railway: Forge Solar assessment identified approximately 26,868 minutes of yellow glare per annum at Rail 2 and 11,834 minutes at Rail 3. In [REDACTED] view, this gives rise to a 'Medium' and 'Low' magnitude of effect respectively. He also considers the sensitivity of a railway to be 'High.' A train driver is clearly a safety-critical receptor. The operational task involves continuous observation of signals, track conditions and other cues. Sensitivity should not be reduced simply because glare is outside a narrowly defined primary field of view or because mitigation is proposed. The worst-case scenario in respect of a railway is a crash, potentially harming many people. As a result, [REDACTED] identifies a 'Major/Moderate' significant effect in relation to Rail 2 and a 'Moderate' significant effect in relation to Rail 3.

2.1.55. A summary of the significant effects is presented in the following table:

Receptor	Sensitivity	Magnitude of impact	Significance of Effect
Road 1/Fosse Way	Medium	Medium	Moderate
Road 2 / Bradfield Cottages	Medium	Medium	Moderate
Rail 2	High	Medium	Major/Moderate
Rail 3	High	Low	Moderate

2.1.56. Separately, [REDACTED] also notes in respect of Bradfield Cottages that the Applicant has assessed the effect rather than screening the receptor out but appears to rely heavily on the assumption that mitigation will satisfactorily address the effect. SLD considers that the sensitivity of the receptor and the unmitigated effect need to be established first. The effectiveness of



mitigation should then be demonstrated rather than used to reduce the underlying receptor sensitivity. This point is echoed in Section 11 of [REDACTED] LVIR [REP1-170].

Action Point 9

2.1.57. Action Point 9 requests the Applicant to provide “a side-by-side comparison of the Pager Power and Forge Solar modelling results demonstrating that both models lead to similar results.”

2.1.58. SLD will consider what the Applicant provides and address the comparison in its closing submissions if necessary. A general statement that Pager Power and Forge Solar give “similar” results is not sufficient. The side-by-side comparison should demonstrate that the same array geometry, panel characteristics, tracking/backtracking assumptions and receptor locations have been used and should show the resulting glare occurrence, intensity and duration. Even if the modelling outputs agree, that only validates the prediction of the reflection. It does not validate the subsequent judgement that the effect is acceptable or that a particular receptor has low sensitivity; that subsequent judgment is not an output of the simple act of modelling reflections.

2.1.59. Table 9 in Appendix G of SLD’s Written Representation [REP1-178], [REDACTED] conducted just such a comparison between the Forge Solar modelling and Pager Power modelling, as excerpted below (p. 14):

Assessment Aspect	Straten CSL / ForgeSolar (110SLD001-2)	Pager Power (EN010168/APP/6.3)
ForgeSolar data published?	Yes — full annual and monthly minutes per array per receptor	No — intensity category only (Green/Yellow)
Quantitative glare durations provided?	Yes — to nearest minute, all arrays and receptors	No — qualitative descriptors only
Monthly breakdown provided?	Yes — twelve-month distribution for all arrays	No
Cumulative multi-array totals calculated?	Yes — cumulative receptor totals across all arrays	No — arrays appear to be assessed individually
Impact scale thresholds defined quantitatively?	N/A — this report presents raw data for independent assessment	No — Annex D provides qualitative categories only
Aviation impact designation for Badminton circuits	Yellow glare confirmed; cumulative duration confirmed by ForgeSolar data	“Low impact” — basis not independently verifiable
Road receptor yellow glare disclosed?	Yes — Road 1: 47,246 min/yr; Road 2: 47,503 min/yr yellow	Partial — some mitigation claimed; raw figures not published
Rail receptor yellow glare disclosed?	Yes — Rail 2: 26,868 min/yr yellow; Rail 3: 11,834 min/yr yellow	Some mitigation committed; raw data not reproduced
Overall evidential basis	Evidence-based: raw ForgeSolar radiometric outputs	Opinion-based: proprietary framework without published quantitative thresholds

Table 9: Comparative Assessment — Straten CSL vs Pager Power

Item 3.1: Designated Heritage Assets

2.1.60. [REDACTED] agreed with Wiltshire Council that there would be no harm to the Rodborne Conservation Area as the Applicant has confirmed that there would be no substantive works to the access. Likewise, [REDACTED] agreed that there would be no harm to the setting of Grittleton House but that that is subject to the agreement of appropriate socioeconomic safeguards to avoid indirect effects.

2.1.61. SLD clarified that in relation to the archaeological remains in association with the Fosse Way, SLD still maintains its position. However, following clarification in respect of the Pillow Mound in the Deadline 6 response (regarding the HDD to the west of the Pillow Mound southwest of Surrendell Farm (NHLE: 1018610)), SLD's concerns have fallen away. In relation to asset D2401, [REDACTED] explained that the concerns also fell away. Outside of those three points, SLD confirmed that those heritage assets identified within the SoCG

accurately reflected those assets which SLD continues to experience significant adverse effects.

- 2.1.62. SLD confirmed that there was ongoing discussion in respect of the Fosse Way, Bradfield Manor and Norton but it was unlikely that there would be agreement reached.

Item 3.2.1: Archaeological Mitigation Geophysical Surveys

- 2.1.63. There was no further comment from SLD on item 3.2.1.

Item 3.2.2: Archaeological Mitigation Strategy

- 2.1.64. There was no further comment from SLD on item 3.2.2.

Item 4.1: Assessment of flood risk and drainage – impact of PV panels on run-off

- 2.1.65. Item 4.1 concerned SLD's submission at Deadline 5, Appendix D, ("Modelling enhanced runoff from solar panels at Lime Down Farm") [REP5-130] and section 2.3 (Hydrology), [REP6-081], and explored the conclusions of the study in relation to (i) runoff from the varied soil types present in the panel areas; (ii) the impact of large tracker panels and their orientation on surface water runoff; (iii) the proposed use and maintenance of vegetation underneath the panels to mitigate runoff; (iv) potential off-site flood risk. Appendix D in [REP5-130] used the PV-SMaRT Model from the University of Minnesota to investigate these issues. The model is the only generally-available model of runoff from solar panel areas which has been validated against data, and has been utilised for this purpose in 25 countries and 40 US states. As far as is known, this is the first UK application.

- 2.1.66. Runoff from different soil types: The PV-SMaRT Model assesses whether the various soil types present in the solar panel areas are likely to be

able to absorb the concentrated runoff from the panels, and under what conditions. It showed that one soil type was able to do so, but the other four soil types generated excess runoff even from quite modest rainfall events. Some of these soil types also have high susceptibility to compaction and are difficult to remediate, which would increase the risk of runoff still further.

2.1.67. Impact of large tracker panels and their orientation: The model also showed that use of the large tracking panels increased runoff relative to more conventionally-sized panels. There is little experience of the use of these panels in the UK, and none in an area as wet as Lime Down. The tracking panels also have to be oriented north-south, irrespective of the local slope. Solar panels are conventionally installed along the slope contours, which allows unpanelled areas between the rows to absorb excess runoff as it moves downslope. If both the ground slope and the panels are both north-south oriented or close to it, the drip points on the panels become aligned downslope leading the ground to become progressively wetter in a narrow-channelled area, which carries a risk of excess runoff and soil erosion. The PV-SMaRT modelling showed that these effects could be very significant.

2.1.68. Proposed planting and maintenance of vegetation: As explored at the hearing and in evidence, SLD considers that the current proposed controls which impact surface water runoff are not sufficient. The Applicant's case that runoff from the panelled areas will not be enhanced rests entirely on the assumption that planting and maintenance of a grass sward underneath and between the panels will be sufficient to mitigate it. The PV-SMaRT modelling showed, on the contrary, that although planting a grass sward would mitigate runoff relative to bare ground, on the sensitive soil types it would not be enough to eliminate it altogether. Different types of grass sward had different effectiveness, but none were adequate in eliminating runoff from common rainfall events on the sensitive soil types. The reasonable worst-case scenario for this Scheme should take into account climate change and the likelihood of more extreme events, both droughts

and floods. In those circumstances, the level of vegetation cover is likely to be heavily impacted.

2.1.69. Additionally, Professor Skeffington discussed the flood risk during the construction phase and immediately post-commissioning. The oLEMP [REP6-038] acknowledges that “*diverse grassland can take time to develop on previously arable land which has been fertilised and ploughed*” (para 1.3.95) and that “*poor vegetation establishment can reduce infiltration capacity on affected soils and lead to increases in runoff if left unmanaged*” (para 1.3.96). However, the only proposed monitoring of the grassland to be established provides (paras 1.3.100 and 1.3.102):

“An inspection will be undertaken in early August in the first year following seeding of grassland at the relevant Solar PV Sites. The inspection will be undertaken by the operating company. Should the proportion of bare ground be greater than 20%, sowing with an appropriate grassland seed mix should be undertaken or repeated in these areas, depending on the initial methodology for grassland creation. Reseeding in August is likely to be particularly appropriate where the months of May, June and July have been very dry.

Monitoring visits, as set out in Section 1.4, will identify any areas of bare ground exceeding 20% cover, which will be re-seeded as required.”

2.1.70. The ExA queried what would happen if the Applicant finished developing a site in January, but no remediation was proposed until August. The Applicant’s approach means that there is no proposed management for the increased flood risk from the panels after the panels have been constructed, but the grassy sward is yet to establish. In those circumstances, even on the Applicant’s case, there will be no controls for the increased surface water runoff risk arising from the panels. Even the development of a successful sward would take time during which flood risk would be increased.

2.1.71. [REDACTED] agreed that this remains a risk in the Applicant's approach. Connectedly, he noted that maintaining grassland in the stressed environment under the panels will be challenging and even more so under changing climate conditions. However, per section 1.4, ecological monitoring is only provided for within the first five years of the scheme. In [REDACTED] view, this raises serious concerns in respect of the climate resilience of the scheme.

2.1.72. SLD considers that, if this scheme is consented, regular monitoring will be necessary. In response to that monitoring, the management plans should provide for adaptive management. [REDACTED] considers that there may be a need for engineered mitigation such as SuDS features to deal with the excess runoff and this should be allowed for in the management plans. Merely managing the habitat beneath of the panels is unlikely to be effective.

2.1.73. Increase in off-site flood risk. [REDACTED] commented that if the Applicant considers that it can maintain the greenfield runoff rate from the panelled areas, notwithstanding the increased surface water runoff risk from the panels, the Applicant should demonstrate in a quantitative assessment that that is correct. If it is unable to do so, then off-site flood risk will inevitably increase.

2.1.74. For the avoidance of doubt, SLD does consider that panel runoff gives rise to a fundamental concern which needs to be addressed at application stage and cannot be deferred to a future verification framework. NPS EN-1 is clear that in order to pass the Exception Test, the Applicant must demonstrate *inter alia*, "that the project will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere..." (paragraph 5.8.11). Additionally, paragraph 5.8.12 states that "development should be designed to ensure there is no increase in flood risk elsewhere, accounting for predicted impacts of climate change throughout the lifetime of the development."

2.1.75. SLD notes that following ISH5, the Applicant was invited in Action Point 11 to provide its comment on SLD's submission at Deadline 5, Appendix D, "Modelling enhanced runoff from solar panels at Lime Down Farm") [**REP5-130**] and section 2.3 (Hydrology), **REP6-081**. SLD will consider this response in its closing submissions at Deadline 8. Presently, the only evidence available to the ExA in respect of the likelihood of panel run-off and the increased surface water flood risk is presented within the evidence of SLD and [REDACTED].

4.2 Assessment of Flood Risk and Drainage – Lime Down D

2.1.76. [REDACTED] discussed the Applicant's hydrological model for the Gauze Brook. Professor Skeffington's detailed comments are set out in [**REP6-081**] at paragraphs 2.3.4-2.3.10. In brief, and as acknowledged at the hearing, SLD acknowledges that the Rodbourne river gauge is designed primarily for monitoring low flows (and is likely of lower accuracy than a full-range gauge), the fact that outcomes are so different when using this gauge as compared to the information relied upon by the Applicant from "donor" sites (from very different parts of the country) is significant. As noted at Deadline 6, according to the Applicant's model, the 30-year return period flood peak (i.e. the peak which would be expected to occur approximately once in 30 years) was exceeded 25 times at the Gauze Brook and the Rodbourne Brook in the last 30 years. Notwithstanding the problems of flow gauge calibration, this suggests that the Applicant's modelling is seriously underestimating the likely flood peaks. The fact that the modelled flood extent for the 1% AEP + 39% climate change event in [**REP5-096**] is smaller than the observed flood extent during Storm Bert (an approximately 1% AEP event) in [**REP5-176**] whereas it ought to be larger, lends credibility to this view.

2.1.77. [REDACTED] agrees with the Environment Agency's comments at the hearing: the gauges on the Gauze Brook and the Rodbourne Brook assist in placing the modelled flows in the context of the site and should not be discounted.

2.1.78. [REDACTED] does not dispute the assessments undertaken in the Applicant's Natural Flood Management Viability Report, save that Professor Skeffington is astounded that the modelled 1% AEP event did not cause the Gauze Brook banks to be overtopped according to the model. It is acknowledged that for a flood of this magnitude, natural flood management is not going to make much of a difference to flooding in Corston. It is asking a lot of natural flood management to deal with a 1% AEP event unless there is a huge flood plain which can be utilised, which is absent in this case. However, it would have been helpful for the Applicant to have provided an assessment for more frequent but less severe events.

2.1.79. [REDACTED] had no further comments in respect of the potential effects of sewage flow discharges into the Gauze Brook. SLD hopes that Wessex Water will provide a further comment at Deadline 7.

2.1.80. [REDACTED] has no comment in relation to the functional floodplain of Lime Down D or the watercourse between fields D22 and D1.

4.3 Assessment of Flood Risk and Drainage – Lime Down C

2.1.81. [REDACTED] had no further comment to make in respect of Lime Down C, save that SLD shared the concerns of Wiltshire Council and the Environment Agency. [REDACTED] also made the submission that the need to site a substation with a floodplain was a consequence of the Applicant's flawed approach to site selection.

In respect of Farleaze Farm, [REDACTED] noted that this is an area where it is predicted that some of the excess runoff from panels will occur. The Farm is located upstream from the Norton Brook, which will convey the enhanced runoff rapidly downstream. SLD understand that [REDACTED] has submitted his comments to the ExA. With SLD's assistance, [REDACTED] -

█ comments have been passed to the Applicant in advance of Deadline 7.

4.4 Impact Management – Hydrological Verification Framework

2.1.82. SLD had no further comment to make under this item. Generally, SLD agreed that it would be beneficial to have a clear framework for Wiltshire Council to ensure that hydrology issues are properly addressed post-consent. SLD acknowledges that the Applicant's Mitigation Route Map is useful in this respect.

4.5 Integration of Sustainable Drainage Systems (SUDS) and Landscape

2.1.83. SLD had no further comment to make under this item.

4.6 Water Quality – Water Framework Directive

2.1.84. In relation to the effects of heat on sensitive groundwater receptors, Professor Skeffington noted that the deeper you build the cables the hotter they will run. The default approach is to bury the cables at 910 mm (3ft) with depths of 1.2 m or 1.5 m used in more sensitive areas. █ notes that the applicant proposes to use XLPE high voltage cables – which are different from the vast majority of existing National Grid high voltage cables. These are mostly filled with a cooling fluid which is pumped along the cable to heat exchangers which transfer the heat to the atmosphere. XDPE cables avoid this fluid, which is an environmental advantage in the Lime Down area where a fluid leak could occur in one of the extensive groundwater source protection zones. However, the inevitable downside is that heat will have to be dispersed along the length of the cable. This will increase groundwater heating but also increase heat transfer to the surface relative to the fluid-filled cables. The area above the cable will dry out sooner in a developing drought, and will affect agricultural operations more frequently. There are few precedents to guide assessment of these effects, but quantitative modelling should be possible if the cable characteristics are known.

█ acknowledged that the Applicant is balancing two

environmental effects – lack of fluid is an advantage, but more heat is a disadvantage.

4.7 Horizontal Directional Drilling (HDD) Position Between Wiltshire Council and the Applicant

2.1.85. SLD had no further comment under this item.

2.2.ISH6: matters relating to environmental matters, including traffic and transport

Item 2: Construction HGV numbers

2.2.1. As noted by [REDACTED] on behalf of the ExA, at the beginning of this examination, the Applicant told the ExA that 588,988 modules was the likely reasonable worst-case requirement for the development, with such a figure being relied upon for the development of the transport assessment and the EIA. [REDACTED], on behalf of SLD (and alongside Wiltshire Council) have consistently raised concerns that the number of HGVs have been underestimated. The Applicant, in response, has suggested that high cube containers will mean that the Applicant will never need to go above 1,200 HGV deliveries. As the ExA is aware, the new figure for the number of modules is 842,500 modules in 1,200 HGV deliveries. In the first instance, SLD considers that the change in calculation indicates a failure by the Applicant to estimate the reasonable worst-case scenario and an underestimation of HGV figures from the outset. It appears that the Applicant's revised estimate of panel numbers (842,500) merely constitutes the original estimate of the number of HGV deliveries (1,170) multiplied by the number of panels in a high cube container (720). This approach does not provide confidence that the current estimate of panel numbers is reliable.

2.2.2. In response to [REDACTED] question, the Applicant explained that its original figures for HGV numbers were based upon an exercise carried out with its contractor. There has been an evolving calculation and since the DCO application

was submitted, new forms of panel array layouts have come onto the market, which means that the highest number which could be conceived of utilising that technology has increased. Following oral submissions from the Council and SLD, SLD still remain confused whether the Applicant originally assessed a layout which was not a reasonable worst case for the scheme, and consider this should be clearly explained given the considerable changes in the figures and also the time and expense that has been expended by all parties on this issue.

2.2.3. [REDACTED] agreed that it would be helpful to see the information which was provided by the contractors for the purpose of reviewing the Applicant's calculations. [REDACTED] indicated that he was willing to sign an NDA for the purpose of reviewing that information. At the time of writing, [REDACTED] has received some data but this is partial and further clarification has been sought. Once [REDACTED] has properly examined the data he will be able to confirm whether or not he is satisfied with the Applicant's assumptions about numbers of solar panels and mounting structures per vehicle.

2.2.4. There was also discussion of the ratio of the panelled area for the calculation of the panels. [REDACTED] explained that using the Applicant's new figure of 385.3 ha area, assuming it is covered with panels, with a 4.5 metre panel area and a 2.5 gap between panels (the dimensions the Applicant has provided), and a single panel area of 2.7 metres squared, he has calculated the number of panels that could fit in that space. His calculation of the reasonable worst case then gives rise to 917,381 panels.

2.2.5. There was further discussion of the ratio of HGV to solar array areas, as discussed in SLD's previous submission. Additionally, note that following Action Point 2, the Applicant will recalculate and submit the numbers in Table 2-1 in [REP5-107] (ratio of HGV's to solar array areas) with the Lime Down waste HGV numbers removed from the calculations and revisit the Work No. 1 panel planting areas cited for Green Hill, Cottam, and West Burton. SLD will review this table

when it is provided and provide further comment in its closing submissions as appropriate.

2.2.6. Connectedly, the Applicant has agreed to add the BESS Units and the BESS PCU units HGV numbers to the total HGV numbers in [REP5-107]. At the hearing, [REDACTED] noted that the Applicant had omitted HGVs associated with BESS units and BESS Power Conversion Units from the totals used in the Applicant's spreadsheet.

2.2.7. Wiltshire Council also suggested at the hearing that it is not reasonable to assume that all panel deliveries would be made using high cube containers and there should be an assumption of a mix of container types. [REDACTED] agrees with this view. SLD notes that, per Action Point 4, paragraph 6.17 of the oCTMP will be updated with an *"explicit requirement to use high cube contains if the number of modules in the final scheme layout is calculated to exceed 600,000, to avoid exceeding 1,200 HGV deliveries."* Given the concerns raised by the Council and SLD, SLD consider that this needs to be a clear and strict requirement otherwise the reasonable worst case will remain exceeding the 1,200 deliveries (and in such circumstances the proposal must be assessed on that basis).

2.2.8. Further details of the aspects of HGV trip generation where [REDACTED] does not agree with the Applicant are set out in Annex A of SLD's Deadline 6 submission [AS-28].

2.2.9. [REDACTED] also pointed out that to assume that compound aggregate could be re-used to construct access tracks is not reasonable since compounds and access tracks within an area will need to be constructed and operational at the same time.

Item 3: Construction HGV flows on key routes



Stop Lime Down Deadline 7

2.2.10. Daily HGV flows on route network: The key points in respect of a comparison between the Applicant's and SLD's calculations were the following:

- Both approaches lead to increases in daily HGVs on the route through the CNL of over 100%;
- The increase on the Fosse Way is predicted to be 265% by the Applicant and 351% by SLD;
- The construction periods for Lime Down A and B overlap with Lime Down C for 2 months. However, for the whole of the construction period, the daily increase on the Fosse Way would be in excess of 100% (152% with just Lime Down C and 199% with just Lime Down A and B);
- The increase in daily HGVs on Bradfield Cottages is predicted to be 54 per day (+113%) by the Applicant and 60 per day (+125%) by SLD. The timescale for this level of impact is for the vast majority of the construction period.

2.2.11. There was discussion of the AADT numbers provided by the Applicant in Table 3-4. Per Action Point 6, the Applicant has agreed to revisit and revise column 2 numbers in Tables 3-4 and 3-5 of **[REP5-107]** to include the originally assessed average day movement numbers, rather than the peak day HGV movements (in line with Table 13-12 of REP6-014).

2.2.12. [REDACTED] also discussed the flow diagrams prepared and commented upon the impacts from an EIA perspective. Action Point 7, which requests for an updated table of the final HGV numbers and percentages for daily flows on key links, has been addressed further below. The following is a summary of the comments made at ISH6.

2.2.13. In respect of Acton Turville, [REDACTED] noted that there is a primary school in the village. If a user crosses the road, they will experience the difficulty of seeing to the north if they are going east to west (near the Tormarton Road). Increases in HGVs and traffic flows at that location will have an impact in terms

of severance and highway safety. Medium sensitivity in the settlement, with moderate to major adverse effect (which is significant).

2.2.14. In respect of Burton, [REDACTED] observed that the road gets quite narrow, there are sections where pedestrians need to walk in the carriageway because there are no footways. There are also dwellings that open straight onto the back of the footways. Increases in traffic there and the HGVs will affect people in Burton adversely. Medium level of sensitivity, with moderate to major adverse effect (which is significant).

2.2.15. [REDACTED] noted that even if the works on Lime Down A and B were stripped out, moderate and major impacts would be experienced at Acton Turville and Burton for almost the whole of the construction period. [REDACTED] noted that the Applicant had argued that in certain cases the level of construction traffic should be understood in terms of low background flows on the B4040 and B4039, and that those roads carry significant HGV flows already. However, the level of HGV increase in this area remains significant.

2.2.16. In respect of Alderton Road and the Fosse Way, [REDACTED] noted that the impacts would be greater because there are lower background flows. When you look at the actual number of HGVs and frequency they will be likely to meet – these are not rare occurrences. In terms of sensitivity – there are high levels of cyclists and regular equestrian use, and the road is constrained in its width. This leads [REDACTED] to conclude that the road is 'High' sensitivity. [REDACTED] concluded that these routes will experience a major adverse effect on a highly sensitive link for a two-year period (which is significant).

2.2.17. [REDACTED] discussed the A429, and agreed he had no concerns there from the point of access to Lime Down D (east) or E. In Hullavington there is an impact of 49%. [REDACTED] has concerns because of the narrowness of the carriageway towards the village, alongside steep embankments with no verges.

There is evidence of vehicle wheels cutting into the verge and embankment on either side and sections with very limited forward visibility.

2.2.18. In respect of Sherston, 59% increase. [REDACTED] acknowledged that this is a less sensitive link, but that the width is still less than 5.5 metres in places. The number of HGVs and the duration was also less. Although there will be times when HGVs are meeting where they will likely be forced to mount the verge, [REDACTED] had less concern in EIA terms than he did on the Fosse Way and Alderton Road. [REDACTED] noted however that there is still an impact. It is sensitive because cyclists use the link and there are equestrians, as well as a stud nearby. [REDACTED] concluded a moderate adverse effect (which is significant).

2.2.19. Post-hearing, [REDACTED] would add the following points following from the meeting which was undertaken between [REDACTED], [REDACTED] and [REDACTED] on 10 September 2026, in respect of Sherston:

- There is a 180m section of the road north of the Ladyswood Stud access where the road is less than 5.5m in width where forward visibility is restricted by a bend where HGVs could meet and be forced to mount the kerb;
- There is a 300m section of the road south of the farm access south of the Lime Down A access where the width of the road is less than 5.5m and bends in the road restrict forward visibility. HGVs meeting on this section of road would be forced to mount the verge although there are sections where the carriageway is bounded by a low but steep embankment that would make it difficult to leave the carriageway;
- The level of HGV use (19 HGV movements per day), the timescale (9 months) and the simpler access arrangements (one site access only) reduce the severity of impact (in terms of HGVs passing) along this stretch of road compared with Bradfield Cottages;
- [REDACTED] view is that mitigation should have been considered at the outset for this section of road in terms of localised widening in key locations dictated by visibility requirements.

2.2.20. At Bradfield Cottages, there is a very sensitive part of the network, a sharp bend and a very narrow carriageway. There is also an area where there are pedestrians, cyclists and there are limited opportunities for HGVs to pass each other and cars. [REDACTED] explained that he considered this to be an area of major impact and very concerned that the Applicant is proposing no physical measures to mitigate the impact on vulnerable highway users or facilitate the passing of large vehicles safely, or avoid issues with vehicles having to stop suddenly or pull up onto verges. [REDACTED] concludes major adverse effect, and notes that the duration of impact is expected to be for the whole of the construction period. There will be a long period of impact on a highly sensitive part of the network.

Action Point 7

2.2.21. Action Point 7 requests that Stop Lime Down produce “*an updated (and slightly revised) version of Table 5 included in SLD’s [REP1-172] using the parties’ final HGV numbers and percentages for daily flows on the key links at peak, adding extra columns for the average daily flows and peak and average hourly flows.*”

2.2.22. [REDACTED] has been in correspondence with the Applicant seeking further information in respect of deliveries in order to calculate final HGV numbers and percentages. While the Applicant has provided some data, the information provided is not complete. [REDACTED] is unable to update the table until the Applicant provides this missing information.

2.2.23. SLD apologises that it is unable to provide an up-to-date timetable for Deadline 7. Once the information is shared, [REDACTED] will endeavour to update the table as soon as possible. SLD would invite the ExA to accept the updated table as late evidence.

Item 4: Construction route highway improvement works

2.2.24. [REDACTED] first raised concerns in respect of the Applicant's topographical surveys of Bradfield Cottages. At the site visit, [REDACTED] clarified that the Applicant's measurements of road widths were based on the furthest extent of existing tyre tracks. [REDACTED] does not agree that the method that the Applicant has used to assess the width of roads is appropriate. Measurements are taken to the edge of gravel areas or over-run verge where there is evidence of vehicle currently leaving the main carriageway. In places verges are steeply sloping and debris is being dislodged by vehicle wheels. To rely on areas of loose, sloping, soft and unstable verge and embankment is not a reasonable basis on which to assess 'available carriageway width'. [REDACTED] remains concerned that the Applicant has over-estimated the length of sections of road where HGVs can safely pass.

1.1.2. [REDACTED] identified two areas where the Applicant's measurements were not correct: at the sharp bend south of the railway the stated width would take the vehicle onto the verge and on the inside of the bend there is a stone wall almost immediately adjacent to the carriageway with no verge. The Applicant identifies a width of 6.24m at this point (Drawing PL305B) whereas it was measured on site as 5.9m. Also, as an individual goes north-east from the bend the Applicant suggests that the road is at least 5.5m in width for some distance whereas measurements on site identify width consistently below 5.5m.

2.2.25. With regard to the discussion of HGVs negotiating the tight bend on Bradfield Cottages south of the railway bridge, [REDACTED] reported that during the site visit [REDACTED] had suggested that traffic management (signals) could be used to prevent vehicles meeting on the blind bend. [REDACTED] pointed out that the width of the road to the south of the bend is less than 5.5m to a point just to the north of The Street junction so any signals would need to be separated by a significant distance. This would lead to long delays that could encourage other drivers to avoid the route and use other less suitable routes along narrow lanes.

2.2.26. [REDACTED] stated that if the verge around the outside of the bend were to be used to widen the road, this would increase the conflict with pedestrians emerging from the public right of way immediately south of the bend. At the hearing, the ExA asked the Applicant whether temporary closure of the right of way had been considered. [REDACTED] notes post-hearing that this could lead to pedestrians walking further along the narrow section of Bradfield Cottages south of the bend.

2.2.27. Post-hearing, [REDACTED] notes further points arising out of the 10 September 2026 site visit, which may be summarised as follows:

- For HGVs to pass in the areas marked as at least 5.5m in width, one or both vehicles would, in most cases, need to drive with wheels cutting into verges and embankments. This presents risks because of the reduced vehicle control when wheels are not on hard carriageway surface and because further damage to verges and embankments will dislodge loose material and rocks and spread this across the carriageway;
- Wider areas (6.0m and above) are measured at access points and side roads. This means that vehicles would need to use the section of the access closest to the road and potentially conflict with vehicles emerging from the accesses and side roads;
- There is a section of Bradfield Cottages north of the Flying Monk where forward visibility is restricted by a bend and the road is less than 5.5m in width. There are no passing opportunities and HGVs would need to reverse if they meet on this section;
- Larger HGVs seeking to use the concrete pad south of the Flying Monk would need to mount and over-run kerbs and verge in order to use the space. There is already evidence of damage to the kerbs on the southern side of the pad and damage to the verge/embankment on the northern side of the pad;

2.2.28. [REDACTED] made further points in respect of the Alderton Road/Fosse Way construction route. Principally, he noted distances between passing opportunities which in excess of 200m and are in areas that are not within the Order Limits or designated as Highway Improvement Areas. Post-hearing, [REDACTED] concerns in respect of this route may be summarised as follows:

- Alderton Road (south): A passing place is shown at the northern extent of the built-up area of Grittleton. This utilises an existing field access that has been used as an informal passing place. It appears too short to accommodate a 16.5m HGV. The passing place is opposite another field access that incorporates a right of way. There is a risk that vehicles may drive up onto the footway on the eastern side of the road where it meets the right of way;
- Alderton Road (north): The distance between HGV passing places south of the bend at the northern end of Alderton Road is shown to be 220.6m. HGVs are likely to meet on this section and would be forced to either reverse or drive up onto the embankment/verge;
- Fosse Way (access to West Bramley Farm): At a point around 400m north of the bend at the southern end of the Fosse Way, it is proposed to use the access to West Bramley Farm as a passing place. It appears that this is of insufficient size to accommodate a 16.5m HGV so it is likely that the verge will be over-run;
- Fosse Way: There are sections of the Fosse Way where the visibility between passing opportunities is long (the following are the distances between passing opportunities on Fosse Way from southern junction with Alderton Road: 134.6m, **203.8m**, 89.4m, **219.8m**, **360.5m**, 171.7m, 67.9m, 100.3m, 77.0m, 113.7m, 111.3m, **424.1m**, 176.9m, 46.9m, 110.6m, 151.9m, 45.8m, **247.8m**, 185.0m). In all cases these long forward visibility distances (in **bold**) are in areas that are outside of the order limits.

2.2.29. Additionally, [REDACTED] pointed out that the Network Rail works referred to at the hearing comprise bank reinforcement. The HGV movements have therefore been mainly associated with the setting up of the compound over a short



Stop Lime Down Deadline 7

period and would have comprised tipper trucks rather than larger articulated vehicles.

2.2.30. There was further discussion of the Applicant's NMU Survey [REP6-061]. [REDACTED] stated his view that the surveys confirm the presence of significant numbers of NMUs in several locations. That is particularly so of cyclists on the Fosse Way and Alderton Road route as part of recognised cycle routes. [REDACTED] explained that he did not agree with the conclusions set out in the report that suggest that there would be '*no material impact*' on NMUs.

Item 5: Construction worker traffic

2.2.31. [REDACTED] expressed doubts that 50% of construction workers would take up the shuttle buses proposed for the scheme, particularly having regard to the likelihood that construction workers are unlikely to be contracted locally.

2.2.32. The ExA also pointed out that since the number of solar panels has increased, the number of workers associated with their installation may also increase. The Applicant suggested that the number of workers would remain the same but would work over a longer period. This will obviously extend the construction timescales.

2.2.33. Post-hearing, [REDACTED] has an additional concern that the number of construction workers allocated to Lime Down D does not realistically reflect the concentration of staff at the 400kV substation and the BESS sites.

Item 6: Construction traffic management plan

2.2.34. [REDACTED] stated his view that the fact that the management of HGV movement involved '*layers and layers of complexity*' and still did not achieve the aim of preventing HGVs meeting on sections of road where they could not pass

reflected the Applicant's inability to present a robust and convincing construction access strategy.

2.2.35. [REDACTED] also requested that more than one banksman be provided at sensitive access points to ensure constant coverage.

2.2.36. [REDACTED] stated that banksmen must be suitably trained and qualified; a requirement that should be added to the CTMP;

2.2.37. [REDACTED] repeated his concern that the CTMP does not provide measures to reduce conflict within Acton Turville where the B4039 divides the village with no designated pedestrian crossing facilities and poor visibility for those crossing from east to west ([REDACTED] described the B4039 through Acton Turville as '*nice and wide*' - something that makes crossing more difficult).

2.2.38. [REDACTED] also queried whether a control could be introduced for noise from vehicles when reversing.

Item 7: Any other traffic and transport matters

2.2.39. [REDACTED] raised a concern in respect of Fowlswick Lane. Although it is technically possible to provide the access shown in Drawing PL109, the impact on vegetation both along Fowlswick Lane and at the junction with the B4039 has not been assessed. The Outline Ecological Protection and Mitigation Strategy suggests that only 18m of hedgerow would be removed. The visibility to the south is identified as appropriate for the speed of traffic but the visibility to the north is not. It is not clear how traffic will be controlled given the lack of visibility around the bend and the lack of verge to accommodate traffic control. [REDACTED] expressed a concern that this had been overlooked.

2.2.40. The Applicant agreed to provide swept paths of construction vehicles using Fowlswick Lane, both at the B4039 and site access junctions.

2.2.41. [REDACTED] noted that the location of access 12 that serves Lime Down E 132kV substation has been moved to the south-west and is now opposite access 13. Whereas the previous access made use of an existing field access, the proposed access is entirely new. It appears that the rationale for this is to allow AIL vehicles to avoid travelling along the lane. The swept path drawing for access 13 (PL13D) shows an AIL vehicle crossing the lane between access 13 (north-west of the lane) and access 12 (south-east of the lane). It is not clear how the AIL vehicle accesses the internal track network north of the lane to allow this straight across movement.

2.2.42. Post-hearing, [REDACTED] notes that it appears that the access road from the A429 to Lime Down E will need to be removed after construction. The Applicant needs to make allowance for the removal of the access from the A429 after construction since it appears that all maintenance vehicles are expected to use the route through Rodbourne as the land owner does not want the construction access from the A429 to remain throughout the operational phase. Clarity is sought from the Applicant in closing submissions.

2.3.ISH7: matters relating to environmental matters, including management plans

REP4-043: Design Principles and Parameters

2.3.1. [REDACTED] began by expressing an overarching point which SLD considered relevant to many of the management documents. Principally, SLD's position was that there was merit having the CLG constituted at an earlier date. [REDACTED] expressed SLD's concern that the actual utility of the CLG was not being fully realised because it was not being used in a way which would inform decision-making moving forward.

2.3.2. [REDACTED] submitted that the CLG should be established prior to the discharge of any requirements within Schedule 2 of the DCO and consulted upon in respect of the detailed management plans, including decisions in respect of the design of the Scheme. Further discussion of the Community Liaison Group and the Terms of Reference is set out below.

2.3.3. At the hearing, SLD suggested that there might be merit in having the CLG constituted prior to the commencement of any preliminary works. Since ISH9, SLD has considered its position and considers that establishment of the CLG prior to preliminary works is not necessary and that reliance on the Community Liaison Manager would be sufficient at that stage.

2.3.4. [REDACTED] also emphasised that the CLG needed to be more than just an information sharing exercise and should be a forum for local people to raise concerns and feedback in respect of the management plans and the scheme. By the time the detailed management plan is submitted, it will be too late for the community to raise valuable points of input. There would be no obligation on the Applicant to accept the points raised, just to give them conscientious consideration.

2.3.5. [REDACTED] pushed back on the Applicant's suggestion that SLD provide a list of topics that they would like to provide input on. While SLD accept that there may be issues which are technical and may be of less interest to the community, this would prejudice the question of what the community can comment upon.

REP5-106: Outline Permitted Preliminary Works Environmental Management Plan

2.3.6. In response to a comment made by [REDACTED] for the Environment Agency, [REDACTED] queried the Agency's approach to water sampling and whether an automatic system existed, as relied on by the Applicant. [REDACTED] clarified that the Agency partakes in an array of water quality monitoring across the country, and that the data was available on the Agency's Water Quality

Explorer website. [REDACTED] affirmed this, but noted that such data relies typically on monthly spot sampling followed by laboratory analysis and cannot be described as “automatic”. The Agency clarified that they were content with the proposed approach as the Applicant agreed that the Agency would be consulted in respect of frequency of sampling. [REDACTED], however, felt that the Environment Agency was missing an opportunity to fulfil its regulatory functions. As described in Stop Lime Down’s Deadline 5 submission [REP5-130] paragraphs 3.1.119-3.1.123, a small number of automatic water samplers downstream of the construction areas would be (a) technically feasible; (b) affordable; (c) give real-time warning of problems and thus allow the Agency and Wiltshire Council to fulfil their monitoring and enforcement duties; (d) provide a strong incentive for the Applicant’s contractors to adhere to the requirements of the management plans. At least a year’s pre-construction data would be essential so the baseline response of the rivers could be established.

REP6-029: Outline Construction Environmental Management Plan

2.3.7. In respect of the equine mitigation measures. [REDACTED] submitted that the proposal to make reference to an equine expert within the CLG was not a suggestion which SLD would object to, but noted that there was already extensive equine expertise within the vicinity. [REDACTED] expressed on behalf of SLD that the integration of an equine expert into the other management documents may be of greater benefit, as a way of mitigating effects of the Scheme. A key example was that discussed by the ExA at the hearing, it may be beneficial to have an equine expert involved in training workers during the construction phase to identify when a horse is in distress and how to respond.

2.3.8. [REDACTED] also queried how environmental and construction complaints would be investigated. It was noted that paragraph 2.15.1 currently provides that a “logbook of complaints will be prepared and managed by the Site Manager or nominated representative.” Paragraph 2.1.5.2 further states that “any environmental complaints received will be investigated, with appropriate action

taken and recorded, so that a full audit trail is available should the complainant raise the issue(s) with the local authority." [REDACTED] queried what check there would be to make sure the Applicant "isn't marking their own homework." SLD has suggested that a review in respect of the complaints logged for the Scheme is provided to the CLG and/or a "You Said, We Did" is taken on the Scheme's website.

REP6-031: Outline Operational Environmental Management Plan

2.3.9. [REDACTED] made submissions in respect of the need for skylark specific monitoring, noting that it is not adequately provided for within either the oOEMP or the oEPMS.

2.3.10. Post-hearing: [REDACTED] notes the points raised at ISH7 concerning the lack of species-specific skylark monitoring during the operational phase, particularly throughout the initial first five-year cycle following panel installation. The Applicant's stated position at the hearing was that this skylark-specific data would not contribute significant, additional information or inform management actions which could not be gathered through routine habitat surveys.

2.3.11. SLD is concerned about this stated position, given impacts to skylark have been identified by the Applicant as being significant on the district level, and one of the major ecological concerns associated with the project. The Applicant has committed to an enhancement scheme, aiming to increase the suitability of a proportionally smaller retained area to support a greater number of skylark nests to partially offset losses. Without any follow-up, species-specific monitoring and territory counts post-development, there is no means to confirm whether the proposed enhancements and skylark mitigation are working as intended, and thus actually addressing the expected impacts.

2.3.12. While habitat management may prevent a decrease in skylark territories within the retained/enhanced fields, the Applicant's mitigation strategy specifically

requires for there to be an increase in territories in order to even partly offset the loss of nesting habitat within the solar panel fields [REP4-011]. Routine monitoring of habitats and their condition during the initial five years of operation may correctly confirm that important aspects such as sightlines are not being obscured [REP6-038], however it has no way of confirming or quantifying to what degree the site is supporting more skylark territories than it did originally.

2.3.13. Lastly, as previously raised within ISH7, the lack of species-specific monitoring would prevent Wiltshire Council from being able to make decisions based on cumulative impacts on the species within the area. This is an important consideration to make when factoring the significant degree of skylark displacement expected even if stated mitigation measures are successful.

2.3.14. SLD echoes once again its position for more frequent skylark monitoring to be carried out on Y1, Y2, Y3 and Y5 throughout the initial five-year cycle of the operational phase, to confirm proposed mitigation measures are working as intended. Frequency of monitoring surveys throughout the initial cycle should be adapted based on survey findings, increasing when enhancements do not appear to be working as intended and further management action required, and decreasing as skylark nesting territories meet the proposed uplift targets.

REP6-037: Outline Landscape and Ecological Management Plan

2.3.15. In response to a question raised by [REDACTED], the ExA asked the Applicant about the management of proposed planting and water. It was noted that summer droughts can lead to water restrictions, but the outline LEMP sets out that plants will be watered “*regularly*” during the first summer and thereafter “*as required*.” The Applicant acknowledged that different species have different watering rates and different watering requirements. The need to water is also dependent on the climactic conditions of the time.

2.3.16. While SLD acknowledges that it is difficult at this stage to set out detail in respect of how frequent watering will be for each type of plant, the Applicant has failed to assess the amount of water which will be required for habitat management or how such water will be transported around the Scheme. [REDACTED] noted that the Applicant's Water Resources Strategy [APP-290] at para 3.2.1 does not calculate the sum of water required for habitat management. As a result, Wessex Water and Bristol Water have been consulted in respect of an amount of water that is likely less than the reasonable worst case for the scheme. [REDACTED] noted that if such water cannot be supplied from the water undertakers, the Applicant would need to estimate the amount of water tankering necessary and any additional vehicle movements as a consequence.

2.3.17. [REDACTED] emphasised that it will be difficult for meadows to establish in mitigation areas because of the agricultural history of the land, in particular land subject to long-term fertilisation. [REDACTED] identified Area E as an area of concern in particular based on the Applicant's soil data and Natural England's criteria for the probability of success. While [REDACTED] agrees that such establishment is possible on very fertile soil, it will take a lot of effort, including possibly top-soil stripping with its attendant problems.

REP6-039: Outline Soil Resources Management Plan

2.3.18. SLD supports the concerns raised by Wiltshire Council and would likewise welcome clarification within the plans that soil stockpiles will not be located in prominent fields within the setting of the CNL.

2.3.19. [REDACTED] disputes the points raised by [REDACTED] on behalf of the Applicant. [REDACTED] claimed that because clay soils are highly water retentive, this will slow overland flow from clay soils. This is a misunderstanding of clay soil properties. It is true that clay soils are good at retaining water because the small size of the clay particles produces a large surface area and small pore sizes which hold water tightly. The very same properties mean that water

penetrates clay soils slowly if at all, particularly as clay soils are often close to saturation. There is ample empirical evidence that water runs easily off clay soils, as described in every soil science textbook. The structure of clay soils can also make them vulnerable to compaction, exacerbating the problems.

2.3.20. [REDACTED] expressed his concern that the majority of the oSRMP was concerned with the treatment of stripped topsoils, and there was very little on how in situ soils would be protected and handled. Soil compaction and remediation is recognised as a vital issue in the Applicant's hydrological risk assessments, but the only mention of the issue in the oSRMP is paragraph 1.8.33: *"Compaction will be monitored during construction by inspecting the soil following installation of piles but prior to fixing the panels. If compaction is identified, remedial action must be taken while the ground remains accessible to the machinery required to relieve compaction and before the panels are fixed."* This is inordinately vague, and fails to describe even in outline how compaction is to be measured and by who; what remediation might be applied; and how feasible this might be under the circumstances.

2.3.21. [REDACTED] expressed his view that although the oSRMP contains an elaborate set of procedures for avoiding soil stripping and handling when the soil is too wet, there is nothing about avoiding general construction work when the soil is too wet. Likewise the issue is not mentioned in the oCEMP or the oLEMP. Local farmers report that there are substantial periods during a typical year when they cannot access the land without risking permanent damage to the soils, and the Applicant's Soils and Agriculture Report [APP-243] Table 1 notes that the soils are typically saturated (at field capacity) for almost half the year. In these circumstances restrictions on working on sensitive soils would seem to be vital and should be detailed in the SRMP.

2.3.22. [REDACTED] also commented that where soil is stored for sixty years a lot of the soil functions are not going to be preserved.

REP3-106: Outline Battery Safety Management Plan

2.3.23. SLD continues to have some concerns about air quality in the event of a BESS fire (paragraphs 5.5.8 to 5.5.10). Though SLD welcomes the commitment to conduct a further plume analysis study when the actual battery technology to be used is known, it would like to point out that the Applicant's assessment that gas toxicity thresholds would not be breached in the event of a fire is entirely dependent on the fire being confined to one container. The Applicant's plume modelling to date clearly shows that a simultaneous fire in two containers would probably breach the toxicity thresholds at the closest receptors. This issue must be secured in the revised study. SLD is also concerned that it is still proposed to restrict the analysis to 1 km distance even though this will eliminate consideration of important receptors such as Hullavington Primary School, and there is no technical limitation in assessing greater distances. SLD also still has concerns about the use of occupational health limits to assess particulate concentrations and the lack of modelling of ultra-fine particles. These and other issues are discussed in SLD's Deadline 4 submission **[REP4-132]** section 3.7.

Action Point 2

2.3.24. AP2 following ISH7 asks the Applicant, Wiltshire Council, and Stop Lime Down to:

"To progress discussions regarding the heads of terms for the community liaison group (CLG) and confirm where there is agreement on the extent to which the CLG should be consulted on the content of management plans prior to discharge of requirements. Where agreement is not reached, each party is asked to provide its preferred wording for the heads of terms and requirement 4 of the draft DCO."

2.3.25. Having first requested sight of the suggested draft Terms of Reference (**ToR**) for the Community Liaison Group in its Deadline 5 submission on 7 August 2026 **[REP5-130]**, SLD was provided the terms of reference for Longfield Solar Farm on 21 September 2026, and then a draft ToR for the Proposed Development

on 24 September 2026. It is disappointing that the draft ToR has been left until a late stage in the Examination process.

2.3.26. SLD responded with comments on the draft ToR on 30 September 2026, and has had further correspondence by email with the Applicant. On 2 October 2026 SLD also discussed the updated draft ToR that the Council (but not SLD) had received. SLD has not seen a final draft of what the Applicant proposes to submit at Deadline 7, but does have remaining concerns on the draft that it has seen as provided by the Council. SLD would also note that it is broadly in agreement with the position of the Council in regard to this matter. SLD will comment on the draft submitted by the Applicant as part of its closing submission.

2.3.27. A principal concern of SLD, raised at ISH7, was that the operations of the CLG would cease at too early a stage following final commissioning. SLD considered a period of up to five years for the CLG to operate (albeit with power in the CLG to curtail that period) was appropriate. It is understood from the most recent draft ToR that this is resisted by the Applicant. SLD understand the Council also agrees that up to five years of operation following final commissioning is appropriate. As a result, SLD and the Council agree on a modification of the wording to the DCO to reflect this (SLD understand the wording following is the same as will be submitted by the Council at Deadline 7):

“Community Liaison Group

4. – (1) Prior to the undertaker submitting any written plan, scheme, details, strategy, or amendments to the relevant planning authority under any requirement of Schedule 2, a community liaison group must be established with an approved terms of reference.

(2) The terms of reference must be submitted to and approved by the relevant planning authority.

(3) The terms of reference must be substantially in accordance with the outline terms of reference.

(4) The community liaison group must be administered by the undertaker and operated in accordance with the approved terms of reference.

(5) The community liaison group will be in operation for five years following final commissioning of the authorised development (subject to any resolution of the community liaison group to curtail its period of operation), during peak replacement activities and at the decommissioning stage.

(6) Notwithstanding (1), the undertaker may submit any written plan, scheme, details, strategy, or amendment to the relevant planning authority under any requirement of Schedule 2, where the making of that submission is agreed with the relevant planning authority.”

2.3.28. The above would also require consequential amendments to Schedule 13 to provide for certified documents. We understand that the Applicant does not object to that and the outline ToR process, but does disagree with the above proposal (a similar such proposal having been provided to the Applicant by SLD previously).

2.3.29. SLD consider this draft strikes the right balance in the establishment of the CLG, and does not understand the Applicant’s arguments in favour of either (1) the CLG being established later than the point in time described herein; or, (2) the Applicant’s reluctance to a period of up to five years for the initial operation of the CLG following final commissioning (noting the CLG can curtail this).

2.3.30. This draft achieves the dual aims of staging the establishment of the CLG early in pre-construction, but still permitting the Applicant to undertake the Permitted Preliminary Works and to agree (with the Council pursuant to Article 4(6)) that certain other matters for approval can be done in advance of the CLG being established. This is to address the issue, identified by [REDACTED] at ISH7, of allowing the Applicant to submit (say) a CTMP for specific road works to coincide with a fortuitous closure of a road. It addresses the very real concern of

the Applicant establishing the CLG late in the process when many design decisions have already been taken.

2.3.31. This draft wording also makes clear that the input of the CLG is not purely related to Requirement 5 of Schedule 2 of the Draft DCO **[REP6-006]**. This draft requires the CLG to be established before applications for approval generally under Schedule 2 because the CLG may properly have input into other plans (for example the CEMP or the LEMP, which obviously directly concern local people). Inconsistent wording in the draft ToR should in SLD's view be removed.

2.3.32. Aside from this, SLD has other concerns about the current draft ToR. SLD consider any independent Chair should be appointed with the agreement of the Council in addition to the Applicant. This is to address the fact that there may be good community reasons that a Chair is appropriate or inappropriate, which the Council can act upon. This will also maintain the independence of the Chair (which the Applicant appears to accept).

2.3.33. It is also considered that the Chair should have powers to control the redaction of sensitive documents. Given the Chair will be independent, that person will operate as an independent arbiter of any dispute about confidentiality. In that way, the provision will reflect the same position for an arbitrator as now set out in the draft DCO at Schedule 14, para 8 **[REP6-006]**.

2.3.34. It is also considered that the Chair should have the power to either chair sub-groups of the CLG, or appoint some other person to that role. Given the need for independence, this is considered the appropriate measure to achieve this.

2.3.35. SLD note "action log" or "log" procedure described to secure the recording of feedback and the availability of that feedback for the Council. In the draft of the ToR SLD have seen this is addressed at para 1.2.3(g), along with a duty in the Applicant to consider feedback in para 1.8.3. SLD consider the Applicant considering feedback and that feedback being available to the Council

key to the effective operation of the CLG. SLD will review these provisions in the draft as submitted by the Applicant at Deadline 7 to ensure that what is provided properly secures the input of feedback, its consideration by the Applicant, and its provision to the Council.

2.3.36. To highlight, SLD consider “log” may be more appropriate than “action log” in that regard as it better reflects the fact that recorded feedback may not necessarily take the form of an action.

2.3.37. SLD are supportive of the Council’s view that wellbeing should be addressed more fully through the CLG.

2.3.38. SLD reserves the right to comment further on the draft ToR.

2.4. ISH8: matters relating to environmental matters, including socio-economics and ecology and biodiversity

Equine Business Impacts

2.4.1. Horse Physiology: As stated in its Deadline 6 submission, SLD disputes the Applicant’s evidence on equine physiology. SLD would echo the comments made by [REDACTED] at ISH8 in respect of horse physiology and considers that her evidence should be preferred to that of [REDACTED]. It is noted that [REDACTED] experience is largely in private equine veterinary practice, with limited exposure to stud farms for thoroughbred and competition horses, which are common within the area of the Scheme. In contrast, [REDACTED] has worked exclusively in thoroughbred veterinary practice since qualification and for the last eleven years has worked exclusively within a large, commercial, industry-leading thoroughbred stud farm.

2.4.2. In respect of horse physiology, [REDACTED] explained:

- While [REDACTED] did not disagree with [REDACTED] that horses can habituate, the studies underpinning the report inappropriately focus on the average farm. As a result, the sensitivities of thoroughbreds have been grossly underestimated within the equine business report. [REDACTED] noted that there are behavioural studies to show that thoroughbreds do not adapt as quickly (see [REDACTED] separate Deadline 7 submission on the reactivity of Thoroughbreds, prepared at the request of the Examining Authority). Additionally, the horses on stud farms include a high proportion of foals and maiden mares, both of which are less likely to habituate.
- The consequences of ongoing construction go beyond visible startle to young horses, but can also have unseen effects, including changes to feeding patterns and rising stress levels – all of which have a knock-on effect on gut health, nutrition, and ultimately the development of young stock.
- Stud horses may also exhibit subtle stress responses, even after habituating to some extent. For example, mares may get used to the noise but adapt by moving away from it. As a result, they retreat to the paddock gate, or the area furthest from the disturbance, and stand there rather than grazing. This reduces their forage intake and therefore their milk supply, and if they have a foal at foot, may mean the foal does not nurse. This can reduce their ability to feed their foals, reduce their propensity to forage and if they have a foal at foot, it may mean that they do not nurse. In the first weeks of life, a foal will typically suckle several times an hour, at intervals of roughly 15–20 minutes. Frequency declines gradually as the foal ages and begins to graze, but remains high throughout the early months. Neonatal foals have very limited energy reserves and depend on frequent, uninterrupted access to the mare; even short periods of reduced suckling can lead to hypoglycaemia, dehydration and reduced immune protection. A reduction in suckling is also one of the earliest signs relied upon by stud staff to detect illness, so disruption to normal nursing patterns both compromises the foal directly and masks early warning signs. Moreover, if a mare is constantly pacing and guarding, the foal will not be able to keep up with the mare, leading to

exhaustion, reduced suckling and a risk of injury, all of which predispose the foal to illness.

- Further, horses are herd animals. It only takes one reactive horse to cause disturbance to the herd. In stud farms, groups change frequently as horses arrive and leave for foaling, covering, boarding and sales, so there is rarely an established herd hierarchy (unless it is a closed stud farm), which makes the group more reactive.

2.4.3. Likewise, comments were shared by other equine businesses attending the hearing, noting the sensitivity of horses to external noises. For example:

- [REDACTED] (Ladyswood Farm & Stud), explained that stud farms, by their nature, have largely young horses coming through. Those horses would inevitably be more reactive and sensitive to external noises, as they will have had less of an opportunity to habituate to them.
- [REDACTED] (Sue Godwin Livery) described thoroughbred yearlings as being *"like a nervous child."* While yearlings may have a calm nature, anything in a disruptive in the environment may cause the horse to be much more alert and have a tendency to run and gallop. [REDACTED] described a circumstance where a horse was spooked by a moo from a local cow, causing the horse to take flight into the path of a lorry and was sadly killed.

2.4.4. Post-hearing, SLD also note a recent incident which occurred in Melksham, where a rider's horse was spooked by a van and, as a consequence, she fell into a ditch with her horse, suffering a laceration on her liver, a displaced rib fracture and hematoma (see BBC reporting, "injured horse rider backs road safety campaign", dated 15 September 2026, <https://www.bbc.co.uk/news/articles/c6jdvr01j57xo>).

2.4.5. West Park Farm: As observed by [REDACTED] for the ExA, the Applicant's table of tourism and recreation receptors [APP-241] originally identified West Park Farm as a *"locally important livery and equestrian care business."* That table concluded

that there would be a “low” temporary adverse effect upon West Park Farm and that, as a “medium” sensitivity receptor, there would be medium-term temporary moderate-minor adverse effect with embedded mitigation, and medium-term temporary moderate-minor adverse with additional mitigation (neither of which amount to significant effects). However, in the updated equine business report [REP5-105], the Applicant properly identifies West Pak Farm “as a *commercial thoroughbred breeding and bloodstock enterprise forming part of Dermot Farrington Bloodstock, an international bloodstock business which has operated for more than twenty years*” (at Table 1, [3.4.3]). It further notes that:

“The farm specialises in broodmare management, foaling, youngstock rearing, sales preparation and the temporary management of high value thoroughbreds on behalf of clients in the UK and overseas. Unlike a livery yard, horses are continually arriving and leaving the farm as part of breeding, sales and bloodstock management.

Information provided about the nature of the enterprise in [REP1-191] includes investment in approximately 50–100 horses per annum; boarding of valuable bloodstock on behalf of overseas clients with horses regularly in transit to destinations such as Hong Kong, Australia, and the United States, as well as to sales across Europe; and pinhooking foals (process of buying foals aged between six to eight months and selling as yearlings).

The facility employs six full-time and five part-time members of staff.”

2.4.6. Notwithstanding that additional information in respect of West Park Farm’s business, the Applicant’s conclusions on effects remained the same within the Equine Business Report. [REDACTED] queried this on behalf of the ExA, although the Applicant disappointingly maintained at the hearing that West Park Farm’s sensitivity remained assessed as “medium”. SLD agree with the concern behind the query, and note that livery farms and bloodstock farms are fundamentally different, as follows:

- A livery yard principally provides accommodation and care for horses owned by other people, alongside other additional facilities and services. Customers will often choose a livery yard based on the local riding routes and hacking around the local area. These livery yards often house a variety of different breeds of horses, and can include retired racehorses and competition horses.
- In contrast, a stud farm will conduct operations which include breeding, rearing, preparing, educating and managing valuable bloodstock as part of a commercial enterprise. This will include pregnant broodmares, mares with foals, weanlings, yearlings, and horses being prepared for sales and new arrivals from sales or from training establishments. Most thoroughbred stud farms run boarding facilities for their clients' horses but also have their own broodmare band as well.

2.4.7. At the hearing, [REDACTED] submitted that the Applicant had generally underestimated the susceptibility and sensitivity of stud farms affected by the scheme. Those businesses should be identified as “high sensitivity” having regard to the physiology of the horses within their business, as well as the points raised by [REDACTED], and [REDACTED] at the hearing. In particular:

- [REDACTED] noted that the primary aim of many stud farms was to produce an athletic horse. Consequently, any change which could directly or indirectly impact (or be perceived by clients as potentially having an impact), would have a significant effect on an equine business. [REDACTED] noted that bloodstock horses were meticulously managed from time of conception to time of becoming a racehorse. In her view, the Applicant's assessment of sensitivity was not reflected in the equine report. These are very high value animals. A single unpredictable event, such as a panic episode resulting in a fracture, tendon injury or laceration, can be enough to cause an irreversible loss in their function as a racehorse. There is a need for an assessment of specific stud farms – not based on other types of horses. They do not have the same level of performance expectation.

- [REDACTED], on behalf of Wiltshire Council, properly observed that the Scheme places the future of eleven stud farms within the area at serious economic risk. Clients are especially wary of any local change that could affect the circumstances in which a horse is reared given their sensitivity to change. [REDACTED] noted that owners of a very expensive thoroughbred horse were unlikely to be persuaded to situate their horses within a farm that will be surrounded by construction noise for at least a two-year period.
- [REDACTED] emphasised the risk to the economic viability of many stud farms having regard to the slim margins upon which many stud farms operate. Many stud farms are already on the brink of commercial collapse, and the loss of even several horses could render them unviable. [REDACTED] also underscored the national significance of stud farms and their contribution to the economy.

2.4.8. Properly considered, West Park Farm should be assessed as “high” sensitivity. The environment in which thoroughbred horses are bred and reared is part of the business itself. Owners are making commercial decisions about where to place valuable bloodstock, and safety, tranquillity, turnout, handling conditions and confidence in the environment can therefore affect horse placement, investment, client retention and ultimately the viability of the business. Having regard to the EIA Methodology Table 6-4 [APP-058], this would give rise to a significant effect on West Park Farm in the construction stage, even if the magnitude of effect was assessed as “low.”

2.4.9. However, SLD considers that the construction effects on West Park Farm should at least be “medium”, having regard to the extent of noise effects on the property (considering the Applicant’s own noise assessment (NA) [REP5-025] and map [APP-159]). That will result in a major-moderate (significant) adverse effect. The closest noise monitor to West Park Farm is R14 (as against representative location LT13), located 350 metres from the red line for the Scheme (NA para 14.6.40). The Applicant for this location assesses the existing baseline LOAEL (i.e. background noise) at about 45 decibels (NA para 14.6.45). The Applicant has then assessed the noise effects of construction as 56 decibels

(NA para 14.10.4). As [REDACTED] discussed at the hearing, this means that at a minimum, West Park Farm will experience an 11 decibel increase during the construction period. However, given many horses will be much closer than West Park Farm (possibly as little as 90 metres away from the red line), the decibel increase experienced is likely to be even higher. SLD's expert notes that a ten decibel increase is generally experienced as being approximately twice as loud to the human ear. The Applicant's LOAEL assessment is also focussed on the human effects of noise and does not take into account the sensitivity of horses' hearing.

2.4.10. At the hearing, the Applicant maintained that its proposed additional mitigation would have the effect of reducing the magnitude of the effect at West Park Farm. SLD struggles to understand how the Applicant can assert that to be the case, given the Applicant's Environmental Statement concludes that the significance of the effect on West Park Farm does not change after additional mitigation is imposed (see [APP-241] p. 127).

2.4.11. [REDACTED] likewise noted there were limited steps which West Park Farm could take in response to nearby construction works and traffic. [REDACTED] noted that many types of horses must be kept separate, e.g. colts cannot be moved alongside fillies. Stable capacity is further limited and thoroughbred athletes are required to spend as much time as possible in paddocks, such that keeping them indoors for an extended period is not an option. Foaling is also difficult to manage as stud farms cannot predict precisely when a mare will foal and cannot reorganise foaling around a construction programme.

2.4.12. In short, while advance notice and liaising with equine businesses will obviously be welcome, notification of the works will not mitigate the effects on business. If businesses like West Park Farm have to move horses, later turnout, change routines, or provide additional staff or supervision as a consequence of additional handling risk, those are themselves economic effects on the business which have knock-on impacts on customer confidence.

2.4.13. Ladyswood Farm and Stud: Similar to West Park Farm, the Applicant's initial assessment of Ladyswood Farm and Stud identified it as a "*locally important livery and equestrian care business*" [APP-241]. That table concluded that there would be a "low" temporary adverse effect upon Ladyswood Farm and Stud and that, as a "medium" sensitivity receptor, there would be medium-term temporary moderate-minor adverse effect with embedded mitigation, and medium-term temporary moderate-minor adverse with additional mitigation (neither of which amount to significant effects). However, in the updated equine business report [REP5-105], the Applicant identifies Ladyswood Farm and Stud as:

"Specialist commercial thoroughbred breeding enterprise specialising in the breeding, foaling, rearing and preparation of thoroughbred racehorses for racing and public sale. Services include commercial thoroughbred breeding, broodmare management, foaling services, foal and youngstock rearing, seasonal boarding of mares, rest and rehabilitation for racehorses, sale preparation, permanent and seasonal equine boarding, grazing and pasture management, and horse transportation. The stud provides 24-hour foaling supervision using CCTV and dedicated night staff during the foaling season and maintains specialist facilities designed specifically for broodmares and young stock.

The business currently accommodates approximately 45 horses, comprising broodmares, foals, yearlings, youngstock and horses on seasonal or permanent board. The stud typically produces up to 20 foals per annum, representing a significant annual breeding programme.

The facility employs five full-time and two part-time (seasonal) members of staff."

2.4.14. As above, the Equine Business Report maintains that the effects on Ladyswood remain the same. For the same reasons as West Park Farm, Ladyswood Farm and Stud should be understood to be of "high sensitivity". SLD

also notes the additional points raised by [REDACTED] at the hearing, which noted that the stud already operates close to break even. Any loss in income (for example as the result of a loss of clientele or horses being moved) or increase in cost (for example, as a consequence of mitigation measures), renders the business increasingly less viable. [REDACTED] explained that welfare and paddock rotation is critical at the stud farm, and there is no extra pastureland to accommodate changes in a construction timetable.

2.4.15. Additionally, the temporary effect on West Park Farm should at least be “medium”, having regard to the extent of noise effects on the property, which would also give rise to a major-moderate (significant) adverse effect [APP-159]. The noise monitor R30 (located at Ladyswood House, used for day measurements) is 160 metres away from development red line (representative red line location LT5) (NA para 14.6.40). The assessed background noise in respect of R30 is 50 decibels (NA para 14.6.45). The predicted effect during the construction stage is 57 decibels, i.e. an increase of 7 decibels.

2.4.16. Flight Zones: There was extensive discussion at ISH8 in respect of flight zones for horses. The Equine Business Report maintains that “*at over 30 metres, on-site movements of people or construction machinery is not likely to elicit a response at all.*” [REDACTED] maintains that there is no cited evidence which shows that beyond a 30m “flight zone”, horses will not respond to external stimulus, and [REDACTED] was unaware of any such evidence for thoroughbreds. [REDACTED] was asked to identify and explain on what basis a 30m flight zone is appropriate and what they rely upon. [REDACTED] was unable to answer this question at the hearing and further evidence was promised at Deadline 7.

2.4.17. CLG: While SLD welcomes the provision of an equine expert for the CLG, it struggles to understand what additional benefit the equine expert will have for the CLG, in light of the already significant equine expertise within the local

area. [REDACTED] submitted that there may be greater value in an equine expert providing input on the detailed plans and any proposed traffic control measures.

2.4.18. Post-hearing submission: SLD have had the benefit of having sight of post-hearing submissions which are being prepared by interested parties. SLD would draw the ExA's attention to the following papers which they have seen and may be of relevance to the above:

- [REDACTED] papers on BESS Hazards to Equine Operations, Equestrian Road Safety, Equine Physiological Responses to Stress, and Thoroughbred Reactivity;
- The submissions of [REDACTED] and [REDACTED], which comment further upon the effects of the Scheme on Ladyswood Stud and West Park Farm;
- The submissions of [REDACTED], which comments upon the effects of the Scheme on her livery;
- The report prepared by [REDACTED], appended to the representation of [REDACTED], which comments upon the danger of inhalation of toxic gases to horses in the event of a hazardous incident;
- The submissions of the Thoroughbred Breeders' Association, appended to the representation of [REDACTED] [REDACTED], which comment upon the characteristics of a thoroughbred stud; and
- The statement of [REDACTED], an equine vet with 27 years of experience, which disputes the 30m flight zone suggested by the Applicant's expert.

2.4.19. SLD also notes the paper by Johanna Henke-von der Malsburg and Uta Konig von Borstel, entitled 'Constant traffic noise affects the behaviour and physiology of naïve horses at pasture' published by the Research Institute for Farm Animal Biology in Dummerstorf Germany. SLD note that this paper provides a persuasive analysis of horses' high auditory sensitivity and the short-term

behavioural and physiological responses of horses adjacent to motorways. This is provided at Appendix B to this submission.

Non-Equine Business Impacts

2.4.20. At Deadline 6, the Applicant produced a 'Technical Note on Impacts to Non-Equine Business.' In response to questions raised at ExQ2, the Applicant specifically considered the effects on Grittleton House, Whatley Manor Hotel & Spa, and the Angel Café.

2.4.21. Grittleton House: In respect of Grittleton House, the Note states at paragraph 4.4.16:

*"The Applicant's assessment of impacts on Grittleton House has been led primarily by cultural heritage and visual considerations, to which the Applicant has assessed no significant effects, which Wiltshire Council has agreed upon. The only outstanding concern therefore is solely economic. The Applicant considers that due to the short-term impacts likely to occur, and with construction mitigation measures in place, as secured by the **Outline Construction Environmental Management Plan [REP4-049]** by Requirement 13 of Schedule 2 to the **Draft DCO [REP4-004]**, that there would be no significant effect on the business viability of Grittleton House."*

2.4.22. At ISH8, the ExA heard persuasive evidence from Vanessa Shipp, owner of Grittleton House, that the effects on the wedding venue would be both significant and more than short-term. It was explained that the proposed location of the compound is directly in view of Grittleton House and is situated on Grittleton House's most exposed side. It will be in view of the wedding lawn and the back lawn, both of which are used for ceremonies and there is nowhere else the wedding can be moved to. It is visible from key locations where photographs will be taken. For customers who have already booked for their wedding, Grittleton House's reputation is at risk. Bad reviews will not disappear once the compound

is removed. The Cotswolds area is one of the most densely populated areas of weddings and the couple can simply choose another venue. This means losing many weddings.

2.4.23. Grittleton House was not assessed by the Applicant as a tourism and recreation receptor in its ES [APP-241]. Accordingly, while the Applicant concludes within the Technical Note on Impacts to Non-Equine Businesses that there would be “*no significant effects*” in economic terms, the Applicant has not identified the sensitivity of the receptor, the magnitude of the impact, the significance of the effect with embedded mitigation or the residual effect with additional mitigation. As [REDACTED] submitted at ISH8, clearly the scheme gives rise to a significant effect on Grittleton House. Grittleton House is clearly of “high” sensitivity.”

2.4.24. Angel Café: The Applicant further maintained that there would be no significant effect on the viability of the business operations at the Angel Café. In response, [REDACTED] noted the response which the Angel Café had provided to its business survey [AS-27], at paragraph 3.4.7.1:

“Broadly the Angel has two groups of customers: (a) Residents of Sherston and surrounding villages / areas who use it as a convenient and pleasant meeting place. As a result, it has become a major hub for the village since re-opening in 2021. (b) Walkers and cyclists drawn to the locality by the beauty of the area. Walkers are of particular importance as they regularly take rooms overnight (through Cotswold Walks etc.). This second group of customers is unlikely to be drawn to walk or cycle through acres and acres of solar panels, let alone the heavy plant that will be present for a long time before project completion. Should the Lime Down project proceed, the expectation is that our trade will reduce drastically, to the extent that The Angel will become completely unviable as a business and, potentially, forced to close.”

Business Compensation Fund and Community Facilities

2.4.25. SLD supports Wiltshire Council's suggestion that a compensation scheme for businesses be arranged. There is an absence of robust evidence to support the Applicant's conclusion that there will be no significant adverse effects to these businesses. In the absence of such evidence, and applying the usual precautionary approach in the absence of a lawful and proper assessment, it is appropriate that provision be made for targeted financial intervention in the form of a business compensation fund for those circumstances where the significant adverse effect does so crystallise (as SLD considers it will). It is likely that any benefits which do arise out of the scheme (whether through construction employment or otherwise) will bypass local businesses and be felt more regionally or nationally.

2.4.26. While SLD notes that a separate compensation regime is provided under the Planning Act 2008, the circumstances in which an individual or business can claim compensation are very limited. In the absence of a compensation fund, many businesses within the area of the Scheme (including Ladyswood and West Park Farm), will have no or very limited recourse.

2.4.27. SLD note that a Business and Local Economy Fund was provided for HS2 to offset the effects of disruption on local communities and local economies. Likewise, a Tourism Fund was provided in Sizewell C to mitigate potential impacts on tourism from the Project and managed by East Suffolk Council.

Human Health

2.4.28. Unfortunately, NHS Bath and North-East Somerset Swindon and Wiltshire ICB did not attend ISH8 and were unable to provide further detail in respect of its objections to the Applicant's health assessment. SLD maintains that the health effects of the Scheme have not been properly assessed by the

Applicant, and repeats the points set out Appendix I1 to its Written Representation [REP1-180].

Outline Skills and Supply Chain Employment Plan

2.4.29. SLD repeated the points set out in SLD's Business Survey [AS-27] at paragraph 2.2.2:

"The Applicant has estimated that 145 jobs could be created for local residents in the construction sector. In the absence of any detail collaborating this comment, it is unclear where these employment opportunities will be sourced. To the best of SLD's knowledge, there are no construction companies based close to the vicinity of the proposed solar scheme. According to the Office for National Statistics (ONS), there are no more than 40 construction companies with more than 10 employees in the entire South Cotswolds constituency, which has a total population of about 96,500."

2.4.30. Connectedly, [REDACTED] reiterated at ISH8 that it was doubtful any employment benefits arising out of the Scheme would be felt locally. SLD had no further comments in respect of the Outline Skills and Supply Chain Employment Plan.

Ecology

2.4.31. Birds: At the hearing, the ExA queried whether there was a risk that the Applicant's approach, particularly in the area of the CRC close to Corsham Lake, had been too narrow and had failed to capture relevant species. [REDACTED] similarly noted that the area adjacent to Corsham Lake was different to the Solar PV Sites.

2.4.32. [REDACTED] considered that it might be difficult to reroute the cable within the area. [REDACTED] flagged as an example a particular section within 700m of the

nearest section of Corsham Park, identified within the Cable Route Corridor Habitat plans as CRF56 and CRF57 ([APP-114] page 9); the field to be crossed was noted for the combination of ruderal scrub, brook crossing and apparently waterlogged patches of wet grassland across the neighbouring fields, with the whole section having potential to support individual and/or flocks of waders. However, the order limits in this section were noted to only extend as far as the edges of a single field, with no apparent option for ad-hoc re-routing through sections with different (and ideally less sensitive) habitat conditions if flocks of ecologically significant waders be found to consistently use the area during cable-laying.

2.4.33. [REDACTED] further raised concerns in respect of the Applicant's proposed mitigation for wintering birds. Method Statement 11 of the Applicant's EPMs provides at paragraphs 12.2.1 and 12.2.2:

"12.2.1. During the winter months of November to February inclusive, any significant commencement or re-commencement of development works within fields will be immediately preceded (in the morning) by an inspection for the presence of flocks of overwintering birds. The aim will be to ensure that flocks of overwintering birds are not subject to displacement and disturbance stresses at this vulnerable time of year. As these flocks move about within the landscape on a daily basis, it should be possible to postpone mobilisation into undeveloped fields which are occupied by them by approximately one day to avoid impacts.

12.2.2. The inspections will be carried out by the EcoCoW. The Site Manager(s) will be responsible for liaising with the EcoCoW in advance of mobilisation into previously undeveloped fields or fields where work is re-commencing during the winter months in order to avoid disturbance of overwintering flocks of birds."

2.4.34. [REDACTED] considered it was insufficiently clear in what circumstances an EcoCoW would advise pausing or rerouting works after identifying a flock of wintering birds. [REDACTED] considered that given the pressure on the Applicant's construction timetable, it was unlikely works would actually be paused to avoid



Stop Lime Down Deadline 7

disturbance to wintering birds. As currently drafted, the Applicant appears to be suggesting that works would be paused where wintering birds are identified in all circumstances. The Applicant ought to explain in what circumstances pausing the works will not be considered possible, and the proposed mitigation in the alternative.

2.4.35. Lastly, [REDACTED] noted that, within the bird mitigation table submitted at ISH8, mitigation measures described across the various species in the document imply and rely heavily on seasonal avoidance and, where unfeasible, precautionary measures, depending on the time of the works. [REDACTED] however also noted that the oEPMS [REP6-040] mentions a number of other, partially overlapping seasonal and weather limitations. A notable one is reptiles, where clearance to avoid the species is carried out between April to October, overlapping and partly contradicting stated mitigation and considerations during the bird breeding season.

“In order to avoid inadvertent mortality of reptiles during this process, the creation works will not take place within the winter months (November to February inclusive) or during temperatures below 8°C and all areas of the habitat mentioned above will be hand searched and removed with hand tools only once reasonable likelihood or absence of reptiles has been established. All such habitat creation work should be carried out by individuals with experience of identifying reptiles and their habitat”

2.4.36. [REDACTED] was however conscious that the Applicant has stated in prior responses that they cannot formally commit to specific seasonal restrictions for ecological mitigation. SLD would therefore query what the overall avoidance considerations will be throughout the year for wildlife avoidance, to determine what seasonal consideration for given species would take precedence over others (if at all). Otherwise, many of the considerations listed throughout the bird table and oEPMS as part of their mitigation commitments may not apply at all beyond a commitment to consider, with no concrete action being taken.

2.4.37. Badgers: SLD had no comments to make in respect of badgers.

2.4.38. BNG: [REDACTED] noted that, applying the Metric, losses of habitat can only be treated as temporary where the habitats are replaced within five years for low distinctiveness habitat and two years for medium or high distinctiveness habitat. Where such habitat is not returned to its pre-intervention condition, those losses must be treated as permanent and taken into account in the BNG calculation. [REDACTED] noted that the Applicant did not appear to be proposing any monitoring of habitat replacement within the CRC within the oLEMP [REP6-038]. Clarity was sought as to how habitat remedial works would be monitored within the CRC.

2.5. ISH9: the draft Development Consent Order

2.1 Article 2 – Interpretation

2.5.1. Discussion related to a dispute in respect of the definition of “maintain.” Wiltshire Council have proposed the following wording (underlined text being proposed additions): “*maintain*” includes inspect, repair, adjust, alter, remove, refurbish, reconstruct, replace (including scheduled replacement of components of the authorised development where such replacement remains within the parameters assessed in the environmental statement and secured by the documents certified under article 42 and the requirements) and improve any part of the authorised development, but does not include the removal, reconstruction or replacement of the whole of the authorised development other than such scheduled replacement where it remains within those assessed and secured parameters, and “maintenance” and “maintaining” are to be construed accordingly”.

2.5.2. [REDACTED] explained that SLD agreed with the Applicant that ultimately the suggested additional wording did not secure the control that might be intended. Among other things, the meaning of the word “whole” would mean that 95% replacement of something would not breach the provision. [REDACTED] did

highlight that, if there was a concern remaining, another way of managing this issue would be to add wording to firm up section 2.13 of the oOEMP [REP6-032] which addresses replacement and maintenance of the Scheme. Such outline plans allows for more flexibility. But [REDACTED] confirmed that SLD accept the effect of Article 5(3) and the control it imposes on the maintenance power.

2.2 Article 6 – Disapplication and modification of legislation, etc

2.5.3. [REDACTED] indicated that SLD had no comment.

2.3 Articles 8 to 16 (in relation to Streets)

2.5.4. [REDACTED] indicated that SLD had no comment.

2.4 Article 17 – Discharge of Water

2.5.5. [REDACTED] indicated that SLD had no comment.

2.5 Article 37 – Consent to Transfer the Benefit of the Order

2.5.6. This item was not discussed, but SLD has no further comment.

2.6 Articles 40 and 41 – Felling and Lopping of Trees and Removal of Hedgerows and Trees Subject to Tree Preservation Order

2.5.7. [REDACTED] indicated that SLD had no comment.

2.7 Schedule 2 – Requirements

2.5.8. Requirement 2: [REDACTED] indicated that SLD agreed with Wiltshire Council that the construction phasing plan should require approval from the local planning authority on the basis that it would deal with interaction with discharge of other



Stop Lime Down Deadline 7

outline plans, rather than the Applicant choosing this. [REDACTED] also explained that it has been included in the most recent made orders: Springwell DCO and One Earth Solar DCO.

2.5.9. Requirement 3: [REDACTED] indicated that SLD had no comment.

2.5.10. Requirement 5: This was not discussed, but SLD has no comment.

2.5.11. Requirement 15: This was not discussed, but SLD has no comment.

2.5.12. Requirement 20 (Decommissioning): [REDACTED] highlighted that it was unclear whether the Council would be told the extent of the value of the bonds and be able to raise a concern about the value of the bond that is secured (while recognising that this is a risk to the landowner, but that could still result in insufficient money being available to the Council). [REDACTED] queried whether that could leave the Council unsatisfied by the amount of the sums available to it on decommissioning. Following the Applicant indicating that that it would not allow the Council to raise a concern about the value of the security, [REDACTED] highlighted that the Council should consider that that means it may be left at financial risk if this issue eventuates.

2.5.13. [REDACTED] highlighted SLD's remaining concern about piecemeal decommissioning. [REDACTED] didn't restate the point but highlighted that we consider the issue remains and pointed to our submissions at para 6.3.3. of the WR [REP1-167] and para 17 of [REP1A-022]. [REDACTED] also queried whether Requirement 20(2)(b) should be in the DCO given the approach of an outline TOR for the CLG and given the requirement to revive the CLG when there are events of maintenance

2.8 Schedule 13 – Documents and Plans to be Certified

2.5.14. This was not discussed, but SLD has no comment.

Item 3: Protective Provisions

2.5.15. [REDACTED] indicated that SLD had no comment under this item.

Item 4: Other items not covered

2.5.16. Article 47(4): [REDACTED] highlighted agreement with the Council on its concerns about the time period provided in Article 47(4) and Schedule 16 are too short.

2.5.17. Requirement 4 (the Community Liaison Group): [REDACTED] explained SLD's three concerns in respect of the CLG: (i) that it would not be established early enough; (ii) that it would not be consulted at times which SLD considers important (which SLD considers to be the bedding in period following construction and the major maintenance points); and (iii) securing a document which will become the terms of reference during the examination.

2.5.18. Since ISH7, there has been a substantial amount of progressed achieved between the parties. SLD and Wiltshire Council have agreed a form of wording for Requirement 4. Likewise, SLD has had the opportunity to comment upon a draft terms of reference which was circulated. Comments on this have already been provided and are set out above in response to Action Point 2 following ISH7. As highlighted there, however, some dispute does still remain.

2.5.19. Schedule 14 para 8 (Arbitration Rules): SLD welcomes the amendment made by the Applicant which now provides for information to be public as the default position. [REDACTED] raised a concern that other reasons for confidentiality may arise where this was not concerned with commercially sensitive information. He accepted the suggestion of the Applicant to make clear in the DCO that this did not also require disclosure publicly where other legislation provided for confidentiality.



Stop Lime Down Deadline 7

2.5.20. Mitigation Route Map: [REDACTED] highlighted that SLD had no comments.

3. Comments on Deadline 6 and 6B Submissions

3.1.1. For the avoidance of doubt, where no comments have been provided on a document, SLD maintains its position as set out in SLD's Written Representation LVIR **[REP1-170]** and other responses/comments.

3.2. Site Selection - Applicant's Response to Stop Lime Down's Deadline 5 Submission Appendix E Site Selection and Cable Route **[REP6-064]**

3.2.1. Alongside this comment on **[REP6-064]** (**the Applicant's Paper**) SLD has commissioned Marrons to produce a further report addressing site selection which is provided as an appendix to this submission (**the Marrons Paper**). These comments should be taken with that report. Without repeating every submission that SLD has made on this issue, SLD also refers to the Appendix E paper that it produced at Deadline 5 **[REP5-130]** (**Appendix E**).

Section 1.2: Proportionality

3.2.2. It remains the case that the Applicant asserts that the approach it took here was proportionate without actually explaining why that is the case. The Marrons Paper explains why this should not be accepted in this case (see section 2). Indeed, given proportionality is directed to the question of whether the approach to matters is in proportion, it is necessary to consider the characteristics of this case. This was explained in Appendix E at para 12.

3.2.3. In short, this is a 500MW scheme associated BESS where only 12 PDAs were assessed in the principal SSAR (and, it might be added, assessed by a defective methodology). The Proposed Development is of considerable size at 1,237ha and of considerable value at £900-£950m. This is also, on the Applicant's own case, a proposal which does have significant effects, including on nationally designated landscapes (which should have been obvious even at the selection stage). And, again, on the Applicant's own case in its original Site Selection Assessment Report **[APP-185]** (**SSAR**) had 7 ambers in Appendix D, and thus was far from

the optimal location even on its own assessment. Given the size, the value, and the recognised effects and constraints (even at the selection stage), this clearly was a case where proportionality required significantly more inquiry than was in fact set out in the assessment. Indeed, in many ways, it is hard to distinguish the site selection process here from a process that might be conducted in respect of EIA development below the NSIP threshold (i.e. a solar farm assessed under the Town and Country Planning Act 1990).

3.2.4. It is notable that para 1.2.6 of the Applicant's paper recognises that each site assessment should be assessed on its own merits due to the constraints of the individual project. SLD agrees; the fact that the Applicant then goes on to draw comparisons to other schemes (at para 1.2.1-1.2.11) without explaining why they should be considered as of sufficiently similar characteristics to this case is not explained. Both the Marrons Paper and SLD focus on the facts of this case in explaining the lack of proportion (and indeed the flaws in the assessment). The Applicant seemingly does not.

3.2.5. Also as to para 1.2.6 it should be noted that, ultimately the decision-maker on the sufficiency of the site selection process here is the Secretary of State on a recommendation from the Examining Authority. While it may be for the Applicant to express its initial view on proportionality, that does not change the fact that the assessment of sufficiency is for the decision-maker informed by all of the submissions. SLD has clearly put the issue of the sufficiency of the site assessment in issue here supported by legal and expert evidence.

3.2.6. Paragraphs 1.2.12-1.2.16 repeat the same policy points that the Applicant has made previously. SLD has set out its response to these before, and maintains that policy supports its position. See para 6-7 of the Appendix E paper and the reference back to SLD's original Written Representation.

3.2.7. As to para 1.2.17.1, SLD was specifically noting that the Applicant recognised the effect of the policy. SLD was perfectly aware of the Applicants position, and it

is not understood why the Applicant thought this clarification was necessary. SLD's position remains, however, that the Applicant's approach is flawed.

3.2.8. As to para 1.2.17.2, the Applicant misstates SLD's position as expressed in Appendix E. At para 6(d) SLD specifically stated "SLD does not say that the Applicant must avoid all harms to the CNL". Again, then, it is not understood why the Applicant thought this clarification was necessary. SLD's position remains, however, that the Applicant's approach to s.85 is flawed (both generally, but also in the site selection process).

Section 1.3 Specific methodology points raised by SLD

3.2.9. As to para 1.3.2-1.3.4, in the first instance this text again makes the point for SLD that the Applicant has applied its criteria with an undue preference for PDA 10 (given the overlap with the factors identified in para 1.3.3 and the fact that PDA 10 was taken forwards, whereas the Applicant did not even consider these other areas were worth assessing on a RAG basis). SLD remains of the view expressed at para 10-12 of the Appendix E report and other reports to which it cross-references. As with para 13 of the Appendix E report, the same points may be made of the Applicant's comments on Green Belt at para 1.3.5.

3.2.10. As to para 1.3.7 SLD welcome the provision of this plan. The difference to the redline for the Proposed Development is remarkable, particularly in respect of Lime Down D and Lime Down E. This expressly supports SLD's argument that there has been an undue preference in favour of PDA 10, given the exclusions which (on a site selection analysis) should have remained excluded. SLD refers back to the SLD-D3 submissions referred to in para 14 of Appendix E (and this map appears to confirm many of the concerns that SLD raised in para 6.1.12 of that document **[REP3-173]**).

3.2.11. As to para 1.3.8, it is difficult to reconcile the idea that the SSAR represents the site selection process as conducted and taking proper account of environmental constraints if the Applicant has essentially formulated the site for

the Proposed Development separately to and inconsistently with that process. It should be remembered that the Technical Note on Site Selection **[REP2-043]** removed constraints that were applied in the original SSAR (see para 4.1.2). This is not a new set of constraints, but the constraints that were said to guide the original selection. So while showing these constraints in the Technical Note and now for PDA 10 in the Applicant's Paper is new, the effect of those constraints in the original site selection process should not have been new.

3.2.12. Para 1.3.9 amounts to the assertion that the Applicant's clustering is correct, with no explanation of the actual decisions made provided. However, as has previously been emphasised, the approach adopted appears to depart from the original SSAR's approach even to drawing PDAs. As with much of the Applicant's approach, this concern about an inconsistent methodology remains.

3.2.13. The issue in para 1.3.10 is a feature also commented upon in the Marrons Paper, and the assessment of SLD's heritage expert which was also recited therein. It is again difficult to reconcile the reasoning here with the approach that the Applicant has taken to the unconstrained PDA 10 when compared to the Proposed Development. However, given the considerable size of the clusters as explained in both Appendix E and the Marrons Paper, it is difficult to understand why the hundreds of available hectares in the clusters are insufficient to meet these concerns. Indeed, ultimately, this is all retrospective justification by the Applicant which properly should have been captured and assessed properly as part of the original approach in the SSAR.

3.2.14. As to para 1.3.11-1.3.14, the response by the Applicant boils down to an assertion that it was not proportionate to apply criteria consistently across the original SSAR, and not proportionate to assess two Clusters as part of the SSAR. SLD maintains its position as expressed and considers this is a clear example of how "proportionate" for these purposes is being read down to a level which bears no relation to the size, value, and effects of this Proposed Development.

Section 4: Substantive points raised by SLD

- 3.2.15. In respect of para 1.4.2, SLD note the reliance on land agents in respect of PDA 9 and repeat the concern that this has the effect of failing to give the proper weight required in the alternatives assessment to planning constraints. SLD note the responses in respect of PDA 1 and PDA 11; its remains concerned but recognises that the Applicant accepts that “it is not accepted that the selection of PDA 1 could in any way normalise a longer cable route corridor”. That reflects the point that SLD has expressed about the cable route length throughout the Examination, starting in its Written Representation.
- 3.2.16. In respect of para 1.4.3 SLD, the recognition of the change in approach to gradient is noted. Such recognition makes even more striking the suggestion that it was not proportionate to properly reassess PDA 2 in line with this change of approach.
- 3.2.17. Para 1.4.4 reflects the disagreement between SLD and the Applicant on scoring. SLD note that the Marrons Paper also addresses aspects of the RAG approach to PDA scoring, relating to the clusters.
- 3.2.18. In respect of agreements and land agents in para 1.4.5-1.4.6, SLD note the acceptance of such reliance by the Applicant, and also now note the comparison between the unconstrained PDA 10 and the Proposed Development. As SLD have repeated, this reflects an undue preference for such land considerations to the detriment of the environmental effects in the selection of this site. It does not reflect a consistent, proportionate, or lawful approach to the meeting of the requirements of the EIA Regulations. Notwithstanding the Applicant’s comments, the inconsistency (explained away as proportionality) does give rise to the concerns raised at para 34-35 of Appendix E. SLD will comment on this and related matters in its closing summary submissions.

Section 5: The 400kV cable

3.2.19. SLD remains of the view, disputed by the Applicant at para 1.5.1, that the Proposed Development is an outlier. Indeed, even given what the Applicant seems to accept in this section, the Proposed Development is extremely unusual compared to the other consented and proceeding DCO applications. Even with the amendments suggested by the Applicant, the average length of cable route remains 6.5km across all of the schemes (including Cottam, West Burton, and Tillbridge). SLD re-emphasises the point expressed in Appendix E from para 36 which explains the policy and environmental reasons pointing against lengthy cable routes. The experience of the compulsory acquisition hearings related to the CRC through the Examination gives this further emphasis.

3.2.20. In respect of para 1.5.2, this is not an error and clearly explained in the footnote to the table which states: "The lengths of cable shown are the external distance from the on-site 400kV substation to the National Grid connection point, internal cables that join up individual areas of panels and on-site infrastructure are excluded". SLD disagrees with the suggestion that it is difficult to objectively compare; indeed it is consistent to adopt an approach which measures on-site substation to National Grid connection point.

3.2.21. Indeed, what the Applicant incorrectly describes as an error is in fact a disagreement about where to measure from. However, as can be seen from the table of extracts included from p.177 of Appendix E, it is the standard approach in Environmental Statements to measure in the way that SLD has. Indeed, it would be fraught with difficulty to measure internal to site cable lengths, and also (more importantly) would not deal with the specific policy preference against long cable routes to point of connection.

3.2.22. For internal cables within solar sites, the effects of the cable are almost all (or entirely) subsumed by the overlaid development. Put another way, a long cable route outside of the solar sites is an additional harmful environmental effect which is not 'priced in' in the same way as cable within the solar site.

3.2.23. As to interna cables which are between solar sites, internal cables create considerably less harm than external cables. Internal cables are an integral part of on-site infrastructure and, where possible, are woven into the site design. Generally, they are lower voltage and smaller in scale. Whereas lengthy external cables cross 'virgin territory' and are usually 400kV. Their construction can involve massive civil engineering operations, disruption to the local community and complex crossings of roads, waterways and other obstacles. Indeed, the policy points made from para 36 of Appendix E are of particular relevance to external cables.

3.2.24. This distinction also reflects site selection and design: on-site infrastructure is far more extensive than simply the cable. The layout of on-site infrastructure (and the corresponding lengths of interconnecting internal cables) is determined by the local geography and the need to minimise the harmful impact of the on-site infrastructure. Whereas the connection to the National Grid is distinct and has to be understood in the context that location of the site as a whole is informed by alternative sites selection. Put another way, an applicant is free to decide where to locate the site with such considerations in mind, but then may be constrained in its layout of on-site infrastructure. Ultimately, an applicant has significant control over cable length at a very early stage (indeed, cable length was the first criteria the Applicant modified and enlarged as part of its own SSAR).

3.2.25. SLD recognise that the approach it has adopted may not be perfect; a better methodology may be possible. However, the Applicant's approach would be problematic and also focus attention away from the critical issue with CRC length. In any event, SLD's analysis is more than sufficient to make the point that it makes in its Appendix E that the Proposed Development is an outlier.

3.2.26. As to para 1.5.3, first this text has the same issue as was just described. Second, this is exactly addressed by footnote 3 to the table in Appendix E. The layout of these three schemes is particularly unusual, and the sharing of cable route and approach to connection is such that the policy and environmental



Stop Lime Down Deadline 7

considerations are materially different for a cable route which is (in part) repeatedly and efficiently used. That is clearly relevant to site selection. In any event, as SLD noted, and applying the appropriate approach to measurement cable routes, including these schemes would have minimal effects on SLD's conclusions (increasing average cable length to 5.1km). As to the comments about West Burton, were SLD to apply the same approach it has to these other schemes, it would reduce the average in any event. None of this changes SLD's conclusions as to the outlier nature of this scheme.

3.2.27. As to para 1.5.5-1.5.7, SLD maintains its position and points to the policy preference and environmental harm related to such a lengthy cable corridor. The fact remains that the 22km 400kV cable connection is an outlier compared to other solar projects, is a result of the defective approach to site selection generally, and clearly and significantly indicates against the Proposed Development.

Section 6: Conclusion

3.2.28. For the reasons set out above, SLD maintains its conclusions expressed in Appendix E and its previous papers on site selection. The Applicant's position is not accepted, is contrary to policy, results in significant and unacceptable environmental effects, and remains a strong indication against the Proposed Development. As SLD has also repeatedly emphasised, the defects and inconsistencies of the Applicant's approach to site selection demonstrate an inadequate approach which is flawed methodologically and substantively and does not give the Secretary of State the requisite information to take into account in the decision-making process.

3.3. Landscape

REP6-065: Landscape and Visual Effects of the Removal of Solar Infrastructure from the Southern Part of Field A1

- 3.3.1. [REDACTED] **agrees** that the removal of panels from the southern part of A1 results in visual effects for transport route receptors no longer being significant adverse, and a small increase in beneficial effects on the CNL.

REP6-069: Wiltshire Council's comments on submissions at Deadline 5

- 3.3.2. 7.15 Outline Soil Resources Management Plan: [REDACTED] agrees with para. 14.1, which states, "Significant concerns remain regarding the scale of soil storage required/proposed, the absence of identified stockpile locations, which in the Councils view risks subsequent conflict with areas of embedded mitigation, stated Design Principles and Parameters and best practice referenced from within various outline Management Plans".

- 3.3.3. 9.55 Applicant's response to submissions received at D4: [REDACTED] **agrees** that *"the applicant, in the Council's view, has not interpreted or applied this guidance [GLVIA3] correctly within their LVIA, landscape assessment, which in the Council considers ultimately culminates in the omission and/or under reporting of adverse change effects for some landscape elements, while over stating the beneficial effects for others."*

- 3.3.4. The Council's response states that *"The Council considers that the applicant should be asked a simple question in relation to their assessment of landscape fabric, as follows... 'Is the term 'Landscape Fabric' as applied within the applicants LVIA interchangeable with the term 'landscape Element' as defined in the GLVIA3 Glossary (page 156)?"*

- 3.3.5. In [REDACTED] opinion, the LVIA **does** use the terms 'fabric' and 'element' interchangeably (see for example LVIA para. 8.7.15, which states, "... In LVIA there must be identification of both: • Landscape Receptors, including **the constituent elements of the landscape (the Landscape Fabric)**, its specific aesthetic or perceptual qualities and the character of the landscape in different areas; and..." (emphasis added)).

3.3.6. However, the LVIA does **not** conform to GLVIA3's definition of 'elements', which is "*individual parts which make up the landscape, such as, for example, trees, hedges and **buildings***" (emphasis added), the word 'buildings' clearly indicating that 'elements' include both 'soft' / natural and 'hard' / man-made items. Indeed, in [REDACTED] experience it is very unusual for an LVIA to exclude the latter.

3.3.7. The Applicant's position is that the 'hard' / man-made elements are included in the assessment of overall effects on landscape character, which does appear to be the case, but these elements should also have been included in the LVIA's assessment of effects on landscape 'fabric'.

3.3.8. As they are not included in the 'fabric' assessment, the result is, as noted by the Council, that the Applicant only reports the effects arising from the removal / introduction of 'soft' elements such as hedges, trees and grassland, and does not factor the introduction of the 'hard' elements into the conclusions. Evidently, this does not provide a balanced outcome.

3.3.9. Furthermore, the LVIA concludes that the introduction of the 'soft' elements would result in beneficial landscape / visual effects, but erroneously double counts mitigation as enhancement (albeit acknowledging that GLVIA3 is clear that mitigation cannot be double-counted as enhancement, and that this is a deliberate departure from GLVIA3) – the benefits would only arise where the 'soft' elements are not required to mitigate adverse landscape and visual effects.

3.3.10. [REDACTED] agrees with the Council that "*The LVIA should include within its separate assessment of fabric components, all elements, both natural and manmade, existing and introduced into the landscape within the DCO order limits / study areas, to help the ExA understand the direct tangible landscape effects attributable to the proposed development during construction, operation and decommissioning stages*".

- 3.3.11. 9.60 Limestone Lowlands Character Area: [REDACTED] **agrees** with the Council's concerns expressed in this section about the Applicant's assessment of the landscape character areas and types.

REP6B-007: Assessment of Effects on the CNL and its Special Qualities

REP6B-010: Applicant's Response to Relevant Representations and Written Representations

- 3.3.12. [REP6B-007] ES Appendix 8-6 *Assessment of Effects on the CNL and its Special Qualities (Rev 3) (Tracked)* has been updated to reflect the Applicant's proposal to remove solar infrastructure from Field C9. [CR1-046] *Supporting Environmental Information Report (Change Application)* para. 1.7.2 states that the whole of Field C9 would be planted with "low density scrub".

- 3.3.13. It is not clear why references to low density scrub planting in Field C9 have been removed from the [REP6B-007] report, which now states that Field C9 would be sown with diverse wildflower meadow species - see for example para. 2.3.25. Clarification of this point would be helpful. Para. 2.3.25 explains that the purpose of the creation of meadow in this location is "*to maintain the relationship of the Church within Alderton Conservation Area and the surrounding landscape*" – presumably the Applicant means that historically, meadow would be more characteristic / appropriate than arable. However, if low density scrub is planted instead, this objective would not be met.

- 3.3.14. SLD's landscape comments on this part of the Change Application are in Section A of Appendix A to [REP6-081] *SLD Deadline 6 Final Submission and Appendices*. At para. 14, [REDACTED] explains that in her opinion, the introduction of low-density scrub is very likely to result in localised adverse landscape and visual effects due to the contrast between the existing orderly agricultural baseline character, as identified in, and typical of, the published character assessments, and dynamic, unmanaged vegetation, which is not characteristic in these landscapes.

3.3.15. The Applicant's response to the above point is set out in [REP6B-010] Applicant's Response to Relevant Representations and Written Representations Received at Deadline 6, at Ref. SLD-007 on page 108. It states, "*The Applicant recognises that these changes in land management would begin to alter the character of the receiving landscape, but respectfully disagrees that these changes would necessarily be adverse, and would suggest that they would be perceived as Neutral.... A change to the landscape and visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation*".

3.3.16. [REDACTED] agrees that in principle, a change to the landscape and visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation. However, in this case, as noted at para. 14 of SLD's [REP6-081] Appendix A, the alteration to the existing situation would result in the introduction of features which are not part of the prevailing character.

3.3.17. In the response at Ref. SLD-007, the Applicant argues that "*it is only reasonable to assume that there is an understanding that these landscapes are dynamic and through the implementation of the Local Nature Recovery Strategy that there would be an increase in the change in farming practices across Wiltshire with more land being brought forward for nature recovery purposes rather than traditional agricultural farming*". That may be the case; however, in [REDACTED] opinion, this proposal, and the resultant landscape and visual changes, should be considered in relation to the **existing** baseline situation.

3.3.18. Regarding [REP6B-007], under the heading Specific Enhancement Measures, para. 2.3.21 states, "In response to Consultation, specific embedded **mitigation measures** have been included within the Outline LEMP [EN010168/APP/7.18] to both maintain and enhance landscape character on the edge of the CNL" (emphasis added). This highlights SLD's concerns about double-counting, ie the Applicant's claims that the Scheme would deliver



Stop Lime Down Deadline 7

landscape / visual benefits, whereas this would only be the case where the proposals are not required to mitigate adverse landscape and visual effects.

3.3.19. [REDACTED] understanding is that the third item in the list at para. 2.3.21, which is “Maintaining hedgerows at their current height of c1.5m (or as existing if greater) bordering the CNL within Site C (including the northern boundary of C1 to maintain open views of the landscape within the setting of the CNL” is mitigation, not enhancement.

3.3.20. The above point is relevant to the Applicant’s proposed linear tree planting in hedges along the lanes which form the boundary of the CNL adjacent to Field C9, the aim of which is to “preserve the character of the setting of the National Landscape”, which is the subject of ExQ2 LV2.7.

3.3.21. As explained at paras. 45 – 67 of [REP6-081] Appendix A, [REDACTED] does not agree with the Applicant that the proposed linear tree planting in hedges “complements the existing landscape character”, nor that it would “support the landscape character of their setting”. Escaped roadside hedgerow trees are not characteristic along this section of the CNL boundary, nor within this part of the study area, and the significant increase in tree cover would screen the existing open views towards and from the CNL, which are one of the CNL’s Special Qualities.

REP6B-011: Applicant’s Response to SLD Deadline 5 Landscape Submission

3.3.22. Sequential Visual Effects on the Wiltshire Cycleway [REP4-078]: At para. 1.2.1 the Applicant states, “*The Applicant does not accept that it is reasonable to assume that all existing off site vegetation would be lost over the lifetime of the development. This is especially relevant considering the dispersed nature of the Sites and the strong framework of existing vegetation that exists between them which as an example includes extensive blocks of woodland, many of which is designated as being Ancient Woodland and is protected. Its retention is therefore*

considerably more likely than its removal. As such, it is not considered that suggesting removal of such large scale landscape features would constitute a 'reasonable' worse case".

3.3.23. [REDACTED] does not assume that *all* existing off site vegetation would be lost over the lifetime of the development, but does considers it reasonable to assume that a proportion would be lost, due to factors including natural death in old age; removal of, for example, mature forestry plantations / orchards, and hedgerows / trees for land management / land use purposes; accidents; erosion, decline and death from intensive land use / pollution, and / or pests / pathogens / diseases; climate / weather-pattern changes, especially the increase in prolonged periods of heat / drought, and rainfall / flooding; or a combination of these and other factors.

3.3.24. [REDACTED] position on this matter remains as summarised in [REP4-078] and explained in Section 7.5 of SLD's LVIR and other submissions. [REDACTED] does not agree that all of the vegetation which currently screens views, or is proposed to screen them, can be relied upon to do so in future, and considers that judgements about effects on views do not reflect a reasonable worst-case scenario: levels of adverse visual effects are likely to be higher than predicted.

3.3.25. Para. 1.2.2 states that "*The establishment and longevity of proposed on site vegetation as well as existing vegetation would be protected under the detailed Landscape and Ecological Management Plan*". Firstly, the establishment and longevity of existing **off-site** vegetation would **not** be protected under the detailed LEMP.

3.3.26. Secondly, the establishment and longevity of proposed on-site vegetation may be "protected" under the detailed LEMP, but that does not mean the proposed vegetation would certainly successfully establish and remain in place for the duration of the operation.

3.3.27. [REDACTED] agrees that in theory, Ancient Woodland, which is protected, should have a high degree of permanence, but unfortunately, around the country, trees in Ancient Woodlands **are** being lost due to a) pests / pathogens / diseases; and b) climate / weather-pattern changes, especially the increase in prolonged periods of heat / drought. Note that the two categories often overlap: according to Forest Research (an executive agency of the Forestry Commission), climate-stressed trees are far more vulnerable to opportunistic pests and diseases (see for example <https://www.forestresearch.gov.uk/climate-change/risks/pests-and-diseases>).

3.3.28. Furthermore, not only are mature specimens affected, but also, according to Forest Research, *“Prolonged dry springs and extreme summer heatwaves are killing young, newly planted native saplings before their roots can establish; data indicates more than 20% of recently planted saplings have died purely from drought stress”*.

3.3.29. As noted at paras. 62 and 63 of SLD’s [REP6-081] Appendix A, it is not clear how the Applicant intends to address watering under such circumstances, in terms of source, availability, and capacity of the water supply, and frequency of monitoring. If the newly-planted trees and shrubs do not establish successfully and have to be replaced – which could potentially be more than once during the Scheme’s 60-year operational period – there would be consequences for the LVIA’s assumptions about the length of time it would take for plants to grow tall enough to screen views. Levels of adverse effects could remain at high levels for longer than predicted.

3.3.30. Applicant’s Response to Other Parties’ Responses at ExQ1 (LV1.2, LV1.4, LV1.5): Paras. 1.2.7 – 1.2.21 of [REP6B-011] reiterate the Applicant’s opinions, with which neither [REDACTED] nor Wiltshire Council agree (see comments on Wiltshire Council’s [REP6-069] above and previous submissions), that a) the definition of landscape ‘fabric’ relates solely to ‘soft’ / natural landscape elements, not ‘hard’ / man-made elements, which does not accord with GLVIA3’s

definition, and b) that it is acceptable to double-count landscape / visual mitigation measures as landscape / visual enhancements, which GLVIA3 makes clear it is not.

3.3.31. Indeed, the Applicant accepts that this is a deliberate departure from the Guidance, proposed to attempt to find benefits where in reality, they would only exist where the planting is not required for mitigation. Para. 1.2.20 of **[REP6B-011]** states, *“it is the substantial gains, compared to the negligible losses that are considered to result in the Beneficial Effects to Landscape fabric”*.

3.3.32. LV1.6: [REDACTED] response to this question is in SLD’s **[REP3-173]**, with further comments in **[REP4-132]**. In summary, [REDACTED] agrees with Wiltshire Council about the Applicant’s approach being unusual in terms of the LVIA having assessed geographical study areas as opposed to Landscape Character Types (LCTs) and Landscape Character Areas (LCAs).

3.3.33. Para. 1.2.22 of **[REP6B-011]** reiterates the Applicant’s opinion that *“GLVIA3 does not suggest that an LVIA should consider individual Landscape Character Areas (LCAs) or Landscape Character Types (LCTs) as individual Landscape Receptors, rather that LCAs / LCTs are used to identify the Baseline”*.

3.3.34. [REDACTED] does not agree with this assertion. At paras. 4.1.40 and 4.1.41 of **[REP3-173]**, [REDACTED] refers to para. 5.44 of GLVIA3, which states that following the baseline studies, *“the value of the Landscape Character Types or Areas that may be affected”* should be established, and para. 5.50, which states that *“The geographical area over which the landscape effects will be felt must also be considered”*, which may be *“at the scale of the landscape type or character area within which the proposal lies”*, or *“on a larger scale, influencing several landscape types or character areas”*.

3.3.35. LV1.9: Here, the Applicant reiterates that “the setting of the CNL to be defined by the area within which development and land management proposals,

by virtue of their nature, size, scale, siting materials or design can be considered to have an impact, positive or negative, on the landscape, scenic beauty and special qualities of the CNL”.

3.3.36. [REDACTED] agrees with this definition, but as set out in Appendix A of SLD’s [REP5-130], does not agree that the setting on the CNL only extends to parts of Lime Down A, B and C, on the basis that, as shown on the ZTVs for the individual Lime Down sites, Lime Down E, which is furthest from the CNL, is intervisible with the CNL. See also Natural England’s response to ExQ2 LV2.5 in [REP5-140], and [REDACTED] comments on Natural England’s response in Section D of [REP5-130] Appendix A.

3.3.37. Protected/valued landscape status: At para. 1.2.43 of [REP6B-011], the Applicant states that they do not agree with [REDACTED] opinion about the levels of landscape value ascribed in the LVIA to Lime Down Sites A – E. Para. 1.2.43 states that the LVIA “*has identified Sites A, B and C as being of High Value. The Applicant has identified that the value of the landscape decreases from east to west with Sites D and E being identified as Medium Value*” (“east to west” may be an error, as the higher value CNL is to the west, so it should be “west to east”).

3.3.38. Firstly, note that in the SoCG with Wiltshire Council, the Applicant “*agrees that Lime Down Sites A, B and C are within the setting of CNL and have a higher value than Lime Down Sites D and E*”. However, the Applicant has now confirmed (in writing and on plans) that it considers that only parts of Sites A, B and C are within the setting.

3.3.39. Secondly, the High level of value ascribed to Sites A, B and C highlights the problem of the Applicant’s use of a four-point scale for value levels, where the highest category is High, but the lowest is Very Low: for balance (and so that Moderate is in the middle), there should be a Very High category. Using the five-point scale, the Very High category would differentiate between nationally designated landscapes such as the CNL, which would normally be Very High, and

landscapes within the CNL's setting, which would normally (but not always) be High.

3.3.40. [REDACTED] agrees with the Applicant's comment in para. 1.2.44, that *"landscape value is derived from many varying factors, and whilst being within the setting of a National Landscape may be an indicator to its value, must not be the only consideration. Conversely, where land is outside of the setting of a national landscape, it should not be considered to not being of high value"*. However, in this case, in [REDACTED] opinion, the Applicant has not carried out a granular assessment to establish how levels of value vary across the sites – as noted previously, the LVIA ascribes the same level of value to each of the individual sites.

3.3.41. In [REP5-130], [REDACTED] a) queries why the Applicant ascribes a High level of value to the whole of Lime Down A, B and C, when it considers that only parts of those sites are within the CNL's setting, and b) seeks clarification on the factors which have resulted in the parts of Lime Down A, B and C which are not considered to fall within the setting being categorised as the same High level of value as the parts which do.

3.4. Heritage

REP6-063: Final Evaluation Reports

3.4.1. SLD welcomes the submission of the Final Evaluation reports and the greater clarity these give to the archaeological potential of the Site. No further comments on the these.

REP6-013: Outline Archaeological Mitigation Strategy



3.4.2. SLD welcomes the updated Outline Archaeological Mitigation Strategy and clarity given regarding the use of Horizontal Directional Drilling in proximity of the Pillow mound 280m southwest of Surrendell Farm' (NHLE: 1018610). SLD has no further objections or additional comments regarding the Outline Archaeological Mitigation Strategy.

3.5. Hydrology

REP6-011: FRA and Outline Drainage Strategy – Lime Down C1

3.5.1. This is the only FRA which has been altered by the Applicant at Deadline 6. At, paragraphs 2.4.13 to 2.4.16, the Applicant explains that the EA's new Flood Risk datasets have only slightly increased the flood risk area compared to the previous set, but that the increase is not material and does not alter the strategy of building the substation in the drier part of the field, away from the surface water flow route. Paragraph 2.4.16 states: "*Where any part of the final substation layout cannot avoid the identified surface water flow route, the site-specific assessment and mitigation measures outlined in this FRA will apply to ensure that the existing flow conveyance and storage are maintained, and that flood risk is not increased elsewhere.*" What these measures are is not obvious.

3.5.2. The EA in response to ExQ2 **[REP5-124]**, expressed their concern about this issue and asked for further studies at the design stage and wording to secure this in the DCO. SLD remains concerned in respect of the Applicant's proposed siting of a substation within the floodplain.

REP6-060: The Applicant's Responses to Submissions Received at Deadline 5

3.5.3. SLD-075 to SLD-076: SLD notes the Applicant's response which maintains its prior position that there is no excess runoff generation from the panel areas.

3.5.4. Appendix D to SLD's Deadline 5 submission uses modelling to demonstrate that, over much of the site, panel runoff will be increased, the larger panels will create more runoff, panel orientation on the slope will also increase runoff and grass cover under the panels will not be sufficient to alleviate this. The Applicant's response is simply that "*The Applicant does not consider that SLD's Appendix D alters the conclusions of the Scheme assessment.*" SLD welcomes the action point issued by the ExA following ISH5 which requires the Applicant to finally provide a rebuttal to SLD's Deadline 5 report [REP5-130], including commentary on:

- The percentage of vegetation cover required to successfully address surface water run-off including any potential 'gaps' in ground cover during the installation period to the full establishment of the grass sward
- The timing for review of 80% take of grass sward and an explanation if this needs to be reviewed
- The adaptive management details of the grass sward to take account of climate change
- Any differences of run-off rates between the various soil types within Lime Down following the full establishment of the grass sward
- The need for further SuDS and/ or temporary SuDS to address surface water run-off from the PV panels and achieve the agreed run-off rates. If so, include an explanation of how this will be calculated and addressed in the outline Drainage Strategies
- How all the relevant management plans will be updated including, but not limited to, oCEMP, oOEMP, oLEMP and outline Drainage Strategies
- Include a comment on the robustness of the model used by SLD in their report
- Any other matters within the report that the Applicant considers pertinent to respond to.

3.5.5. SLD will consider the Applicant's Deadline 7 response and address any remaining points in its closing submissions.

- 3.5.6. SLD-078: SLD continues to doubt the ability of the Applicant to grow and maintain a grass sward beneath the panels, particularly in light of changing climate conditions.
- 3.5.7. SLD-081: SLD notes that infiltration to the ground has (rightly) been discarded as a mechanism for disposing of excess water from hardstanding areas, and the SLD agrees with this change.
- 3.5.8. SLD-082: The Applicant disputes that drainage would be impeded beneath the panels because of the poor infiltration rates leading to the excess runoff described in Appendix D. The Applicant's response suggests that SLD are conflating two different drainage mechanisms. That is not the case. SLD agrees with the Applicant that *"The relevant potential change is the local redistribution of rainfall, and whether that redistribution becomes hydraulically connected to a watercourse or receptor."* The modelling in Appendix D explores the implications of that local redistribution of rainfall. SLD merely notes that the poor infiltration which prevents use of soakaways to dispose of hardstanding water will also mean that drainage from most panel areas will be inhibited and hard to remediate. Poor infiltration is the mechanism behind both these effects. The Applicant's comments about mitigation are irrelevant to this discussion.
- 3.5.9. SLD-083: SLD's Deadline 5 submission seeks clarification in respect of whether swales, detention basins, and ponds for the substation and roads, and infiltration trenches for the conversion units will be located. The Applicant's response does not provide any further clarification.
- 3.5.10. SLD-086 and SLD-087: SLD's Deadline 5 submission enquires where the retention storage for Area D will be. The Applicant's response explains that it does not want to constrain their options, but they believe there is enough room round the BESS and along the "drainage conveyance route" into the Gauze Brook. SLD queries how there will be enough room around the BESS, given that is also the location for the retention volume for potentially contaminated

firefighting water. This cannot therefore be a permeable SuDS system, except for runoff from the road. We now know that the impermeable storage would be under the BESS/substation.

3.5.11. SLD-100 to SLD-103: SLD's Deadline 5 submission pointed out that the hydraulic modelling implied much lower peak flows for a given flood event than data from the flow gauges on the Gauze Brook and Rodbourne Brook. As discussed at ISH5, SLD acknowledges that the flow gauges for both streams has limitations which can be used to challenge the validity of the measured high flows.

3.5.12. [REDACTED] further disputes the Applicant's statement that "characterising Storm Bert as a particular AEP event requires an appropriate hydrological analysis and cannot be established solely by comparing an observed or rated peak with one model inflow." The "appropriate hydrological analysis" requires a long-term flow record, and cannot be used in this case because this would mean using high flow records from the Gauze Brook which the Applicant claims are unreliable. The Storm Bert AEP was thus estimated from rainfall data as explained in SLD's Written Representation Appendix F3 [REP1-176]. The latter part of the Applicant's statement makes little sense.

3.5.13. SLD-110 to SLD-113: The Applicant has made numerous attempts to downplay the significance of the observed lake which developed above Corston during Storm Bert in 2024. The Applicant claims that it was not possible to verify the time and position of the video presented as images. However, SLD has provided evidence from EXIF metadata of the exact time and location in its Deadline 5 submission [REP5-130] paragraph 2.6.22. [REDACTED] notes that the video was taken three hours before the flood peak and therefore does not represent the maximal flood extent. SLD's case is that the video shows that the observed flood extent was greater than the Applicant's model predicts.

3.6. Transport

3.6.1. REP6B-012: Transport Response to Appendix C of SLD Deadline 5 Submission:

3.6.2. The Applicant has undertaken additional calculations in respect of the probability of HGVs meeting on Fosse Way and Bradfield Cottages that exclude those sections of these sensitive routes where they consider that HGVs are able to pass. These calculations still show 1.54 HGVs passing each other on Fosse Way every hour and 1.15 HGVs per hour passing each other on Bradfield Cottages. [REDACTED] considers that this confirms that there will be unacceptable conflicts along these sensitive sections of road;

3.6.3. The Applicant has also assessed the implications if HGVs travel in convoys of 2 vehicles. This still shows 0.92 meetings on Fosse Way and 0.9 meetings on Bradfield Cottages per hour. [REDACTED] does not consider that this provides comfort since a convoy of two vehicles meeting an HGV travelling in the opposite direction raises even greater concerns over highway safety (risks of vehicles braking suddenly, insufficient space to pass two vehicles).

3.6.4. The probability calculations are based on the Applicant's original trip generation figures. If the ExA accepts that the figures should be higher, the frequency of HGVs meeting will be higher (or the duration of vehicle conflict increases).

1.1.1. It was agreed that there would be 2.31 and 1.17, on the basis of the Applicant's original estimates of HGV deliveries, occurrences of HGVs meeting per hour on the Fosse Way and Bradfield Cottages respectively. If the ExA accepts that the figures should be higher (as SLD suggest), the frequency of HGVs meeting will be higher (or the duration of vehicle conflict increases).

REP6-061: Highways Technical Note – Non-Motorised User Surveys

3.6.5. The revised NMU survey (**REP6-061**) confirms that parts of the local highway network are used by significant numbers of NMUs. However, [REDACTED] notes that parts of the survey were undertaken when temperatures were very high (over

30 degrees on one day and over 27 degrees on three other days). This is likely to have subdued some NMU movements, particularly equestrians.

3.6.6. The survey found 41 cyclists during weekday delivery hours on Fosse Way and 93 during Saturday morning delivery hours with even greater numbers on Alderton Road (50 and 100 cyclists respectively). On Bradfield Cottages, south of Bradfield Cottages there were 30 cyclists during weekday delivery hours and 66 during Saturday delivery hours. However, the survey failed to identify the number of pedestrians on the section of Bradfield Cottages south of the railway where the lane is particularly constrained. The nearest survey point was just south of the Flying Monk cafe but this would not have picked up pedestrians with origins and destinations between Hullavington and the Flying Monk (residential areas, employment, a right of way on the eastern side of the road south of the survey point). It should also be noted that the PRow from Hullavington to Bradfield Cottages is currently closed due to the construction works at a residential site;

3.6.7. The Applicant concludes, '*There is therefore no material impact on cyclists at [these] location[s]*'. This conclusion is based on an assumption that passing places would be used but cyclists and HGV drivers, confronted by cyclists, are very unlikely to use passing places. [REDACTED] does not agree with the Applicant's conclusion since there will obviously be high numbers of instances of HGVs meeting cyclists on narrow sections of road where forward visibility is restricted in places;

3.6.8. Para. 4.2.3 compares the surveys with Strava data. This comparison has no credibility since Strava data is highly selective, including only those who use the Strava app. Paragraph 4.2.3 also refers to the January 2024 surveys. Details of the 2024 data have never been made available despite repeated requests.

3.6.9. There were 6 pedestrians observed on Bradfield Cottages during weekday delivery hours and 7 during Saturday delivery hours. The conclusion reached is



Stop Lime Down Deadline 7

that passing places are available. There are, however, places where there is very limited space for pedestrians to step away from the carriageway. The surveys did not identify pedestrians with origins and destinations further south and the public right of way from Hullavington is currently closed so the surveys are likely to underestimate the number of pedestrians on the most sensitive section of Bradfield Cottages south of the railway.

3.6.10. Equestrians were observed in a number of locations. It is known from submissions that many people have raised concerns about impacts on equestrians. The Applicant concludes that there would be no material impact on equestrians. This is clearly not the case.

3.6.11. [REDACTED] considers the report cursory and dismissive of significant highway safety impacts involving vulnerable highway users.

3.7. Ecology and Biodiversity

REP6-060: Applicant's Responses to Deadline 5 Submissions

3.7.1. [SLD-049 and SLD-050]: The Applicant explains that while expectations are for the wildflower meadow to establish in 10+ years, as it develops the area would still be suitable for nesting skylark. While species richness/soil conditions would indirectly affect the number of invertebrates present (and thus their value as foraging habitat), the Applicant points out that these would not be the primary aspect that would affect the number of skylark territories present within. Rather the primary factors for skylark adoption will be managing sightlines and ensuring a varied sward.

3.7.2. [SLD-058]: In response to SLD's query concerning what would trigger a crayfish survey, the Applicant has confirmed that the crayfish surveys would form part of a pre-works habitat assessment, to re-assess suitability (similar to what has already been carried out in the initial ecological surveys). If suitable habitat is

found which could be impacted by the culverts, a targeted search for presence is to be carried out. If found, this would then be followed up by the drafting of appropriate mitigation considerations, be they either re-siting the culvert and/or securing a licence. [REDACTED] is satisfied with this approach, although he queries whether a WCC licence may be required where WCC presence cannot be discounted.

3.8. Noise

REP6-017: Baseline Noise Survey

3.8.1. The update to the Applicant's Baseline Survey Report details that following review of the meteorological data, periods of noise monitoring affected by adverse weather have been omitted from the analysis.

3.8.2. The update does not state where meteorological data was obtained from, nor what filters were applied to omit such data. The report mentions periods of heavy precipitation were excluded, but does not mention high wind speeds, which significantly affect background levels.

- As an example, for position LT6, a short period on Friday 13/10/23 was excluded, however, it is clear that the remainder of that day, background levels were significantly elevated above those which occur for the remainder of the monitoring period.
- At monitoring location LT9, LT10, LT11 and LT13, for the same period, no data was omitted from the analysis on 13/10/23 – a day which was clearly affected by significant rainfall and high winds. It is not clear why this is the case.

3.8.3. The veracity of this analysis and update is therefore questionable. Nevertheless, the updated report concludes that average LAeq levels would be lower than previously reported (particularly at LT6 with levels 3dB lower at night). The average LAeq levels would also be likely to be lower at LT9, 10, 11 and 13

if data from Friday 13th October was omitted. This may affect resultant construction noise limits detailed in the noise assessments.

3.8.4. The background LA₉₀ levels were reported to have changed following the analysis. This is unsurprising, as the Applicant's analysis essentially selects the modal value from the dataset. Our position remains that use of the modal value from this limited monitoring period is not appropriate to represent the very quiet conditions that can occur.

3.9. Climate

REP6-060: Applicant's Responses to Deadline 5 Submissions

3.9.1. SLD-117 to SLD118: SLD points out that in the Climate chapter of the ES, rainfall data from Yeovilton was used to represent Lime Down, giving a much lower rainfall than from a more appropriate site, and enquires as to what the data were used for. The Applicant replies that the baseline data were used "to inform the baseline situation only". The Applicant does not offer any further justification for its approach, and SLD considers that this is generally unsatisfactory. The meaning of this is unclear, but SLD suspect it confirms that no conclusions relevant to the enquiry have been drawn from these data. Predictions for the future have used gridded rainfall data from UKCP18, hence the correct data. The analysis in turn is based on the RCP8.5 emissions pathway, now officially deemed to be unlikely to occur. However, no conclusions seem to have followed from this analysis either.

3.10. BESS Fires

REP6-060: Applicant's Responses to Deadline 5 Submissions

3.10.1. SLD-115: SLD outlines the containment arrangements and arrangements for disposal, and the Applicant notes our agreement with the risk calculation. It remains unclear to SLD whether the storage volume is sufficient

given that it may carry on raining after the incident is over, whereas analysis of the retained water and tankering off site will take time during which the containment may overflow.

3.10.2. SLD-116: SLD questions whether the volume of firefighting water will be sufficient, given that the supply is for 4 hours at 1900 L/min which was the flow recommended in the guidance, whereas BESS fires can last considerably longer. In reply, the Applicant points out that the guidance has now been reduced to 1500 L/min, which would give 5 hours water. The Applicant discusses firefighting tactics which use less water, including re-using the collected water from storage under the BESS and applying cooling water intermittently to other containers. SLD queries whether the revised 1500 L/min guidance already includes allowance for this sort of tactic.



4. Conclusion

4.1.1. This submission has addressed SLD's post-hearing submissions, including responses to APs, and comments on D6 and D6B Documents.

4.1.2. SLD's review of that material confirms that the additional information has not resolved the concerns raised by SLD at preceding deadlines. For all the reasons set out in this submission, and the documents prepared by SLD so far, SLD maintains that development consent should not be granted for the Scheme.



Stop Lime Down Deadline 7

5. Appendixes



APPENDIX A

SITE SELECTION REPORT



Site Selection and Alternative Site Assessment
October 2026



Contents

1.	Introduction.....	3
2.	Proportionality	4
3.	RAG Rating Review.....	8
4.	Review of the Applicant's PDA 10 Submission.....	24
5.	Main Findings from Re-Assessment of Assessment Criteria	28
6.	Summary.....	33

1. Introduction

- 1.1. This Alternative Site Selection Report has been prepared by Marrons (planning consultants) on behalf of SLD Wiltshire Limited. Marrons have been commissioned by Stop Lime Down (SLD) to prepare this report to provide an independent assessment of the alternative site selection work which has been previously undertaken by the Applicant (Lime Down Solar Park Limited) prior to and during the examination period by the Planning Inspectorate.
- 1.2. The purpose of this statement is to assess the work undertaken by the Applicant including their ongoing submissions and responses to the questions raised by Examiners and specific issues which have been raised by SLD throughout the examination process.
- 1.3. This report therefore does not repeat all the previous comments made by SLD, though offers an additional perspective and should be read in conjunction with previous comments made by SLD which are supported by Marrons.

2. Proportionality

- 2.1. As detailed in the Written Representation of Stop Lime Down (REP1-167) there is a requirement on the Applicant to include “information about the reasonable alternatives they have studied” and to give “an indication of the main reasons for the Applicant’s choice, taking into account the environmental, social and economic effects and including, where relevant, technical and commercial feasibility”.
- 2.2. NPS EN-1 highlights that the consideration of alternatives “should be carried out in a proportionate manner”.
- 2.3. Stop Lime Down at that time highlighted defects in the methodology applied by the Applicant and defects in the outcome of the alternative sites assessment itself. This included a clear failure to properly assess the environmental effects of PDA 10 and as a result a selection of a manifestly inappropriate site for the proposed development. This was as detailed in Appendix L to the Written Representations of Stop Lime Down (REP1-186).
- 2.4. The position that Stop Lime Down has advanced through those and its later submissions is not replicated here in detail, with the exception of further consideration of the PDA scoring in Section 3 of this report.
- 2.5. As detailed in Stop Lime Down’s Appendix L to the Written Representations (REP1-186), and in the report submitted by Marrons at (REP1-168) at Appendix A to the Written Representation (from paragraph 5.20), the adequate assessment of alternatives remains an important material consideration. This should be done in a proportionate manner, which Stop Lime Down has set out, has not been done.
- 2.6. Marrons supports this view. The Applicant is correct in advising that there is no definition of “proportionate manner” provided within NPS EN-1, however, in our view the level of work required should reflect the importance of the issue, and the characteristics of and potential consequences of the scheme. Proportionality is not the same as a minimal assessment.
- 2.7. The Applicant acknowledges that the site selection work has been an iterative process, and it is Marrons’ view that there were, and remain issues with the preferred site. Therefore, it is evident there has been and remains the need to test alternative sites. There are substantial concerns with PDA10, acknowledged within the Applicant’s own assessment. Notably, and among other things, it abuts a national landscape and is the most distant PDA originally assessed from the substation for grid connection.
- 2.8. Proportionality should operate consistently between alternatives. The Applicant has now undertaken further work involving removal of constraints and combining PDA’s into clusters but has not applied the same approach to PDA 10.
- 2.9. The Applicant’s responses to the submission of Stop Lime Down, with respect to site selection, are included in its Technical Note on Site Selection Assessment (REP3-173), Applicant’s Response to the ExA Second Written Question (REP5-097) and the Applicant’s Response to SLD’s D5 Submission Appendix E (Site Selection and Cable Route) (REP6-064).
- 2.10. The Technical Note on Site Selection Assessment (REP3-173) includes:

- Consideration of an expanded search area to 25km;
 - Land within the Bath Green Belt;
 - Use of the “least constrained areas of land” potentially combining individual PDA in Clusters; and
 - Review of further areas of land within PDAs.
- 2.11. The Applicant’s Technical Note replies directly to the position of Stop Lime Down in its submissions whilst noting, at paragraph 1.1.6, that “there is no policy requirement to show that the proposed site for the Scheme has the fewest adverse impacts”.
- 2.12. Notwithstanding this, the Technical Note includes a direct response to the deficiency highlighted by Stop Lime Down that the Applicant had not considered combining parts of PDAs. Stop Lime Down’s position here being:
- There is no explanation of how the component parcels were collected together into each PDA;
 - The Applicant frequently recognised as an option the combination of its PDAs, however this was not properly explored across the range of PDAs where it was recognised; and
 - Where it was explored, it was constrained by the approach taken to identifying PDAs.
- 2.13. The Applicant through Section 4 of the Technical Note reconsiders the PDAs through removal of areas affected by individual constraints and combining / re-assessing these “at a high level” to further consider suitability as alternative sites. The Applicant does not undertake the same re-evaluation of PDA10 in this Technical Note.
- 2.14. We note there are various constraints removed from the reconsidered PDAs which affect PDA10. This is highlighted in the plan at Annex A of Applicant’s Response to SLD’s D5 Submission Appendix E (Site Selection and Cable Route) (REP6-064). There remains inconsistency in the approach undertaken by the Applicant between the PDAs. Some of these removed areas may be suitable if the same level of assessment had been completed as had been for PDA10.
- 2.15. The reconsidered PDAs, with constraints removed, are grouped by the Applicant into three clusters comprising:
- Cluster 1 – PDA 6, 11, 2, 8 and the northerly part of 3
 - Cluster 2 – PDA 3 and 8
 - Cluster 3 – PDA 6, 11 and 12
- 2.16. Our review of the PDAs and Clusters are set out in Section 3 and 5 of this report.
- 2.17. There remains a clear difference in view between the Applicant and Stop Lime Down as to whether the Applicant’s approach to site selection is proportionate, in line with the policy requirements of NPS EN-1.
- 2.18. The Applicant is correct in highlighting there is no definition of what is or is not “proportionate”. It is agreed between the Applicant and Stop Lime Down that this however must include sufficient detail in order for the Secretary of State to form a view on whether any identified alternative sites are important and relevant for their decision (para 1.2.3 of REP6-064).
- 2.19. In our view, proportionality should not be understood as meaning that alternatives can be considered at whichever level of detail the Applicant considers convenient. The appropriate

level of assessment should be sufficient to enable a meaningful comparison between the proposed development site and any alternative which has been identified as potentially capable of accommodating the Scheme. This does not require every alternative to be assessed to the same level of detail as the proposed site. It does, however, require sufficient evidence to establish whether an alternative can reasonably be discounted on environmental, social, economic technical or commercial grounds.

- 2.20. This is particularly important where the alternative has been identified by the Applicant itself through its site selection process, and where the alternative has subsequently been shown to have potentially developable areas through the Applicant's further assessment of constraints and clustering. In those circumstances, a high-level identification of constraints should not, without more, be treated as sufficient to discount the alternative. A proper and proportionate assessment should establish whether those constraints are capable of being avoided, mitigated or accommodated through the site layout, boundary refinement or combination with adjoining land.
- 2.21. The issue is therefore not whether every potential alternative requires the same level of assessment as the Scheme. The issue is whether the Applicant has undertaken sufficient work to demonstrate, on the evidence available, that the alternatives which it has identified can reasonably be discounted. In our view, that has not been demonstrated in relation to the clusters identified in REP3-173 and REP6-064.
- 2.22. The Applicant's Response to SLD's D5 Submission Appendix E (Site Selection and Cable Route) (REP6-064) notes at paragraph 1.2.14:
 - *"These additional alternatives have not been assessed in the same level of detail as the chosen site or as the potential development areas (PDAs) identified in ES Volume 3, Appendix 4-1 Site Selection Assessment Report [APP-185] as the Applicant does not consider it proportionate to do so."*
- 2.23. Further:
 - *"The Applicant notes that, given the stage of the examination, these alternatives are unlikely to be developable in the same timescales as the Scheme (NPS EN-1 paragraph 4.3.23). Further work would be required to fully understand their commercial viability in terms of available space, landowner willingness to accommodate the solar PV, connection and layout (NPS EN-1 paragraph 4.3.27, NPS EN-3 paragraph 2.10.60). On that basis, the alternatives are unlikely to be able to meet the same objectives as the Scheme (NPS EN-1 paragraph 4.3.22) in terms of the grid connection offer and deliverability even if further assessment and design work identified that the alternatives were suitable for accommodating solar development"*
- 2.24. Timescales are also referred to in paragraph 1.2.4 of the same document:
 - *"The existence of an alternative site in itself does not make it important and relevant. It must be a "feasible and viable alternative" (which, for the Scheme, means one capable of delivering the necessary capacity to the grid connection by the anticipated 2029 grid connection date)."*
- 2.25. We do not consider the Applicant's comments regarding timing should be given any weight at this stage. The failure to adequately consider alternatives lies with the Applicant for not

completing the necessary steps at an earlier stage in the process. The lack of proportionate consideration of combining PDAs pre-submission should not weigh against the alternatives now. This demonstrates the Applicant has not been robust in its approach.

- 2.26. The issue of the lack of alternative sites selection assessment has been raised prior to the examination by Stop Lime Down, so the concern raised around lack of time is not accepted. The requirement to undertake site selection assessment work is clearly set out within the NPS-1 and that this should be done prior to submission.
- 2.27. Furthermore, the assumption made by the Applicant that the scheme will be consented by March 2027, with a 2-2.5 year build out, and operational in 2029 appears questionable. The scheme of this scale, size and its proposed location raise fundamental issues, which have been raised through the examination process. Further work has been undertaken in an attempt to address the issues, however, there are still unresolved issues, with no certainty as to when they will be resolved. This should have been anticipated given the scale, size and location of the project.
- 2.28. The Applicant identifies its approach a proportionate one to this stage of the Examination. It states at para 1.2.5 of Applicant's Response to SLD's D5 Submission Appendix E (Site Selection and Cable Route) (REP6-064) that it is not realistic, nor helpful, to assess every possible alternative in the same level of detail as the chosen site. Nevertheless, it now considers the approach of grouping sites together as Clusters (albeit only "high-level").
- 2.29. It is the view of Marrons that this work should have been completed prior to the application being submitted to Examination.
- 2.30. It is our view that the rigid approach to PDAs applied pre-submission was not proportionate. Whilst we are pleased the Applicant has now sought to address this through the identified clusters, it is our view that the process undertaken is flawed, both in terms of proportionality as detailed above and also the reasons cited for excluding the PDA's and clusters which are difficult to understand and hard to substantiate. The "high-level" analysis fails to proportionally consider these as a realistic alternative prospect.
- 2.31. The Applicant itself identified, at paragraph 1.2.16 of REP6-064 that "subject to further assessment, it is possible that there is land within the search area that could be suitable for other solar developments working to different delivery timescales".
- 2.32. Given the extent of the unresolved concerns over PDA 10, as discussed further in Section 4, we do not consider proportionate work has been completed by the Applicant to demonstrate that a robust assessment has been undertaken.

3. RAG Rating Review

- 3.1. The Applicant has, through its Site Selection Assessment Report (APP-185), completed a review of the identified individual PDAs. This section considers the Applicant's approach and assessment to understand whether the RAG 'scoring' is robust and if the conclusions reached are supported by the evidence presented.
- 3.2. Our assessment includes a review of the site selection methodology, assessment criteria, data sources, assumptions and the rationale used to score the PDAs. Consideration was given to the consistency of the assessment, the treatment of environmental and planning constraints, and whether the process aligns with industry practice.
- 3.3. The review does not seek to repeat the Applicant's assessment in full. Rather, it provides an independent appraisal, by Marrons and the wider team instructed by Stop Lime Down, of the information presented. Our findings are set out in a topic-by-topic basis, with any divergence from the Applicant's scoring rationalised.
- 3.4. The outcomes of this work inform our consideration of the clusters in Section 5.
- 3.5. The Applicant's RAG assessment is limited to the individual sites originally identified and has not been revisited to reflect the clusters subsequently formed or other potential sites dismissed by the Applicant. Furthermore, the assessment focuses primarily on individual constraints identified by the Applicant and does not apply a comparable RAG appraisal to the additional information, revised methodology, and clustering approach that have emerged since the original assessment was undertaken. As a result, the RAG ratings do not appear to fully reflect the current site selection framework or the potential implications of the clustered site configurations.
- 3.6. A further limitation of the Applicant's assessment is that, whilst the original PDAs were subject to a formal Red-Amber-Green (RAG) assessment, the same approach does not appear to have been consistently applied to the alternative configurations and clusters subsequently identified. Instead, the assessment of the newer options focuses largely on individual constraints and opportunities rather than undertaking a systematic comparison against the full suite of site selection criteria. As a result, it is difficult to understand how these alternative cluster options perform relative to the assessed PDAs.
- 3.7. The commentary provided prior to each comparative table highlights key observations that are not always fully captured by the RAG ratings alone. The tables should therefore be read alongside the accompanying commentary, which informs and, where necessary, qualifies the conclusions presented in the RAG assessment.

RAG Methodology Critique.

- 3.8. Although Red-Amber-Green (RAG) ratings are assigned to each PDA, there is no transparent framework for understanding how different constraints were balanced against one another. The assessment does not explain the relative importance attributed to landscape designations, heritage assets, ecological constraints, public rights of way, residential receptors, best and most versatile agricultural land, cumulative development or other considerations. Similarly, the role of mitigation in influencing assessment outcomes is not clearly described.

- 3.9. Consequently, it is difficult to understand how individual topic assessments contributed to overall conclusions. The report does not explain whether certain constraints were considered overriding factors, nor does it establish a hierarchy of importance between topics. As a result, it is not possible to objectively compare PDAs or independently verify the rationale underpinning the final ratings given by the Applicant.
- 3.10. Questions also arise regarding the influence of land ownership on the site selection process. The assessment suggests that land availability may have played a significant role in identifying areas before environmental constraints were fully assessed. If this is so, there is a risk that potentially less constrained or more suitable sites were excluded from consideration at an early stage. The report does not adequately explain the relationship between landownership considerations and environmental assessment, making it difficult to determine whether the site selection process was primarily driven by suitability or instead availability. Nor is it clear why isolated PDAs well below the area threshold were included in the assessment at all if landownership was the predetermining factor.

Ecology and Biodiversity

- 3.11. The following table provides a high-level ecological review of the alternative PDAs, considering the principal ecological opportunities and constraints associated with each potential development site. The assessment focuses on factors identified in the indicator assessment including designated sites, protected species, habitat resources, potential cumulative effects, and the implications of cable route requirements. It is intended to provide context to the conclusions drawn from the re-assessment.

PDA	RAG Rating		Marrons' Additional Comments
	Applicant's Assessment	Marrons' Assessment	
2	Amber	Amber	Through a high-level ecological perspective, PDA 2 represents a potentially viable alternative location. The site benefits from its proximity to the Melksham substation, which could reduce the extent of disturbance required to deliver the cable connection route. Although set within a predominantly rural landscape, the site is located adjacent to areas of urban and suburban habitat to the west. However, its proximity to Melksham may also introduce additional constraints that could necessitate further cable route diversions or design modifications. Notwithstanding these advantages, PDA 2 is subject to a number of notable ecological constraints. These include its proximity to designated sites, particularly the Bath and Bradford on Avon Bats SAC and associated Bat

PDA	RAG Rating		Marrons' Additional Comments
	Applicant's Assessment	Marrons' Assessment	
			Consultation Zone, the presence of the River Avon between the site and the substation, and the relative proximity of ancient woodland. In addition, the surrounding landscape contains existing solar developments, which may increase the potential for cumulative ecological effects. There may be greater challenges associated with the displacement of skylark and other farmland bird species due to the reduced availability of alternative suitable nesting and foraging habitat within the wider area. Overall, whilst PDA 2 appears to be a credible option from an ecological perspective, it would not be free from significant ecological constraints and would require careful consideration of a range of ecological effects.
3	Amber	Green	PDA 3 comprises four relatively dispersed land parcels, located in relatively close proximity to Cuckoo Wood Ancient Woodland. These features would require careful consideration during site design, particularly in relation to access arrangements, habitat protection and the implementation of mitigation measures. However, these are not considered overriding or significant constraints to development as elsewhere. Designated ecological sites in the surrounding area do not appear to represent significant constraints at a strategic level. The northernmost parcel is nestled directly between several brook areas, and depending on ground-level surveys may need to be omitted entirely or heavily mitigated. Therefore it is recommended that a green rating could have been implemented considering the additional points made.

PDA	RAG Rating		Marrons' Additional Comments
	Applicant's Assessment	Marrons' Assessment	
6	Amber	Amber	As noted, in the Applicant's assessment the primary ecological consideration would be PDA 6's location within the Bats Impact Risk Zone, which would require significant considerations and mitigations for lighting and long-term foraging habitat retention/management, particularly in the selection of the BESS areas, which would need to be sited well outside this if requiring security lighting. While disruption to commuting and foraging bats would likely be the primary consideration for mitigation, its proximity to the Melksham substation makes it ecologically appealing in being able to limit the extent and duration of cable-laying works (and with it nocturnal disruption from lighting during the autumn and winter months), resulting in less short-term disturbance and impacts off-site.
8	Amber	Amber	The PDA is located within 5-10km range from the substation, its proximity to Seend Ironstone Quarry and siting within the Bats SAC Impact Zone present two notable constraining factors. The Applicant's assessment that the large section of brook that crosses the entirety of the parcel remains a primary consideration from an ecological perspective is agreed.
11	Amber	Green	PDA 11 provided another site notably close to the substation and requiring a minimal CRC, and unlike some of the PDA's is located outside the Impact Zones and SAC, albeit still quite close to these and needing mitigation. The most notable features of the area are the relative proximity to the River Avon and, as noted with PDA 2, nearby clusters of solar farms, both of which would likely have an impact on the effective extent and mitigations required within the order limits.

PDA	RAG Rating		Marrons' Additional Comments
	Applicant's Assessment	Marrons' Assessment	
			Utilising the assessment criteria and taking these factors into account, at the current level, a green ranking would be a sufficient reflection of the PDA's position.
12	Amber	Amber	Located mainly around the ~15km radius from the substation, much further than other PDAs. In terms of designated sites, the area directly abuts Southwick Country Park Local Nature Reserve (LNR). This northern area also falls within the SAC's Bat Impact Zone. Clusters of ancient woodland are similarly present within its surroundings. Given the above three features, it is assumed that commuting bats roosting, commuting and foraging around these woodland patches to be an important consideration, as well as the length and routing of the CRC. On-site constraints from the above however are not necessarily prohibitive, especially if coupled with long-term habitat retention/enhancement and ample buffers within its northern sections. The relative distance does however add a further degree of considerations in relation to the CRC, similar to those seen within Lime Down itself. Notably, routes between PDA 12 would unavoidably need to cross the River Avon, and either pass near Bradford-upon-Avon or around to the east of Trowbridge. Overall, while constraints are present, at this preliminary high-level of appraisal, options to effectively address these on-site concerns on-site do not seem unfeasible. Off-site considerations, particularly concerning routing options, would need to be given particular attention as well. Overall, an Amber rating is sufficient.

Landscape and Visual

- 3.12. A review of the Applicant's Site Selection Assessment Report identifies a number of concerns regarding the robustness, transparency and consistency of the methodology employed relating to the 'Landscape' indicator. These concerns relate to the assessment framework itself, the treatment of landscape and visual considerations, the weighting of constraints, and the overall decision-making process used to identify preferred Potential Development Areas (PDAs).
- 3.13. The landscape and visual assessment indicators in Annex A (APP-185) fail to create a clear distinction between nationally and designated landscapes. Whilst the supporting policy and guidance review in Annex B acknowledges differing levels of designation, the assessment framework itself appears to treat these receptors in a similar manner. This is inconsistent with established planning and landscape practice, which generally recognises nationally designated landscapes as being of greater value and sensitivity than locally designated landscapes. The Applicant's response to this is that the NPS does not technically bar development in and next to National Landscapes. However, the NPS EN-1 states at paragraph 5.10.20 "for projects which may affect a National Landscape the assessment should include effects on the natural beauty and special qualities of these areas". This clearly sets out the requirement for a higher and more detailed level of assessment to be undertaken, with the need for a refined assessment criteria to be applied. It is also pertinent to have regard to the mitigation hierarchy, and the requirement first to avoid effects, and particularly likely significant effects (due to the sensitivity of such designations).
- 3.14. Furthermore, the methodology does not appear to explicitly assess the settings of designated landscapes, even though adverse effects can occur beyond designation boundaries and may extend across a much wider area. Moreover, the Applicant's site selection indicators do not appear to include that the settings of nationally designated landscapes as mentioned in LVIR para 8.6.49 should be Very High Sensitivity and settings High sensitivity (note also the concerns about the extent of the setting raised in the Examination).
- 3.15. Furthermore, it is unclear how the Applicant has arrived at the Red-Amber-Green (RAG) ratings as the methodology utilised lacks an explanation into how sensitivity and weighting have been applied to certain aspects such as PRow's / cycleways and residential receptors.

PDA	RAG Rating		Marrons' Additional Comment's
	Applicant's Assessment	Marrons' Assessment	
2	Amber	Amber	There are no National Landscapes within around 3.8km but is 140m from an SLA (Special Landscape Area). Though there are multiple PRow's within the PDA and few residential receptors within the PDA (farmsteads).
3	Amber	Amber*	The PDA is Immediately adjacent to a National Landscape and c. 450m from an SLA along with Multiple PRow's within the PDA along with some residential receptors within and adjacent to the PDA. We consider a Red rating could be justified, however noting the size (circa. 900ha) the PDA could be re-drawn to remove the most

PDA	RAG Rating		Marrons' Additional Comment's
	Applicant's Assessment	Marrons' Assessment	
			sensitive portions of the site which would reduce this to Amber. *As a result of the above redrawing, presented as Amber in this analysis.
6	Amber	Amber	There are no National Landscape within c. 1km, and no SLAs though there are multiple PRoWs and Wiltshire Cycleway within the PDA. Along with a few residential receptors within PDA
8	Amber	Green	There are no National Landscapes within 5 km of the PDA and no SLAs within 1 km. Multiple Public Rights of Way (PRoWs) cross the PDA; however, with the exception of National Cycle Network (NCN) Route infrastructure, there are no major recreational walking or cycling routes within 1 km of the site. Residential receptors within the PDA are limited, comprising a small number of isolated farmsteads.
11	Amber	Amber	There is no National Landscapes within 4km, no SLAs within 1km. Multiple PRoWs cross PDA, and the Wiltshire Cycleway adjacent, but no other major walking or cycling routes are within 1km. Though there are a few residential receptors within PDA, and the PDA is adjacent / in close proximity to several settlements including Melksham (c. 200m from PDA).
12	Amber	Amber	There are no National Landscapes within 3.2km, nearest SLA is 850m away, multiple PRoWs, Wiltshire Cycleway, and Macmillan Way long distance trail which cross the PDA. Several residential receptors and small settlements within and in close proximity to PDA, Trowbridge is c.450m from PDA.

Land Use

3.16. The Applicant's approach to land use, as set out in Annex A of its Site Selection Assessment Report (APP/6.3) is to consider whether the PDAs have any existing land uses, development allocations, safeguarded areas or extant planning permissions which would potentially conflict with the proposed development. This includes:

- Number and type of existing land uses within and adjacent to the potential development area
- Extant planning permissions within the potential development area
- Local plan/emerging local plan development allocations within the potential development area

- Number and location of public rights of way within the potential development area
 - Proximity to urban areas
- 3.17. A 'red' score is assigned where the PDA has the potential to conflict with a large number of uses, extant permission or policy allocations "which would be difficult to avoid". Whereas amber reflects that there would be conflicts, but this can largely be avoided.
- 3.18. This has been applied by the Applicant in a way which we consider to be overly restrictive, resulting in most of the PDAs being 'red' on account of the presence of public rights of way, mineral safeguarding area (despite the resource not being sterilised), proximity to settlements and agricultural land grading (without the benefit of detailed survey work as completed for PDA10). Conversely, PDA10 has been underassessed as discussed in Section 4. The Applicant also makes reference to landowner approaches / willingness in its assessment, which falls outside of the criteria indicated in its methodology. It is not clear how landowner willingness has been factored into the scoring, it's our view it should not.
- 3.19. We disagree with the Applicant's conclusions in this respect and consider, at worst, scoring should be amber unless there are physical constraints, such as existing built form or extant consents, which rule out development across large portions of the PDAs.

PDA	RAG Rating		Marrons' Additional Comments
	Applicant's Assessment	Marrons' Assessment	
2	Red	Amber	No further comments
3	Red	Amber	No further comments
6	Red	Amber	No further comments
8	Red	Amber	No further comments
11	Red	Amber	No further comments
12	Amber	Amber	No further comments

Cultural Heritage

- 3.20. The heritage assessment methodology appears to place considerable weight on the presence of designated heritage assets within PDA boundaries, without clearly demonstrating how opportunities for mitigation have been considered. Across several PDAs, it is considered that potential impacts on listed buildings and conservation areas could be substantially reduced through the introduction of appropriate stand-off distances, buffering, planting, or other design measures. As a result, some sites may have been assigned higher levels of constraint than would ultimately be justified once realistic mitigation measures are considered.
- 3.21. A recurring concern is the lack of flexibility in the PDA boundaries as across many PDAs it was clear that minor amendments to the red line boundary had the potential to remove heritage assets from the development area and therefore reducing the number of significant impacts. Therefore, small boundary refinements could potentially avoid impacts on listed buildings or

conservation areas within certain PDAs, resulting in a lower level of heritage constraint whilst not significantly reducing development land. However, the Applicant's assessment does not appear to adequately explore or test these opportunities before assigning RAG ratings.

- 3.22. Furthermore, where PDAs have been combined into larger clusters, there is often a greater degree of flexibility available to accommodate constraints through internal layout changes and boundary refinements. The inclusion of additional land within clustered areas can provide opportunities to avoid or reduce effects on heritage assets, including listed buildings and conservation areas, without materially affecting the overall development capacity of the cluster. As such, the heritage constraints identified within individual PDAs may not necessarily translate directly to the clustered scenarios assessed later in the process.
- 3.23. The methodology also lacks clarity regarding the thresholds used to distinguish between Amber and Red ratings. In particular, there is uncertainty as to whether the assessment is driven primarily by the number of affected heritage assets or by their significance. This creates situations where a site containing a relatively small number of highly important heritage assets could theoretically receive a lower rating than might be expected, despite the potential for substantial harm. The methodology therefore appears to place insufficient emphasis on the relative importance and sensitivity of individual heritage assets when determining overall constraint ratings.
- 3.24. Furthermore, there is limited explanation of how different types of heritage effects have been considered and weighted. The assessment does not clearly distinguish between direct impacts on assets within the PDA boundary and indirect impacts on the settings of heritage assets located outside the site. Across many PDAs, although direct impacts could potentially be mitigated through boundary amendments, wider effects on the settings of conservation areas, registered parks and gardens, and listed buildings would remain.
- 3.25. A key conclusion that the review discovered is the conclusion of PDA 8 which retains a Red heritage rating and the Applicant's conclusion is broadly agreed with. However, it is noted that the PDA boundary currently extends into the edge of the Poulshot Conservation Area and a small section of the Keevil Conservation Area. It is considered that relatively minor amendments to the PDA boundary could remove these Conservation Areas, and potentially several associated listed buildings, from the development area without materially reducing the amount of developable land. Consequently, whilst the Red rating is considered appropriate based on the PDA as currently defined, there is potential for the heritage constraint to be reduced to Amber through boundary refinement.

PDA	RAG Rating		Marrons' Additional Comments
	Applicant's Assessment	Marrons' Assessment	
2	Amber	Green	This is a relatively unconstrained site, green category in accordance with the Applicant's methodology; the harm caused would be to two Grade II assets and could quite likely accommodate appropriate buffers to mitigate against the harm.

PDA	RAG Rating		Marrons' Additional Comments
	Applicant's Assessment	Marrons' Assessment	
3	Red	Amber*	Whilst there are 3 Listed Buildings (Grade II) in the PDA, the impact to these could be mitigated through buffering and/or a slight redraw of the site which would not result in a material loss of developable space. Similarly, only a small amount of buffering in a portion of the PDA would be needed to mitigate against harm to the Conservation Area. *As a result of the above redrawing, presented as Amber in this analysis.
6	Amber	Amber	Even if site boundary is redrawn to not include the Grade II LB, the redline is within the setting of several Conservation Areas and Registered Parks and Gardens. Remains Amber.
8	Red	Amber*	Whilst the Red conclusion in its current form is noted, it is considered that the red line could be slightly redrawn to remove this Conservation Areas from the area (and likely several of the Listed Buildings) which could downgrade to Amber without losing a material portion of the developable area. *As a result of the above redrawing, presented as Amber in this analysis.
11	Amber	Amber	Even if boundary is redrawn to not include the Grade II LB, the redline is within the setting of several Conservation Areas and Registered Parks and Gardens therefore an Amber rating remains.
12	Red	Red	PDA12 has potential to impact greatly 3 listed buildings (one of which is Grade I). The Applicant's methodology interprets a Red rating to reflect an impact to a "large" number of assets. Despite the potential impact, we do not consider 3no. listed buildings represents a large number of assets. Further, harmful effects may be mitigatable through design however this would result in the loss of a large portion of the developable area. On balance, noting the potentially large area required for mitigation, we have retained the Red rating.

Construction Access

- 3.26. The construction access methodology raises concerns. Whilst the general approach of assigning an Amber rating to sites requiring construction traffic to utilise constrained rural roads is understood, the methodology does not distinguish between sites with limited sections of constrained road and those that require extensive use of narrow rural lanes. As a result, sites with substantially different highway constraints may receive the same rating, reducing the assessment's ability to accurately reflect the relative severity of construction access impacts.
- 3.27. Furthermore, as raised in the Examination hearings the Applicant does not appear to explicitly recognise the sensitivity of routes passing through or affecting nationally designated landscapes, which is a major concern and an omission on the Applicant's part.
- 3.28. A further weakness is the lack of consideration given to the complexity of construction access arrangements. The methodology appears primarily concerned with the suitability of access routes but does not account for the number of access points required to facilitate construction
- 3.29. This introduces additional considerations, including vegetation loss, impacts on roadside character, visibility constraints, highway safety risks, and the need for potentially significant highway interventions. The complexity and cumulative effects associated with numerous access points are not reflected within the assessment framework.

PDA	RAG Rating		Marrons' Additional Comment's
	Applicant's Assessment	Marrons' Assessment	
2	Green	Green	There are two large areas adjacent to each other, close to A3102 and A365 with access likely to be achievable without impacting on narrow country lanes and without the need for large numbers of access points.
3	Amber	Amber	The northern section appears to have good access from the A361 via Bell Hill (>5.5m in width) while the middle (largest) section is less easy to access (impact on narrow lanes around Marston) unless a route were to be constructed direct from the northern area. The southern area appears to be accessible from A360 although a 1km section of narrow country lanes is likely to be used.
6	Green	Amber	Access appears possible via B3109 that is generally more than 5.5m in width although the road is constrained by a lack of verges in places. A single access point could potentially be used. This would lead to a high concentration of HGV movements on a lane that is only just wide enough to accommodate 2-way HGVs. Access from the east is more difficult and would have a greater impact
8	Green	Green	Direct access to most parcels appears possible from the A361 with minimal or no requirement for the use of narrow country lanes.

PDA	RAG Rating		Marrons' Additional Comment's
	Applicant's Assessment	Marrons' Assessment	
11	Amber	Green	Access for construction could be achieved via the A350 and the B3107 that appears to be of a sufficient standard to accommodate passing HGVs. It appears possible to avoid the narrower Melksham Lane and reach areas to the north with a controlled crossing point.
12	Green	Green	Access via A36 and A361 without the need to use narrow country lanes. The number of access points would also be low.

Flood risk

- 3.30. After review of the flood risk ratings many concerns regarding the consistency and application of the Applicant's methodology arise, particularly in relation to the thresholds used to distinguish between Amber and Red ratings. Across several PDAs, it appears that sites have been assigned Red ratings despite not meeting the methodology's stated criterion that the majority of the site should be affected by flood risk. In a number of cases, flood-prone areas comprise only a relatively small proportion of the PDA, suggesting that the assessment outcomes are not always aligned with the criteria set out by the Applicant.
- 3.31. A particular concern is the apparent inconsistency in the interpretation of flood risk constraints. For PDAs 6, 8 and 11, areas affected by Flood Zones 2 and 3 and surface water flooding are considered to represent only a minority of the overall site area. Despite this, the Applicant has attributed higher levels of constraint than would appear to be justified by the methodology. The assessment therefore raises questions as to whether consistent thresholds have been applied across all sites and whether the published criteria have been followed in practice.
- 3.32. A further issue is the limited consideration given to potential design responses and boundary refinement. In some cases, relatively minor amendments to PDA boundaries could remove substantial portions of flood-prone land from the development area without materially affecting overall site capacity. For example, parts of PDA 8 could potentially be adjusted to reduce flood risk exposure, yet there is little evidence that such opportunities have been factored into the assessment. This is similar to concerns raised under other topic areas, where fixed PDA boundaries appear to have been assessed without considering whether minor refinements could reduce constraints.
- 3.33. Overall, it is considered that PDA's which are "Red" according to the Applicant should be "Amber" if the criteria are adhered to. To be classed as "Red" the majority of the site has to be at risk of fluvial and surface water flooding, and clearly none of the PDAs meet this criterion. The scale is clearly deficient, with the vast majority of sites likely to be classed as "Amber", not differentiating a wide range of risk environments. Finding a site classified as "green" (PDA12) is an achievement. This implies that the RAG scale for flooding used is of little use for planning purposes, offering no basis for choice between sites.

PDA	RAG Rating		Marrons' Additional Comments
	Applicant's Assessment	Marrons' Assessment	
2	Amber	Amber	There are no Flood Zones within the PDA boundary though there are areas of surface water flooding both north and south of the Clackers Brook.
3	Amber	Amber	There are no flood zones within the PDA boundary. There are some larger areas of potential surface water flooding.
6	Red	Amber	There are small areas in Flood Zones 2 and 3, and a small area of potential surface water flooding. The flood-prone area is clearly much less than the "majority" required for Red. It is estimated around 10% for Flood Zones 2 and 3 and <5% for surface water flooding. The grading should therefore be Amber.
8	Red	Amber	It is estimated that 20% in flood zones plus c. 10% for surface water flooding, implying a grade of Amber. Moreover, a small adjustment of the boundaries could easily reduce the proportion in the flood zone.
11	Red	Amber	Approximately 10% of the area is in Flood Zones 2 and 3, and the surface water flooding extent is small and scattered. Majority of the site is not at risk of flooding therefore an Amber rating is appropriate.
12	Green	Green	There are no flood zones or surface water flooding. The PDA has to be extended northwards considerably to impact the surface water flooding zone referred to by the Applicant.

Field Shading

3.34. Noting the size of the PDAs, we have not undertaken our own review of field shading. We therefore accept the Applicant's conclusions in this regard.

PDA	RAG Rating		Marrons' Additional Comments
	Applicant's Assessment	Marrons' Assessment	
2	Green	Green	No comments
3	Green	Green	No comments
6	Green	Green	No comments
8	Amber	Amber	No comments
11	Green	Green	No comments
12	Green	Green	No comments

Grid Connection

- 3.35. The grid connection assessment considers the likelihood that a potential development area would encounter constraints when connecting to the electricity network. This includes evaluating the length of the required connection route, the number and type of physical obstacles such as roads, rivers and railways, and the presence of environmental or planning designations that may restrict routing options or require additional land take.
- 3.36. Sites requiring longer and more complex connection routes, with a greater number of constraints, are generally considered less favourable than those with shorter and more straightforward connections. In this respect, the furthest PDA from the grid connection point is PDA10. PDA10 is the longest and most challenging connection as reflected in our scoring below and in Section 4.

PDA	RAG Rating		Marrons' Additional Comments
	Applicant's Assessment	Marrons' Assessment	
2	Amber	Amber	PDA located within 5km of point of connection. Requirement to cross Wessex mainline and Reading-Taunton rail line. Requirement to cross River Avon, Kennet and Avon Canal and various other watercourses. Requirement to cross A350 and other local roads.
3	Amber	Amber	Located within 8-15km from point of connection. Requirement to cross Wessex mainline and Reading-Taunton rail line. Requirement to cross River Avon, Kennet and Avon Canal and various other watercourses. Requirement to cross A350 and other local roads.
6	Green	Green	2km from the point of connection No requirement to cross main roads, rail or rivers.
8	Amber	Amber	Approximately 6km from the point of connection. Requirement to cross Wessex mainline, A350, A361 and other local roads and River Avon Canal and other smaller watercourses.
11	Green	Green	Less than 1km from point of connection. Requirement to cross minor road (Bath Road).
12	Amber	Amber	Approximately 11km from the point of connection. Requirement to navigate between large settlements of Bradford-on-Avon and Trowbridge. Requirement to cross railway, River Avon, Kennet and Avon Canal and approximately 8 roads.

Topography

- 3.37. Regarding Topography nowhere in the Site Assessment report does it state how the areas of land >3% or >5% have been calculated. The criteria for the boundary between “Green” and “Amber” are also not stated it appears to be somewhere around <20% of 3% gradient. Though North Wiltshire has generally gentle gradients outside the slopes of the upland rivers and streams.
- 3.38. As referenced in Appendices L of SLD’s Written Representations (REP1-167, page 20), when the Green Hill Solar Park (same Applicant) was assessed, the Applicant stated that ‘All land with a 5% or less gradient...is considered to be very flat and optimal for solar generation’.

PDA	RAG Rating		Marrons’ Additional Comments
	Applicant’s Assessment	Marrons’ Assessment	
2	Green	Green	Agree with Applicants Assessment
3	Green	Green	Agree with Applicants Assessment
6	Green	Green	Agree with Applicants Assessment
8	Green	Green	Agree with Applicants Assessment
11	Green	Green	Agree with Applicants Assessment
12	Green	Green	Agree with Applicants Assessment

Site Size

- 3.39. The site size assessment considers whether a PDA provides sufficient land to accommodate a 500 MW solar scheme.
- 3.40. The Applicant identified that approximately 1,000 ha of land would be required to support a 500MW development and, to provide flexibility for mitigation, design evolution and other constraints, generally sought sites or combinations of sites around 10% larger than this requirement.
- 3.41. Accordingly, the assessment considers both the overall size of individual PDAs and their proximity to other potential development areas that could be linked together to achieve the required scale. Sites capable of accommodating the scheme independently are rated Green, whilst smaller sites are rated Amber or Red depending on whether they could reasonably be combined with neighbouring PDAs.

PDA	RAG Rating		Marrons’ Additional Comments
	Applicant’s Assessment	Marrons’ Assessment	
2	Amber	Amber	At 256.03ha the site is too small but is near other PDAs and therefore could potentially be linked, subject to further technical assessment.
3	Green	Green	At 932.51ha the site is slightly smaller than the indicated size, but we agree with the Applicant’s conclusion that an approximately sized site could be accommodated. It is also near to other PDAs.

PDA	RAG Rating		Marrons' Additional Comments
	Applicant's Assessment	Marrons' Assessment	
6	Amber	Amber	At 528.7ha the site is too small but is near other PDAs and therefore could potentially be linked, subject to further technical assessment.
8	Amber	Amber	At 520.6ha the site is too small but is near other PDAs and therefore could potentially be linked, subject to further technical assessment.
11	Amber	Amber	At 492ha the site is too small but is near other PDAs and therefore could potentially be linked, subject to further technical assessment.
12	Amber	Amber	At 731ha the site is too small. It is more isolated than other PDAs, albeit PDA4 (60ha) is 2km away.

4. Review of the Applicant's PDA 10 Submission

- 4.1. Stop Lime Down through its Written Representations, specifically in Appendix L (REP1-186) reviewed the Applicant's assessment of PDA10 (Lime Down) in order to examine whether the published methodology has been applied consistently and whether the evidence presented supports the conclusions reached by the Applicant.
- 4.2. Marrons agrees with that submission and disagrees with the findings of the Applicant. Where inconsistencies are identified between the Applicant's methodology and the assessment outcome, these are highlighted along with supporting comments.

Assessment Criteria	RAG Rating		Marrons' Comments
	Applicant's Assessment	Marrons' Assessment	
Ecology and Biodiversity	Amber	Amber	Regarding PDA 10 it is noted, both the extensive and scattered nature of the various parcels forming PDA 10 result in it being directly adjacent to Harries Ground SSSI and the Cotswolds National Landscape. It also directly abuts and even partially encloses six Ancient Woodlands, with another located in the vicinity. Lastly, it is among the most distant of the PDAs from the substation, being well within the 15-20km radius band. On-site, however, the area directly abuts several sites that would require significant consideration and measures to address much more than many of the other individual PDAs listed above which have been flagged as Amber due to proximity to similar designated sites and features. Ultimately, from an ecological point of view the assessment of Amber is agreed, with a similar degree of considerations associated with it as with other PDA's.
Landscape and Visual	Amber	Red	The site (PDA 10) sits immediately adjacent to a National Landscape (but no SLAs) with multiple PRowWs within the PDA, and designated recreational routes within / in proximity to PDA. There are no residential properties within the PDA but there are several adjacent / in proximity. It should also be noted that in Annex D of [APP-085], the justification for the Red category includes a note that the adjacent National Landscape 'is at a significantly higher elevation than the PDA in this particular location and would result in likely significant landscape and visual impacts due to elevated views from sensitive receptors within the National Landscape'. There is also no mention of the elevation of the National Landscape adjacent to PDA 10, but as it is not significantly higher than the PDA area, it may be

Assessment Criteria	RAG Rating		Marrons' Comments
	Applicant's Assessment	Marrons' Assessment	
			potential reason to why the applicant categorised PDA 10 as Amber. However, as explained in SLD's submissions, it is important to note that views are not the only factor that must be considered – many landscape and other effects are non-visual. Also see Natural England's response to ExQ2 [REP5-140], under the heading LV2.5 – Setting of the Cotswolds National Landscape, subheading other factors that relate to the setting of the CNL (on page 8), which refers to tranquillity, dark skies, and ecological connectivity. Regarding residential properties, it would be helpful to know whether a) PDA 10 Lime Down's boundary was redrawn to exclude properties following the preliminary site identification / assessment stage, and b) whether other PDA boundaries could be redrawn to exclude properties. In summary PDA 10 Lime Down should be categorised as Red mainly due to it being adjacent to the National Landscape, and the setting being extensive.
Land Use	Green	Amber	Given the PDA lies adjacent to the Cotswolds National Landscape, numerous PROWs and proximity to multiple villages, plus there are areas of best and most versatile agricultural land, an amber score is justified.
Cultural Heritage	Amber	Amber	PDA 10 is impacted by wider setting impacts to a variety of assets which could be mitigated through design. Along with proximity to Grade I Bradfield Manor which will be a key design factor to ensure any harm here is mitigated against by generous buffer and careful landscaping. Note presence of three conservation areas within the 500m radius which is one the higher number of Conservation Areas within the PDAs assessed.
Access for Construction Traffic	Amber	Red	PDA 10 requires multiple access points and use of significant lengths of narrow country lanes therefore Red is prescribed. A particular concern is that the methodology appears to underestimate the extent of highway constraints associated with PDA 10. Evidence

Assessment Criteria	RAG Rating		Marrons' Comments
	Applicant's Assessment	Marrons' Assessment	
			presented during the Examination indicates that construction traffic would need to utilise significant lengths of narrow rural roads and that the effectiveness of available mitigation measures may be limited, particularly where these rely on construction traffic management controls. Given that significant constraints to HGV access form part of the methodology's criteria for a Red rating, there is concern that the true scale of access constraints was not fully recognised during the site selection process. Another key consideration is that PDA 10 would route heavy levels of traffic through the Cotswolds National Landscape for a sustained period of time.
Flood Risk	Amber	Amber	Relating to the Applicant's assessment of land above Corston as having small sections of flood zone 3 category land it is considered these would be classified as "fairly large" using the Applicant's criteria. PDA6 has a similar area in Flood Zone 3 described as "fairly large". Close to Fosse Farm there is small area of Flood Zone 3. There is also an area of Flood Zone 3 around the Rodbourne Brook, impacting Area E. There are areas of surface water flooding scattered over the site, including particularly the areas of low permeability soils between Surrendell Wood and Sherston. Amber category is justified.
Field Shading	Amber	Amber	Agree with Applicant's conclusion as no additional research was undertaken.
Grid Connection	Amber	Red	SLD's response at Appendices L of its Written Representations (REP1-167) highlight why a 'Red' rating is justified in this instance including the cable route being the longest and most challenging out of the assessed options. This also highlights inconsistencies in approach compared with the Green Hill Solar Farm (same Applicant) which identified a clear preference for identifying land as close to the National Grid as possible. NPS EN-3 (Para 2.10.24) states that "the connection voltage, availability of network capacity, and the distance from the solar farm to the existing

Assessment Criteria	RAG Rating		Marrons' Comments
	Applicant's Assessment	Marrons' Assessment	
			network can have a significant effect on the commercial feasibility of a development proposal".
Topography	Green	Green	The criteria for the boundary between "green" and "amber" are not stated, it appears to be somewhere around <20% of 3% gradient. Though North Wiltshire has generally gentle gradients outside the slopes of the upland rivers and streams.
Site Size	Green	Amber	The Applicant's scoring is inconsistent with its approach to other PDAs. The area of PDA 10 (878 ha) is only 80% of the size required by the Applicant (1100 ha). The location is remote from other PDAs, eliminating the opportunity of increasing the site's area by linking up with other areas. An Amber score is justified.

5. Main Findings from Re-Assessment of Assessment Criteria

- 5.1 The review identified a number of criteria where the assessment outcomes differ from those presented by the Applicant. Whilst there is broad agreement with several of the Applicant's conclusions, a number of RAG ratings are considered to either overstate or understate the significance of particular constraints when assessed against the Applicant's published methodology. In several cases, alternative ratings have been identified where the assessment criteria do not appear to have been applied consistently, where opportunities for mitigation or boundary refinement have not been fully considered, or where the justification for the assigned rating is not clearly supported by the evidence presented.
- 5.2 Overall, the review identifies a number of significant inconsistencies in the application of the assessment criteria. In several instances, the Applicant's conclusions appear to rely on differing interpretations of sensitivity, mitigation potential, and site-specific circumstances, resulting in assessments that are not always applied in a comparable or consistent manner across the PDAs. The review also notes that opportunities to avoid or reduce effects through boundary refinements, design evolution, and the subsequent clustering of sites have not been consistently considered. As a consequence, a number of the Applicant's conclusions are considered to overstate the level of constraint or potential effect. The following section summarises the principal areas where the review departs from the Applicant's assessment and sets out the rationale for these alternative conclusions.
- 5.3 The extent of land available within the clustered site options is also a relevant consideration. The Applicant's own figures indicate, that Cluster 1 comprises approximately 2718ha, Cluster 2 approximately 1452ha, and Cluster 3 approximately 1752ha, compared with approximately 729ha (unconstrained) for PDA 10. The substantially larger land areas available within the clusters provide a significant degree of flexibility to respond to environmental and heritage constraints through layout evolution, internal land reallocation and boundary refinements. This flexibility increases the potential to avoid or reduce impacts on sensitive receptors whilst maintaining overall development capacity. This is reflected in our consideration of the potential alternatives presented by the clusters.
- 5.4 Consequently, where there is additional land, available this provides opportunities to redesign or reposition development away from the most sensitive areas, i.e. the RAG scoring may be more favourable for a cluster as opposed to individual PDAs.
- 5.5 The Applicant produced a report titled "Technical Note on Site Selection assessment" (REP3-173) which was published in May 2026 and outlines the main reasons why each Cluster was discounted, a key reason being heritage constraints and, in the case of PDA8, landowner willingness.
- 5.6 As set out in Section 3 and below, our review notes identified heritage impacts could potentially be reduced through boundary refinements, buffering and mitigation measures. Whilst heritage remains a significant consideration, the extent to which these constraints definitively preclude the cluster as a suitable alternative is less determinative than suggested by the Applicant's assessment.

- 5.7 Furthermore, whilst land availability is a consideration, the willingness (or lack of) from landowners should not be an overriding constraint. Where required, compulsory acquisition powers are available.
- 5.8 In relation to the main restrictions and reasoning to discounting the Cluster's detailed in (REP2-043) the re-assessment has reached the following conclusions in relation to the main restrictions.

Cluster 1 (PDA 2,3 (part of),6,8 and11)

- 5.9 Cluster 1 includes a considerable amount of land, approximately 2,718ha unconstrained, which provides significant opportunity to site development whilst minimising harms.
- 5.10 For Cluster 1, the review identified one notable change to the heritage assessment: PDA 3's RAG rating was revised from Red to Amber. Although the PDA contains three Grade II listed buildings and lies near a Conservation Area, appropriate buffers and/or minor boundary amendments could mitigate the likely effects without materially reducing the developable area. Accordingly, when assessed against the Applicant's published methodology, the heritage constraint is not considered sufficient to justify a Red rating.
- 5.11 PDA8 in the Applicant's assessment retains a Red heritage rating and the Applicant's conclusion is broadly agreed with. However, it is noted that the PDA boundary currently extends into the edge of the Poulshot Conservation Area and a small section of the Keevil Conservation Area. It is considered that relatively minor amendments to the PDA boundary could remove these Conservation Areas, and potentially several associated listed buildings, from the development area without materially reducing the amount of developable land. Consequently, whilst the Red rating is considered appropriate based on the PDA as currently defined, there is potential for the heritage constraint to be reduced to Amber through boundary refinement (as set out in Section 3).
- 5.12 On the basis of our re-evaluation and taking account of the comments above, our assessment of Cluster 1 is as set out below with our conclusion of PDA 10 identified for comparison.

CLUSTER 1 RE-EVALUATION	RAG Rating	
	CLUSTER 1 (PDA 2,3,6,8 and11)	PDA 10
Ecology and Biodiversity	Yellow	Yellow
Landscape and Visual	Yellow	Red
Land Use	Yellow	Yellow
Cultural Heritage	Yellow	Yellow
Access for Construction Traffic	Green	Red

CLUSTER 1 RE-EVALUATION	RAG Rating	
	CLUSTER 1 (PDA 2,3,6,8 and11)	PDA 10
Flood Risk		
Field Shading		
Grid Connection		
Topography		
Site Size		

Cluster 2 (PDA 3 and 8)

- 5.13 Cluster 2 includes 2 PDAs which also form part of Cluster 1. The site size is notably smaller at circa. 1,452ha unconstrained but nevertheless allows some opportunities for mitigation through design.
- 5.14 Similar to the concerns regarding Cluster 1 the main concerns relating to Cluster 2 are the number of conservation areas west of PDA's 3 and 8 including (Marston, Worton and Poulshot).
- 5.15 Notably, the Applicant includes the whole of PDA 3 in Cluster 2, whereas only the northerly part of this included in Cluster 1. As detailed in Section 3, we consider PDA 3 could be justified a 'Red' rating for Landscape and Visual matters as drawn. Subject to re-drawing, to remove the most sensitive parts of the PDA nearest the National Landscape, this could be reduced to 'Amber'. This is reflected in the scoring below, which reduces the site size scoring from Green to Amber for Cluster 2.

CLUSTER 2 RE-EVALUATION	RAG Rating	
	CLUSTER 2 (PDA 3 and 8)	PDA 10
Ecology and Biodiversity		
Landscape and Visual		
Land Use		
Cultural Heritage		
Access for Construction Traffic		
Flood Risk		
Field Shading		

CLUSTER 2 RE-EVALUATION	RAG Rating	
	CLUSTER 2 (PDA 3 and 8)	PDA 10
Grid Connection		
Topography		
Site Size		

Cluster 3 (PDAs 6,11 and 12)

- 5.16 Cluster 3 includes elements of Cluster 1, with the addition of PDA12. In total, this equates to approximately 1,752ha of land (unconstrained). That is smaller than Cluster 1, but still with significant potential for mitigate harms through design.
- 5.17 The Applicant considers that Cluster 3 has the most significant cultural heritage constraints with PDA 6 and 11 offering the same constraints that were identified in Cluster 1. The introduction of PDA 12 per the report further poses additional cultural heritage receptors upon the Cluster's suitability due to the proximity to a Grade I Listed building and two Grade II Listed Buildings which would surround the PDA.
- 5.18 As per our comments in Section 3, a review of PDA12 heritage considerations indicates a potential inconsistency between the Applicant's methodology and the assessment outcome. On balance, we consider an amber rating is justified for the cluster as a whole, however this would require a large portion of developable land of PDA12 to be given over to mitigation. Even if this were the case, there would remain in excess of 1,000ha of land within the cluster.

CLUSTER 3 RE-EVALUATION	RAG Rating	
	CLUSTER 3 (PDA 6,11 and12)	PDA 10
Ecology and Biodiversity		
Landscape and Visual		
Land Use		
Cultural Heritage		
Access for Construction Traffic		
Flood Risk		
Field Shading		
Grid Connection		

CLUSTER 3 RE-EVALUATION	RAG Rating	
	CLUSTER 3 (PDA 6,11 and12)	PDA 10
Topography		
Site Size		

6. Summary

- 6.1 The review has identified several shortcomings in the Applicant's site selection assessment. In particular, the assessment of alternative sites and clusters is not considered proportionate to the scale of the proposal, its potential impacts, or the significant period over which communities may be affected.
- 6.2 The review also concludes that the case for PDA 10 remains insufficiently justified. Across several topic areas, the evidence does not clearly demonstrate why PDA 10 should be preferred over other available options. Furthermore, a number of PDA ratings appear either over-assessed or under-assessed when compared against the Applicant's published methodology, raising questions regarding the consistency of its application. It is also unclear the extent to which landowner agreement and considerations have influenced the selection of land and thus the influenced the approach to the avoidance of effects when selecting PDAs.
- 6.3 In reviewing the assessment, reasonable allowance by Marrons has been made for factors such as site size requirements, design evolution, mitigation opportunities and boundary refinement. Even taking these considerations into account, the alternative clusters generally perform more favourably than PDA 10 across a range of environmental and planning criteria. Marrons has noted and agrees with the previous criticisms that Stop Lime Down has made about the process of drawing PDA areas, which appears to have contributed to this problem.
- 6.4 Whilst the review does not seek to identify a single preferred alternative site, it demonstrates that there are credible acceptable alternatives which warranted and warrant more detailed and transparent assessment than has been undertaken to date. That is the case for each of the clusters.
- 6.5 Consequently, further investigation by the Applicant is considered necessary.
- 6.6 In its current form, the site selection assessment does not provide a robust and acceptable justification for the selection of PDA 10 and, in doing so, reinforces Stop Lime Down's position that the site selection process and resulting conclusions cannot presently be relied upon to demonstrate a proper approach to mitigation nor that the proposed site is an acceptable location.



APPENDIX B

Effect of Traffic Noise on Horses at Pasture





OPEN ACCESS

EDITED BY

██████████ O,
University of the Republic, Uruguay

REVIEWED BY

██████████
██████████
██████████
██████████
██████████

*CORRESPONDENCE

██████████
✉ ██████████

RECEIVED 03 February 2026

REVISED 05 May 2026

ACCEPTED 07 May 2026

PUBLISHED 29 May 2026

CITATION

Henke von der Malsburg J and König von Borstel U (2026) Constant traffic noise affects the behavior and physiology of naïve horses at pasture. *Front. Ethol.* 5:1802957. doi: 10.3389/fetho.2026.1802957

COPYRIGHT

© 2026 Henke von der Malsburg and König von Borstel. This is an open access article distributed under the terms of the [Creative Commons Attribution License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

Constant traffic noise affects the behavior and physiology of naïve horses at pasture

Johanna Henke-von der Malsburg^{1,2*}
and Uta König von Borstel¹

¹Institute of Animal Breeding and Genetics, Department of Animal Husbandry, Behavior and Welfare, Justus Liebig University Giessen, Giessen, Germany, ²Research Institute for Farm Animal Biology (FBN), Working Group Husbandry & Health, Dummerstorf, Germany

Introduction: Horses are frequently kept on pastures near major roads, exposing them to high levels of traffic noise. In humans, prolonged traffic noise exposure is associated with physiological stress, sleep disruption, and adverse health effects. Despite horses' high auditory sensitivity, comparable data on the behavioral and welfare implications of continuous traffic noise are scarce. This study investigated short-term behavioral and physiological responses of horses naïve to constant motorway noise in their home environment.

Methods: Twenty horses housed in four stable groups across three facilities were exposed to recorded motorway noise for 1–2 weeks. Emitted noise levels ranged from 54 to 71 dB, corresponding to distances of approximately 500 to 10 m from a four-lane motorway, and were played during daytime for up to 11 h/day using portable outdoor loudspeakers. Control periods without motorway noise (average ambient noise level: 38 dB) before and between exposure days served as baseline, intermediate washout, and final control phases. Behavioral parameters were recorded throughout the day using focal and scan samplings. Heart rate was continuously monitored as a physiological indicator of stress.

Results: During noise exposure, horses reduced foraging behavior from a median of 81% at baseline to 41% during the first exposure phase ($p < 0.001$), while vigilance increased from nine to 54 instances per day ($p < 0.001$). Horses also avoided the vicinity of the noise source ($p < 0.001$). Behavioral effects were pronounced at higher noise levels, with clear avoidance responses suggesting aversion as an active coping strategy. Heart rate increased within the first exposure phase, rising from an average of 57.60 bpm to 66.76 bpm ($p < 0.001$), suggesting an acute stress response.

Discussion: Although some behavioral habituation was observed over time, spatial avoidance of the noise source persisted, and elevated heart rates indicated continued physiological arousal. Even noise levels of a 500 m distant motorway (≥ 54 dB) altered behavior and physiology. These findings demonstrate that traffic noise represents a relevant environmental stressor for horses and may compromise welfare when exposure is frequent or prolonged. The study highlights the need to consider noise in equine management and supports mitigation strategies such as providing large pastures with quiet retreat zones or installing noise barriers.

KEYWORDS

equine welfare, horse (*Equus caballus*), noise exposure, pasture use, physiological stress, traffic noise, vigilance

1 Introduction

Roads are a pervasive feature of human-modified landscapes, frequently intersecting both human and animal habitats. In densely populated regions, pastures are often situated close to roads, exposing humans and animals alike to various external stimuli such as air pollution, visual stimuli, and particularly, constant noise. Among these, chronic noise exposure is increasingly recognized as a significant stressor to humans and animals with physiological and behavioral implications (Barber et al., 2010; Arregi et al., 2024). For animals that rely on auditory cues, for instance, for the innate predator recognition in flight animals, traffic noise may ultimately affect their behavior and proximately trigger a stress response (Wright et al., 2007; Kok et al., 2023). In humans, traffic noise is linked to chronic stress responses, even when humans feel accustomed to the noise. Long-term noise exposure contributes to metabolic and cardiovascular diseases (Jarup et al., 2008; Huss et al., 2010; Sørensen et al., 2011). The World Health Organization (WHO) defines environmental noise levels above 53 dB as potentially harmful, associated with higher risks of hypertension and myocardial infarction (World Health Organization, 2018). The German Federal Ministry for the Environment considers physiological effects to occur likely above 65 dB, while chronic exposure above 85 dB causes irreversible hearing loss due to cochlear damage (JAMA, 1990). These thresholds guide human-focused road construction and noise mitigation measures. For example, in Germany, traffic noise must not exceed noise levels of 59 dB at residential buildings (Bundesministerium der Justiz, 2020).

Despite widespread recognition of traffic noise as an ecological stressor, systematic research on its effects on animals remains scarce. Many species possess broader auditory ranges and higher sensitivity than humans, yet livestock regulations are generally based on human thresholds. For example, EU Directive 2008/120/EC sets noise thresholds at 85 dB for pigs in indoor husbandry conditions but disregards outdoor sources such as traffic noise, even when the animals have constant access to outdoor compartments (Council Directive - 2008/120/EC, 2009). Conversely, wildlife protection regulations often include specific provisions to minimize disturbance from roads, addressing effects on habitat use, reproduction, and communication—particularly in birds, for which species-specific thresholds have been established (Garniel et al., 2007). It is also well-studied that roads fragment habitats and alter activity rhythms of wildlife (Fahrig and Rytwinski, 2009). Despite this, livestock at pasture remain unprotected from road-related stimuli, although they may experience comparable disturbances, specifically concerning noise.

Horses are specifically vulnerable to environmental noise due to their innate flight response and highly sensitive auditory system (Rørvang et al., 2020). Their mobile, funnel-shaped ears can rotate approximately 180° and amplify sounds by up to 20 dB (Ödberg, 1978). This allows perception from 50 Hz at a distance to 33,500 kHz at close range (Heffner and Heffner, 1983, Heffner and Heffner, 1986). These adaptations enhance environmental awareness but also increase sensitivity to acoustic disturbances. The startle and flight response, an evolutionary survival mechanism, remains largely unchanged in domesticated horses, compared to their wild

ancestors (Brubaker and Coss, 2015; Janczarek et al., 2020). When environmental irregularities occur, horses display increased vigilance—raising the head and orienting the ears toward the sound source (Christensen et al., 2005; Leiner and Fendt, 2011). Vigilance has been suggested to be a primary indicator of discomfort (König von Borstel et al., 2010; Noble et al., 2013). Depending on previous experience and the perceived potential of danger, horses may either habituate or become more reactive towards certain stimuli, but their reflexive tendency to flee from sudden, unfamiliar stimuli (e.g., gunshots) remains high (Baragli et al., 2014; Gronqvist et al., 2016; Lindstedt, 2020; Hole et al., 2023).

Horses typically have a cyclical daily rhythm alternating between grazing, locomotion, short periods of dozing while standing, and sleeping while lying down (Mayes and Duncan, 1986; Berger et al., 1999). They typically graze for 60–80% of the day and rest in synchronized bouts lasting about 20 minutes (Maeda et al., 2021). Both standing dozing, and recumbent sleep are essential for recovery and health (Bertone, 2015; Greening and McBride, 2022). Rest usually occurs in quiet, sheltered areas within pastures or stables (Carson and Wood-Gush, 1983). Consequently, appropriate husbandry must provide sufficient space for movement, social contact, and undisturbed resting opportunities (Lesimple et al., 2016). When foraging or resting behavior is disrupted, significant physical and psychological consequences can arise, including digestive disorders (e.g., colic), stress-induced illness, increased aggression, and behavioral abnormalities such as narcolepsy (Chaplin and Gretgrix, 2010; Malmkvist et al., 2012; Greening and McBride, 2022). Individual stress susceptibility varies with breed, age, temperament, and experience (Hausberger et al., 2004; Morgan and Tromborg, 2007). Noise from which horses cannot escape, as by retreating to quiet zones, or heightens vigilance, may therefore induce chronic stress. Reported symptoms of noise-related disturbance include hypersensitivity, irritability, and persistent nervousness (Rochais et al., 2017; Janicka et al., 2022; Wiśniewska et al., 2022). However, it remains unclear at which noise levels these effects emerge, whether horses can adapt, or whether long-term welfare and health are compromised.

In this study, we investigated whether continuous motorway noise affects the well-being and stress physiology of horses. In general, we expected initial stress responses, including alterations of the horses' normal behavior. We also expected more pronounced reactions with increasing sound levels and to identify a specific sound level as a critical noise threshold. Our findings aim to inform science-based welfare recommendations and contribute to evidence-based noise mitigation strategies for equine management near roads.

2 Materials and methods

To investigate the influence of constant motorway noise on horses, we deliberately exposed naïve horses to motorway noise in their familiar environment at pasture, while recording their behavior and stress response (heart rate; Figure 1). We selected N = 20 horses kept in four groups (three facilities) on a quiet pasture (37–40 dB only ambient noise) at 2–8 km away from the nearest



FIGURE 1

(A) Setup with two loudspeakers at the pasture and an observation post between the loudspeakers, (B) 24 h surveillance camera, (C) view from the focal camera, (D) heart rate sensor chest strap with the recording device fixated on the halter. Photographs by [redacted]

main road for at least the past two grazing seasons (Table 1). Horses varied in breed (5 Oldenburg warmbloods, 4 Gypsy horses, 2 Alt-Oldenburg warmbloods, 2 Welsh ponys, 2 German riding ponys, 1 Danish sport pony, 1 English thoroughbred, 1 Rhinelander horse, 1 Fjord horse, 1 Hanoverian warmblood), age (3–30 yrs, mean = 10.7 ± 9 yrs), and sex (9 mares, 11 geldings), were familiar with occasional traffic noise (e.g., single cars or tractors passing by, walking along a road) but naïve to constant road noise exposure at pasture. We selected the facilities and groups to logistically suit the examination (e.g., distance to major roads and other constant noise sources, easily manageable pasture, constant group composition, relatively constant daily routine over the study period) while maintaining their routine, with, e.g., occasional training or supplemental feeding (Table 1). To minimize disruptions to the respective facility operations and account for the varying circumstances, we adapted data collection to the specific conditions on site (observation sessions, noise exposure procedures), leading to heterogeneous sampling procedures between the facilities (Figure 2). The study was approved by the Regierungspräsidium Giessen (approval number: G 27/2022). All horse owners agreed to the experimental sampling via consent forms.

2.1 Study animals

The three equine facilities were located in Northern and Western Germany. Facility 1 (riding school, Weser-Ems region) comprised school horses (group 1.A, $N = 6$) and privately owned horses (group 1.B, $N = 3$) kept on directly adjacent pastures (0.36 and 0.30 ha; Figure 3), ensuring simultaneous exposure to traffic

noise for 12 days; one additional donkey in the group of private horses was excluded from analyses. School horses were pastured daily from approximately 0800 to 1200 and housed individually out of earshot in a nearby stable outside this period, whereas private horses remained on pasture for 24 h. Facility 2 (boarding and training stable, Weser-Ems region) included $N = 5$ horses monitored over 7 days on a 1.3 ha pasture (Figure 3); one horse was partly, and from day 4 onwards continuously, housed in an individual stable with minimal noise exposure. The others were kept at pasture for 24 h. Data for this horse were only included for the periods on pasture. Facility 3 (riding and breeding stable, North Rhine-Westphalia) included $N = 6$ horses, kept at pasture for 24 h, which were monitored over 13 days. Due to seasonal conditions, three adjacent pasture areas were used sequentially (0.52–0.93 ha; Figure 3; supplementary material). Heart rate was recorded in all horses, with sensor reassignment as necessary (Table 1).

2.2 Procedure

We exposed the horses to motorway noise for a period of one to two weeks during the daily time on pasture (Figure 2). For this purpose, we installed two loudspeakers (Vonyx Splash 300) on one side of the pasture (Figure 1A). Surveillance cameras (ViSiTec) around the pasture recorded the horses' behavior for the entire study period (Figure 1B). We performed direct behavioral observations (15-min *focal sampling* of individual horses alternated with 5-min *scan samplings* of the entire group) in two to three sessions a day, depending on the amount of daylight, and recorded the focal behavior with an additional focus handheld camera (Sony HDR-

TABLE 1 Individual horses and groups studied at the three facilities (1: riding school: groups 1.A and 1.B; 2: boarding stable: group 2.C; 3: riding and breeding stable: group 3.D).

Group individual (current facility)	Breed	Sex (age)	Time at pasture daily absence	Heart rate recording
Group 1.A			4 h pasture in the morning individual stall ca. 12–8 h	
1.A.1 (min. 2 yrs)	Danish sport pony	Gelding (5)		Day 0-11
1.A.2 (min. 2 yrs)	Gypsy horse	Gelding (10)		Day 4-11
1.A.3 (min. 2 yrs)	Gypsy horse	Gelding (10)		–
1.A.4 (min. 2 yrs)	Gypsy horse	Gelding (10)		Day 4-11
1.A.5 (min. 2 yrs)	Welsh pony	Mare (8)		Day 4-11
1.A.6 (min. 2 yrs)	Welsh pony	Gelding (8)		Day 5-11
Group 1.B			24 h pasture	
1.B.1 (4 yrs)	English thoroughbred	Mare (9)	ca. 1 h riding daily	Day 0-2
1.B.2 (18 yrs)	German riding pony	Mare (28)		Day 0-11
1.B.3 (3 yrs)	German riding pony	Gelding (3)	ca. 1 h training every other day	Day 0-11
1.B.4 (4 yrs)	Donkey	Mare (NA)	(excluded from analyses)	–
Group 2.C			24 h pasture	
2.C.1 (3 yrs)	Oldenburg warmblood	Gelding (3)		Day 0-7
2.C.2 (3 yrs)	Oldenburg warmblood	Gelding (3)		Day 0-7
2.C.3 (13 yrs)	Oldenburg warmblood	Gelding (13)	individual stall: ca. 15–8 h	Day 0-6
2.C.4 (12 yrs)	Oldenburg warmblood	Gelding (12)		Day 0-7
2.C.5 (4 yrs)	Oldenburg warmblood	Gelding (22)		Day 0-7
Group 3.D			24 h pasture	
3.D.1 (28 yrs)	Rhineland horse	Mare (28)	supplementary food next to the pasture	Day 0-13
3.D.2 (3 yrs)	Fjord horse	Mare (3)		Day 0-13
3.D.3 (3 yrs)	Hanoverian warmblood	Mare (3)	supplementary food next to the pasture	Day 0-13
3.D.4 (3 yrs)	Alt-Oldenburg warmblood	Mare (3)		Day 0-13
3.D.5 (3 yrs)	Alt-Oldenburg warmblood	Mare (3)		Day 0-13
3.D.6 (min. 2 yrs)	Gypsy horse	Mare (30)	supplementary food at the barn (ca. 1 h absence)	Day 0-13

While groups 1.B, 2.C, and 3.D were out in the pasture all day (24/7), the horses in group 1.A were kept in individual stalls for use in the riding school in the afternoon and at night.

DAY	-1	0	1	2	3	4	5	6	7	8	9	10	11	12
group 1.A	(in stable)	0 h 0 dB M	0 h 0 dB M	4 h 71 dB M	4 h 65 dB M	4 h 60 dB M	0 h 0 dB M	4 h 71 dB M	6 h 58 dB MA	6 h 56 dB MA	6 h 54 dB MA	4 h 71 dB M	0 h 0 dB M	
group 1.B	start: 1700h	0 h 0 dB MA	0 h 0 dB MAE	11 h 71 dB MAE	11 h 65 dB MAE	11 h 60 dB ME	0 h 0 dB MAE	11 h 71 dB MAE	11 h 58 dB MAE	11 h 56 dB MAE	11 h 54 dB MAE	6 h 71 dB MAE	0 h 0 dB M	
group 2.C	start: 1200h	0 h 0 dB E	0 h 0 dB MAE	11 h 65 dB MAE	11 h 54 dB MAE	0 h 0 dB ME	11 h 65 dB MAE	11 h 58 dB MAE	0 h 0 dB MA					
group 3.D	start: 1400h	0 h 0 dB ME	0 h 0 dB ME	8 h 58 dB ME	8 h 65 dB ME	8 h 71 dB ME	0 h 0 dB ME	0 h 0 dB ME	0 h 0 dB ME	0 h 0 dB ME	8 h 60 dB ME	8 h 54 dB ME	8 h 56 dB ME	0 h 0 dB ME

FIGURE 2
Procedure of the noise exposure with day -1 as habituation to the experimental setup (excluded from analyses), days 0–1 as pre-exposure baseline control, two succeeding noise exposure phases with an intermediate wash-out day, and a final control day. Given are the hours of daily noise exposure, the respective noise level (color-coded; grey: no noise exposure, only ambient noise of 37–40 dB), and the observation sessions (M: morning session with start after sunrise; A: afternoon session with start 1.5 h after the end of the morning session; E: evening session with start so that it was finalized before sunset) per group. Procedures differ between groups due to adaptations to the management within the individual facilities.

CX405; Figure 1C). To record the physiological stress response, the horses wore heart rate girths (Polar® Equine WearLink®) with a recording device fixed to the horse’s halter (Polar® RS800 or RS800CX; Figure 1D).

2.2.1 Noise exposure

Before the noise exposure, we recorded the horses’ normal behavior and heart rates over two days, which served as habituation to the setup (day -1) as well as baseline for the study (day 0–1). On the following days, we exposed the horses to constant motorway noise (modified sound ‘motorway, directly next to the road, fast-moving cars and trucks’) from morning to evening. On the last day and an intermediate wash-out day, we played no motorway noise for control purposes (Figure 2). Each day, we set a different sound level (54 dB to 71 dB) for the noise exposure to simulate varying distances (500 m to 10 m) to a motorway (Table 2). The order of the different sound levels varied between facilities and was pseudo-randomized (Figure 2). The sound level was verified in the proximity area of the pasture (zone 1: 15 m distance from the loudspeakers) using a sound level meter (UNI-T UT353 BT). We also measured noise levels throughout the pasture twice a day, once during noise exposure and once without noise exposure (supplementary material, Supplementary Figure 1, Supplementary Table 1).

The vicinity of the sound source was defined as approximately 30 m around each outer loudspeaker (zone 1 + 2). The specified sound level was ensured in the immediate vicinity of the loudspeakers (approximately 15 m around both loudspeakers, zone 1; Figure 3; supplementary material, Supplementary Table 1). Beyond this close range, the sound level decreased to a greater or lesser extent, depending on the terrain (flat areas at facilities 1 and 2; tree boundaries at facilities 1 and 3). Wind speed and direction were taken into account when

adjusting the volume to the desired intensity. The distance from the noise sources, i.e., potential areas of retreat, varied depending on the size of the pasture, with the pasture of group 2.C, at over 1 ha, and the third pasture of group 3.D, at just under 1 ha, being considerably larger than the other pastures (Figure 3).

2.2.2 Behavioral observations

The behavioral observations, with 15-minute focal animal samplings alternated with 5-minute group scan samplings, took place in two (facility 3) to three sessions (facilities 1 and 2) per day (Figure 2) to obtain a comprehensive picture of the horses’ daily routine following a pre-defined ethogram (Table 3). To this end, the observer stood inconspicuously between the two loudspeakers, recording the horses’ behavior (Figure 1A). The first session started in the morning after sunrise, as soon as all the horses of a given group were out in the pasture (group 1.A, one individual of group 3.D). The next session took place one to two hours after the end of the first session, around noon. The last session took place in the evening so that it was finished before sunset. Each session began with a 5-minute scan sampling of the entire group. This was followed by alternating 15-minute focal sampling of one horse and 5-minute scan sampling of the entire group. On days with motorway noise exposure, the first session started with two scan samplings – the first without motorway noise, the second after the loudspeakers had been set to the respective sound level. The last session at the end of the day ended with two scan samplings – the first with motorway noise, the second after the loudspeakers had been switched off.

2.2.2.1 Scan sampling

During the 5-minute scan samplings, the current position of all horses in the pasture (zone 1–3) and their behavior were recorded every minute (Table 3). In addition, the noise level was verified, and any audible road noise, wind, and rain were noted to control for potential noise influences.

1 downloaded from <https://www.salamisound.de/4788474-autobahn-direkt-an-der>.

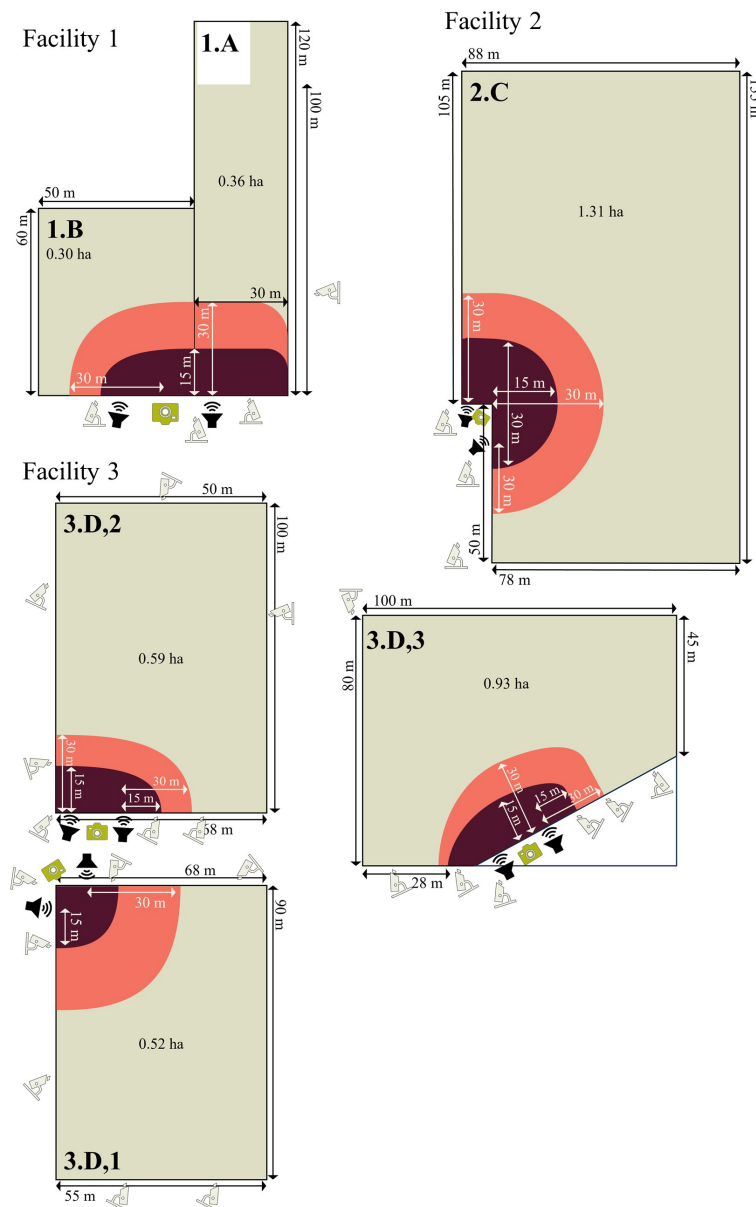


FIGURE 3

Schemes of the pastures at facility 1 (Groups 1.A and 1.B), facility 2 (Group 2.C), and facility 3 (Group 3.D, 3 pastures). Pastures 3.D, 1 and 3.D, 2 were located on the same meadow area, which was divided as shown here. Pasture 3.D, 3 was located opposite 3.D, 2 on the other side of a dirt road. The dimensions given are rounded to the full meter. The colors correspond to the division into different zones in relation to the position of the loudspeakers (🔊): Dark red = zone 1, 15 m radius; orange = zone 2, 30 m radius; beige = zone 3, rest of the pasture. Cameras show the location of the observation point (📹) and the surveillance cameras (📷).

2.2.2.2 Focal Sampling

During the 15-minute focal samplings, the position of the observed horse (focal) and its behavior were recorded. Position changes between zones, as well as ad libitum behaviors related to distraction, stress, and well-being, were also recorded for all other horses (Table 3). The focal horse was filmed (Sony HDR-CX405) for later detailed analysis of body posture and facial expressions, which are prepared for publication elsewhere.

2.2.3 Heart rate

The horses' heart rates were continuously recorded using sensors on girths (Polar® Equine WearLink®) and corresponding data watches as recorders (Polar® RS800 or RS800CX). The recorded pulse values were read out using the manufacturer's Polar ProTrainer 5 software. The fit of the girths and the connectivity of the sensor to the recording device were controlled several times a day. As the horses were able to move freely at all times and

TABLE 2 Daytime noise levels and corresponding distances to a 4-lane motorway with 30, 000 vehicles per day (EIBS GmbH, 2024).

Noise level	Simulated distance
0 dB (only natural noise at 37–40 dB)	No highway
54 dB	500 m
56 dB	400 m
58 dB	300 m
60 dB	200 m
65 dB	100 m
71 dB	10 m

socialized with group members, it was not possible to ensure the girths remained correctly positioned at all times, especially when the horses lay down, sometimes causing the girths to slip caudally and resulting in missing values. Measurements taken while the horse was in the stable, during training, or while being supplementary fed by humans as well as measurements taken around the time of applying and checking the pulse girth (first and last 3 minutes after activation and before deactivation of the sensor, respectively) were manually excluded to evaluate only the heart rate during the time at pasture and free from disturbances unrelated to the experiment.

2.2.4 24 h monitoring

To record resting behavior, spatial distribution on the pasture, and temporary absences throughout the day, surveillance cameras with night vision (ViSiTec) were installed on the pasture to film the groups continuously. If horses were temporarily in the stable (group 1.A, one individual of group 3.D), a camera (Sony HDR-CX405) was also installed there. However, due to technical failure, nighttime recordings were not always available or of sufficient quality to reliably assess resting behavior. Thus, the 24-h monitoring was only used to identify periods of absence of single individuals (e.g.,

training, additional feeding) but could not reliably present the resting, especially lying behavior, as well as spatial distribution of all individuals as planned.

2.3 Statistical analysis

To evaluate behavioral changes in relation to noise exposure and different sound levels, changes in foraging behavior (mostly grazing while slowly moving forward, also feeding on hay or others), comfort behavior (standing relaxed, lying, rolling, autogrooming), vigilance (alert, spooking, flight), and the location on the pasture (distant area, zone 3; proximity areas, zones 1–2; Figure 3) were assessed (Table 3). Social behavior (e.g., affiliative or agonistic behavior), locomotor behavior (walking, trotting, cantering), and other behavior were generally rare, so a statistical evaluation was not meaningful. To evaluate stress reactions in relation to noise exposure, the recorded heart rates per minute were averaged, excluding clearly erroneous measurements (<24 bpm, >240 bpm).

For statistical evaluation in R (version 4.5.1, R Core Team, 2016), linear mixed models with normal distribution structure (lmer, package lme4; Bates et al., 2014) were calculated for continuous variables (foraging duration, comfort duration, zone factor, heart rate), and generalized mixed models with binomial structure (glmer, family="binomial", package lme4; Bates et al., 2014) were calculated for combined matrices of count data (vigilance). We calculated two models per variable, which either took into account the explicit sound level (0 dB, 54 dB, 56 dB, 58 dB, 60 dB, 65 dB, 71 dB) or the experimental phase (pre-exposure: days before noise exposure; first noise exposure; wash-out days; second noise exposure; post-exposure: after noise exposure) as influencing factors (*fixed factor*). Due to the correlation between the sound level and the experimental phase, it was not possible to perform a calculation in a joint model. As further explanatory variables (*fixed factors*) we used the horse groups (group 1.A, N = 6; group 1.B, N = 3; group 2.C, N = 5; group 3.D, N = 6), the age group of the horse (young: <8 years, N = 7; middle: 8–13 years,

TABLE 3 Behavioral variables recorded, as well as their definition and classification.

Variable	Observation	Definition/Classification
Location	scan sampling focal sampling Ad libitum	Location within the pasture (zone 1–3) in relation to loudspeakers (sound source), see Figure 3
Foraging	scan sampling focal sampling	(Mostly) grazing while slowly moving forward, also: feeding on hay (group 1.B), acorn or gnawing on tree bark (group 3.D)
Comfort behavior	scan sampling focal sampling	Rolling (also <i>ad libitum</i>), scratching/autogrooming, lying (also <i>ad libitum</i>), etc.
Vigilance/Flight behavior	scan sampling focal sampling Ad libitum	Alert focusing, spooking/startle, fleeing
Social behavior	scan sampling focal sampling Ad libitum	Aggression between group members, affiliative behavior, social grooming, vocalization, etc.
Locomotion	scan sampling focal sampling	Standing, walking, trotting, cantering
Others	scan sampling focal sampling	Drinking, urinating, defecating (also <i>ad libitum</i>), contact with humans/other horses outside the pasture (also <i>ad libitum</i>)

N = 9; old: >13 years, N = 4), the sex (mare: N = 9; gelding: N = 11), and a zone factor as a relative assessment of the area of the pasture where the horse was kept (see [supplementary material](#) for calculation of the zone factor). To consider individual influences due to repeated measurements, the ID of the horses nested in the horse groups was included in the model as *random factors*, as well as individual variances of the explanatory variables within these random factors (*random slopes*). Specifications regarding the structure and calculation of the statistical models are explained in the [supplementary material](#) ([Supplementary Table 2](#)).

3 Results

3.1 Behavior

3.1.1 Foraging behavior

Compared to the baseline (81% foraging behavior; day 0–1), the horses reduced their foraging behavior by about half upon the first noise exposure, to 41% of the observation time (median across all horses; [Figure 4](#)). Including the wash-out days without noise exposure, the horses spent significantly less time foraging than before the noise exposure ([Supplementary Table 3](#), model F.PH, full-reduced model comparison phase: $\chi^2(7, N=216)=43.96$, $p<0.001$; [Figure 5](#)). With increasing sound level, horses spent less time foraging ([Supplementary Table 3](#), model F.SL, full-reduced model comparison sound level: $\chi^2(7, N=216) = 12.90$, $p<0.001$; $E=-0.01\pm0.002$; [Figure 5](#)).

It was also noticeable that the horses in group 1.A (facility 1, 4-hour pasture) were generally more engaged in foraging than the horses in the other groups ([Supplementary Table 3](#), model F.PH, full-reduced model comparison group ID: $\chi^2(8, N=216) = 10.65$, $p=0.014$). Age, sex and location in the pasture did not influence the duration of foraging behavior ([Supplementary Table 3](#), models F.PH and F.SL, all $p>0.05$).

3.1.2 Comfort behavior

Comfort behavior (especially resting: dozing while standing, occasionally with one hind leg resting on the tip of the toe) was

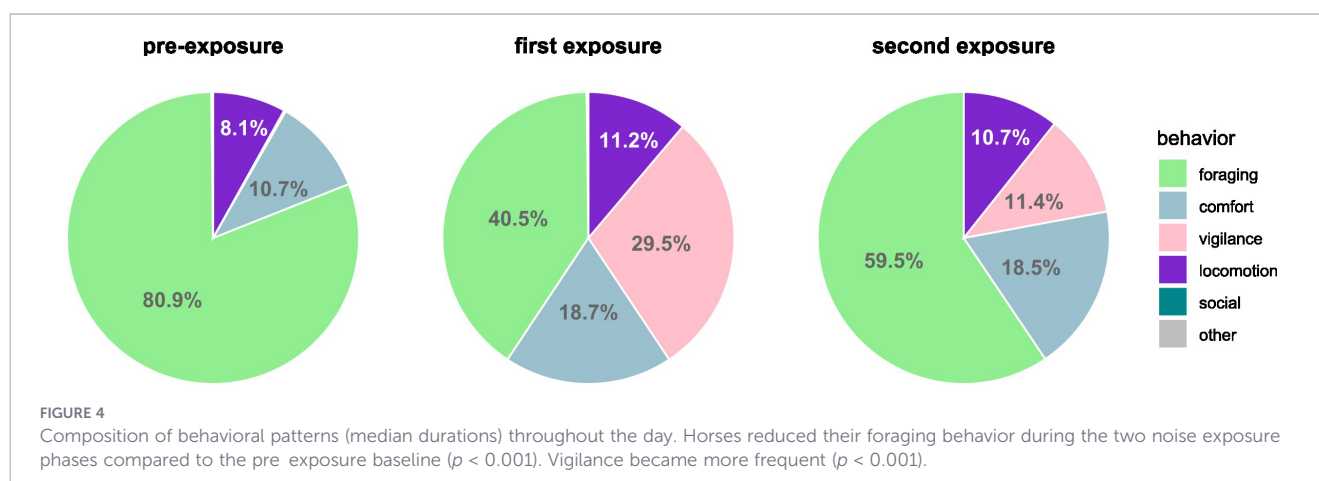
observed in all horses that stood in the pasture for 24 hours (groups 1.B, 2.C, 3.D) in regular, mostly synchronized resting phases within the group for about 10–19% of the observation time (median across all horses; [Figure 4](#)). The linear models identified no significant effects of the experimental phase ([Supplementary Table 3](#), model C.PH: full-reduced model comparison phase: $\chi^2(7, N=216) = 2.68$, $p=0.613$; [Figure 6](#)), the sound level ([Supplementary Table 3](#), model C.SL: full-reduced model comparison sound level: $\chi^2(7, N=216) = 1.47$, $p=0.226$), or any other factor ([Supplementary Table 3](#), models C.PH and C.SL, all $p>0.05$).

3.1.3 Vigilance

Vigilance (alert, startle response, flight response) was recorded for all horses present throughout the entire observation period. Upon the first noise exposure, vigilance significantly increased 6-folds from a maximum of 9 instances per observation period before the noise exposure to a maximum of 54 instances during the first noise exposure ([Supplementary Table 3](#), model V.PH: full-reduced model comparison phase: $\chi^2(7, N=217) = 71.78$, $p<0.001$; $E=1.63\pm0.21$; [Figure 7](#)). They remained more vigilant throughout the entire study period than before the noise exposure, while vigilance reduced from the first to the second noise exposure ($E=0.45\pm0.30$). In addition, horses became increasingly vigilant with increasing sound level ([Supplementary Table 3](#), model V.SL: full-reduced model comparison sound level: $\chi^2(7, N=217) = 14.20$, $p<0.001$; $E=0.01\pm0.002$; [Figure 7](#)). Vigilance did not vary depending on the location within the pasture, group, age or sex ([Supplementary Table 3](#), models V.PH and V.SL, all $p>0.05$).

3.2 Location within the pasture

The general distance from the noise source (zone factor: relative factor of time spent in the different zones) varied depending on the phase of noise exposure ([Supplementary Table 3](#), model Z.PH: full-reduced model comparison phase: $\chi^2(6, N=217)=19.63$, $p<0.001$; [Figure 8](#)). As compared to the pre-exposure baseline, the horses kept a significantly greater distance from the noise source during the noise exposures (first phase: $E=2.25\pm0.64$; second phase: $E=1.66\pm0.61$), while reducing this distance on wash-out days ($E=0.42\pm0.74$) and coming closer on the post-exposure day



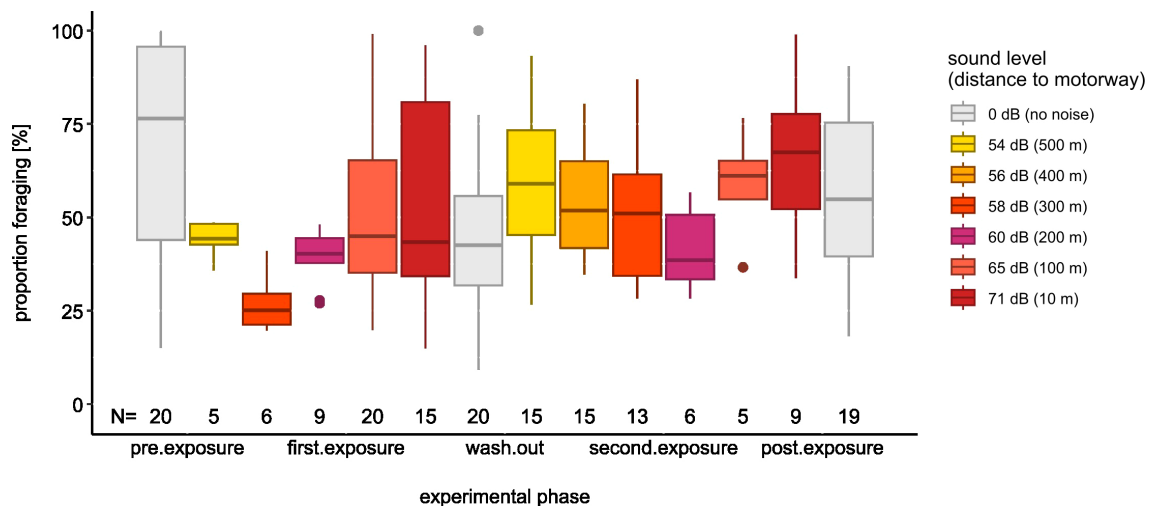


FIGURE 5

Proportional duration spent foraging during the observation period per phase of noise exposure and sound level (0 dB: only natural sounds, no noise exposure). Horses decreased their foraging behavior during noise exposure, specifically at higher sound levels. Sample sizes (N) below each boxplot indicate the number of individuals observed per sound level and phase. The median, 25% and 75% percentiles, minimum and maximum values, and extreme values are displayed.

($E=-0.14\pm0.86$). Especially when noise levels were high, the horses tended to stay longer in pasture areas further away (Supplementary Table 3, model Z.SL: full-reduced model comparison sound level: $\chi^2(6, N=217) = 18.97, p<0.001; E=0.03\pm0.01$; Figure 8). The location within the pasture did not vary with group, age or sex (Supplementary Table 3, models Z.PH and Z.SL, all $p>0.05$).

3.3 Physiology

The horses studied had a median heart rate of 48.81 bpm (min. = 28.40 bpm, max. = 215.83 bpm; N = 14 horses) before noise

exposure. During observation times, heart rates varied with the experimental phases (Supplementary Table 3, model HR.PH: full-reduced model comparison phase: $\chi^2(7, N=35320)=1065.07, p<0.001$; Figure 9; N=19 horses). The heart rate increased to a median of 66.76 bpm ($E=0.54\pm0.03$) during the first and 55.70 bpm ($E=0.63\pm0.03$) during the second noise exposure. On wash-out days ($E=-0.00\pm0.00$), noise-free observation times ($E=-0.02\pm0.01$), and the control day after the noise exposure ($E=0.02\pm0.00$), heart rate was not significantly different to the pre-exposure baseline. A group effect became significant (Supplementary Table 3, model HR.PH: full-reduced model comparison group ID: $\chi^2(9, N=35320) = 8.08$,

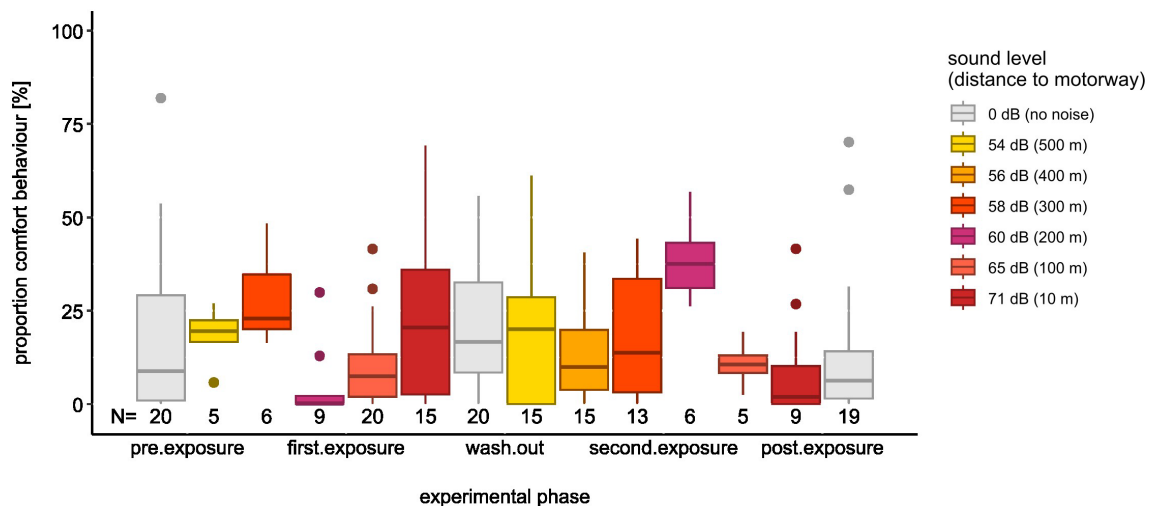


FIGURE 6

Proportional duration of comfort behavior during the observation period per phase of noise exposure and sound level (0 dB: only natural sounds, no noise exposure). Comfort behavior did not systematically vary with either noise exposure phase or sound level. Sample sizes (N) below each boxplot indicate the number of individuals observed per sound level and phase. The median, 25% and 75% percentiles, minimum and maximum values, and extreme values are displayed.

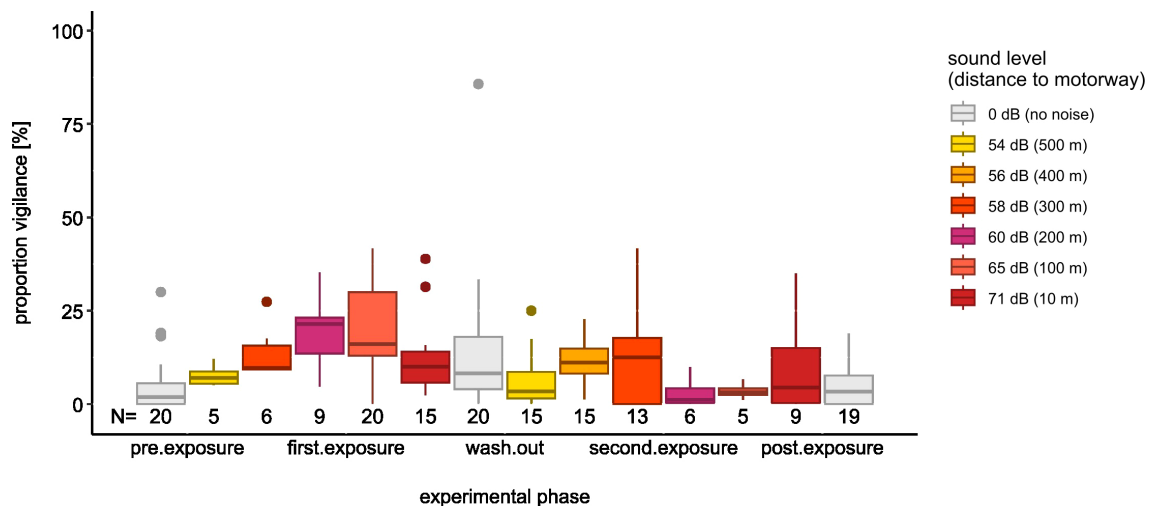


FIGURE 7

Proportional frequency of vigilance (increased alertness and startle response) during the observation period per phase of noise exposure and sound level (0 dB: only natural sounds, no noise exposure). Vigilance increased during noise exposure, specifically at higher sound levels. Sample sizes (N) below each boxplot indicate the number of individuals observed per sound level and phase. The median, 25% and 75% percentiles, minimum and maximum values, and extreme values are displayed.

$p=0.044$), with group 3.D having the highest ($E=0.31\pm0.41$) and group 2.C the lowest heart rates ($E=-0.28\pm0.32$). Sound level (Supplementary Table 3, model HR.SL: full-reduced model comparison sound level: $\chi^2(7, N=35320) = 0.00$, $p=0.974$), the location within the pasture, age, or sex did not influence the heart rate (Supplementary Table 3, models HR.PH and HR.SL, all $p>0.05$).

4 Discussion

Exposing pastured horses to reproduced motorway noise produced a consistent pattern: (1) rapid habituation to the experimental

equipment (installation/habituation on day -1; baseline behavior observed on Days 0–1), (2) an immediate species-typical startle reaction on first noise presentation (Day 1–2) that subsided within ~5–15 min and usually declined by the second exposure day, and (3) pronounced changes in normal behavior and stress parameters during and after noise exposure, including reduced foraging, increased vigilance, persistent spatial avoidance of the noise source, and elevated heart rates. Although behavioral indicators (foraging, vigilance) showed partial habituation over the study period, horses continued to avoid the noisy areas, and elevated heart rates were detectable to some extent even in the absence of the noise source during wash-out periods. This suggests that disturbances persist throughout a period of 10 days rather than that full habituation to traffic noise occurs.

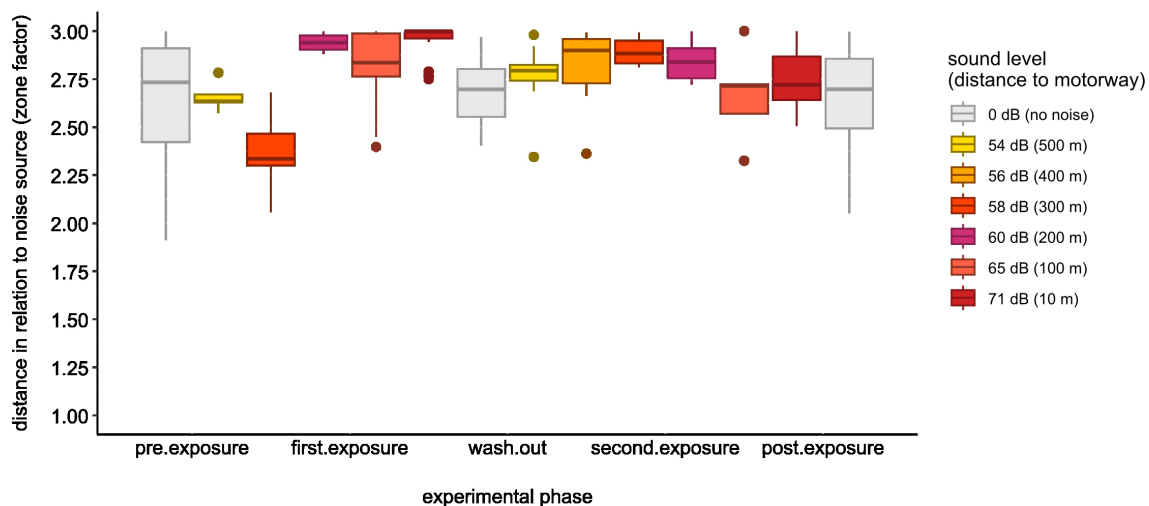


FIGURE 8

Location at pasture (zone factor based on the duration spent in zones relative to the noise source, with 1 spent in close vicinity and 3 spent in distance) during the observation period for each phase of noise exposure and sound level (0 dB: only natural sounds, no noise exposure). Horses avoided the proximity to the noise source, specifically at higher sound levels. Sample sizes (N) below each boxplot indicate the number of individuals observed per sound level and phase. The median, 25% and 75% percentiles, minimum and maximum values, and extreme values are displayed.

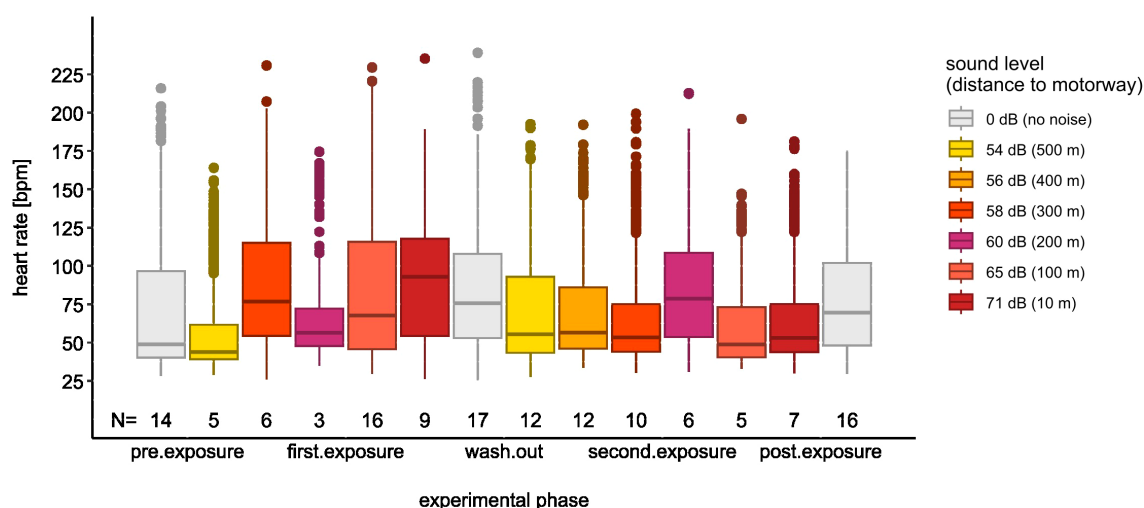


FIGURE 9

Average heart rate per minute during the observation period for each phase of noise exposure and sound level (0 dB: only natural sounds, no noise exposure). Heart rates increased during noise exposure, irrespective of the sound level. Sample sizes (N) below each boxplot indicate the number of individuals sampled. The median, 25% and 75% percentiles, minimum and maximum values, and extreme values are displayed.

4.1 Behavioral changes and physiological effects upon noise exposure

During traffic noise exposure, horses increased vigilance and reduced foraging, indicating disruption of normal behavioral rhythms. The concurrent increase in heart rate further confirms physiological arousal consistent with the activation of the sympathetic nervous system and the onset of a stress response (von Borell et al., 2007). Reduced feeding and increased vigilance, therefore, likely reflect a shift from energy intake to environmental monitoring, a typical short-term trade-off under perceived threat (Khater et al., 2016). Chronic activation of this system can lead to maladaptive outcomes, including gastrointestinal dysfunction, metabolic disorders, and stereotypic behavior (Wagner, 2010; Henshall et al., 2022). Such negative effects on health may become visible upon long-term exposure to traffic noise but were not further assessed or noticed during the short-term exposure within the current study.

Behavioral data indicate a partial habituation, as the horses gradually returned to their near-normal foraging and reduced vigilance (Figure 4). However, they consistently preferred quieter pasture zones during noise exposure throughout the study. This spatial avoidance of the noise source suggests that, while horses may behaviorally adapt, the underlying perception of noise as an aversive stimulus remains. Such behavior is in line with findings in wildlife that shift habitat use under noise exposure (Brown et al., 2012; Shannon et al., 2016; Buxton et al., 2020). Because horses in managed pastures cannot fully escape the stimulus, this active coping mechanism may be limited, potentially leading to sustained stress, even if at a comparably low level. The heart rate of adult horses is 28–40 bpm at rest (Younes et al., 2016). In our study, we consistently recorded higher mean heart rates, reflecting the short resting periods of only about 11–16%, as well as a general high arousal at times of noise exposure. Elevated blood pressure and heart rates in response to noise exposure are observed in humans,

too (Lusk et al., 2004; Kraus et al., 2013). Therefore, comparable to humans living near busy roads, behavioral habituation may mask continued physiological strain, which may still lead to substantial, negative health consequences in humans (Palatini and Julius, 2004; Custodis et al., 2010; Arana et al., 2014; Recio et al., 2016; Tobollik et al., 2019) and potentially in animals, too (Arregi et al., 2024). Thus, avoidance behavior may serve as an active coping strategy supporting partial resilience but cannot lead to full recovery from noise-induced stress.

4.2 Critical noise levels

The study identified behavioral and physiological alterations already at the lowest tested sound level of 54 dB, equivalent to the noise level of a motorway at 500 m distance. This is within the range known to trigger psychological stress (30–65 dB), as well as physiological responses (55–65 dB) in humans (BMUKN, 2017; World Health Organization, 2018), and to impair habitat suitability in several bird species (47–55 dB) (Garniel et al., 2007). Given horses' broader auditory range and higher noise sensitivity compared to humans (Heffner and Heffner, 1983), their sensitive response highlights the need to consider species-specific thresholds. While we could not establish precise critical noise thresholds, our findings still indicate that constant traffic noise of noise levels below established thresholds (usually 65 dB) has the potential to compromise equine welfare.

4.3 Study limitations

Despite providing an overview of the impact of sudden, monotonous exposure to motorway noise on horses on pastures, methodological and contextual limitations must be acknowledged. First, heart rate served as the sole physiological indicator of stress in this study, not differentiating between positive eustress, negative distress, or varying locomotion. Although elevated heart rate is a

valid proxy for acute stress responses in horses (von Borell et al., 2007; König von Borstel et al., 2017), the use of long-term field measurements introduced technical constraints. The Polar® equine system, although widely validated, proved unreliable during extended outdoor use. Sensor disconnections, movement artefacts, and signal duplication led to data losses and potentially occasional overestimation of heart rates. At one site, only five of nine horses could be reliably equipped with sensors, and data completeness varied between phases. Even though the heart rate data in this facility could only be partially included in the analysis, complete data for the entire observation periods were available for the remaining eleven horses. Despite these challenges, the consistently higher heart rates during noise exposure, particularly during the initial exposure days, support a physiological response to the stimulus. However, equipment-dependent measurement noise may have obscured smaller differences between experimental phases or noise levels.

Second, the experimental setup employed loudspeakers to broadcast motorway noise at defined sound levels within the horses' normal pasture environment. While this approach ensured control over noise intensity and duration, it did not fully replicate the acoustic complexity or spatial distribution of the noise associated with a real motorway, or associated distractions (e.g., visual stimuli, vibrations). Sound attenuation was stronger than expected, and noise levels declined steeply with distance from the speakers. Consequently, horses in more distant areas experienced substantially lower sound intensities than would occur in a pasture directly adjacent to a real motorway. The behavioral and physiological effects observed here may therefore underestimate the responses to real motorway noise. Moreover, the exposure varied between facilities and was limited to daytime hours (4–11 h daily) to comply with local noise regulations, as well as animal welfare concerns. This allowed the animals to recover overnight, reducing cumulative exposure and likely moderating the stress response, which we could not further control for. Horses exposed to continuous 24-hour noise would not benefit from such recovery periods. Thus, the current results cannot be directly extrapolated to chronic or permanent motorway exposure but rather represent a minimum nuisance level that already affected the horses. Further, the limited duration of exposure and observation period precludes conclusions about nighttime rest. Horses require regular periods of recumbent sleep to maintain physiological and psychological health (Greening and McBride, 2022), yet they typically lie down only under conditions perceived as safe (Bertone, 2015). Continuous nocturnal noise could therefore disrupt essential resting behavior without being observable during daytime. Future investigations should include 24-hour behavioral monitoring, preferably with automated video or accelerometer systems, to determine whether chronic noise exposure interferes with resting patterns or leads to sleep deprivation-related problems such as pseudo narcolepsy.

Third, the study was limited to a small number of naïve horses that had no known prior experience with continuous traffic noise. Consequently, the findings primarily reflect the responses of noise-naïve individuals. Horses habituated to traffic environments may exhibit less pronounced behavioral responses but could still experience long-term physiological or auditory effects. Moreover, the sample did not represent the full variation in age, breed, or management systems found in domestic horse populations. With future studies including larger,

more heterogeneous samples and encompassing both noise-experienced and unexperienced horses, we can assess a broader picture of individual differences in sensitivity and coping capacity. To determine a critical threshold of noise tolerance in horses, future experiments need to systematically expose horses to defined noise levels over extended periods using randomized and repeated designs. This would allow the determination of the noise intensity at which behavioral or physiological indicators deviate from baseline, leading to concrete advice for noise barriers. In addition, combining behavioral observations with hearing assessments could clarify whether chronic motorway noise leads to sensory impairment similar to that reported in humans and other mammals (Arana et al., 2014; Tobollik et al., 2019; Pollarolo et al., 2022).

5 Conclusion

Motorway noise significantly influenced horses' behavioral and physiological responses at pasture. We observed partial behavioral habituation over time, as horses gradually returned to their pre-exposure foraging behavior. In contrast, persistently elevated heart rates along with persistent avoidance of areas close to the noise source indicate a sustained physiological stress response and active coping strategy, suggesting potential long-term welfare risks. It is also noteworthy that even the lowest noise level (54 dB, equivalent to about 500 m distance from a four-lane motorway), which is below standard noise thresholds (65 dB), elicited measurable changes in heart rate and behavior. As the observed horses mainly used more distant areas within the pasture, large pastures with quieter retreat areas may help cope with constant noise exposure and mitigate long-term health effects. To ensure horse welfare, management practices should be revised with this regard, and potentially also adopted for other livestock, given the similarity of sensory perception.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The animal studies were approved by Regierungspräsidium Giessen, approval number: G 27/2022. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent was obtained from the owners for the participation of their animals in this study.

Author contributions

JH-M: Writing – original draft, Writing – review & editing, Conceptualization, Data curation, Formal analysis, Investigation,

Methodology, Project administration, Resources, Visualization. UKB: Writing – original draft, Writing – review & editing, Conceptualization, Project administration, Supervision.

Funding

The author(s) declared that financial support was received for this work and/or its publication. This study was funded by the Autobahn GmbH.

Acknowledgments

We are grateful to the facilities and private horse owners for their cooperation and interest in the study, and three reviewers for their thorough feedback to an earlier version of the manuscript. We thank the Autobahn GmbH for thoughtful discussions on the project design.

Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

- Arana, M., San Martin, R., and Salinas, J. C. (2014). People exposed to traffic noise in european agglomerations from noise maps. A critical review. *Noise Mapp.* 1, 40–49. doi: 10.2478/noise-2014-0005
- Arregi, A., Vegas, O., Lertxundi, A., Silva, A., Ferreira, I., Vereziartua, A., et al. (2024). Road traffic noise exposure and its impact on health: evidence from animal and human studies—chronic stress, inflammation, and oxidative stress as key components of the complex downstream pathway underlying noise-induced non-auditory health effects. *Environ. Sci. Pollut. Res.* 31, 46820–46839. doi: 10.1007/s11356-024-33973-9
- (2009). Council Directive 2008/120/EC of 18 December 2008 laying down minimum standards for the protection of pigs (Codified version). *Official Journal of the European Union*, L 47, 5–13. Available online at: <https://eur-lex.europa.eu/eli/dir/2008/120/oj/eng>.
- Baragli, P., Vitale, V., Banti, L., and Sighieri, C. (2014). Effect of aging on behavioural and physiological responses to a stressful stimulus in horses (*Equus caballus*). *Behaviour* 151, 1513–1533. doi: 10.1163/1568539X-00003197
- Barber, J. R., Crooks, K. R., and Fristrup, K. M. (2010). The costs of chronic noise exposure for terrestrial organisms. *Trends Ecol. Evol.* 25, 180–189. doi: 10.1016/j.tree.2009.08.002
- Bates, D., Mächler, M., Bolker, B., and Walker, S. (2014). Fitting linear mixed-effects models using lme4. *arXiv*. Available online at: <http://arxiv.org/abs/1406.5823>.
- Berger, A., Scheibe, K.-M., Eichhorn, K., Scheibe, A., and Streich, J. (1999). Diurnal and ultradian rhythms of behaviour in a mare group of przewalski horse *Equus ferus przewalskii*, measured through one year under semi-reserve conditions. *Appl. Anim. Behav. Sci.* 64, 1–17. doi: 10.1016/S0168-1591(99)00026-X
- Bertone, J. J. (2015). “Sleep and sleep disorders in horses,” in *Equine neurology*. Eds. M. Furr and S. Reed, (John Wiley & Sons, Inc.) 123–129. doi: 10.1002/9781118993712.ch10
- BMUKN (2017). *Lärmwirkung* (Bundesministerium für Umwelt, Klimaschutz, Naturschutz und nukleare Sicherheit). Available online at: <https://www.bundesumweltministerium.de/WS754> (Accessed September 10, 2025).
- Brown, C. L., Hardy, A. R., Barber, J. R., Fristrup, K. M., Crooks, K. R., Angeloni, L. M., et al. (2012). The effect of human activities and their associated noise on ungulate behavior. *PLoS One* 7, e40505. doi: 10.1371/journal.pone.0040505

Generative AI statement

The author(s) declared that generative AI was not used in the creation of this manuscript.

Any alternative text (alt text) provided alongside figures in this article has been generated by Frontiers with the support of artificial intelligence and reasonable efforts have been made to ensure accuracy, including review by the authors wherever possible. If you identify any issues, please contact us.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fetho.2026.1802957/full#supplementary-material>

- Brubaker, A. S., and Coss, R. G. (2015). Evolutionary constraints on equid domestication: comparison of flight initiation distances of wild horses (*Equus caballus ferus*) and plains zebras (*Equus quagga*). *J. Comp. Psychol.* 129, 366–376. doi: 10.1037/a0039677
- Bundesministerium der Justiz (2020). *Verkehrslärmschutzverordnung – 16. BImSchV*. Available online at: https://www.gesetze-im-internet.de/bimschv_16/ (Accessed August 10, 2025).
- Buxton, R. T., McKenna, M. F., Brown, E., Ohms, R., Hammesfahr, A., Angeloni, L. M., et al. (2020). Varying behavioral responses of wildlife to motorcycle traffic. *Global Ecol. Conserv.* 21, e00844. doi: 10.1016/j.gecco.2019.e00844
- Carson, K., and Wood-Gush, D. G. M. (1983). Equine behaviour: ii. a review of the literature on feeding, eliminative and resting behaviour. *Appl. Anim. Ethol.* 10, 179–190. doi: 10.1016/0304-3762(83)90139-6
- Chaplin, S. J., and Gretgrix, L. (2010). Effect of housing conditions on activity and lying behaviour of horses. *Animal* 4, 792–795. doi: 10.1017/S1751731109991704
- Christensen, J. W., Keeling, L. J., and Nielsen, B. L. (2005). Responses of horses to novel visual, olfactory and auditory stimuli. *Appl. Anim. Behav. Sci.* 93, 53–65. doi: 10.1016/j.applanim.2005.06.017
- Custodis, F., Schirmer, S. H., Baumhäkel, M., Heusch, G., Böhm, M., and Laufs, U. (2010). Vascular pathophysiology in response to increased heart rate. *J. Am. Coll. Cardiol.* 56, 1973–1983. doi: 10.1016/j.jacc.2010.09.014
- EIBS GmbH (2024). *Ergebnisse schalltechnischer berechnungen* (Dresden: Entwurfs- und Ingenieurbüro Straßenwesen GmbH).
- Fahrig, L., and Rytwinski, T. (2009). Effects of roads on animal abundance: an empirical review and synthesis. *Ecol. Soc* 14, art21. doi: 10.5751/ES-02815-140121
- Garniel, A., Daunicht, W. D., Mierwald, U., and Ojowski, U. (2007). *Vögel und Verkehrslärm. Quantifizierung und Bewältigung entscheidungserheblicher Auswirkungen von Verkehrslärm auf die Avifauna. Schlussbericht November 2007 / Kurzfassung* (Bonn, Kiel: Bundesministeriums für Verkehr, Bau- und Stadtentwicklung), 273.
- Greening, L., and McBride, S. (2022). A review of equine sleep: implications for equine welfare. *Front. Vet. Sci.* 9, 916737. doi: 10.3389/fvets.2022.916737

- Gronqvist, G., Rogers, C., and Gee, E. (2016). The management of horses during fireworks in New Zealand. *Animals* 6, 20. doi: 10.3390/ani6030020
- Hausberger, M., Bruderer, C., Le Scolan, N., and Pierre, J.-S. (2004). Interplay between environmental and genetic factors in temperament/personality traits in horses (*Equus caballus*). *J. Comp. Psychol.* 118, 434–446. doi: 10.1037/0735-7036.118.4.434
- Heffner, H. E., and Heffner, R. S. (1983). The hearing ability of horses. *Equine Pract.* 5, 27–32.
- Heffner, R. S., and Heffner, H. E. (1986). Localization of tones by horses: use of binaural cues and the role of the superior olivary complex. *Behav. Neurosci.* 100, 93–103. doi: 10.1037/0735-7044.100.1.93
- Henshall, C., Randle, H., Francis, N., and Freire, R. (2022). The effect of stress and exercise on the learning performance of horses. *Sci. Rep.* 12, 1918. doi: 10.1038/s41598-021-03582-4
- Hole, C., Murray, R., Marlin, D., and Freeman, P. (2023). Equine behavioural and physiological responses to auditory stimuli in the presence and absence of noise-damping ear covers. *Animals* 13, 1574. doi: 10.3390/ani13091574
- Huss, A., Spoerri, A., Egger, M., and Rössli, M. (2010). Aircraft noise, air pollution, and mortality from myocardial infarction. *Epidemiology* 21, 829–836. doi: 10.1097/EDE.0b013e3181f4e634
- JAMA (1990). Noise and hearing loss. *J. Am. Med. Assoc.* 263, 3185. doi: 10.1001/jama.1990.03440230081038
- Janczarek, I., Stachurska, A., Kędzierski, W., Wiśniewska, A., Ryżak, M., and Koziol, A. (2020). The intensity of physiological and behavioral responses of horses to predator vocalizations. *BMC Vet. Res.* 16, 431. doi: 10.1186/s12917-020-02643-6
- Janicka, W., Wilk, I., and Ryżak, M. (2022). Horses' perception of a threat posed by sounds of different origin. *Medycyna Weterynaryjna* 78, 6672–2022. doi: 10.21521/mw.6672
- Jarup, L., Babisch, W., Houthuijs, D., Pershagen, G., Katsouyanni, K., Cadum, E., et al. (2008). Hypertension and exposure to noise near airports: the HYENA study. *Environ. Health Perspect.* 116, 329–333. doi: 10.1289/ehp.10775
- Khater, M., Murariu, D., and Gras, R. (2016). Predation risk tradeoffs in prey: effects on energy and behaviour. *Theor. Ecol.* 9, 251–268. doi: 10.1007/s12080-015-0277-5
- Kok, A. C. M., Berkout, B. W., Carlson, N. V., Evans, N. P., Khan, N., Potvin, D. A., et al. (2023). How chronic anthropogenic noise can affect wildlife communities. *Front. Ecol. Evol.* 11, 1130075. doi: 10.3389/fevo.2023.1130075
- König von Borstel, U., Duncan, I. J. H., Lundin, M. C., and Keeling, L. J. (2010). Fear reactions in trained and untrained horses from dressage and show-jumping breeding lines. *Appl. Anim. Behav. Sci.* 125, 124–131. doi: 10.1016/j.applanim.2010.04.015
- König von Borstel, U., Visser, E. K., and Hall, C. (2017). Indicators of stress in equitation. *Appl. Anim. Behav. Sci.* 190, 43–56. doi: 10.1016/j.applanim.2017.02.018
- Kraus, U., Schneider, A., Breitter, S., Hampel, R., Rückerl, R., Pitz, M., et al. (2013). Individual daytime noise exposure during routine activities and heart rate variability in adults: a repeated measures study. *Environ. Health Perspect.* 121, 607–612. doi: 10.1289/ehp.1205606
- Leiner, L., and Fendt, M. (2011). Behavioural fear and heart rate responses of horses after exposure to novel objects: effects of habituation. *Appl. Anim. Behav. Sci.* 131, 104–109. doi: 10.1016/j.applanim.2011.02.004
- Lesimple, C., Poissonnet, A., and Hausberger, M. (2016). How to keep your horse safe? an epidemiological study about management practices. *Appl. Anim. Behav. Sci.* 181, 105–114. doi: 10.1016/j.applanim.2016.04.015
- Lindstedt, J. S. M. (2020). *Fireworks related equine noise anxiety in Finland and Sweden* (Tartu: Estonian University of Life Sciences).
- Lusk, S. L., Gillespie, B., Hagerty, B. M., and Ziemba, R. A. (2004). Acute effects of noise on blood pressure and heart rate. *Arch. Environ. Health: An. Int. J.* 59, 392–399. doi: 10.3200/AEOH.59.8.392-399
- Maeda, T., Sœur, C., Hirata, S., and Yamamoto, S. (2021). Behavioural synchronization in a multilevel society of feral horses. *PloS One* 16, e0258944. doi: 10.1371/journal.pone.0258944
- Malmkvist, J., Poulsen, J. M., Luthersson, N., Palme, R., Christensen, J. W., and Søndergaard, E. (2012). Behaviour and stress responses in horses with gastric ulceration. *Appl. Anim. Behav. Sci.* 142, 160–167. doi: 10.1016/j.applanim.2012.10.002
- Mayes, E., and Duncan, P. (1986). Temporal patterns of feeding behaviour in free-ranging horses. *Behaviour* 96, 105–129. doi: 10.1163/156853986X00243
- Morgan, K. N., and Tromborg, C. T. (2007). Sources of stress in captivity. *Appl. Anim. Behav. Sci.* 102, 262–302. doi: 10.1016/j.applanim.2006.05.032
- Noble, G. K., Blackshaw, K. L., Cowling, A., Harris, P. A., and Sillence, M. N. (2013). An objective measure of reactive behaviour in horses. *Appl. Anim. Behav. Sci.* 144, 121–129. doi: 10.1016/j.applanim.2012.12.009
- Ödberg, F. O. (1978). A study of the hearing ability of horses. *Equine Vet. J.* 10, 82–84. doi: 10.1111/j.2042-3306.1978.tb02225.x
- Palatini, P., and Julius, S. (2004). Elevated heart rate: a major risk factor for cardiovascular disease. *Clin. Exp. Hypertension* 26, 637–644. doi: 10.1081/CEH-200031959
- Pollarolo, M., Immordino, A., Immordino, P., Sireci, F., Lorusso, F., and Dispenza, F. (2022). Noise-induced hearing loss in police officers: systematic review. *Iranian J. Otorhinolaryngology* 34, 211–218. doi: 10.22038/ijorl.2022.64036.3198
- R Core Team (2016). *R: a language and environment for statistical computing* (Vienna, Austria: R Foundation for Statistical Computing), 275–286. Available online at: <http://www.R-project.org/https://cir.nii.ac.jp/crid/1574231874043578752>.
- Recio, A., Linares, C., Banegas, J. R., and Díaz, J. (2016). Road traffic noise effects on cardiovascular, respiratory, and metabolic health: An integrative model of biological mechanisms. *Environ. Res.* 146, 359–370. doi: 10.1016/j.envres.2015.12.036
- Rochais, C., Henry, S., and Hausberger, M. (2017). Spontaneous attention-capture by auditory distractors as predictor of distractibility: a study of domestic horses (*Equus caballus*). *Sci. Rep.* 7, 15283. doi: 10.1038/s41598-017-15654-5
- Rørvang, M. V., Nielsen, B. L., and McLean, A. N. (2020). Sensory abilities of horses and their importance for equitation science. *Front. Vet. Sci.* 7, 633. doi: 10.3389/fvets.2020.00633
- Shannon, G., McKenna, M. F., Angeloni, L. M., Crooks, K. R., Frstrup, K. M., Brown, E., et al. (2016). A synthesis of two decades of research documenting the effects of noise on wildlife. *Biol. Rev.* 91, 982–1005. doi: 10.1111/brv.12207
- Sørensen, M., Hvidberg, M., Hoffmann, B., Andersen, Z. J., Nordsborg, R. B., Lillelund, K. G., et al. (2011). Exposure to road traffic and railway noise and associations with blood pressure and self-reported hypertension: a cohort study. *Environ. Health* 10, 92. doi: 10.1186/1476-069X-10-92
- Tobollik, M., Hintzsche, M., Wothge, J., Myck, T., and Plass, D. (2019). Burden of disease due to traffic noise in Germany. *Int. J. Environ. Res. Public Health* 16, 2304. doi: 10.3390/ijerph16132304
- von Borell, E., Langbein, J., Després, G., Hansen, S., Leterrier, C., Marchant, J., et al. (2007). Heart rate variability as a measure of autonomic regulation of cardiac activity for assessing stress and welfare in farm animals — a review. *Physiol. Behav.* 92, 293–316. doi: 10.1016/j.physbeh.2007.01.007
- Wagner, A. E. (2010). Effects of stress on pain in horses and incorporating pain scales for equine practice. *Veterinary Clinics North. America: Equine Pract.* 26, 481–492. doi: 10.1016/j.cveq.2010.07.001
- Wiśniewska, A., Janczarek, I., Ryżak, M., Tkaczyk, E., and Kędzierski, W. (2022). Behavioural responses of Konik Polski horses to natural, familiar sound of thunderstorm, and unfamiliar similar-sounding sounds of volcanic eruption and sea storms. *BMC Vet. Res.* 18, 207. doi: 10.1186/s12917-022-03314-4
- World Health Organization (2018). *Environmental noise guidelines for the European Region - executive summary* (Copenhagen: WHO Regional Office for Europe).
- Wright, A. J., Soto, N. A., Baldwin, A. L., Bateson, M., Beale, C. M., Clark, C., et al. (2007). Anthropogenic noise as a stressor in animals: A multidisciplinary perspective. *Int. J. Comp. Psychol.* 20, 250–273. doi: 10.46867/IJCP.2007.20.02.02
- Younes, M., Robert, C., Barrey, E., and Cottin, F. (2016). Effects of age, exercise duration, and test conditions on heart rate variability in young endurance horses. *Front. Physiol.* 7, 1–11. doi: 10.3389/fphys.2016.00155