From: DIO SEE-EPS PTCP4a (Eaton, Jeremy Mr) [mailto:DIOSEE-EPSPTCP4a@mod.uk]
Sent: 15 October 2015 13:48
To: Banks, Andrew
Subject: Planning Application Reference P150930/O - Ministry of Defence Consultation Response

Dear Mr Banks,

Re: Planning Application Reference P150930/O – Proposed Development of Approximately 250 Dwellings Including Affordable Housing, Public Open Space and Associated Works on Land at Hildersley Farm, Ross-on-Wye, Herefordshire – Ministry of Defence Consultation Response

Please find enclosed the Defence Infrastructure Organisation's (DIO) latest consultation response (dated 15th October 2015), made on behalf of the Ministry of Defence (MoD), in respect of the above planning application.

In support of this consultation response I enclose Amec Foster Wheeler Environmental & Infrastructure UK Limited's Noise Survey & Assessment (Version 05 dated 13th October 2015), and earlier copies of the DIO's consultation responses made on behalf of the MoD.

If you have any questions regarding this response, please do not hesitate to contact me.

Yours sincerely,

Jeremy Eaton BA (Hons) MRTPI
Town and Country Planner

Defence Infrastructure Organisation

Safety Environment & Engineering, Environment and Planning Support, Town & Environmental Planning

Kingston Road, Sutton Coldfield, West Midlands, B75 7RL

MOD telephone: 94421 2132 | **Telephone:** 0121 311 2132 | **Fax:** 0121 311 3636
Mobile: 07468 701 823 | **Email:** DIOSEE-EPSPTCP4a@mod.uk | **Website:** www.mod.uk/DIO

Defence
Infrastructure
Organisation

Ministry of Defence
Building 49
Kingston Road
Sutton Coldfield
West Midlands B75 7RL
United Kingdom

Telephone [MOD]: +44 (0)121 311 2132
Facsimile [MOD]: +44 (0)121 311 3636
E-mail: DIOODC-IPSPlanTCP4a@mod.uk

Mr Andrew Banks
Planning Services
Herefordshire Council
Franklin House
4 Commercial Road
Hereford
HR1 2BB

5th June 2015

Dear Mr Banks,

Re: Planning Application Reference P150930/O – Proposed Development of Approximately 250 Dwellings Including Affordable Housing, Public Open Space and Associated Works on Land at Hildersley Farm, Ross-on-Wye, Herefordshire

I write in connection with the above planning application, which recently came to the attention of the Ministry of Defence (MoD) on 12th May 2015. Following a review of this application, the Defence Infrastructure Organisation (DIO) wishes to **object** to this application, on behalf of the MoD, for the following reasons:

An existing MoD rifle range immediately adjoins the western boundary of the application site. The range facility, comprising of a 9-lane, 600 metre outdoor range, is frequently used by a number of different military groups/units. It is important to highlight to the Local Planning Authority that the existing range is not subjected to restrictions which limit the nature of operations undertaken on the MoD site. This includes no restrictions in respect of the nature of weapons operated, days/hours of operation, noise limit restrictions, etc. Notwithstanding this, the range facility is under license by the Headquarters 11 Sig & West Midlands Brigade.

With regard to the proposed development, whilst it is important to acknowledge that the MoD supports the basic principle of new residential development in the local area, the MoD have fundamental concerns regarding this planning application.

Given the nature of operations undertaken at the MoD rifle range, and their close proximity to the application site, the MoD has significant concerns regarding the potential noise levels (of low frequency noise) that would be experienced by the future inhabitants of the residential development scheme proposed.

It is noticeable that the planning application, submitted by the Applicant, does not include a Noise Impact Assessment. Unfortunately, this is somewhat disappointing, especially given the fact that both the Agent, RPS Planning & Development, and the Local Planning Authority were previously made aware that there is an MoD site adjoining the application site, and are aware of the nature of operations undertaken on the MoD site.

In connection with the above, it is worth highlighting that prior to the submission of the planning application, representatives of the MoD attended a pre-application meeting with the Agent on 11th December 2014, at their Cardiff offices, to discuss the proposed development, and the planning application in general. During this meeting, the Agent was advised that the MoD felt it necessary that a Noise Impact Assessment should accompany any future planning application.

In addition, following this pre-application meeting, the DIO emailed Officers of the Local Planning Authority, including you and Victoria Eaton, between 12th and 16th December 2014, in respect of the Applicant's intention to submit a future planning application for the above site, and to highlight that any future application should be

supported by a Noise Impact Assessment. The Authority's response in respect of this matter suggested that a Noise Impact Assessment would not be required as a Local Validation requirement, although acknowledged that in the absence of a Noise Impact Assessment that it would be difficult for the Local Planning Authority to objectively assess any concerns that might be raised on such grounds. In such circumstances, it was suggested that the Local Planning Authority would have to rely on information currently available from colleagues in the Council's Environmental Health team and any complaints received in connection with the MoD site. Please refer to the attached email correspondence for further details.

I would like to refer the Local Planning Authority's attention to Paragraph 120 of the National Planning Policy Framework (NPPF), which states: *"to prevent unacceptable risks from pollution …, planning … decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health … or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account."* In addition, Paragraph 123 of the NPPF advises that planning decisions should aim to, amongst other things, avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development.

In view of this, it is the MoD's contention that the Local Planning Authority should treat the matter of noise as a material planning consideration, and in doing so request that the Applicant submits a Noise Impact Assessment in support of his/her planning application. Failure to do so would ensure that the Local Planning Authority are not in a position to fully consider the impact of noise from the MoD site on the proposed development, in which case they cannot objectively assess any concerns that might be raised on such grounds. Furthermore, it is suggested that the Local Planning Authority's reliance solely on information currently available from colleagues in the Council's Environmental Health team and any historic complaints received in connection with the MoD site would be inappropriate in respect of objectively assessing such concerns.

In view of the above, the MoD wishes to object to the proposed development.

Going forward, it is hoped that in order to make an informed judgement as to whether or not the proposed development will be acceptable from a noise point of view, the Local Planning Authority will reconsider its previous position and, in doing so, will request that the Applicant submits a Noise Impact Assessment in support of his/her planning application.

Following the submission of a Noise Impact Assessment, the MoD would appreciate the opportunity to review its content and be afforded a further opportunity to provide comments.

Notwithstanding the above, should the Local Planning Authority not reconsider its position, and request a Noise Impact Assessment to be submitted in support of the planning application, it is the MoD's contention that the application should be refused on the basis of insufficient information submitted in support of the application to enable determination of the full impacts of the planning application.

Accordingly, the DIO will leave the above for the Local Planning Authority's consideration.

Whilst the MoD wishes to object at this time, this objection might be overcome by virtue of the Applicant submitting a Noise Impact Assessment in support of the planning application, and allowing the MoD with an opportunity to review its content, including any potential proposed mitigation.

With regard to the proposed development, it is suggested that suitable mitigation would likely be required to protect the future inhabitants from existing (and future) noise generated from the MoD rifle range. Whilst any proposed mitigation may well perhaps be able to secure an acceptable living environment for the houses proposed, it is suggested that this mitigation may not necessarily provide protection to inhabitants in respect of private amenity spaces. Therefore, suitable alternative mitigation may also likely be required to address this.

The MoD would appreciate the opportunity to review the details of any proposed mitigation measures to ensure that the issue of noise is adequately dealt with; otherwise this may well have severe connotations in respect to the MoD site and the nature of its operations.

Notwithstanding the above, it is appreciated that the operations at the MoD rifle range, in support of the Defence of the Realm, can unfortunately cause some annoyance to neighbours by reason of noise disturbance. With regard to the proposed development, should the Local Planning Authority decide to grant planning permission for residential development on this adjoining site to the rifle range, the MoD will bear no responsibility for any complaints or claims from new residents in respect of matters of noise and will refer the complainants to the Developer and the Council.

Whilst the MoD object on the basis of the issue of noise, the MoD have further concerns in respect to matters of national security of which we would like the Local Planning Authority to be aware of. These are as follows:

The proposed development may potentially create a trespass risk on to MoD land. Unfortunately, the application is not supported by any detailed information which would outline whether or not the application site will be fenced off from the adjoining MoD land. In the interests of public safety, and for the protection of MoD land, it is recommended that a minimum of 2.0 metre high trespass resistant fence, in accordance with details which are to be submitted to and approved by the Local Planning Authority in consultation with the MoD, be erected along the boundaries of the application site which adjoin MoD land.

In addition, the proposed development may create a security risk by virtue of the potential to overlook the MoD site (from the application site) and observe the operations being undertaken on the rifle range. With regard to this concern, the indicative 'Concept Plan', which was submitted in support of the application, would suggest that it is likely that there will be houses directly overlooking the MoD site. This would provide the inhabitants of these houses with an opportunity to overlook the rifle range and observe operations being undertaken on site. This would have severe connotations in respect to the MoD site and the nature of its operations. Accordingly, the MoD would like to be satisfied that the boundaries of the application site which adjoin MoD land will be suitably screened, in accordance with details which are to be submitted to and approved by the Local Planning Authority in consultation with the MoD, to ensure that this concern is alleviated.

Whilst it is appreciated that the above matters will form part of a Reserved Matters application, assuming Outline planning permission is to be granted, the MoD would prefer these matters to be considered at Outline stage to ensure that the MoD's interests are fully protected.

As a separate, but interlinked matter to this application, the DIO wish to outline to the Local Planning Authority our concerns in respect to the consultation process undertaken by both the Applicant and the Council.

Firstly, as outlined within the Statement of Community Involvement, the MoD were not identified as a stakeholder in respect to participation in the pre-application community engagement undertaken by the Applicant/Agent. This is somewhat surprising given that the MoD are an adjoining landowner/occupier. Accordingly, the MoD were not invited to attend and be a part of the public consultation event on 6th November 2014. Indeed, it was not until 11th December 2014 that the MoD were invited to be part of pre-application discussions, as discussed above.

Notwithstanding the above, it would appear that the DIO have not been served notice (under Certificate B of the Town and Country Planning (Development Management Procedure) (England) Order 2010 Certificate under Article 12) of the Applicant's intention to submit a planning application given that we have found no record of this activity being undertaken. This is despite of the fact that the Application Form would appear to suggest that Notice was served on 1st April 2015. It is worth highlighting that this date was post submission of the planning application, which according to the Council's website was 30th March 2015. N.B. This may or may not be equally applicable in respect to the notice served on the MoD.

Furthermore, following a review of the Council's website, it would appear that the Local Planning Authority have attempted to consult the MoD on this application on 13th and 19th May 2015 respectively. However, we have found no record of this being received. This could be explained by virtue of the address indicated for the MoD being incorrect. Indeed, the address of which the correspondence appears to have been sent to is St Georges House, Blakemore Drive, Sutton Coldfield, West Midlands, B75 7RL and not MoD, Whitehall, London, SW1A 2HB. Notwithstanding this, it is assumed that the Local Planning Authority have attempted to consult the DIO (on behalf of the MoD), albeit the address which correspondence has been sent to is also incorrect. Please be advised that our address is Kingston Road, Sutton Coldfield, West Midlands, B75 7RL.

In view of the above, the DIO would request that the Council update its details held for the MoD and DIO. This would be most appreciated.

In the meantime, should you wish to discuss the above comments further, please do not hesitate to contact me.

Yours sincerely,

(Signed by email)

Jeremy Eaton

Defence
Infrastructure
Organisation

Ministry of Defence
Building 49
Kingston Road
Sutton Coldfield
West Midlands B75 7RL
United Kingdom

Telephone [MOD]: +44 (0)121 311 2132
Facsimile [MOD]: +44 (0)121 311 3636
E-mail: DIOSEE-EPSPTCP4a@mod.uk

Mr Andrew Banks
Planning Services
Herefordshire Council
Franklin House
4 Commercial Road
Hereford
HR1 2BB

24th June 2015

Dear Mr Banks,

Re: Planning Application Reference P150930/O – Proposed Development of Approximately 250 Dwellings Including Affordable Housing, Public Open Space and Associated Works on Land at Hildersley Farm, Ross-on-Wye, Herefordshire

I write in connection with the above planning application further to my letter dated 5th June 2015, a copy of which I enclose for your reference.

Following receipt of your email dated 10th June 2015, a copy of which I enclose for your reference, it has come to the attention of the Defence Infrastructure Organisation (DIO), and the Ministry of Defence (MoD), that the Agent, RPS Planning & Development, has now submitted additional documentation in support of the Applicant's planning application.

Following a review of the planning application on Herefordshire Council's website, it is evident that a number of additional and amended documents have now been submitted; including amongst others an Acoustic Consultancy Report (reference 10816 Rev E dated 1st June 2015). Accordingly, it is the purpose of this letter to provide the DIO's formal consultation response, on behalf of the MoD, in respect of this additional and amended documentation.

With regard to the Acoustic Consultancy Report referred to above, the DIO have the following comments:

- The MoD welcomes the submission of this document in support of this planning application. This provides reassurance to the MoD that the issue of noise is being given due consideration by the Applicant.

- Paragraph 2.3 and Appendix A: It is suggested that the diary indicated in Appendix A, and referred to in paragraph 2.3, is unreliable evidence. Firstly, it is unknown as to the source of the diary. Secondly, the daily pattern of use of the MoD range covering the past 7-month period (1st November 2014 to 31st May 2015) indicated in this diary is inaccurate and is not a true reflection of the actual firing activity recorded by the MoD (within the Range Log Book). N.B. should the Local Planning Authority require the detailed records of the range use in support of their assessment of the planning application, the MoD will be happy to provide this information. If required, please do not hesitate to contact me. Thirdly, there is no indication as to the duration of firing activity recorded on any given date within the diary. Accordingly, it is suggested that this evidence cannot be relied upon, and as such undermines the outcome of the Acoustic Consultancy Report.

Notwithstanding the above, it is important to note that the training requirements undertaken at the MoD range periodically change to meet operational needs and can be done so without notice, in which case the historic daily pattern of use of the range referred to within the diary cannot be considered to be a true representation. It is suggested that on occasions where the use of the range is intensified, the noise impact of the range on the proposed development could increase significantly.

- Paragraph 2.4: It is acknowledged by Acoustic Consultancy Partnership Ltd that the existing MoD range does not have any planning restrictions which would limit the hours of operation of the range. Notwithstanding this, as previously highlighted to the Local Planning Authority within my letter dated 5th June 2015, the existing range is not subjected to restrictions which limit the nature of operations undertaken on the MoD site. This includes no restrictions in respect of the nature of weapons operated, days/hours of operation, noise limit restrictions, etc.

- Paragraphs 3.1-3.2 and Appendix B: With regard to the environmental noise monitoring locations used in the assessment, it is understood (following the review of the 'Concept Plan' submitted in support of the planning application) that there could potentially be dwellings located closer to the MoD range than the location of monitoring position MPA. In view of this, it is the MoD's contention that the established MPA established noise levels do not represent the dwellings closest to the range.

  Notwithstanding the above, the firing positions indicated in the plan within Appendix B do not indicate the 500 or 600 metre firing positions. This omission of detail is considered to be somewhat misleading and this could well have influenced the location of monitoring position MPA.

  In view of the above, the MoD has significant concerns regarding the extent of noise monitoring undertaken.

- Paragraph 5.1: The undertaking of noise monitoring must be done so in accordance with BS 7445:2003 'Description and Measurement of Environmental Noise'. There appears to be no evidence of this.

  Notwithstanding the above, the MoD has concerns regarding the suitability of the instrumentation used to measure the noise levels from gunfire. There is a question over the suitability of the noise monitoring equipment used in the submitted Acoustic Consultancy Report given the noise sources involved, and no details of the microphone used.

  Given that noise from the discharge of firearms is characterised by a high frequency, short duration impulsive noise, the data acquisition system employed is critical, especially in terms of dynamic range of the instrument used, frequency response, and sampling rate; it is questionable whether the instrumentation used has the dynamic range required, is capable of monitoring L_{max} on 20 millisecond sample times, and that the microphone used has enough bandwidth to capture the signal. It was also noted that although the instrument used was capable of undertaking 1/3 octave band analysis, this was not provided.

- Paragraph 7.2: It is suggested that Acoustic Consultancy Partnership Ltd's statement *"We were advised by the MOD that the following guns were used on the day of the survey: ..."* is incorrect. The list of weapons identified as being fired during the firing range exercise undertaken at the MoD range on 26th January 2015 is inaccurate. The correct list of weapons used include the following; General purpose machine gun light role 7.62mm, rifle 5.56mm, light machine gun 5.56mm and a sniper rifle 3.38mm. Whilst the consultant was initially advised of the type of weapons that would likely be fired during the firing range exercise, on the day this was not the case due to unforeseen circumstances. Representatives of the MoD advised the consultant on the day to contact them post completion of the exercise for a complete list of weapons fired during the exercise; however, this action was not undertaken by Acoustic Consultancy Partnership Ltd.

  Notwithstanding the above, the noise monitoring undertaken does not take in to account the full range of weaponry that the MoD currently use on the range. Therefore, it is suggested that the noise monitoring undertaken does not accurately reflect the possible noise impact of the range on the proposed residential development. This is fundamental in terms of designing appropriate mitigation. In view of this, it is suggested that the Local Planning Authority cannot fully consider the impact of noise from the MoD range on the proposed development.

- Section 8: Whilst a noise monitoring survey of the MoD range has been undertaken, there are concerns regarding the level of detail involved and the type of weaponry employed on the range during the noise survey (see comments above).

  Due to the directional nature of noise from the discharge of firearms, noise measurements would have been more accurate if undertaken at various angles to the firing direction, where possible (including behind and to the left of the weapon) to provide sound power level data from the weapons used, in different directions towards the proposed residential development.

  In addition, the noise monitoring would also have benefited from recording the noise source from the full range of weaponry that the MoD currently uses on the range.

- Paragraph 9.1: It would appear that there has been no reference to BS 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings', the World Health Organisation (WHO) Night Noise Guidelines for Europe (2009) or Building Regulations Approved Document E (2015) 'Resistance to the Passage of Sound' in respect to matters of proposed mitigation. It is suggested that these documents, alongside any other appropriate legislation/guidance, would be fundamental in terms of the assisting in ensuring that the impact of noise from the MoD range can be adequately mitigated. It is worth highlighting that guidance also exists in the form of the Chartered Institute of Environmental Health (CIEH) Guidance on the Control of Noise from Clay Target Shooting, which provides additional guidance with regard to minimising noise impact from gunfire; particularly sections 4.1 to 4.6 (pages 12-14).

- Paragraph 9.2: It is worth highlighting to the Local Planning Authority that the MoD Noise Amelioration Scheme (Military) (NAS(M)) specifications were developed to mitigate the noise impact of fixed and rotary wing aircraft, rather than the impulsive noise of gunfire, and although it is the only NAS available to the MoD, it is unlikely that it would fully mitigate noise from the variety of gunfire currently produced on the MoD range.

- Paragraphs 9.4-9.5: With regard to the proposed *"whole house ventilation system"* proposed in paragraph 9.4, the MoD have concerns that the proposed mitigation may not result in an acceptable living environment for the future occupants of the dwellings proposed.

- Section 9: The document does not appear to indicate any proposed mitigation in respect of providing protection to future inhabitants of the proposed dwellings in respect of private amenity spaces. BS 8233:2014 (referred to above) sets out external noise levels for gardens. Notwithstanding this, the MoD has concerns that effective attenuation could be achieved for external areas of the application site.

- Section 9: Whilst it is appreciated that the proposed mitigation will likely form part of a Reserved Matters application, assuming Outline planning permission is to be granted, the MoD would prefer these matters to be considered at Outline stage to ensure that the MoD's interests are fully protected, and to ensure that an acceptable living environment can be created for the future occupants of the proposed development. The achievement of a satisfactory residential environment is fundamental to the acceptability of the proposed development.

- Paragraph 10.5: This is a subjective statement with no evidence provided in order to support this position.

- Appendix A: See comments above (bullet point 2).

- Appendix B: See comments above (bullet point 4).

In view of the above comments, the MoD does not believe the Acoustic Consultancy Report as submitted to be sufficient and fails to fully address the issue of noise. Accordingly, the DIO suggest the application should be supported by a new Noise Impact Assessment.

Following the submission of a new Noise Impact Assessment, the MoD would appreciate the opportunity to review its content and be afforded a further opportunity to provide comments.

Notwithstanding the above, with regard to the Planning Statement, the DIO have the following comments:

- Paragraph 3.38: The contents of this paragraph conflicts with the content of the Acoustic Consultancy Report (reference 10816 Rev E dated 1st June 2015). Accordingly, it is suggested that the comments provided in respect of the Acoustic Consultancy Report are of particular relevance in this case.

  Notwithstanding the above, the comment *"It is further understood that the duration of its use varies from one hour to six hours and during the past five months there has been no use of the firing range during night time periods"* is unsubstantiated given that there is no evidence provided to indicate times/duration of firing activity recorded on any alleged date within the diary within Appendix A of the Acoustic Consultancy Report, which has been found to be inaccurate and unreliable in any case.

- Paragraph 3.39: Whilst the Agent has engaged in pre-application discussions with the MoD in respect to potential opportunities for mitigation from the noise impact from the MoD range, the MoD have significant concerns with regards to whether or not the proposal can be adequately mitigated against in respect of the matter of noise.

- Paragraph 3.40: Please refer to our comments provided above in connection with Section 9 of the Acoustic Consultancy Report.

- Paragraph 3.42: Whilst it is appreciated that the proposed mitigation measures will likely form part of a Reserved Matters application, assuming Outline planning permission is to be granted, the MoD would prefer these matters to be considered at Outline stage to ensure that the MoD's interests are fully protected, and to ensure that an acceptable living environment can be created for the future occupants of the proposed development. The achievement of a satisfactory residential environment is fundamental to the acceptability of the proposed development.

- Paragraph 4.8: This is a subjective statement with no evidence to support this position, especially in view of the above concerns raised in respect to the matter of noise.

In view of the concerns identified above, with respect to the relevant planning documents, the MoD do not believe that the Local Planning Authority are in a position to fully consider the impact of noise from the MoD site on the proposed development, in which case they cannot objectively assess any concerns that have been raised on such grounds, including those of the MoD. Accordingly, it is for this reason that the DIO, on behalf of the MoD, **maintains its objection** to the proposed development.

In connection with the above matter, the DIO would like to advise the Local Planning Authority that we have commissioned Amec Foster Wheeler Environment & Infrastructure UK Limited to undertake a detailed noise survey and to construct and validate a 3D noise model of the MoD range and the surrounding area, in order to calculate maximum noise levels at receptors in the vicinity of the range, specifically the application site.

It is envisaged that the above work will be completed by mid August 2015. Once available, the DIO will be happy to share this information with the Local Planning Authority. It is suggested that this evidence will provide the Local Planning Authority with a more accurate picture of the MoD range and the issue of noise. In view of this, it is considered appropriate for the Local Planning Authority to refrain from determining the planning application until this information becomes available.

As a separate, but interlinked matter to this application, the DIO wish to outline our concerns to the Local Planning Authority in respect to the consultation process undertaken by the Council since we submitted our previous consultation response on 5th June 2015.

As previously identified, a number of additional and amended documents have been submitted by the Agent in support of the Applicant's planning application post submission of our previous consultation response. Whilst the DIO have subsequently been given the opportunity to submit further comments, specifically in connection with the Acoustic Consultancy Report, we are concerned that the Local Planning Authority has not undertaken a wider consultation on these documents, including re-consultation with members of the general public. Accordingly, we would like to kindly request that the Local Planning Authority formally re-consult on the application, for a period of a minimum of 14-days albeit we believe 21-days would be more appropriate given the circumstances, in order for all parties to be afforded an opportunity to comment on this amended application. The DIO will leave this matter for the Local Planning Authority to further consider.

Notwithstanding the above, in respect of the Local Planning Authority's request for an additional consultation response from the DIO, it is worth highlighting that in the first instance the Local Planning Authority only afforded the DIO 9-days (10th – 19th June 2015) in which to respond, which the DIO considered to be an inappropriate timescale. Accordingly, the DIO were forced to negotiate with the Local Planning Authority for an extension of time, until 24th June 2015, in which to submit a further consultation response. We find the Local Planning Authority's actions in this regard to be disappointing, and would like to kindly request that in future a more appropriate consultation timescale is afforded.

Should you wish to discuss the above comments further, please do not hesitate to contact me.

Yours sincerely,

(Signed by email)

Jeremy Eaton

Enc. DIO consultation response letter dated 5th June 2015
Email from Andrew Banks (Planning Officer) dated 10th June 2015

Defence
Infrastructure
Organisation

Ministry of Defence
Building 49
Kingston Road
Sutton Coldfield
West Midlands B75 7RL
United Kingdom

Telephone [MOD]: +44 (0)121 311 2132
Facsimile [MOD]: +44 (0)121 311 3636
E-mail: DIOSEE-EPSPTCP4a@mod.uk

Mr Andrew Banks
Planning Services
Herefordshire Council
Franklin House
4 Commercial Road
Hereford
HR1 2BB

6th July 2015

Dear Mr Banks,

Re: Planning Application Reference P150930/O – Proposed Development of Approximately 250 Dwellings Including Affordable Housing, Public Open Space and Associated Works on Land at Hildersley Farm, Ross-on-Wye, Herefordshire

I write in connection with the above planning application further to your email dated 25th June 2015, a copy of which I enclose for your reference. It is the purpose of this letter to provide the Defence Infrastructure Organisation's (DIO) formal response, on behalf of the Ministry of Defence (MoD), to the four bullet points contained within your email correspondence.

In response to bullet point 1, the MoD is happy to provide additional detail in support of the use of the MoD range covering the previous 7-month period (1st November 2014 to 31st May 2015). Whilst the MoD cannot publically disclose the Range Log Book, or copies of this Log Book, for national security reasons, we have extracted the relevant information required by the Local Planning Authority. This is provided below.

The MoD can confirm the MoD range was in use on the following days over the past 7-month period:

- Monday 24th November 2014;
- Thursday 27th November 2014;
- Monday 1st December 2014;
- Tuesday 2nd December 2014;
- Thursday 4th December 2014;
- Wednesday 10th December 2014;
- Friday 12th December 2014;
- Monday 12th January 2015;
- Wednesday 21st January 2015;
- Thursday 22nd January 2015;
- Friday 23rd January 2015;
- Monday 26th January 2015;
- Tuesday 3rd February 2015;
- Wednesday 4th February 2015;
- Monday 9th February 2015;
- Tuesday 10th February 2015;
- Wednesday 11th February 2015;
- Tuesday 17th February 2015;
- Friday 20th February 2015;

- Wednesday 11th March 2015;
- Tuesday 17th March 2015;
- Thursday 19th March 2015;
- Monday 23rd March 2015;
- Tuesday 31st March 2015;
- Wednesday 1st April 2015;
- Thursday 2nd April 2015;
- Monday 13th April 2015;
- Friday 24th April 2015;
- Tuesday 28th April 2015;
- Friday 8th May 2015; and
- Tuesday 26th May 2015.

The above record would substantiate the MoD's position in connection with the comments raised in respect to Paragraph 2.3 and Appendix A of the Acoustic Consultancy Partnership Ltd's Acoustic Consultancy Report, as outlined within my letter dated 24th June 2015.

In response to bullet point 2, please be advised that the MoD are unable to publically disclose the full list of currently available weaponry used on the MoD range for national security reasons. Notwithstanding this, representatives of the MoD will be happy to attend a meeting with you in near future to further discuss this matter. If this meeting is required, please do not hesitate to contact me to make the necessary arrangements.

With regard to the Local Planning Authority's request for the MoD to assist the Applicant and their Agent with regard to the undertaking of a further environmental noise monitoring survey, this will require further consideration by the MoD. As you will no doubt be aware, the MoD range is an operational site and so the operational needs of the military are of primary importance to the MoD, above those of other third parties/organisations.

Notwithstanding the above, if the MoD were to grant their approval to facilitate this request, any further noise monitoring surveys will not be possible until post completion of the work that the DIO have commissioned Amec Foster Wheeler Environment & Infrastructure UK Limited to undertake on our behalf. In addition, any additional noise monitoring surveys would need to be completed following the Military summer leave period (September 2015 at the earliest). The above requirement would also need to be planned in advance, with a minimum of 4-weeks notice provided to the MoD. This is required in order to make the necessary arrangements.

As soon as I am able to provide an update in respect of the above matter, I will be in further contact with the Local Planning Authority.

In response to bullet point 3, whilst the DIO, on behalf of the MoD, did not make any representations in connection with the latest consultation event 22nd May – 3rd July 2014 in respect to the Herefordshire Local Plan Core Strategy 2011-31 Pub-Submission Publication May 2014, the Council cannot assume that nil response is representative of the MoD's views in respect of the Local Plan. Unfortunately, this consultation event passed by the DIO without us being in a position to formally respond on behalf of the MoD.

Despite the above, the DIO have subsequently been afforded the opportunity to submit representations, on behalf of the MoD, in connection with the above planning application. Following a review of the application, the MoD has identified issues with regard to the proposed development which are of great concern to the MoD. In view of these concerns, the DIO have subsequently raised an objection to the proposed development.

Notwithstanding the above, and the DIO's previous consultation responses in connection with the above planning application, I provide the following comments in respect to this matter:

'Policy RW2 – Land at Hildersley' of the emerging Core Strategy outlines that the proposed residential development should, amongst other things, bring forward appropriate mitigation measures, which ensure that acoustic and safety issues relating to the proximity of the MoD range are satisfactorily addressed.

As previously advised, the achievement of a satisfactory residential environment is fundamental to the acceptability of the proposed development. Therefore, unless the proposed development can incorporate the necessary mitigation measures to satisfactorily address the impact of noise from the MoD range, the principle of the residential development proposed on the application site comes into question.

The evidence presented to the MoD, in the form of the Acoustic Consultancy Report prepared by Acoustic Consultancy Partnership Ltd, in order to present the findings of the environmental noise monitoring survey and to outline proposed mitigation measures, is not considered acceptable for reasons outlined in our consultation response dated 24th June 2015.

Notwithstanding the above, the application in Outline format does not identify whether or not the proposed development can satisfactorily address the impact of noise from the MoD range. Indeed, it is understood that the Applicant does not propose to deal with such matters until at the Reserved Matters stage, assuming Outline planning permission is to be granted, by which time consideration of this matter will be too late as the principle of development will have already been established. The MoD considers this approach to be inappropriate.

The MoD considers the issue of noise to represent one of the fundamental issues connected with the application site and the proposed development. Accordingly, it is suggested that this matter should be dealt with at Outline stage, rather than at the Reserved Matters Stage. In the absence of this, the MoD has significant concerns with regard to the proposed development.

In view of the above, and for the reasons previously identified within our consultation response dated 24th June 2015, the MoD has subsequently maintained their original objection to the proposed development.

The DIO will leave the above for the consideration of the Local Planning Authority.

In response to bullet point 4, the DIO have previously confirmed that we will be happy to share with the Local Planning Authority the work that Amec Foster Wheeler Environment & Infrastructure UK Limited produces, albeit this will unlikely be until circa mid-August 2015 at the earliest. It is envisaged that the information that we will share with the Local Planning Authority will be the full noise report. However, this will need to be confirmed in due course, following receipt of the draft report from Amec Forster Wheeler and internal review within the MoD. With regard to whether or not this report can be released into the public domain, again this will need to be confirmed in due course.

As a separate, but interlinked matter to this planning application, the DIO wish to outline our concerns to the Local Planning Authority in respect to our consultation response dated 24th June 2015 which does not appear on the Council's website. Please could you ensure this is uploaded onto the Council's website in the very near future? This would be most appreciated.

Should you wish to discuss the above comments further, please do not hesitate to contact me.

Yours sincerely,

(Signed by email)

Jeremy Eaton MRTPI

Enc. Email from Andrew Banks dated 25th June 2015.

Defence
Infrastructure
Organisation

Ross on Wye Firing Range
FINAL Noise Survey and Assessment

Version 05
Dated: 13-10-2015

DIO Ops Projects
Ramillies Bldg
Marlborough Lines
Monxton Rd
Andover SP11 8HJ

DOCUMENT CONTROL SHEET

Change No.	Version No.	Originator of change	Date of Change	Description of change
0	0.1	Natalie Goward	17-Sep-15	Initial Issue for comments
1	0.2	Natalie Goward	18 Sep 15	
2	0.3	Ian Hepplewhite	22 Sep 15	Interim Draft incorporating DIO comments
3	0.4	Dan Clayton	05 Oct 15	Interim Draft incorporating more DIO comments
4	0.5	Dan Clayton	13 Oct 15	Final Issue

Contributors:	
DIO Area Project Manager	
DIO Project Manager:	Elaine Laws
Study Team:	
Author:	Natalie Goward
Reviewers:	Ian Hepplewhite

Distribution:

Report for

Elaine Laws
Senior Environmental Manager

Environmental Liability Management
Environment & Planning Support
DIO SEE-EPS ELM2
Kingston Road
Sutton Coldfield
Birmingham
B75 7RL

Main contributors

Natalie Goward
Ian Hepplewhite
Dan Clayton

Issued by

[redacted]

Dan Clayton

Approved by

[redacted]

Ian Hepplewhite

Amec Foster Wheeler

Sankey House
130 Birchwood Boulevard
Birchwood
Warrington WA3 7QH
United Kingdom
Tel +44 (0)1925 849710

Doc Ref. 37348 Final report 15535i1

s:\e&i\mod projects\37348 nth ross on wye ranges noise assessment\d - design\reporting\ross on wye noise final report 15535i1.docx

Management systems

This document has been produced by Amec Foster Wheeler Environment & Infrastructure UK Limited in full compliance with the management systems, which have been certified to ISO 9001, ISO 14001 and OHSAS 18001 by LRQA.

Defence Infrastructure Organisation

amec foster wheeler

Executive summary

Purpose of this report

This report has been produced for the purpose of supporting the Defence Infrastructure Organisation (DIO) in their response to a planning application for the construction of 250 houses on a proposed development site immediately adjacent to their Ross on Wye Firing Range.

Amec Foster Wheeler Foster Wheeler Environment & Infrastructure UK Limited (Amec Foster Wheeler) was commissioned by the Defence Infrastructure Organisation (DIO) to provide consultancy services with respect to a noise survey in and around the Ross on Wye Firing Range and the construction and calibration of a 3D noise model, using measured results to predict shooting noise to receptors around the range with particular emphasis on a proposed housing development to the east. However, it should be noted that the proposed site layout plan within the application is indicative at this stage and could therefore be subject to change at the Reserved Matters stage. This indicative layout plan has been used for the purposes of this assessment.

A noise survey was undertaken on Wednesday 19th – Thursday 20th August 2015 to measure ambient noise levels at three locations along the boundary of the proposed housing development site approximating the locations of the closest proposed housing to the range. This survey enables ambient noise levels both during and in the absence of live firing to be measured at these locations. The results indicated that the influence of the live firing activities on the range has the potential to increase measured $L_{Aeq,\ 15min}$ noise levels by almost 50 dB at LT2 and L_{Amax} noise levels by up to 24 dB at LT1 and LT2. Section 8.0 of the ACP report submitted with the planning application indicated that noise levels at their monitoring point MPA (which was approximately halfway - but inside the proposed housing development boundary - between LT1 and LT2 of the Amec Foster Wheeler survey) increased from an $L_{Aeq,\ T}$ of 47 to 75 dB and an L_{AFmax} from 58.3 to 101.5 dB. It should be noted that the ACP report used instrumentation that with a sampling rate of approximately 125msec and shooting noise normally requires a much higher sampling rate of at least 20msec (as utilised by Amec Foster Wheeler for this survey).

In addition, noise levels from live firing of a selection of typical weapons used on the range were measured to determine the respective sound power levels for each weapon. The weapons measured were:

- 5.56 Rifle;
- 5.56mm Light Machine Gun (LMG)
- 7.62mm Light Machine Gun (LMG);
- General Purpose Machine Gun; and
- 7.62 Rifle;

Measurements from 10 No. single shots for the 5.56 Rifle and 7.62 Rifle and 10No. 3-5 round bursts from the LMGs and the GPMG were undertaken at a single location on the 91.5m (100yds) firing point. These results were used to determine the sound power levels from the use of each weapon and also help determine the directivity of the shooting noise. This information was input into a 3D model of the range and surrounding area, including the layout of housing on the proposed development. The predicted L_{Amax}s from the simultaneous firing of 3No. different weapons at each firing point was derived from the modelling. The combination of weapons modelled were:

- 1No. 5.56mm 5.56 Rifle, 1No. 7.62mm LMG and 1No. 7.62mm General Purpose Machine Gun at 91.5m (100yds) firing point;
- 1No. 5.56mm 5.56 Rifle, 1No. 7.62mm LMG and 1No. 7.62mm General Purpose Machine Gun at 183m (200yds) firing point;

- 1No. 5.56mm 5.56 Rifle, 1No. 7.62mm LMG and 1No. 7.62mm General Purpose Machine Gun at 274.5m (300yds) firing point;
- 1No. 5.56mm 5.56 Rifle, 1No. 7.62mm LMG and 1No. 7.62mm General Purpose Machine Gun at 366m (400yds) firing point;
- 2No. 7.62mm LMGs and 1No. 7.62mm General Purpose Machine Gun at 457m (500yds) firing point; and
- 3No. 7.62 Rifles at 548.5m (600yds) firing point.

These scenarios were chosen to represent a typical situation where three of the loudest weapons are firing simultaneously, in the middle lanes of and at each firing point. It is understood that the 5.56 Rifle is only used up to a distance of 366m (400yds) and only the 7.62 Rifle fires at a distance of 600yds.

The noise model assumes that the houses on the development have all been built and has assumed a building height of 8m for the purposes of this assessment. The model has also calculated noise levels to a height of 4m above ground level to approximate the first floor bedroom level. Noise levels were calculated to the three boundary monitoring locations as well as a selection of the proposed dwellings on the development site. In summary predicted L_{Amax}'s at a selection of the closest properties to the housing development boundary are within the range 89 – 103 dB; at a selection of properties approximately 90m from the housing development boundary are within the range 78 – 96 dB and finally a selection of properties approximately 160m from the boundary would experience L_{Amax}'s of between 63 – 84 dB.

Most of the predicted noise levels were above (and in many cases significantly above) the shooting noise level (SNL) from The Guidance on Clay Target Shooting (*Clay Target Shooting: Guidance on the Control of Noise, 2003*) published by the Chartered Institute of Environmental Health (CIEH). However, it is considered that this guidance is not really applicable to an existing military range in this context of this assessment.

The ACP report accompanying the application recommends proposed mitigation (in the form of a glazing specification) for the housing on the proposed development site which is based on the MOD's Noise Amelioration Scheme (Military) (NAS(M)) specifications which in turn is derived from the MOD's corporate environmental protection manual (JSP 418). It should be noted that the NAS(M) is primarily used for noise from military aircraft both fixed wing and rotary and has therefore been used out of context in the ACP assessment.

The modelled L_{Amax} results have been used to calculate the break in noise (internal) in the bedrooms of a sample of the dwellings on the proposed development site for comparison with the L_{Amax} criterion for sleep disturbance from the WHO Guidelines of 45 dB L_{Amax}. The calculations indicate that internal levels within the sample of dwellings range between 49 and 60 dB(A) for the closest houses; 42 and 54 dB(A) for houses approximately 90m from the housing development boundary and 30 and 48 dB(A) for houses approximately 160m from the housing development boundary.

The assessment has demonstrated that the WHO guideline value of 45 dB L_{Amax} is likely to be exceeded across the proposed the development site even with the windows closed. This is an indication that sleep disturbance could occur during the night-time for these dwellings. If windows were to be opened then obviously internal noise levels would increase accordingly.

Finally, whilst there is no "criterion" per se against which to assess this, a significant observation made during the live firing exercise at Ross on Wye Range was the presence of a distinct 'echo' from individual shots that was distinctly discernible milliseconds after the actual shot had been fired. The rising ground to the south of the range, albeit quite heavily wooded, seemed to act to reflect sound back northwards and eastwards towards the range and the proposed housing development. The 'echo' was most distinct from the single shots associated with the 5.56 Rifle and the 7.62 Rifle. However, the burst firing from both the LMGs and the GPMG also caused 'echoes' which seemed to almost reverberate around the area at times.

Contents

1. Introduction 8
1.1 Background 8
1.2 Site Overview 8
1.3 Scope of Assessment 9

2. Noise Terminology 10

3. Relevant Policy and Guidance 12
3.1 Technical Guidance 12
Policy Context 12

4. Methodology 18
4.1 Noise Survey 18
Survey Meteorological Conditions 20
4.2 Noise Model 20

5. Results 22
5.1 On-site Observations 22
5.2 Measured Noise Levels 22

6. Assessment 29

7. Conclusion 36

Table 2.1 Typical Noise Levels 10
Table 3.1 Noise Exposure Hierarchy 14
Table 3.2 Noise Guidance Documents 16
Table 5.1 Highest Measured Noise Levels – 91.5m (100yds) Firing Point 22
Table 5.2 Comparison of Measured Noise Levels 27
Table 5.3 Measured Night-time Noise Levels 28
Table 6.1 Calculated Sound Power Levels 29
Table 6.2 Modelled Façade L_{Amax} at Receptor Locations 31
Table 6.3 Internal Noise Levels 35
Table B.1 Equipment Details 1
Table C.2 Results of Source Noise Measurements for Burst Shooting from a GPMG 1
Table C.3 Derived Directivity Corrections Used In Noise Model - GPMG 1
Table C.4 Results of Source Noise Measurements for a Single Shot from a 5.56 Rifle 3
Table C.5 Derived Directivity Corrections Used In Noise Model – 5.56 Rifle 3
Table C.6 Results of Source Noise Measurements for a Single Shot from a 7.62mm Light Support Weapon 4
Table C.7 Derived Directivity Corrections Used In Noise Model – 7.62 Light Support Weapon 5

Defence Infrastructure Organisation

amec foster wheeler

Figure 4.1	Long (LT) and Short Term Noise Survey Locations	18
Figure 4.2	5.56mm Light Machine Gun, belt fed	**Error! Bookmark not defined.**
Figure 5.1	5.56 Rifle, 10 No. single shots at 90°	23
Figure 5.2	5.56mm LMG, 10 No. (6No. illustrated to show individual shots in each burst) 3-5 round bursts at 90°	24
Figure 5.3	7.62mm LMG, 10 No. 3-5 round bursts at 90°	25
Figure 5.4	GPMG, 10 No. 3-5 round bursts at 90°	26
Figure 5.5	7.62mm Rifle, 10 No. single shots at 90°	27
Figure 6.1	Sound Power level Data used in Modelling as measured at 90°	30

Appendix A	Activity Log
Appendix B	Equipment Calibration Details
Appendix C	Directivity Corrections
Appendix D	Noise Contour Plots

1. Introduction

Amec Foster Wheeler Environment & Infrastructure UK Limited (Amec Foster Wheeler) was commissioned by the Defence Infrastructure Organisation (DIO) to provide consultancy services with respect to a noise survey in and around the Ross on Wye Firing Range and the construction and calibration of a 3D noise model, using measured results from the range, to predict shooting noise to receptors around the range with particular emphasis on a proposed housing development to the east.

The Ross on Wye Range is located to the south of Hildersley and approximately 1km east of the centre of Ross on Wye, just off, and to the south of the A40.

1.1 Background

Amec Foster Wheeler understands that a planning application has been submitted to the Local Authority for the construction of housing on a 10.9 hectare site to the east of the range. It should be noted that the proposed site layout plan within the application is indicative at this stage and could therefore be subject to change at the Reserved Matters stage. However, the indicative plan has been used for the purposes of this assessment. A noise survey was submitted with the planning application for the proposed housing development site which measured noise levels during periods when the ranges were both active and inactive. This report concludes that subject to a suitably designed building envelope including brick/blockwork construction, ceiling, glazing, and ventilation specifications, it is believed that suitable mitigation would be provided to alleviate the typical infrequent daytime use of the range. However, maximum noise levels (L_{Amax}) in excess of 100dB(A) were measured at the closest receptor location, and at a location in the middle of the housing development measured L_{Amax}s were in the region of 88dB, albeit in the absence of any intervening screening from houses. There is also some question regarding the suitability of the instrumentation used to measure noise levels from gunfire in this particular report.

1.2 Site Overview

The proposed housing development boundary is approximately 70m (at closest approach) to the range boundary, however, the closest proposed dwellings are probably nearer 100m away from the range boundary. The closest firing point on the range is approximately 85m from the proposed housing development boundary. Amec Foster Wheeler understands from the DIO that the firing range can be used at any time over a 24 hour period, for periods of between 1 - 5 days per week and can even be used at night.

Information provided by the Range Warden indicates that firing positions up to 548.5m (600yds) from the target area can be accommodated at the range and that it is used exclusively by soldiers to improve accuracy and undertake sniper training. The type of weaponry typically used at the range includes (but is not limited to):

- General Purpose Machine Gun (GPMG);
- 7.62 Rifle;
- .338 Rifle;
- 5.56 Rifle;
- 7.62 Light Machine Gun; and
- 5.56 Light Machine Gun.

1.3 Scope of Assessment

A noise study of the use of the Ross on Wye Firing Range was deemed necessary in order to determine if the use of the range would be in compliance with the requirements of both planning and acoustic guidance. The scope of this report includes:

- Noise survey at the range during a live firing exercise to determine:
  - existing environmental noise levels both during and in the absence of firing on the range using locations approximating those measured within the applicant's noise assessment report; and
  - sound power levels from the use of a typical selection of weapons used at the range;
- The survey of noise levels to determine sound power levels from the use of the weapons on the range also considered the directionality of the shooting noise at the range;
- Review of the guidance applicable to this type of noise source in relation to housing developments;
- Construction of a 3D noise model of the range and surrounding area and, using the sound power level data measured during the live firing exercise on the 19th August, prediction of noise from the use of the firing range and in particular that impacting on the proposed housing development site; and
- Assessment and reporting of results of the above exercise.

2. Noise Terminology

The ratio between the quietest audible sound and the loudest tolerable sound is a million to one in terms of the change in sound pressure. Due to this wide range, a scale based on logarithms is used in noise level measurement. The scale used is the decibel (dB) scale which extends from 0 to 140 dB, corresponding to the intensity of the sound pressure level.

The ear has the ability to recognise a particular sound depending on the pitch or frequencies found at the source. Microphones cannot differentiate noise in the same way as the ear; and to counter this weakness the noise measuring instrument applies a correction to correspond more closely to the frequency response of the ear. The correction factor is called 'A-weighting' and the resulting measurements are written as dB(A). 'A-weighting' refers to the noise level that represents the human ear's response to sound.

The dB(A) unit is internationally accepted and has been found to correspond well with people's subjective reaction to noise. Typical dB(A) noise levels for familiar noises are given in Table 2.1.

Table 2.1 Typical Noise Levels[1]

Approximate Noise Level dB(A)	Example
0	Threshold of hearing for normal young people.
30	Recording studio, ambient level.
40	Quiet residential neighbourhood, ambient level.
50	Department store, restaurant, speech levels.
60	Next to busy highway, shouting.
70	Textile mill; press room with presses running; punch press and wood planers, at operator's position.
80	Ship's engine room; rock concert, in front and close to speakers.
100	Moon launch at 100 m; artillery fire, gunner's position.
140	Threshold of hearing for normal young people.

The noise levels given in Table 2.1 are sound pressure levels (L_p) and describe the noise level at a point in space. Sound power levels (L_W) are used to describe the noise output of a noise source. Noise levels vary over time depending on noise generating activities. The following indices are used to take account of these variations:

- $L_{Aeq,T}$ is the equivalent continuous sound level and is the sound level of a steady sound having the same energy as a fluctuating sound over the same period. It is possible to consider this level as the ambient noise encompassing all noise at a given time. L_{Aeq} is considered the best general purpose index for environmental noise;
- $L_{A90,T}$ index represents the sound level exceeded for 90% of the measurement period and is used to indicate quieter times during the measurement period. It is usually referred to as the background sound level;

[1] Bies, D. A., Hansen, C. H., 2009. Engineering Noise Control: Theory & Practice. 4th Edition. Abingdon: Spon Press.

- $L_{A10,T}$ refers to the level exceeded for 10% of the measurement period. $L_{A10,T}$ is widely used as a descriptor of road traffic noise; and
- L_{Amax} is maximum recorded noise level during the measurement period.

In addition, the following definitions may be helpful when reading this report:

- Ambient Noise: Totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far;
- Background Sound: (See $L_{A90,T}$). The A-weighted sound pressure level of the residual sound at the assessment position that is exceeded for 90% of a given time interval, T, measured using the fast time weighting;
- Fast Time Weighting: A sound pressure level measurement using a 125 ms moving average time weighting period is said to have been determined using 'fast weighting';
- Free Field: Signifies that a noise measurement has been undertaken in 'free field' conditions i.e. away from any reflecting facades e.g. building facades, close boarded fence work etc.; and
- Façade level: Addition of 3 dB(A) façade correction to free field levels to reach noise level at the façade of a building (1 m or less).

3. Relevant Policy and Guidance

3.1 Technical Guidance

Policy Context

National Planning Policy Framework, 2012

The National Planning Policy Framework (NPPF) was published in March 2012, and replaces existing Planning Policy Statements (PPS) and Planning Policy Guidance (PPG), including the Department of the Environment's Planning Policy Guidance Note 24: *'Planning and Noise'* (PPG24), 1994.

The NPPF (paragraph 109) states that the planning system should contribute to and enhance the natural and local environment by:

"preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, water or noise pollution or land instability".

The NPPF (paragraph 123) goes on to state that: "*Planning policies and decisions should aim to:*

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land use since they were established, and*
- *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason".*

The NPPF (in its references 27 and 28) refers to the Explanatory Note to the National Policy Statement for England (NPSE) and the provisions of the Environmental Protection Act 1990, and other relevant statute.

Noise Policy Statement for England, 2010

The Noise Policy Statement for England (NPSE) was published by DEFRA in March 2010 and forms the overarching statement of noise policy for England (and hence is of direct relevance to the assessment of planning applications under the NPPF for developments in England only). It sets out the long-term vision of the Government, as follows:

> *"[to]Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."*

This vision is supported by the following aims, which are reflected in the provisions of the NPPF:

> *"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*
>
> - *Avoid significant adverse impacts on health and quality of life;*
> - *Mitigate and minimise adverse impacts on health and quality of life; and*

- *Where possible, contribute to the improvement of health and quality of life."*

The Explanatory Note to the NPSE (paragraph 2.14) acknowledges that noise contributing to annoyance and/or sleep disturbance in human populations can have long-term consequences for health and wellbeing. It introduces three 'Effect Levels' relevant to the assessment of noise. These are:

- NOEL – No Observed Effect Level - This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise;
- LOAEL – Lowest Observed Adverse Effect Level - This is the level above which adverse effects on health and quality of life can be detected; and
- SOAEL – Significant Observed Adverse Effect Level - This is the level above which significant adverse effects on health and quality of life occur.

The aim of the NPSE is to avoid all noise occurring at the SOAEL level and to minimise, as far as possible, all noise occurring between the LOAEL and SOAEL brackets.

The NPSE states that it is not possible to have a single, numerical definition of the SOAEL that is applicable to all sources of noise in all situations, since the SOAEL is likely to be different for different noise sources, for different receptors and at different times. Further research is required to increase understanding of what constitutes a significant adverse impact on health and quality of life due to noise, and the NPSE states that not stating specific SOAEL levels provides a suitable degree of policy flexibility until such evidence is available.

Planning Practice Guidance, 2014

The Planning Practice Guidance for Noise (PPG-N), published by the Department for Communities and Local Government, was revised in December 2014.

The PPG-N introduces a fourth effect level which has not yet been updated in the NPSE:

- UOAEL – Unacceptable Observed Adverse Effect Level – This is the level above which extensive and regular changes in behaviour and/or an inability to mitigate the effect of noise leading to psychological stress or physical effects occurs.

The PPG-N advises that local planning authorities should consider whether the overall effect of the noise exposure is, or would be, above or below the SOAEL and the UOAEL.

The PPG-N gives a noise exposure hierarchy based on the likely average response as detailed in Table 3.1.

.

Table 3.1 Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not Noticeable	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect (NOAEL)			
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Unacceptable Observed Adverse Effect Level (UOAEL)			
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Observed Adverse Effect	Prevent

In cases where existing noise sensitive locations already experience high noise levels, PPG-N suggests that a development that is expected to cause even a small increase in noise may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur.

PPG-N advises that the noise impact may be partially offset if the residents of those dwellings have access to:

- A relatively quiet facade (containing windows to habitable rooms) as part of their dwelling;
- A relatively quiet external amenity space for their sole use (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced with increasing noise exposure and could be such that significant adverse effects occur;
- A relatively quiet, protected, nearby external amenity space for sole use and by a limited group of residents as part of the amenity of their dwellings; and
- A relatively quiet, protected, external publically accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within 5 minutes walking distance).

The potential effect of an existing business on a new residential development being located close to it should be carefully considered as the existing noise levels from the business may be regarded as unacceptable by the new residents and subject to enforcement action. In the case of an established business, the policy set out in the third bullet of Paragraph 123 of the NPPF should be followed.

British Standards and Other Relevant Guidance

The precise numerical values of noise in relation to the NOEL, LOAEL, SOAEL and UOAEL levels have not yet been established by research. The documents summarised in Table 3.2 provide threshold values for noise both inside and outside dwellings and will be referenced within the noise assessment.

Table 3.2 Noise Guidance Documents

Guidance Document	Summary
Clay Target Shooting: Guidance on the Control of Noise (2003)	Contains advice on the measurement and assessment of shooting noise.
BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'	Presents design criteria for noise within habitable rooms in a new residential development to avoid adverse impacts on suitability for the intended use. In summary, these include: Resting in Living Rooms: 35 dB $L_{Aeq,\ 16h}$ (daytime) Dining in Dining Rooms / Areas: 40 dB $L_{Aeq,\ 16h}$ (daytime) Sleeping or resting in Bedrooms: 35 dB $L_{Aeq,\ 16h}$ (daytime) / 30 dB $L_{Aeq,\ 8hr}$ (night-time). It is stated within the guidance that where development is considered necessary or desirable, a relaxation of up to 5 dB on these levels may be available, and reasonable conditions still achieved. Consideration of regular, individual noise events (e.g. scheduled aircraft or passing trains) is also required, as these can lead to sleep disturbance. The specification of noise limits, in terms of L_{AFmax} should be based upon the character and number of events per night. For external amenity space, an $L_{Aeq,\ T}$ of 50 dB is considered 'desirable' with an upper limit of 55 dB suggested as being 'acceptable in noisier environments'. It is advised that noise limits should only be considered for large balconies that will be used for relaxation and that noise limits should not be necessary for small balconies.
World Health Organisation 'Guidelines for Community Noise' (1999)	Presents guideline noise levels for community noise in specific residential environments e.g. in outdoor living areas. In order to avoid significant annoyance in outdoor living areas, a threshold of 55 dB $L_{Aeq,\ T}$ is specified. In order to avoid moderate annoyance, a threshold of 50 dB $L_{Aeq,\ T}$ is given.
World Health Organisation 'Night Noise Guidelines for Europe' (2009)	Reviews the health effects of night-time noise exposure, examines exposure-effects relations, and presents guideline values of night noise exposure to prevent harmful effects of night noise.
ISO 9613:1996 'Acoustics – Attenuation of sound during propagation outdoors' Parts 1 and 2	The aim of this International Standard is to specify methods of calculating the attenuation of sound propagating outdoors in order to predict the level of environmental noise at distant locations from various sound sources.

Guidance on Clay Target Shooting (*Clay Target Shooting: Guidance on the Control of Noise, 2003*) has been produced by the Chartered Institute of Environmental Health (CIEH). The document describes how noise from clay target shooting can occur and provides advice on minimising annoyance and intrusion. Although the guidance is specifically aimed at clay target shooting, a lot of the recommendations are general in nature and can be equally applicable to other forms of shooting noise. The following excerpt is taken from the guidance document:

"*…where a new shooting location is being considered, the guidance can be used to determine what practical noise control measures should be applied. Further, it includes a standardised methodology for the measurement of noise from clay target shooting and suggested criteria that will assist with the assessment of the impact of clay target shooting noise at dwellings*"

"*Most of the guidance is provided in a general way. This is because local circumstances differ and consequently more or less restrictive controls may be appropriate in certain cases. Where specific criteria (e.g. distances, times or noise levels) are given these have been derived from experience and are not intended as precise rules to be routinely applied to every shooting ground or site.*"

Advice on site management to minimise the noise impact is offered, including suggested restriction of shooting to the following times, where justified complaints have been received or are anticipated by the local authority:

- Mondays - Fridays: 09:00-18:00 with a maximum cumulative duration of four hours;
- Saturdays: 10:00-18:00 with a maximum cumulative duration of three hours; and
- Sundays: 10:00-14:00 with a maximum cumulative duration of three hours.

It should be noted that this Amec Foster Wheeler report refers to an existing military firing range, which is different to the context associated with the above guidance and therefore not strictly applicable.

4. Methodology

4.1 Noise Survey

Noise monitoring was undertaken on Wednesday 19th August to Thursday 20th August 2015 at several locations around the site. The monitoring comprised of 3No. locations (LT1 – LT3) situated on the boundary of the proposed housing development site at locations approximating the positions measured during the application noise survey undertaken by Acoustic Consultancy Partnership Limited (ACP) in March 2015 and which accompanied the planning application. This monitoring scheme was devised so that the duration and type of monitoring at each boundary location would provide sufficient data to inform the potential noise effects that the proposed residential receptors are likely to experience, both with and without live firing activities. Monitoring locations were selected to ensure that typical noise effects were fully considered.

All proposed housing site boundary monitoring locations were actually within land under the control of the MOD to ensure equipment security, but were representative of the noise environment expected to be experienced by the proposed noise sensitive receptors in close proximity to the range boundary. Figure 4.1 indicates the locations of the monitoring points and the locations of the firing points at distances of 91.5m (100yds) – 548.5m (600yds) from the target area.

Figure 4.1 Long (LT) and Short Term Noise Survey Locations

Defence Infrastructure Organisation

amec foster wheeler

In addition, 2No. monitoring locations were employed within the range boundary aimed at determining the noise emissions of a representative sample of the weapons typically used on the range, which also took into account the directivity of the sound from the firing. Shorter term measurements were therefore undertaken at angles of approximately 90° and approximately 70° to the direction of firing (which is designated as 0°) at distances of 24m and 26.5m, respectively.

Measurements were taken from a sample of weapons which were fired at varying distances from the targets from 91.5m (100yds) up to 548.5m (600yds). Appendix A shows the activity log for the surveys and describes the weapons fired, where they were fired and the approximate times of firing. At the 91.5m (100yds) firing point, a sample of each weapon was fired in isolation but all at the same relative position, between lanes 2 and 3, to enable a measurement of the sound pressure level of each weapon to be obtained from which the sound power levels were calculated.

Additional measurements were taken from several other firing points moving back across the range at distances of 183m (200yds), 274.5m (300yds), 366m (400yds), 457m (500yds) and 548.5m (600yds) from the target. The additional measurements generally included 3 No. individual weapons of each type in lanes 3, 4, and 5 at each firing point. This scenario represented a typical training firing exercise. The exact noise monitoring locations are described below:

- Long-term 1 (LT1): 51°54'33.48"N, 2°33'52.48"W. Approximately 100m east of the 91.5m (100yds) firing point. Situated along the range boundary;
- Long-term 2 (LT2): 51°54'38.03"N, 2°34'1.94"W. Situated along the eastern range boundary in between 274.5m (300yds) and 366m (400yds) firing points. Approximately 80m from the nearest firing points;
- Long-term 3 (LT3): 51°54'42.23"N, 2°34'4.26"W. Situated along the eastern range boundary, approximately 110m east of the 457m (500yds) firing point.;
- Short-term 1 (ST1): 51°54'30.83"N, 2°33'56.87"W. Situated at approximately 90° east of the 91.5m (100yds) firing point. Approximately 24m from the 91.5m (100yds) firing point;
- Short-term 2 (ST2): 51°54'30.70"N, 2°33'56.59"W. Situated at approximately 70° east of the 100yd firing point. Approximately 26.5m from the 91.5m (100yds) firing point;
- Short-term 3 (ST3): Situated at approximately 90° east of the 183m (200yds) firing point;
- Short-term 4 ST4): Situated at approximately 70° east of the 183m (200yds) firing point;
- Short-term 5 (ST5): Situated at approximately 90° east of the 274.5m (300yds) firing point;
- Short-term 6 (ST6): Situated at approximately 70° east of the 274.5m (300yds) firing point;
- Short-term 7 (ST7): Situated at approximately 90° east of the 366m (400yds) firing point;
- Short-term 8 (ST8): Situated at approximately 70° east of the 366m (400yds) firing point;
- Short-term 9 (ST9): Situated at approximately 90° east of the 457m (500yds) firing point;
- Short-term 10 (ST10): Situated at approximately 70° east of the 457m (500yds) firing point;
- Short-term 11 (ST11): Situated at approximately 90° east of the 548.5m (600yds) firing point; and
- Short-term 12 (ST12): Situated at approximately 70° east of the 548.5m (600yds) firing point.

The weapons used during the noise survey, comprised the following:

- 5.56mm Rifle;

- 5.56mm Light Machine Gun (5.56 LMG);
- 7.62mm Light Machine Gun (7.62 LMG);
- General Purpose Machine Gun (GPMG); and
- 7.62 Rifle;

The weapons used during the survey were confirmed by the Range Commander to be typical of those used during training exercises at the range.

The survey was undertaken using 01dB Duo Class 1 Sound Level Meters (SLM). All measurements were carried out, in accordance with BS 7445-1 '*Description and measurement of environmental noise. Guide to quantities and procedures.*' (2003).

All staff involved with noise measurements were fully competent, either being Members of the Institute of Acoustics (IoA) or holding the IoA Certificate of Competence in Environmental Noise Measurement. Details of the instrumentation used during the survey are given in Appendix B.

No significant drifts in calibration were observed between deployment and collection of the SLMs.

Survey Meteorological Conditions

Weather conditions throughout the survey were noted to be suitable for the measurement of environmental noise. Wind speeds were below $5ms^{-1}$ with no periods of very heavy rain. Due to low wind speeds it was not considered that the wind would have any significance influence on sound propagation. There was intermittent light rain during the daytime on Wednesday 19th August 2015 however due to the high noise levels produced by the weapons on the range this was not considered to have influenced the results of the measurements in any way.

4.2 Noise Model

In order to determine the potential noise impact of live firing activities at Ross on Wye Range on the proposed housing development, a comprehensive noise model was developed using the Stapelfeldt LimA computational noise modelling suite (v. 10.0). The noise model was developed with reference to live firing noise sources affecting maximum ($L_{Amax,f}$) noise levels across the proposed housing development site.

LimA is used widely in noise modelling and mapping projects throughout the UK and Europe. Developed by Stapelfeldt Ingenieuresellschaft mbH, it can implement a number of methodologies for the calculation of noise levels, including the attenuation of sound during propagation outdoors, in accordance with ISO 9613-2 methodology. The LimA noise modelling suite allows a 3D environmental model to be constructed, using digital mapping and topographic data. As such, it takes into account the following factors potentially affecting levels of noise propagation in the area surrounding a particular noise source:

- Noise source location (as shown by digital mapping data);
- Relative distances between noise sources/ receptors;
- Locations and dimensions of barriers (man-made or topographic) between noise source and receptor;
- Ground contours, determining the relative heights of sources/ receptors and barriers; and
- Ground cover effects such as soft ground attenuation etc.

LimA allows the calculation of noise levels at specific, single points, or over a calculation-grid of specified size. In the first instance, noise emissions were calculated using measured noise levels to a series of calibration points, at locations identical to the noise monitoring positions used in the noise survey.

The measured levels at ST1 and ST2 (as detailed in Table 5.1) were used to calculate the Sound Power Level for each weapon assuming hemispherical radiation using the formula:

$$SWL = SPL + 20Log (r) + 8$$

Where,

SWL = Sound Power Level

SPL = Sound Pressure Level

r = distance between firing point and measurement location

These calculated levels were compared to the measured noise levels at these locations in order to verify the sound power level of each weapon. A directivity correction was applied to the noise emission taken from data relating to a general purpose machine gun, a 5.56 LMG and a 7.62 LMG, as detailed in Appendix C.

Table C.2, C3 and C5 detail results of source noise measurements for burst shooting from a GPMG, a single shot from a 5.56 rifle and a 7.62mm light support weapon[2]. Based on these measured noise levels, corrections were determined for all angles in 5° increments through interpolation. These corrections are detailed in Table C.3, C4 and C6 for each weapon. Corrections based on the GPMG measured noise levels were applied to the GPMG, 5.56 Rifle and 7.62 Rifle in the noise model. Corrections based on the 5.56 rifle were applied to the 5.56mm light machine gun in the noise model, and corrections based on the 7.62mm light support weapon were applied to the 7.62mm light machine gun. These corrections were applied as during the model calibration exercise they produced noise levels at the receptor locations which were considered representative of the measured noise levels during the Amec Foster Wheeler survey.

Following this calibration exercise the model was used to simulate different scenarios using a variety of typical weapon combinations at each firing distance. Three of the loudest weapons were chosen for this to reinforce a "worst case" scenario.

Noise levels calculated on a grid basis have been used to plot noise contours. These should be interpreted as indicative levels only due to the potential inaccuracy inherent in any grid calculation which requires interpolation between calculation points. A grid height of 4m high has been selected in order to represent bedroom window height. The night-time period is considered to be the most noise sensitive as people are typically sleeping or preparing for sleep.

[22] A Bullmore (January 2001). Warcop Training Area Proposals to Acquire Commoners' Rights. *Appendices to the evidence on behalf of the MOD*

5. Results

5.1 On-site Observations

Appendix A indicates a summary of the activities undertaken on the range during the period of the noise survey on Wednesday 19th August 2015.

One of the most significant observations regarding the live firing at Ross on Wye Range concerned the distinct 'echo' from the individual shots that was heard milliseconds after the actual shot was fired and discerned by observers on the range itself and no doubt outside the range boundary. The rising ground to the south of the range, albeit quite heavily wooded, acted to reflect sound back towards the range and the proposed housing development. The 'echo' was most distinct from the single shots associated with the 5.56 Rifle and the 7.62 Rifle. However, the burst firing from both the LMGs and the GPMG also caused 'echoes' which seemed to almost reverberate around the area at times.

Whilst the 'echo' was nowhere near as loud as the sound from the actual firing of the weapon itself, it nevertheless would be easily discerned in the area around the range.

5.2 Measured Noise Levels

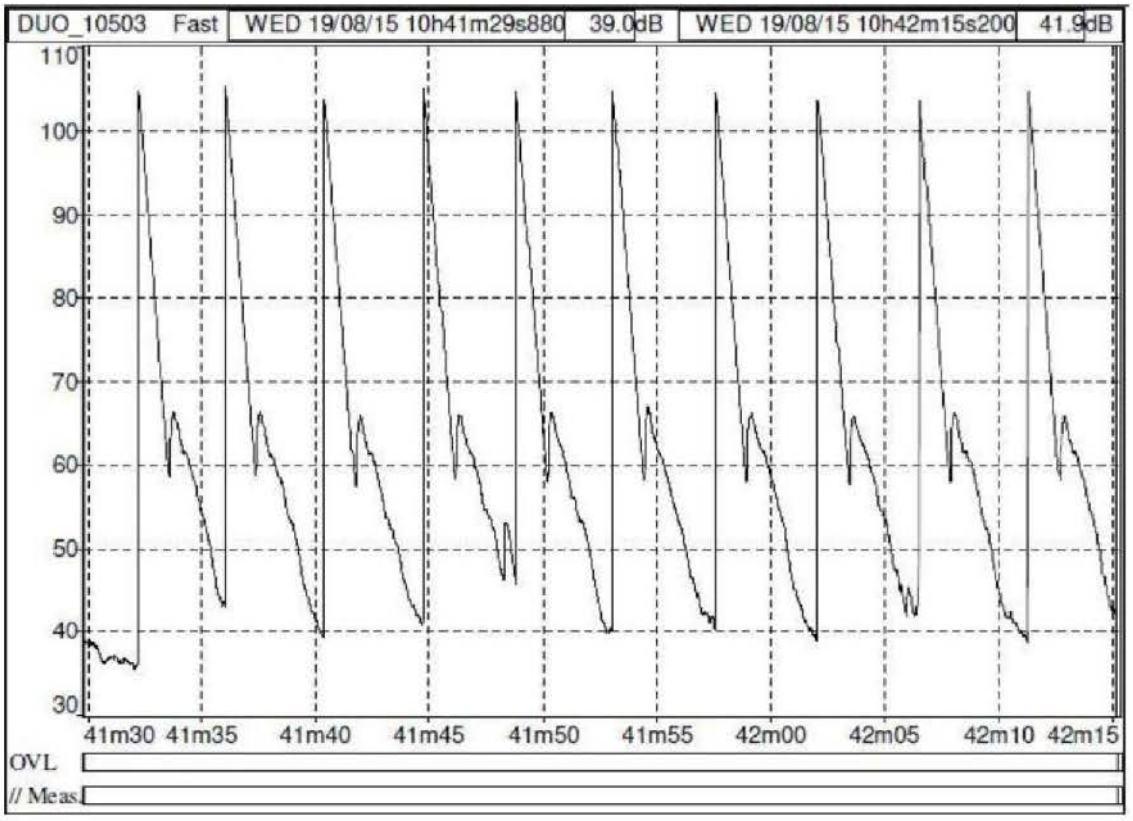
Table 5.1 details the highest measured $L_{Amax,f}$ during the survey at the nearest measurement locations to the 91.5m (100yds) firing point (rounded to the nearest 1dB).

Table 5.1 Highest Measured Noise Levels – 91.5m (100yds) Firing Point

Weapon	$L_{Amax,f}$ (dB) at ST1 (90°)	$L_{Amax,f}$ (dB) at ST2 (70°)	$L_{Amax,f}$ (dB) at LT1	$L_{Amax,f}$ (dB) at LT2
5.56 Rifle	104	109	90	67
5.56 LMG	106	111	79	66
7.62 LMG	111	116	92	71
GPMG	108	113	85	69
7.62 Rifle	107	112	90	73

Figures 5.1 – 5.5 illustrate the measurements made at close range from several of the weapons fired on Wednesday 19th August and at 90° to the direction of firing. In Figures 5.1 and 5.5 for the 5.56 Rifle and 7.62 Rifle, respectively, the 'echoes' can be discerned in the time history traces.

Figure 5.1 5.56 Rifle, 10 No. single shots at 90°



Defence Infrastructure Organisation

amec foster wheeler

Figure 5.2 5.56mm LMG, 10 No. (6No. illustrated to show individual shots in each burst) 3-5 round bursts at 90°

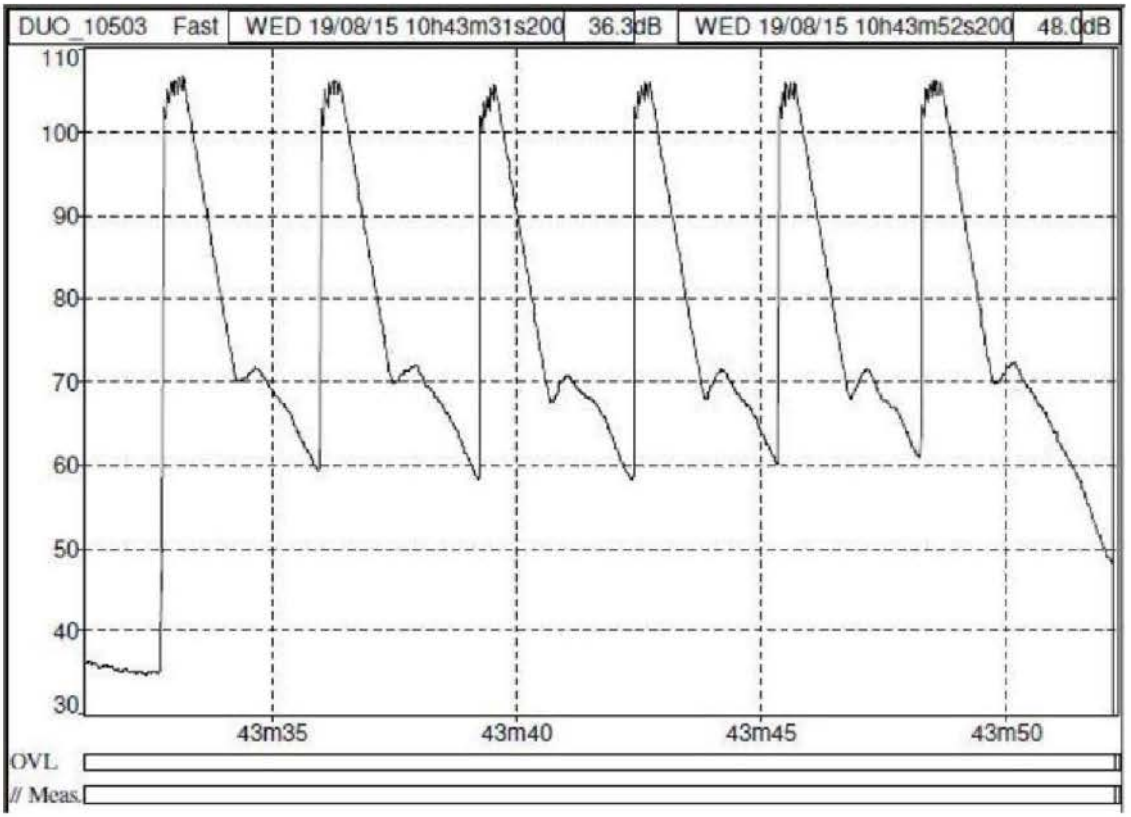
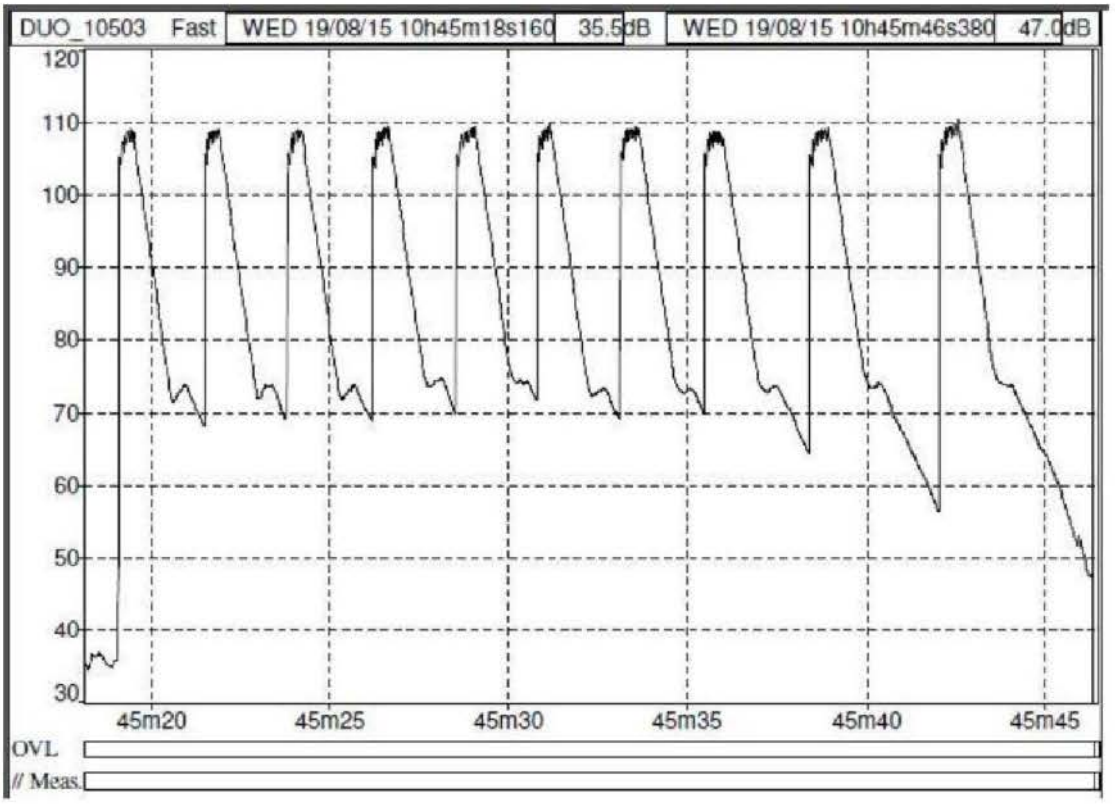


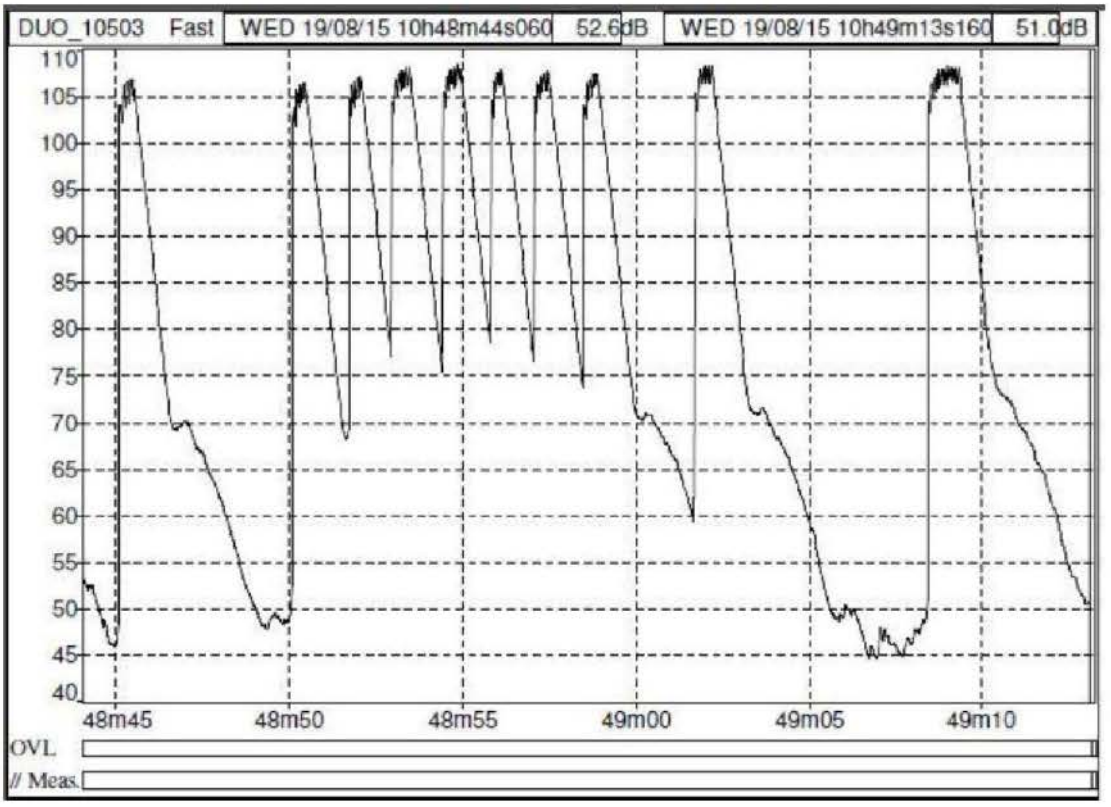
Figure 5.3 7.62mm LMG, 10 No. 3-5 round bursts at 90°



Defence Infrastructure Organisation

amec foster wheeler

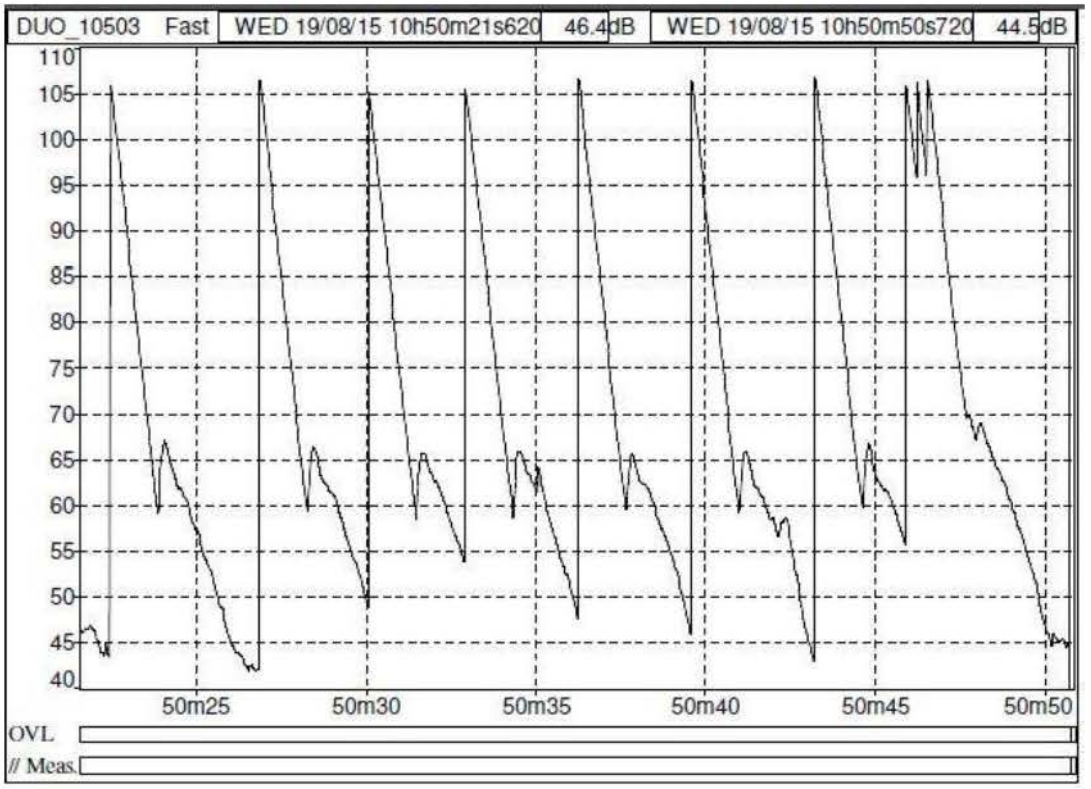
Figure 5.4 GPMG, 10 No. 3-5 round bursts at 90°



Defence Infrastructure Organisation

amec foster wheeler

Figure 5.5 7.62mm Rifle, 10 No. single shots at 90°



A comparison of measured noise levels with and without the operational firing range has been undertaken for LT1, LT2 and LT3. These locations are considered to be representative of the location of some of the closest proposed dwellings. The 'with firing' measurements have been taken during the time period 10:45-14:00 and the 'without firing' measurements during the remainder of the daytime period, 14:00-23:00 on 19th August 2015. Results of the comparison are shown in Table 5.2 below (rounded to the nearest 1dB).

Table 5.2 Comparison of Measured Noise Levels

Location	$L_{Aeq,T}$ (dB) With Firing	$L_{Aeq,T}$ (dB) Without Firing	$L_{A90,T}$ (dB) With Firing	$L_{A90,T}$ (dB) Without Firing	L_{Amax} (dB) With Firing	L_{Amax} (dB) Without Firing
LT1	75	42	38	30	103	79
LT2	80	43	39	31	109	85
LT3	67	45	39	32	101	87

Table 5.2 above, indicates that the influence of the live firing activities on the range has the potential to increase measured $L_{Aeq,T}$ noise levels by almost 50 dB at LT2 and L_{Amax} noise levels by up to 24 dB at LT1 and LT2. Section 8.0 of the ACP report submitted with the planning application indicated that noise levels at their monitoring point MPA (which was approximately halfway - but inside the proposed housing development boundary - between LT1 and LT2 of the Amec Foster Wheeler survey) increased from an $L_{Aeq,T}$ of 47 to 75 dB and an L_{AFmax} from 58.3 to 101.5 dB. It should be noted that the ACP report used instrumentation that with a sampling rate of approximately 125msec and shooting noise normally requires a much higher sampling rate of at least 20msec (as utilised by Amec Foster Wheeler for this survey). The measured L_{Amax}s at LT1 and LT2 are higher than those measured by ACP during their survey which may

have something to do with the type of weapons used and the relative distances from the firing points, but will also be influenced by the type of instrumentation used to undertake the surveys.

For reference purposes, the night-time measured noise levels during the survey on 19th – 20th August 2015 are detailed in Table 5.3. The night-time period has been taken to be 23:00-07:00 hours.

Table 5.3 Measured Night-time Noise Levels

Location	$L_{Aeq, 8hr}$ (dB)	Average $L_{A90, 8hr}$ (dB)	$L_{Amax, 8hr}$ (dB)
LT1	31	26	65
LT2	32	26	62
LT3	33	27	61

The measured noise levels in August 2015, 31 - 33 dB $L_{Aeq, 8h}$ are significantly lower than those measured by ACP in March 2015 which were in the region of 10 dB(A) higher at 41 – 46 dB $L_{Aeq, 8h}$. The night-time background noise levels measured in August 2015 by Amec Foster Wheeler were in the region of 26-27 dB $L_{A90, 8h}$.

6. Assessment

The noise model has been used to assess the noise impact of gun fire on the proposed residential development site.

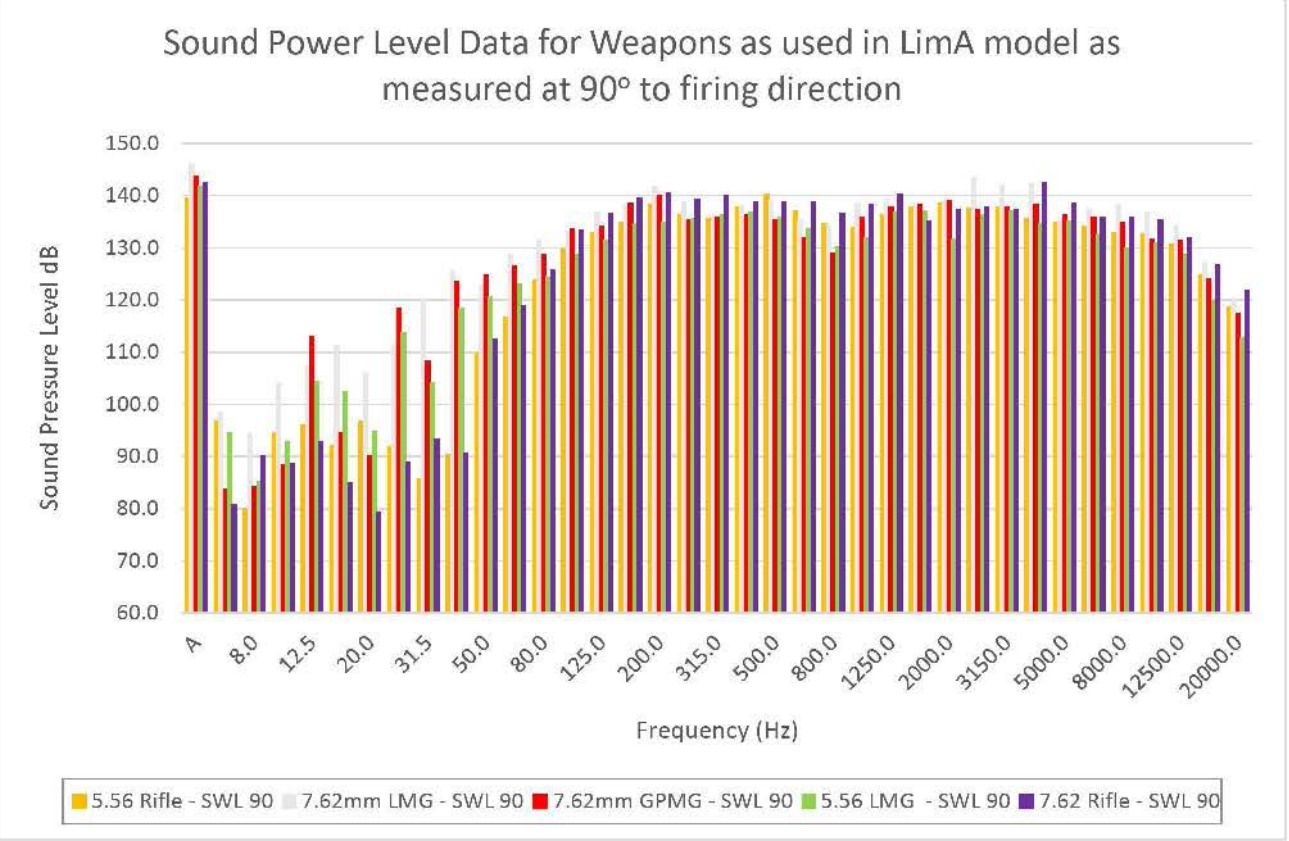
The measured levels at ST1 and ST2 (as detailed in Table 5.1) were used to calculate the Sound Power Level for each weapon as detailed in Table 6.1.

Table 6.1 Calculated Sound Power Levels

Weapon	Sound Power Level (dB) based on measured data at ST1 (90°)	Sound Power Level (dB) based on measured data at ST2 (70°)
5.56 Rifle	140	146
5.56 LMG	142	148
7.62 LMG	146	153
GPMG	144	150
7.62 Rifle	142	148

The frequency content of the sound power level was also calculated from the data and input into the model. An example of the frequency content making up the sound power level as measured at 90° to the firing direction is shown in Figure 6.1 below.

Figure 6.1 Sound Power level Data used in Modelling as measured at 90°



The SWLs in Table 6.1 have been used and then adjusted to calibrate the model to check against the measured levels in Table 5.1. Noise levels to within 3dB(A) were calculated from the calibrated model which is considered to be a reasonable level of accuracy.

Once the noise model calibration was completed the following scenarios were generated in the noise model:

- 1No. 5.56mm Rifle, 1No. 7.62mm LMG and 1No. 7.62mm GPMG at 91.5m (100yds) firing point;
- 1No. 5.56mm Rifle, 1No. 7.62mm LMG and 1No. 7.62mm GPMG at 183m (200yds) firing point;
- 1No. 5.56mm Rifle, 1No. 7.62mm LMG and 1No. 7.62mm GPMG at 274.5m (300yds) firing point;
- 1No. 5.56mm Rifle, 1No. 7.62mm LMG and 1No. 7.62mm GPMG at 366m (400yds) firing point;
- 2No. 7.62mm LMGs and 1No. 7.62mm GPMG at 457m (500yds) firing point; and
- 3No. 7.62 Rifles at 548.5m (600yds) firing point.

These scenarios were chosen to represent a typical situation where three of the loudest weapons are firing simultaneously, in the middle lanes of and at each firing point, based on observations made during the survey on the 19th August. It is understood that the 5.56 Rifle only fires up to a distance of 366m (400yds) and only the 7.62 Rifle fires at a distance of 548.5m (600yds).

Grid calculations at a height of 4m were then used to produce noise contour plots of each scenario. The contour plots show the noise propagation across the range and surrounding area. These contour plots are presented on Figures D.1-D.12. The modelling for the 'with development' scenarios assumes that the

development is complete, all building heights have been modelled at 8m above ground level. Noise levels predicted in the centre of the development therefore include screening from any intervening properties.

The contour plots show that at the façade of the nearest proposed dwellings to the east of the firing range would experience levels in excess of 104 dB L_{Amax} during live firing exercises. Table 6.2 details the predicted L_{Amax} at the nearest noise sensitive receptor locations during each operational scenario.

Table 6.2 Modelled Façade L_{Amax} at Receptor Locations

Scenario	Receptor Location	Façade L_{Amax} (dB)
91.5m (100yds) firing point	LT1*	95
	LT2*	77
	LT3*	71
	Sample of Proposed dwellings closest to range boundary	74
		77
		83
		89
		73
		75
	Sample of Proposed dwellings approximately 90m from range boundary	78
		63
	Sample of Proposed dwellings approximately 160m from range boundary	63
183m (200yds) firing point	LT1*	102
	LT2*	92
	LT3*	80
	Sample of Proposed dwellings along range boundary	78
		82
		90
		95
		77
	Sample of Proposed dwellings approximately 90m from range boundary	83
		75
		65
	Sample of Proposed dwellings approximately 160m from range boundary	64
274.5m (300yds) firing point	LT1*	102
	LT2*	92
	LT3*	80
	Sample of Proposed dwellings along range boundary	84
		90
		96
		99
		83
	Sample of Proposed dwellings approximately 90m from range boundary	89
		83
		82
	Sample of Proposed dwellings approximately 160m from range boundary	75

Scenario	Receptor Location	Façade L_{Amax} (dB)
366m (400yds) firing point	LT1*	100
	LT2*	105
	LT3*	87
	Sample of Proposed dwellings along range boundary	95
		96
		100
		99
		95
	Sample of Proposed dwellings approximately 90m from range boundary	81
		90
		78
	Sample of Proposed dwellings approximately 160m from range boundary	73
457m (500yds) firing point	LT1*	99
	LT2*	109
	LT3*	99
	Sample of Proposed dwellings along range boundary	103
		103
		101
		99
		102
	Sample of Proposed dwellings approximately 90m from range boundary	82
		90
		96
	Sample of Proposed dwellings approximately 160m from range boundary	83
548.5m (600yds) firing point	LT1*	95
	LT2*	104
	LT3*	102
	Sample of Proposed dwellings along range boundary	103
		93
		98
		95
		103
	Sample of Proposed dwellings approximately 90m from range boundary	82
		90
		97
	Sample of Proposed dwellings approximately 160m from range boundary	78

*indicates freefield calculations.

Table 6.2 above indicates modelled L_{Amax} noise levels at the façades of future properties on the proposed housing development, however, it should be noted that the proposed site layout plan within the application is indicative at this stage and could therefore be subject to change at the Reserved Matters stage. In summary predicted L_{Amax}'s at a selection of the closest properties to the housing development boundary are within the range 89 – 103 dB; at a selection of properties approximately 90m from the housing development boundary are within the range 78 – 96 dB and finally a selection of properties approximately 160m from the boundary would experience L_{Amax}'s of between 63 – 83 dB.

Research by BRE and papers presented at the 1997 Institute of Acoustics (IOA) conference provide a basis for guidance on acceptable noise limits to be applied in the vicinity of residential premises. The BRE research suggests there is no fixed shooting noise level at which annoyance starts to occur, but mean shooting noise levels (mean SNLs) below 55dB(A) are less likely to result in annoyance and mean SNLs above 65dB(A) are likely to result in annoyance.

The BRE research indicated a need for further study of the effects of background noise on annoyance due to shooting. BRE found no effect from background noise; however, most of their measurements were undertaken in low background noise environments. Therefore, closer examination of sites with higher background noise levels is necessary before the role of background noise in relation to annoyance can be understood.

The Guidance on Clay Target Shooting (*Clay Target Shooting: Guidance on the Control of Noise, 2003*) states that any limits set will be a matter for local negotiation, but should normally be set according to the following guidelines:

- The limit shall take the form of a mean Shooting Noise Level (SNL) of *X*dB, not to be exceeded;
- *X* will depend on local circumstances, but would normally be expected to fall somewhere in the range 55dB to 65dB.
- Factors that should be considered in selecting *X* are:
  - the locality and general background noise levels;
  - on which days of the week shooting occurs;
  - at which times of day, i.e. morning, afternoon, evening;
  - the intensity of shooting - e.g. number of shooting days per year;
  - the type of shoot - e.g. 28 day or with planning approval; and
  - the rate of fire.

Taking each of the above listed factors in turn, average ambient and background noise levels in the absence of live firing on the range are in the region of $L_{Aeq,16hr}$ 29dB to 57dB, and $L_{A90,16hr}$ 25dB to 42dB, with L_{Amax} noise levels in the range 37dB to 89dB. It is considered that this range of noise levels is equal to the background noise levels depicted in the guidance, i.e. those associated with rural areas where the overwhelming majority of clay target shoots take place.

The typical training day at Ross on Wye is anywhere between approximately 08:00 to 17:00 hrs. However, shooting can and does occur outside these times and can even occur during the early hours of the morning. The shooting range can be utilised fairly intensively throughout the training day. Based on the rate of fire from the firing range during the exercise on the 19th August, it is assumed to be high; the noise model currently assumes 3 No. weapons firing simultaneously at each firing point. This is based on the observations made during the noise survey where noise from at least 2No. of the 3No. weapons being used, appeared to fire simultaneously on a frequent basis. The DIO have indicated that all 9 No. lanes at each firing point can be utilised at the same time and therefore a figure of 3No. simultaneous shots/bursts have been derived from observations made on the range.

Considering all of the above, a SNL of 65dB is considered unachievable at the proposed housing development without major mitigation measures being employed. However the modelled internal L_{Amax}'s should also be taken into consideration for this assessment particularly during the night-time hours.

WHO guidelines recommend that internal noise levels during the night should not exceed 45 dB L_{Amax} in order to avoid sleep disturbance. It should be possible to sleep with a bedroom window slightly open (a reduction from outside to inside of 15 dB is indicated).

Based on the calculated noise levels from the noise modelling exercise, the proposed dwellings would expect to experience approximate internal noise levels of 77 dB L_{Amax} with closed windows[3] or 88 dB L_{Amax} with an open window. These levels significantly exceed the recommended level of 45 dB L_{Amax} therefore sleep disturbance would be highly likely from live firing at night on the Ross on Wye range. It can also be seen from Table 5.3 that background sound levels during the night were low (26-27 dB $L_{A90, 8hr}$ over the period of the survey) therefore L_{Amax} levels of this magnitude would be very noticeable to people sleeping or attempting to sleep.

The ACP report accompanying the application recommends proposed mitigation (in the form of a glazing specification) for the housing on the proposed development site which is based on the MOD's Noise Amelioration Scheme (Military) (NAS(M)) specifications which is derived from the MOD's corporate environmental protection manual (JSP 418). However, paragraph 14 of Leaflet 4.1 (associated with JSP 418 relating to environmental noise) concerns the NAS(M) and intimates that the NAS(M) is primarily related to noise from military aircraft and states that any NAS(M) would be based on the following parameters:

- Offer to purchase residential properties exposed to noise of 72dB(A) $L_{Aeq,16h}$ or more;
- Offer to install an acoustic insulation package (the acoustic double glazing system should be at least 10(12)6.4) for residential properties exposed to noise of 66dB(A) $L_{Aeq,16h}$;
- 63dB(A) $L_{Aeq,16h}$ for noise sensitive areas such as schools/colleges, hospitals, care homes;
- Night time (23:00 -07:00) 48dB(A) $L_{Aeq\ 8\ hr}$ for rotary wing activities; and
- Night time (23:00 – 07:00) 80dB L_{Amax}. for fixed wing fast jets.

The ACP report states that DIO have requested that sealed 10/12/6.4 double glazed units are incorporated within the dwellings on the site, which ACP consider *"would achieve a good level of sound insulation and we* (ACP) *consider this appropriate for this site"*. This is based on the second bullet point above where residential properties are exposed to noise of 66dB $L_{Aeq,16h}$ or more. It should be noted that the NAS(M) is primarily used for noise from military aircraft both fixed wing and rotary and has therefore been used out of context in this particular assessment as corroborated by the final two bullet points in the list above.

However, as previously stated, the most significant source of nuisance noise would be the L_{Amax} parameter, particularly at night when sleep disturbance would be the overriding concern to any residents of the proposed housing estate. Amec Foster Wheeler has undertaken some break-in calculations based on the modelled noise levels and the specification indicated in the ACP report, ie 10/12/6.4 double glazed units, mechanical ventilation, etc.

A typical bedroom size of 3.4 x 2.9 x 2.4m has been assumed, with a window area of 1.3m^2 (915mm x 1050mm). External walls are assumed to be double leaf 1400kg/m^3, 100mm blockwork and 50mm cavity, plastered either side.

Table 6.3 details the results of the break-in calculations with closed windows. The highest and lowest levels have been used in the calculation for dwellings close to the housing boundary, dwellings approximately 90m from the boundary and approximately 160m from the boundary.

[3] Assuming standard thermal double glazing providing 26 dB(A) noise attenuation

Table 6.3 Internal Noise Levels

Firing Point	Receptor Location	Calculated External L_{Amax} (dB)	Internal L_{Amax} (dB)*
91.5m (100yds)	Dwellings closest to range boundary	89	49
548.5m (600yds)	Dwellings closest to range boundary	103	60
91.5m (100yds)	Proposed dwellings approximately 90m from range boundary	78	42
548.5m (600yds)	Proposed dwellings approximately 90m from range boundary	97	54
91.5m (100yds)	Proposed dwellings approximately 160m from range boundary	63	30
457m (500yds)	Proposed dwellings approximately 160m from range boundary	83	48

* It should be noted that these break-in calculations are based upon a sample of the proposed dwellings and therefore should be considered as indicative only.

The above assessment has demonstrated that internal noise levels are likely to exceed the WHO guideline value of 45 dB L_{Amax} across the proposed development site even with windows closed. This is an indication that sleep disturbance is likely for the inhabitants of the many of the proposed dwellings. If windows were to be left open then even higher internal L_{Amax}'s would occur.

7. Conclusion

Amec Foster Wheeler Foster Wheeler Environment & Infrastructure UK Limited (Amec Foster Wheeler) was commissioned by the Defence Infrastructure Organisation (DIO) to provide consultancy services with respect to a noise survey in and around the Ross on Wye Firing Range and the construction and calibration of a 3D noise model, using measured results to predict shooting noise to receptors around the range with particular emphasis on a proposed housing development to the east. However, it should be noted that the proposed site layout plan within the application is indicative at this stage and could therefore be subject to change at the Reserved Matters stage.

A noise survey was undertaken on Wednesday 19th – Thursday 20th August 2015 to measure ambient noise levels at three locations along the boundary of the proposed housing development site approximating the locations of the closest proposed housing to the range. This survey enables ambient noise levels both during and in the absence of live firing to be measured at these locations. The results indicated that the influence of the live firing activities on the range has the potential to increase measured $L_{Aeq,\ 15min}$ noise levels by almost 50 dB at LT2 and L_{Amax} noise levels by up to 24 dB at LT1 and LT2. Section 8.0 of the ACP report submitted with the planning application indicated that noise levels at their monitoring point MPA (which was approximately halfway - but inside the proposed housing development boundary - between LT1 and LT2 of the Amec Foster Wheeler survey) increased from an $L_{Aeq,\ T}$ of 47 to 75 dB and an L_{AFmax} from 58.3 to 101.5 dB. It should be noted that the ACP report used instrumentation that with a sampling rate of approximately 125msec and shooting noise normally requires a much higher sampling rate of at least 20msec (as utilised by Amec Foster Wheeler for this survey).

In addition, noise levels from live firing of a selection of typical weapons used on the range were measured to determine the respective sound power levels for each weapon. The weapons measured were:

- 5.56 Rifle;
- 5.56mm Light Machine Gun (LMG)
- 7.62mm Light Machine Gun ;
- General Purpose Machine Gun; and
- 7.62 Rifle;

Measurements from 10 No. single shots for the 5.56 Rifle and 7.62 Rifle and 10No. 3-5 round bursts from the LMGs and the GPMG were undertaken at a single location on the 91.5m (100yds) firing point. These results were used to determine the sound power levels from the use of each weapon and also help determine the directivity of the shooting noise. This information was input into a 3D model of the range and surrounding area, including the layout of housing on the proposed development. The predicted L_{Amax}s from the simultaneous firing of 3No. different weapons at each firing point was derived from the modelling. The combination of weapons modelled were:

- 1No. 5.56mm 5.56 Rifle, 1No. 7.62mm LMG and 1No. 7.62mm General Purpose Machine Gun at 91.5m (100yds) firing point;
- 1No. 5.56mm 5.56 Rifle, 1No. 7.62mm LMG and 1No. 7.62mm General Purpose Machine Gun at 183m (200yds) firing point;
- 1No. 5.56mm 5.56 Rifle, 1No. 7.62mm LMG and 1No. 7.62mm General Purpose Machine Gun at 274.5m (300yds) firing point;
- 1No. 5.56mm 5.56 Rifle, 1No. 7.62mm LMG and 1No. 7.62mm General Purpose Machine Gun at 366m (400yds) firing point;

- 2No. 7.62mm LMGs and 1No. 7.62mm General Purpose Machine Gun at 457m (500yds) firing point; and
- 3No. 7.62 Rifles at 548.5m (600yds) firing point.

These scenarios were chosen to represent a typical situation where three of the loudest weapons are firing simultaneously, in the middle lanes of and at each firing point. It is understood that the 5.56 Rifle is only used up to a distance of 366m (400yds) and only the 7.62 Rifle fires at a distance of 548.5m (600yds).

The noise model assumes that the houses on the development have all been built and has assumed a building height of 8m for the purposes of this assessment. The model has also calculated noise levels to a height of 4m above ground level to approximate the first floor bedroom level. Noise levels were calculated to the three boundary monitoring locations as well as a selection of the proposed dwellings on the development site. In summary predicted L_{Amax}'s at a selection of the closest properties to the housing development boundary are within the range 89 – 103 dB; at a selection of properties approximately 90m from the housing development boundary are within the range 78 – 96 dB and finally a selection of properties approximately 160m from the boundary would experience L_{Amax}'s of between 63 – 84 dB.

Most of the predicted noise levels were above (and in many cases significantly above) the shooting noise level (SNL) from The Guidance on Clay Target Shooting (*Clay Target Shooting: Guidance on the Control of Noise, 2003*) published by the Chartered Institute of Environmental Health (CIEH). However, it is considered that this guidance is not really applicable to an existing military range in this context of this assessment.

The ACP report accompanying the application recommends proposed mitigation (in the form of a glazing specification) for the housing on the proposed development site which is based on the MOD's Noise Amelioration Scheme (Military) (NAS(M)) specifications which in turn is derived from the MOD's corporate environmental protection manual (JSP 418). It should be noted that the NAS(M) is primarily used for noise from military aircraft both fixed wing and rotary and has therefore been used out of context in the ACP assessment.

The modelled L_{Amax} results have been used to calculate the break in noise (internal) in the bedrooms of a sample of the dwellings on the proposed development site for comparison with the L_{Amax} criterion for sleep disturbance from the WHO Guidelines of 45 dB L_{Amax}. The calculations indicate that internal levels within the sample of dwellings range between 49 and 60 dB(A) for the closest houses; 42 and 54 dB(A) for houses approximately 90m from the housing development boundary and 30 and 48 dB(A) for houses approximately 160m from the housing development boundary.

The assessment has demonstrated that the WHO guideline value of 45 dB L_{Amax} is likely to be exceeded across the proposed the development site even with the windows closed. This is an indication that sleep disturbance could occur during the night-time for these dwellings. If windows were to be opened then obviously internal noise levels would increase accordingly.

Finally, whilst there is no "criterion" per se against which to assess this, a significant observation made during the live firing exercise at Ross on Wye Range was the presence of a distinct 'echo' from individual shots that was distinctly discernible milliseconds after the actual shot had been fired. The rising ground to the south of the range, albeit quite heavily wooded, seemed to act to reflect sound back northwards and eastwards towards the range and the proposed housing development. The 'echo' was most distinct from the single shots associated with the 5.56 Rifle and the 7.62 Rifle. However, the burst firing from both the LMGs and the GPMG also caused 'echoes' which seemed to almost reverberate around the area at times.

Appendix A
Activity Log

Approximate Time	SLM Serial No.	Angle subtended to firing position (where applicable)	Firing Position & Description of stance	Description of Weapon	No. of weapons used	Calibre (mm)	Description of Activity	Comments
10:42:00	10503	90	100yd Firing point between lanes 2 and 3. Prone firing	5.56 Rifle	1	5.56	10No. Individual single rounds spaced about 2 seconds apart - actually in their own time	Distinct echo heard from individual shots. All prone
10:42:00	10646	70	91.5m (100yds) Firing point between lanes 2 and 3. Prone firing	5.56 Rifle	1	5.56	10No. Individual single rounds spaced about 2 seconds apart - actually in their own time	
10:44:00	10503	90	91.5m (100yds) Firing point between lanes 2 and 3. Prone firing	Light Machin Gun	1	5.56	10 No. 3 - 5 round bursts	
10:44:00	10646	70	91.5m (100yds) Firing point between lanes 2 and 3. Prone firing	Light Machin Gun	1	5.56	10 No. 3 - 5 round bursts	
10:46:00	10503	90	91.5m (100yds) Firing point between lanes 2 and 3. Prone firing	Light Machine Gun	1	7.62	10 No. 3 - 5 round bursts followed by a longer single burst	
10:46:00	10646	70	91.5m (100yds) Firing point between lanes 2 and 3. Prone firing	Light Machine Gun	1	7.62	10 No. 3 - 5 round bursts followed by a longer single burst	
10:50:00	10503	90	91.5m (100yds) Firing point between lanes 2 and 3. Prone firing	General Purpose Machine Gun	1	7.62	10 No. 3 - 5 round bursts followed by a longer single burst	

Approximate Time	SLM Serial No.	Angle subtended to firing position (where applicable)	Firing Position & Description of stance	Description of Weapon	No. of weapons used	Calibre (mm)	Description of Activity	Comments
10:50:00	10646	70	91.5m (100yds) Firing point between lanes 2 and 3. Prone firing	General Purpose Machine Gun	1	7.62	10 No. 3 - 5 round bursts followed by a longer single burst	
10:51:00	10503	90	91.5m (100yds) Firing point between lanes 2 and 3. Prone firing	7.62 Rifle	1	7.62	10No. individual Single rounds	Rifle used by SF
10:51:00	10646	70	91.5m (100yds) Firing point between lanes 2 and 3. Prone firing	7.62 Rifle	1	7.62	10No. individual Single rounds	Rifle used by SF
10:55:00	10503	90	91.5m (100yds) Firing point using lanes 3, 4 & 5. Generally prone firing but lane 3 guy kneeling	5.56 Rifle	3	5.56	10No. Individual single rounds from each lane in their own time - total of 30 rounds	Guy in lane 3 kneeling rest prone; at least one occurrence of simultaneous shots fired
10:55:00	10646	70	91.5m (100yds) Firing point using lanes 3, 4 & 5. Generally prone firing but lane 3 guy kneeling	5.56 Rifle	3	5.56	10No. Individual single rounds from each lane in their own time - total of 30 rounds	Guy in lane 3 kneeling rest prone; at least one occurrence of simultaneous shots fired
10:57:00	10503	90	91.5m (100yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machin Gun	3	5.56	10 No. 3 - 5 round bursts - followed by 10 round burst	Sounded like several simultaneous shots in this exercise

Approximate Time	SLM Serial No.	Angle subtended to firing position (where applicable)	Firing Position & Description of stance	Description of Weapon	No. of weapons used	Calibre (mm)	Description of Activity	Comments
10:57:00	10646	70	91.5m (100yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machin Gun	3	5.56	10 No. 3 - 5 round bursts - followed by 10 round burst	Sounded like several simultaneous shots in this exercise
11:00:00	10503	90	91.5m (100yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machine Gun	3	7.62	10 No. 3 - 5 round bursts - followed by 10 round burst	Sounded like several simultaneous shots in this exercise in addition to shouted orders
11:00:00	10646	70	91.5m (100yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machine Gun	3	7.62	10 No. 3 - 5 round bursts - followed by 10 round burst	Sounded like several simultaneous shots in this exercise in addition to shouted orders
11:03:00	10503	90	91.5m (100yds) Firing point using lanes 3, 4 & 5. Generally prone firing	General Purpose Machine Gun	3	7.62	10 No. 3 - 5 round bursts - followed by 10 round burst	As above, but GPMG in Lane 5 got blockage for final burst so only 2No. GPMGs firing
11:03:00	10646	70	91.5m (100yds) Firing point using lanes 3, 4 & 5. Generally prone firing	General Purpose Machine Gun	3	7.62	10 No. 3 - 5 round bursts - followed by 10 round burst	As above, but GPMG in Lane 5 got blockage for final burst so only 2No. GPMGs firing
11:10:00	10503	90	91.5m (100yds) Firing point using lanes 3, 4 & 5. Generally prone firing	7.62 Rifle	3	7.62	10No. individual Single rounds	Can hear distinct echo with this weapon

Approximate Time	SLM Serial No.	Angle subtended to firing position (where applicable)	Firing Position & Description of stance	Description of Weapon	No. of weapons used	Calibre (mm)	Description of Activity	Comments
11:10:00	10646	70	91.5m (100yds) Firing point using lanes 3, 4 & 5. Generally prone firing	7.62 Rifle	3	7.62	10No. individual Single rounds	Can hear distinct echo with this weapon
11:13:00 ish	10503	90	183m (200yds) Firing point using lanes 3, 4 & 5. Generally prone firing	5.56 Rifle	3	5.56	10No. Individual single rounds from each lane in their own time - total of 30 rounds	
11:13:00 ish	10646	70	183m (200yds) Firing point using lanes 3, 4 & 5. Generally prone firing	5.56 Rifle	3	5.56	10No. Individual single rounds from each lane in their own time - total of 30 rounds	
11:16:00	10503	90	183m (200yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machin Gun	3	5.56	10 No. 3 - 5 round bursts - followed by 10 round burst	
11:16:00	10646	70	183m (200yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machin Gun	3	5.56	10 No. 3 - 5 round bursts - followed by 10 round burst	
11:20:00	10503	90	183m (200yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machine Gun	3	7.62	10 No. 3 - 5 round bursts - followed by 10 round burst	Middle lane late starting so extended past time when lanes 3 & 5 had finished

Approximate Time	SLM Serial No.	Angle subtended to firing position (where applicable)	Firing Position & Description of stance	Description of Weapon	No. of weapons used	Calibre (mm)	Description of Activity	Comments
11:20:00	10646	70	183m (200yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machine Gun	3	7.62	10 No. 3 - 5 round bursts - followed by 10 round burst	Middle lane late starting so extended past time when lanes 3 & 5 had finished
11:25:00	10503	90	183m (200yds) Firing point using lanes 3, 4 & 5. Generally prone firing	General Purpose Machine Gun	3	7.62	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire
11:25:00	10646	70	183m (200yds) Firing point using lanes 3, 4 & 5. Generally prone firing	General Purpose Machine Gun	3	7.62	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire
11:29:00	10503	90	183m (200yds) Firing point using lanes 3, 4 & 5. Generally prone firing	7.62 Rifle	3	7.62	10No. individual Single rounds	One reservist assisted with clearing weapon at end of exercise
11:29:00	10646	70	183m (200yds) Firing point using lanes 3, 4 & 5. Generally prone firing	7.62 Rifle	3	7.62	10No. individual Single rounds	One reservist assisted with clearing weapon at end of exercise
11:35:00	10503	90	274.5m (300yds) Firing point using lanes 3, 4 & 5. Generally prone firing	5.56 Rifle	3	5.56	10No. Individual single rounds from each lane in their own time - total of 30 rounds	Distance to first lane in use approximately 23m at 90°

Approximate Time	SLM Serial No.	Angle subtended to firing position (where applicable)	Firing Position & Description of stance	Description of Weapon	No. of weapons used	Calibre (mm)	Description of Activity	Comments
11:35:00	10646	70	274.5m (300yds) Firing point using lanes 3, 4 & 5. Generally prone firing	5.56 Rifle	3	5.56	10No. Individual single rounds from each lane in their own time - total of 30 rounds	Distance to first lane in use approximately 23m at 90°
11:37:00	10503	90	274.5m (300yds) Firing point using lanes 3, 4 & 5. Generally prone firing.	Light Machin Gun	3	5.56	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire - middle lane stood up to complete action
11:37:00	10646	70	274.5m (300yds) Firing point using lanes 3, 4 & 5. Generally prone firing.	Light Machin Gun	3	5.56	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire - middle lane stood up to complete action
11:40:00	10503	90	274.5m (300yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machine Gun	3	7.62	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire
11:40:00	10646	70	274.5m (300yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machine Gun	3	7.62	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire
11:45:00	10503	90	274.5m (300yds) Firing point using lanes 3, 4 & 5. Generally prone firing	General Purpose Machine Gun	3	7.62	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire

Approximate Time	SLM Serial No.	Angle subtended to firing position (where applicable)	Firing Position & Description of stance	Description of Weapon	No. of weapons used	Calibre (mm)	Description of Activity	Comments
11:45:00	10646	70	274.5m (300yds) Firing point using lanes 3, 4 & 5. Generally prone firing	General Purpose Machine Gun	3	7.62	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire
11:47:00	10503	90	274.5m (300yds) Firing point using lanes 3, 4 & 5. Generally prone firing	7.62 Rifle	3	7.62	10No. individual Single rounds	
11:47:00	10646	70	274.5m (300yds) Firing point using lanes 3, 4 & 5. Generally prone firing	7.62 Rifle	3	7.62	10No. individual Single rounds	
11:52:00	10503	135	366m (400yds) Firing point using lanes 3, 4 & 5. Generally prone firing	5.56 Rifle	3	5.56	10No. Individual single rounds from each lane in their own time - total of 30 rounds	
11:52:00	10646	90	366m (400yds) Firing point using lanes 3, 4 & 5. Generally prone firing	5.56 Rifle	3	5.56	10No. Individual single rounds from each lane in their own time - total of 30 rounds	
11:54:00	10503	135	366m (400yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machin Gun	3	5.56	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire - middle lane stood up to complete action

Approximate Time	SLM Serial No.	Angle subtended to firing position (where applicable)	Firing Position & Description of stance	Description of Weapon	No. of weapons used	Calibre (mm)	Description of Activity	Comments
11:54:00	10646	90	366m (400yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machin Gun	3	5.56	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire - middle lane stood up to complete action
11:56:00	10503	135	366m (400yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machine Gun	3	7.62	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire
11:56:00	10646	90	366m (400yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machine Gun	3	7.62	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire
12:05:00	10503	135	366m (400yds) Firing point using lanes 3, 4 & 5. Generally prone firing	General Purpose Machine Gun	3	7.62	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire
12:05:00	10646	90	366m (400yds) Firing point using lanes 3, 4 & 5. Generally prone firing	General Purpose Machine Gun	3	7.62	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire
12:06:00	10503	135	366m (400yds) Firing point using lanes 3, 4 & 6. Generally prone firing	7.62 Rifle	3	7.62	10No. individual Single rounds	NB last guy used lane 6 instead of 5

Approximate Time	SLM Serial No.	Angle subtended to firing position (where applicable)	Firing Position & Description of stance	Description of Weapon	No. of weapons used	Calibre (mm)	Description of Activity	Comments
12:06:00	10646	90	366m (400yds) Firing point using lanes 3, 4 & 6. Generally prone firing	7.62 Rifle	3	7.62	10No. individual Single rounds	NB last guy used lane 6 instead of 5
								NB Duos back to 45 & 90. 1st Lane used 17m from toe of berm which is approximately 1.5m high NB NO 5.56 Rifles AS HAVEN'T GOT THE RANGE
12:14:00	10503	90	457m (500yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machin Gun	3	5.56	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire
12:14:00	10646	70	457m (500yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machin Gun	3	5.56	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire
12:19:00	10503	90	457m (500yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machine Gun	3	7.62	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire
12:19:00	10646	70	457m (500yds) Firing point using lanes 3, 4 & 5. Generally prone firing	Light Machine Gun	3	7.62	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire

Approximate Time	SLM Serial No.	Angle subtended to firing position (where applicable)	Firing Position & Description of stance	Description of Weapon	No. of weapons used	Calibre (mm)	Description of Activity	Comments
12:15:00	10503	90	457m (500yds) Firing point using lanes 3, 4 & 5. Generally prone firing	7.62 Rifle	3	7.62	10No. individual Single rounds	NB Change of order
12:15:00	10646	70	457m (500yds) Firing point using lanes 3, 4 & 5. Generally prone firing	7.62 Rifle	3	7.62	10No. individual Single rounds	NB Change of order
12:21:00	10503	90	457m (500yds) Firing point using lanes 3, 4 & 5. Generally prone firing	General Purpose Machine Gun	3	7.62	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire
12:21:00	10646	70	457m (500yds) Firing point using lanes 3, 4 & 5. Generally prone firing	General Purpose Machine Gun	3	7.62	"Action front" rapid fire - approximately 50 round belt expended in each lane	No shouted instructions other than order to fire
12:33 - 12:58	10503	90	548.5m (600yds) Firing point using lanes 3, 4 & 5. All prone firing	7.62 Rifle	3	7.62	Accuracy competition to use up remaining ammunition - at least 10 rounds each fired	
12:33 - 12:58	10646	70	548.5m (600yds) Firing point using lanes 3, 4 & 5. All prone firing	7.62 Rifle	3	7.62	Accuracy competition to use up remaining ammunition - at least 10 rounds each fired	NB ONLY RIFLES USED AT THIS DISTANCE

Approximate Time	SLM Serial No.	Angle subtended to firing position (where applicable)	Firing Position & Description of stance	Description of Weapon	No. of weapons used	Calibre (mm)	Description of Activity	Comments
NB in addition at the 183m (200yds) FP the MOD planner had a go with the GPMG at about 12:58 hours - this would be picked up on LT1 - LT 3 but not on the range Duos which had been removed at this time								

Appendix B
Equipment Calibration Details

Table B.1 Equipment Details

Item	Manufacturer	Model	Serial Number	Last Calibration Date
Calibrator 1	Rion	NC-74	34251550	30/01/2015
Calibrator 2	01dB	CAL-21	35183004(2008)	07/01/2015
LT1				
Sound level meter	01dB	Duo	10510	21/072014
LT2				
Sound level meter	01dB	Duo	10507	13/05/2014
LT3				
Sound level meter	01dB	Duo	10151	23/04/2014
Attended Measurements at 90°				
Sound level meter	01dB	Duo	10503	23/06/2014
Attended Measurements at 70°				
Sound level meter	01dB	Duo	10646	14/11/2013

Appendix C
Directivity Corrections

Table C.2 Results of Source Noise Measurements for Burst Shooting from a GPMG[4]

Azimuthal Angle of Measurement Relative to Direction of Fire (°)	Sound Level, L_{Amax} (dB)
0	114
45	108
135	86
180	81

All results are expressed as sound pressure levels in dB re: 0.00002 Pa measured 50m from the firing point. The azimuthal angle refers to the measurement location relative to the direction of fire of the weapon.

Table C.3 Derived Directivity Corrections Used In Noise Model - GPMG

Azimuthal Angle of Measurement Relative to Direction of Fire (°)	Correction, (dB)
0	0.0
5	-0.7
10	-1.3
15	-2.0
20	-2.7
25	-3.3
30	-4.0
35	-4.7
40	-5.3
45	-6.0
50	-7.2
55	-8.4
60	-9.7
65	-10.9
70	-12.1

[44] A Bullmore (January 2001). Warcop Training Area Proposals to Acquire Commoners' Rights. *Appendices to the evidence on behalf of the MOD*

Azimuthal Angle of Measurement Relative to Direction of Fire (°)	Correction, (dB)
75	-13.3
80	-14.6
85	-15.8
90	-17.0
95	-18.2
100	-19.4
105	-20.7
110	-21.9
115	-23.1
120	-24.3
125	-25.6
130	-26.8
135	-28.0
140	-28.6
145	-29.1
150	-29.7
155	-30.2
160	-30.8
165	-31.3
170	-31.9
175	-32.4
180	-33.0

Table C.4 Results of Source Noise Measurements for a Single Shot from a 5.56 Rifle

Azimuthal Angle of Measurement Relative to Direction of Fire (°)	Sound Level, L_{Amax} (dB)
0	108
45	104
135	81
180	78

All results are expressed as sound pressure levels in dB re: 0.00002 Pa measured 50m from the firing point. The azimuthal angle refers to the measurement location relative to the direction of fire of the weapon.

Table C.5 Derived Directivity Corrections Used In Noise Model – 5.56 Rifle

Azimuthal Angle of Measurement Relative to Direction of Fire (°)	Correction, (dB)
0	0.0
5	-0.4
10	-0.9
15	-1.3
20	-1.8
25	-2.2
30	-2.7
35	-3.1
40	-3.6
45	-4.0
50	-5.3
55	-6.6
60	-7.8
65	-9.1
70	-10.4
75	-11.7
80	-12.9
85	-14.2
90	-15.5
95	-16.8

Azimuthal Angle of Measurement Relative to Direction of Fire (°)	Correction, (dB)
100	-18.1
105	-19.3
110	-20.6
115	-21.9
120	-23.2
125	-24.4
130	-25.7
135	-27.0
140	-27.3
145	-27.7
150	-28.0
155	-28.3
160	-28.7
165	-29.0
170	-29.3
175	-29.7
180	-30.0

Table C.6 Results of Source Noise Measurements for a Single Shot from a 7.62mm Light Support Weapon

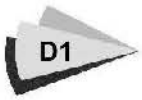
Azimuthal Angle of Measurement Relative to Direction of Fire (°)	Sound Level, L_{Amax} (dB)
0	109
45	104
135	84
180	79

All results are expressed as sound pressure levels in dB re: 0.00002 Pa measured 50m from the firing point. The azimuthal angle refers to the measurement location relative to the direction of fire of the weapon.

Table C.7 Derived Directivity Corrections Used In Noise Model – 7.62 Light Support Weapon

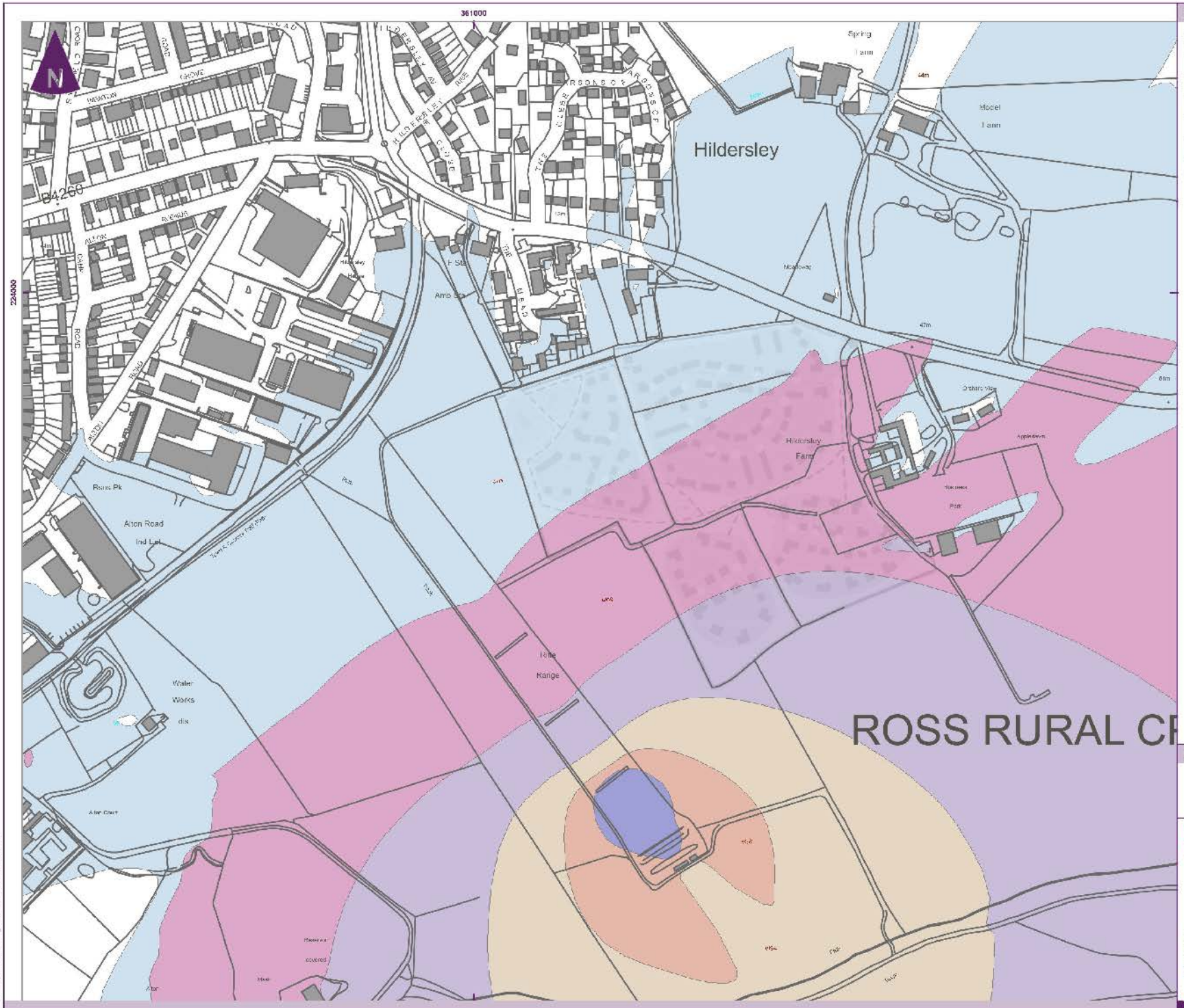
Azimuthal Angle of Measurement Relative to Direction of Fire (°)	Correction, (dB)
0	0.0
5	-0.6
10	-1.1
15	-1.7
20	-2.2
25	-2.8
30	-3.3
35	-3.9
40	-4.4
45	-5.0
50	-6.1
55	-7.2
60	-8.3
65	-9.4
70	-10.6
75	-11.7
80	-12.8
85	-13.9
90	-15.0
95	-16.1
100	-17.2
105	-18.3
110	-19.4
115	-20.6
120	-21.7
125	-22.8
130	-23.9
135	-25.0

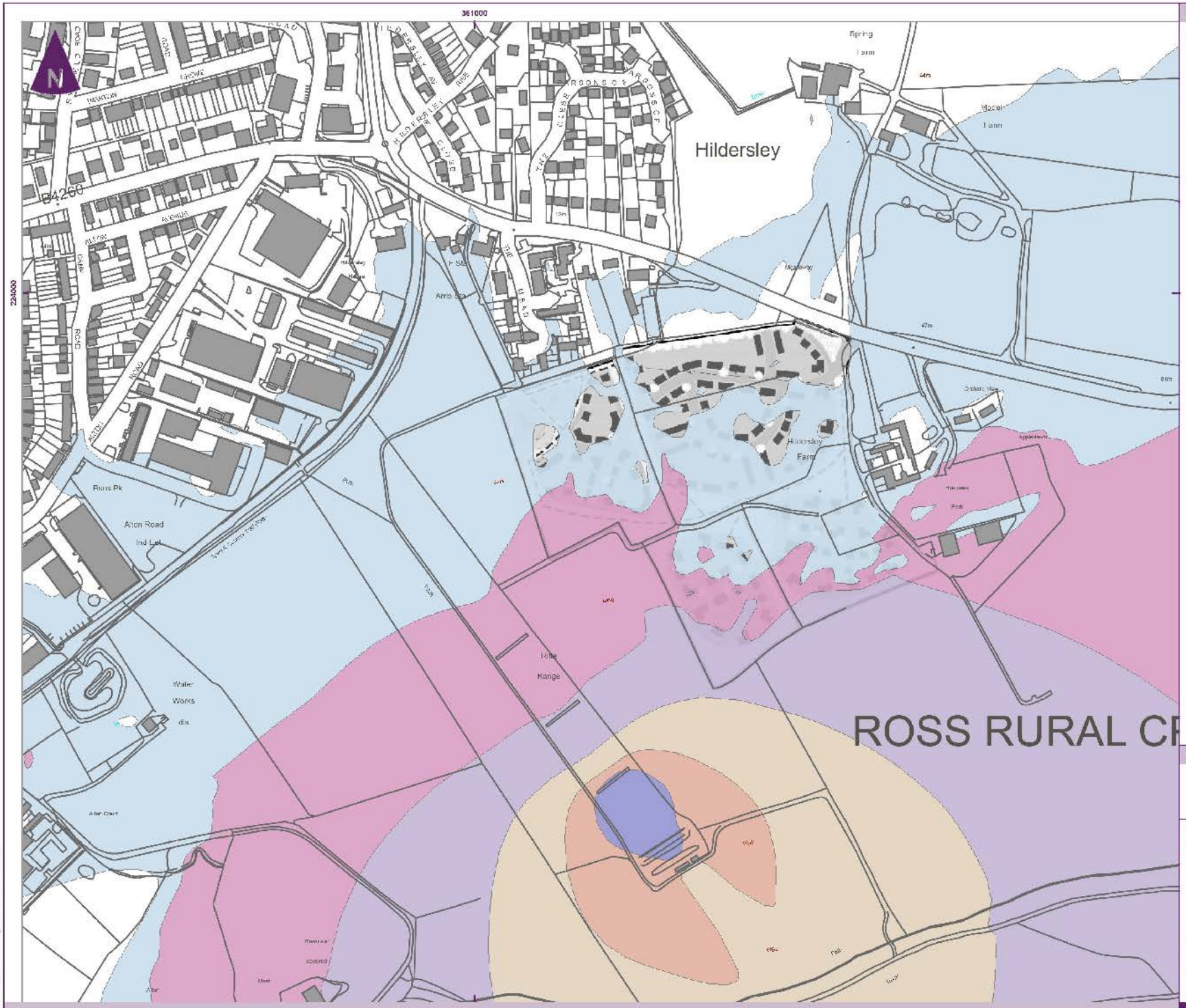
Azimuthal Angle of Measurement Relative to Direction of Fire (°)	Correction, (dB)
140	-25.6
145	-26.1
150	-26.7
155	-27.2
160	-27.8
165	-28.3
170	-28.9
175	-29.4
180	-30.0

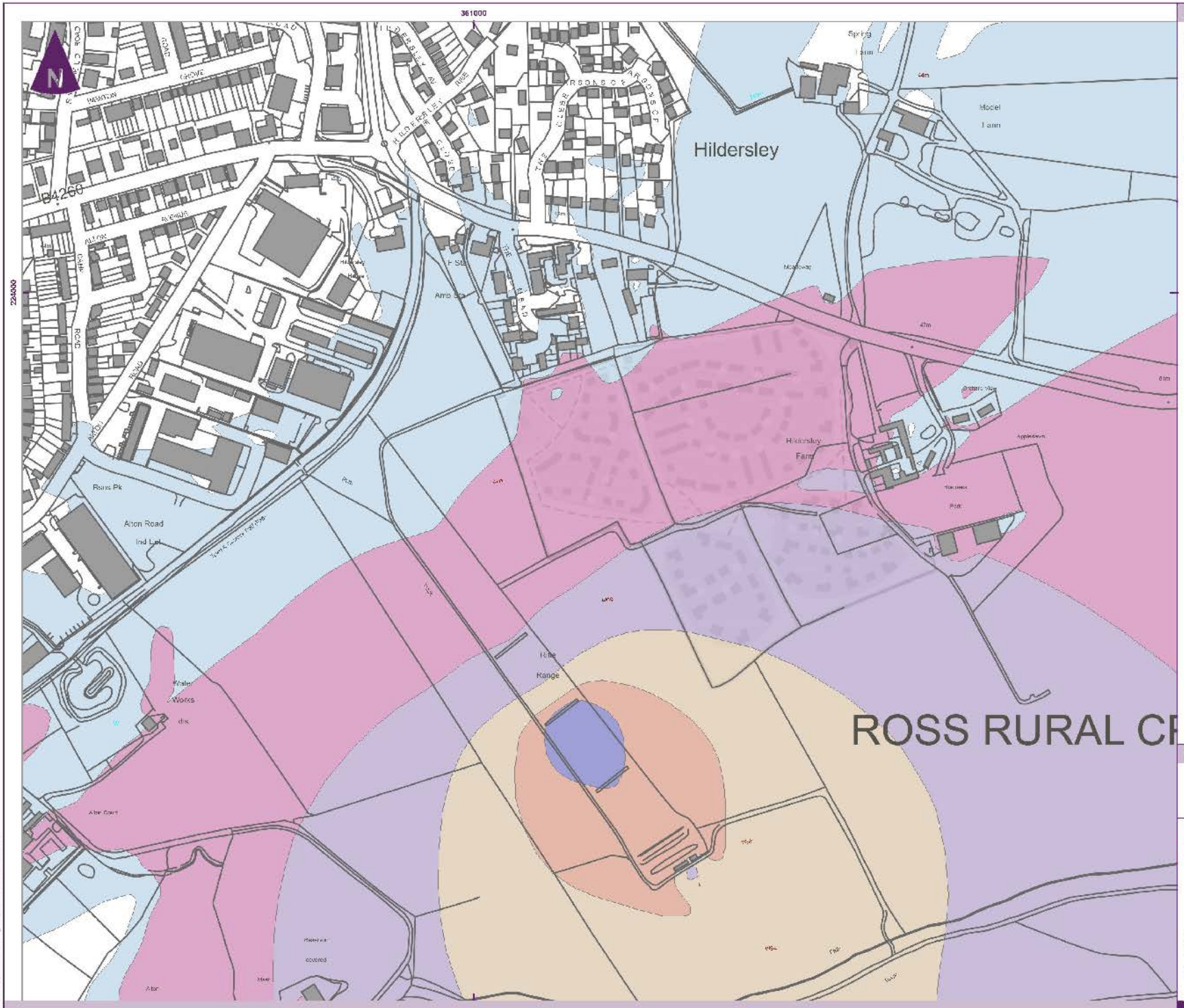


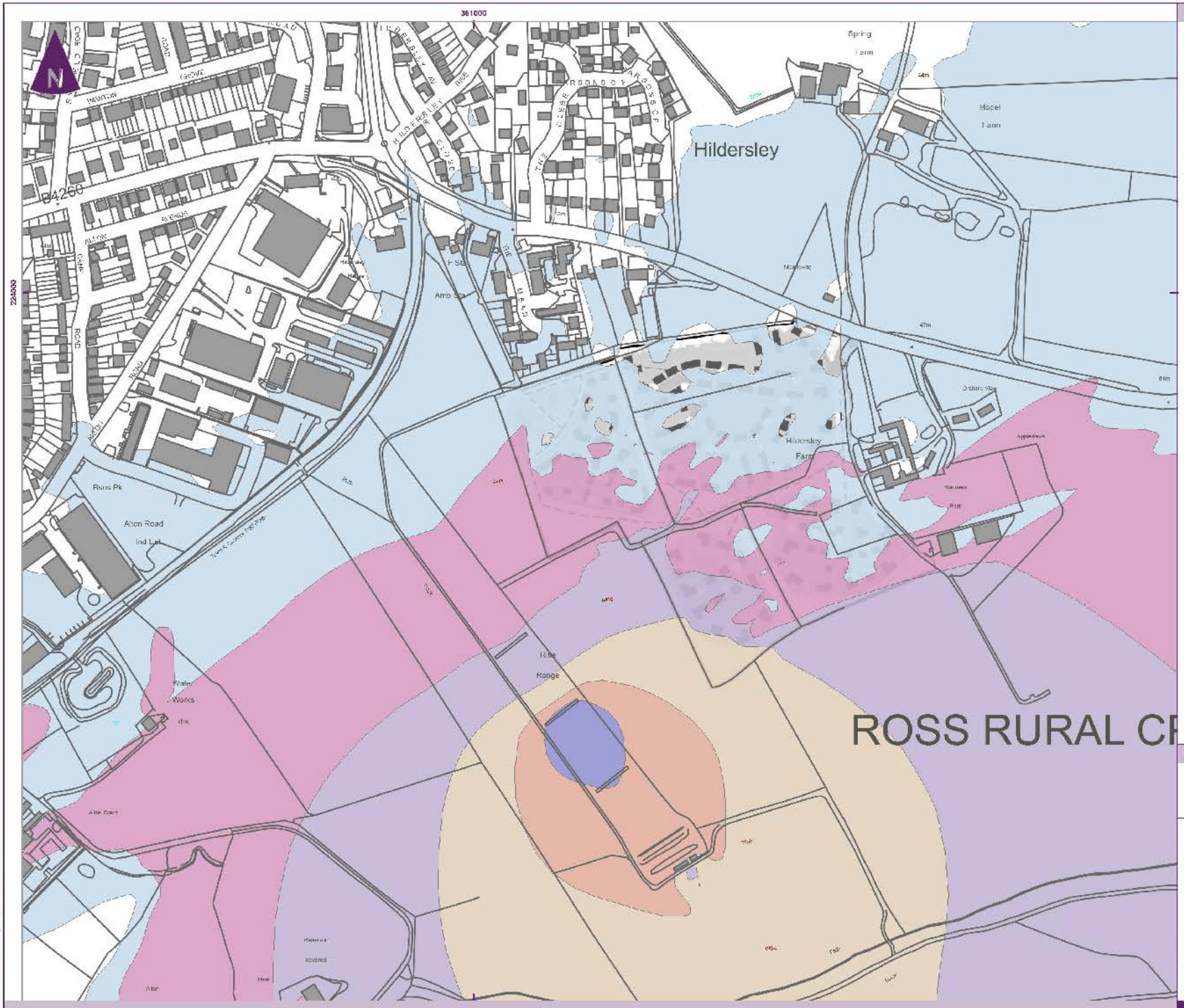
Appendix D
Noise Contour Plots

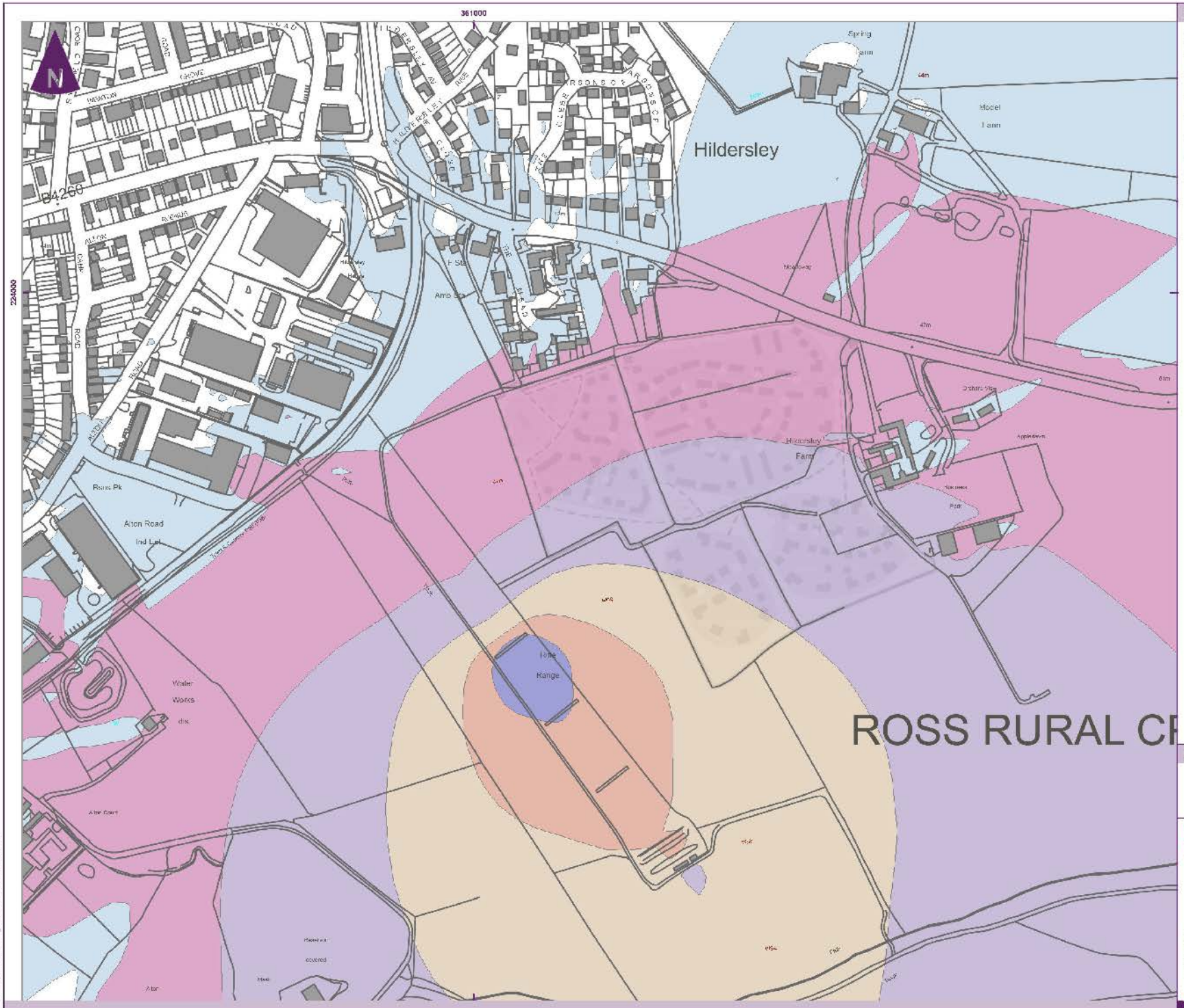
October 2015
Doc Ref. 37348 Final report 15535i1

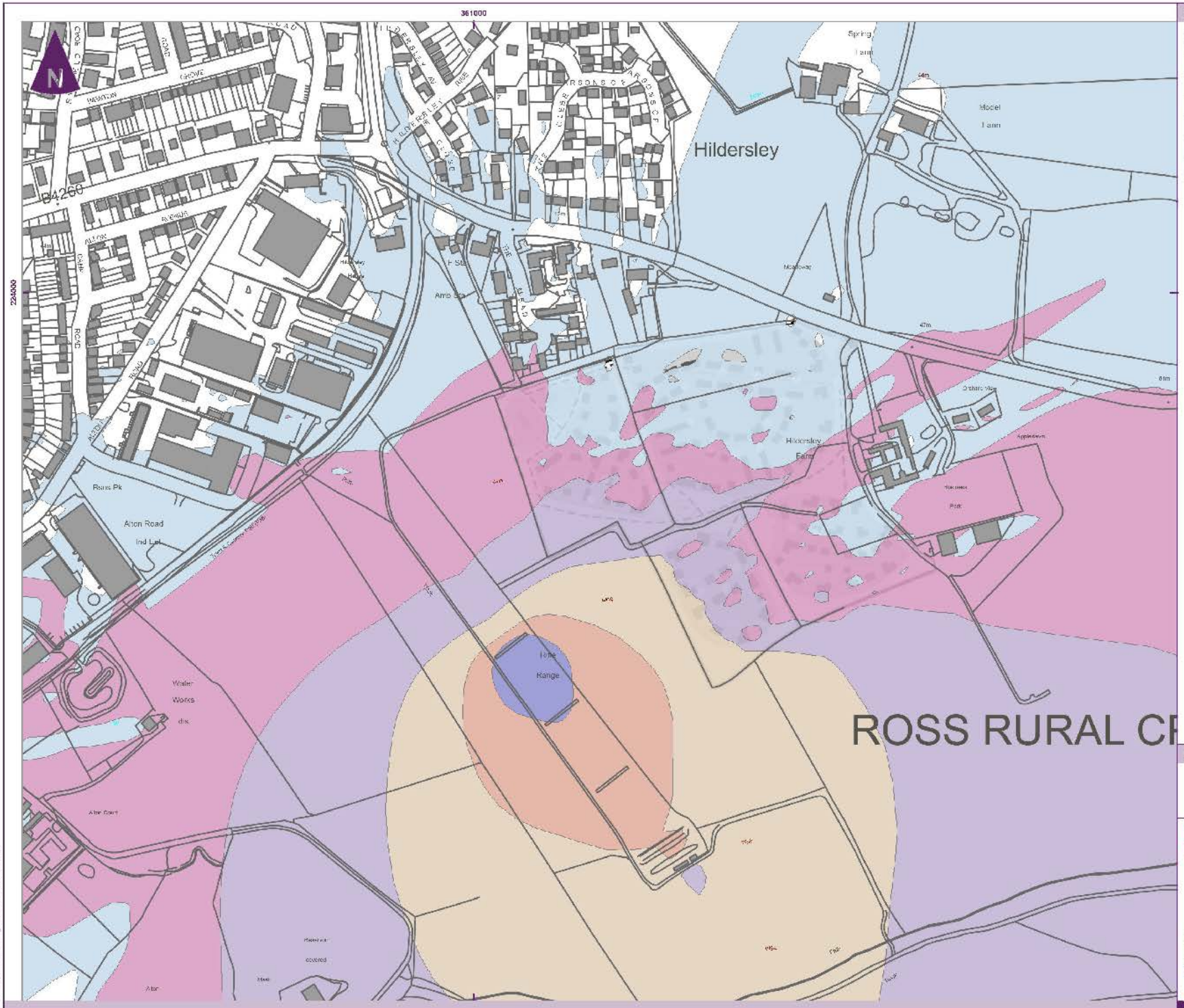

361000
224000
N
B4260
Hildersley
Model Farm
Spring Farm
Hildersley Farm
Ross Pk
Alton Road Ind Est
Rifle Range
Waller Works
ROSS RURAL CP
Key
Noise Level, LAmax (dB)
65
75
85
95
105
115
0
50
100
150
200 Meters
Scale at A3: 1:3,999
Client
Ross on Wye Ranges
Noise Assessment
amec foster wheeler
Figure D.1
Illustration of Directivity
91.5m (100yds) Firing Point - Without Development
October 2015
37348 mxvj


361000
224000
N
B4260
Hildersley
Ross Pk
Alton Road
Ind Est
Waller
Works
The
Range
ROSS RURAL CP
Hildersley
Farm
Spring
Farm
Orchard Villa
Alton Court
Key
Noise Level, LAmax
(dB)
65
75
85
95
105
115
0
50
100
150
200 Meters
Scale at A3: 1:3,989
Client
Ross on Wye Ranges
Noise Assessment
amec
foster
wheeler
Figure D.2
Illustration of Directivity
91.5m (100yds) Firing Point - With
Development
October 2015
37348 mxd


361000
224000
N
B4260
Hildersley
Ross Pk
Alton Road
Ind Est
Range
Works
ROSS RURAL CP
Key
Noise Level, LAmax (dB)
65
75
85
95
105
115
0
50
100
150
200 Meters
Scale at A3: 1:3,989
Client
Ross on Wye Ranges
Noise Assessment
amec foster wheeler
Figure D.3
Illustration of Directivity
183m (200yds) Firing Point - Without Development
October 2015
37348 mxwj


361000
224000
N
B4260
Hildersley
Ross Pk
Alton Road
Ind Est
Range
Works
ROSS RURAL CP
Key
Noise Level, LAmax (dB)
65
75
85
95
105
115
0
50
100
150
200 Metres
Scale at A3: 1:3,989
Client
Ross on Wye Ranges
Noise Assessment
amec foster wheeler
Figure D.4
Illustration of Directivity
183m (200yds) Firing Point - With Development
October 2015
37348 mxwj


361000
224000
N
B4260
Hildersley
Ross Pk
Alton Road
Ind Est
Water
Works
Horse
Range
ROSS RURAL CP
Key
Noise Level, LAmax (dB)
65
75
85
95
105
115
0
50
100
150
200 Meters
Scale at A3: 1:3,989
Client
Ross on Wye Ranges
Noise Assessment
amec foster wheeler
Figure D.5
Illustration of Directivity
274.5m (300yds) Firing Point -
Without Development
October 2015
37348 mxwj



Key

Noise Level, LAmax (dB)

- 65
- 75
- 85
- 95
- 105
- 115

0 50 100 150 200 Meters

Scale at A3: 1:3,989

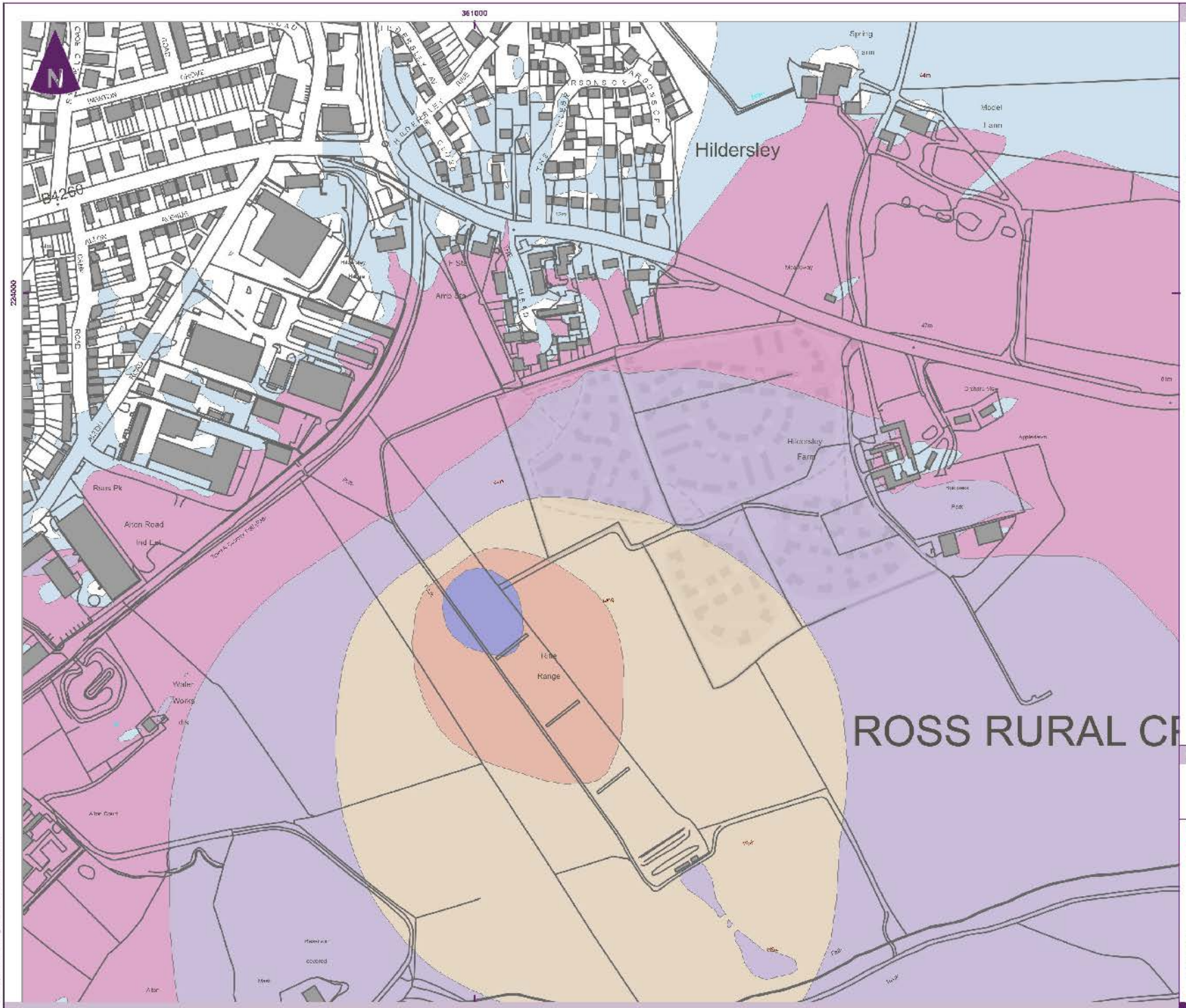
Client

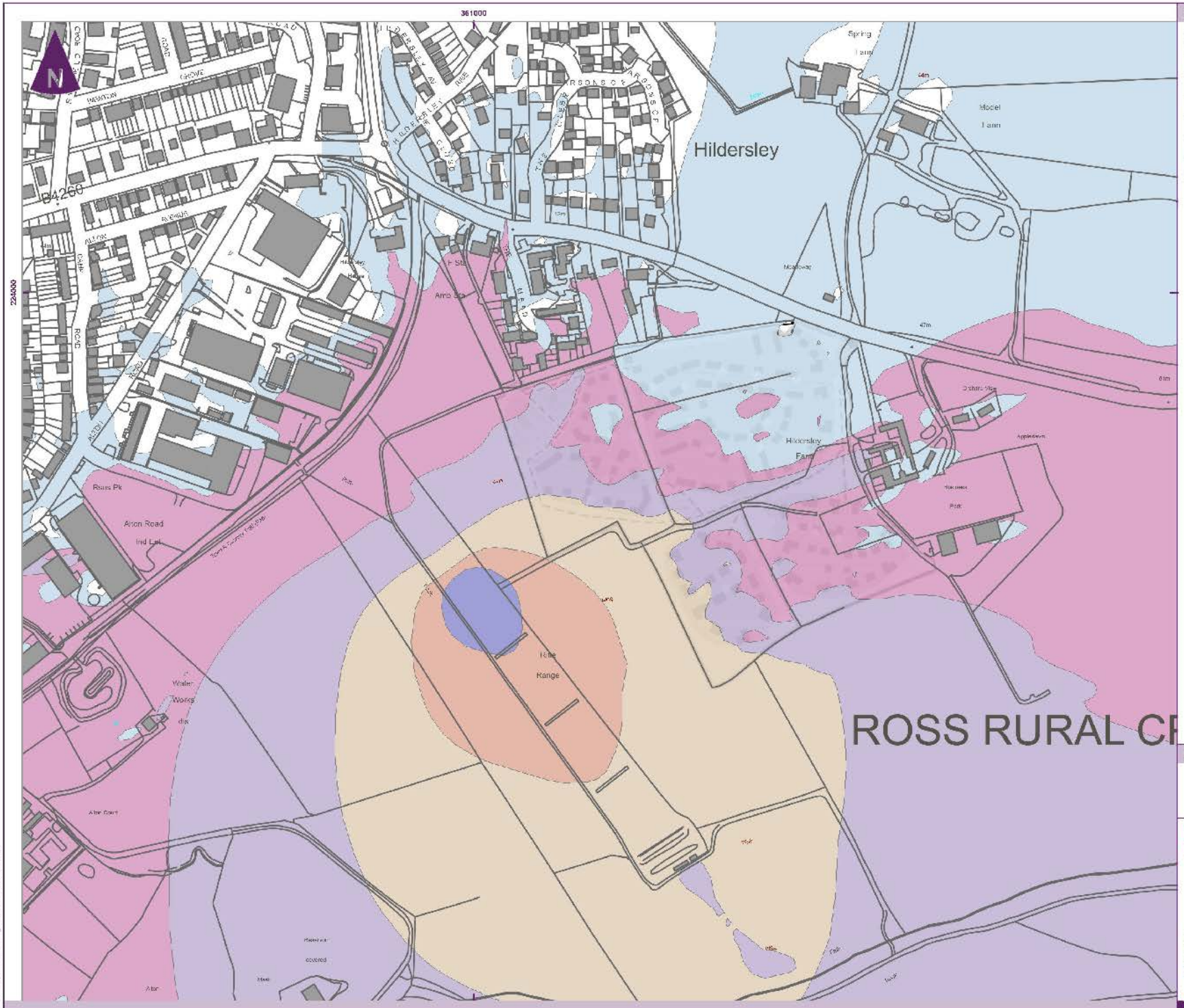
Ross on Wye Ranges
Noise Assessment

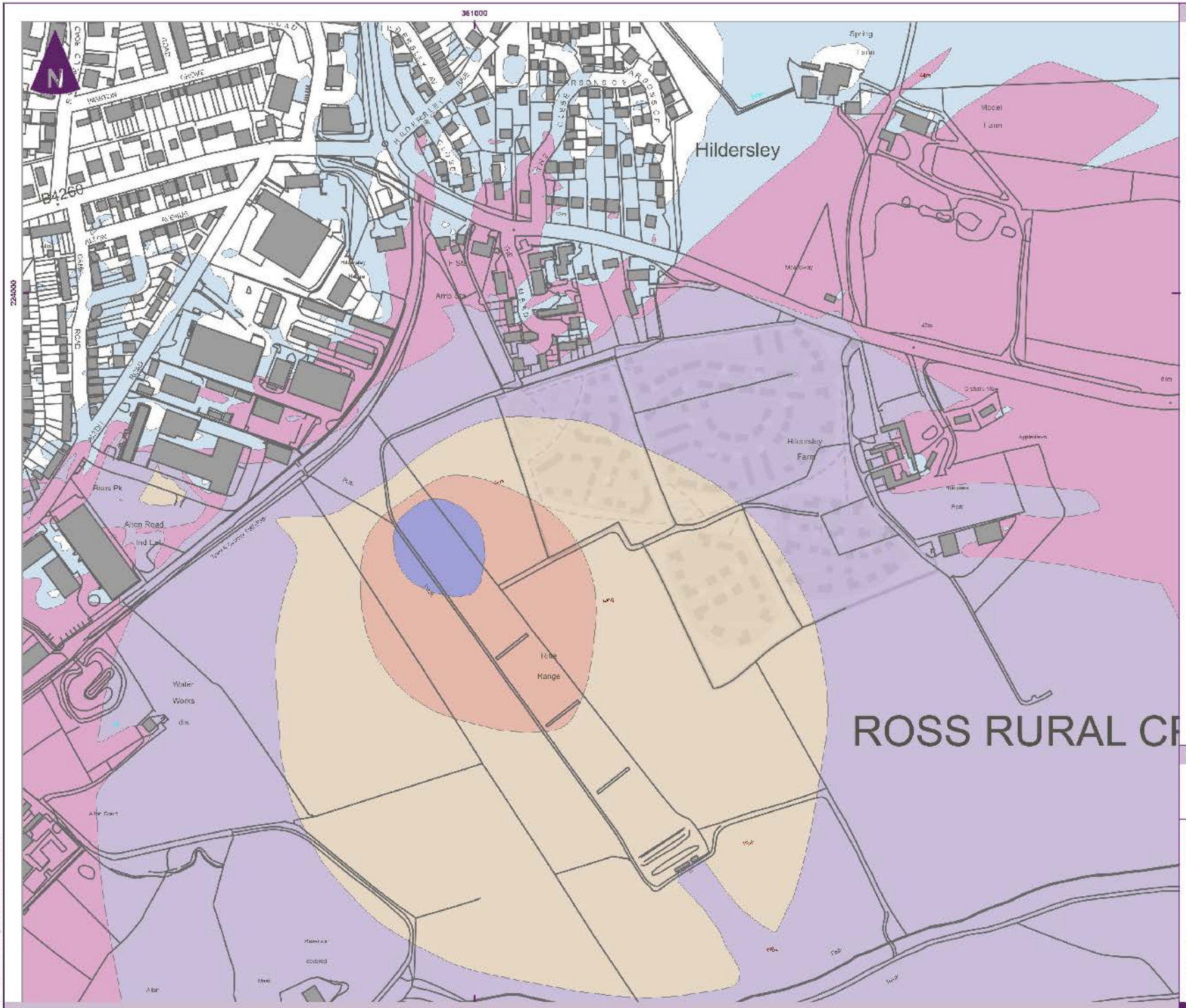
amec foster wheeler

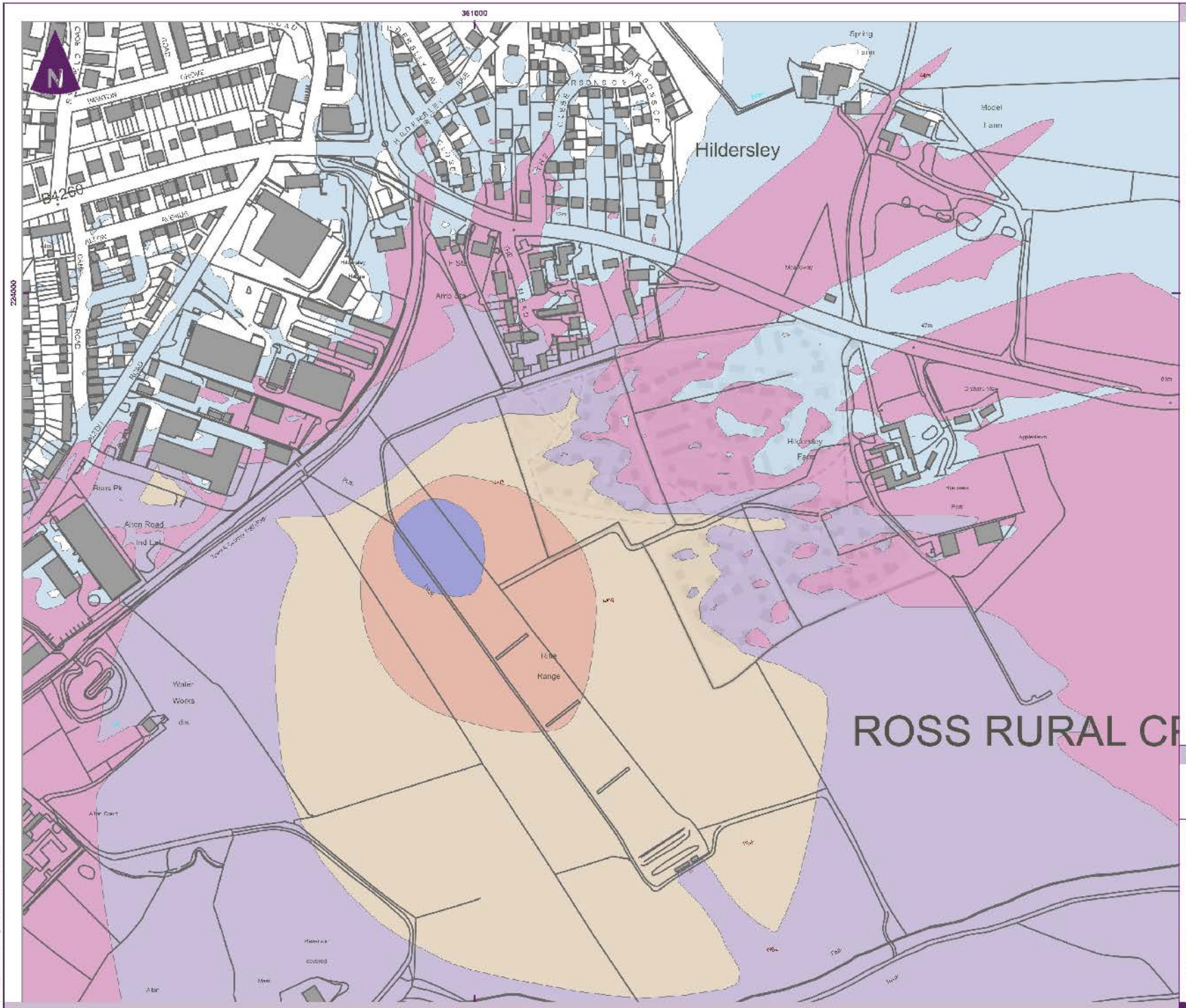
Figure D.6
Illustration of Directivity
274.5m (300yds) Firing Point - With Development

October 2015 37348 mxwj


361000
224000
N
B4260
Hildersley
Spring
Model Farm
Hildersley Farm
Ross Pk
Alton Road
Ind Est
Rifle Range
Waller Works
ROSS RURAL CP
Key
Noise Level, LAmax (dB)
65
75
85
95
105
115
0
50
100
150
200 Metres
Scale at A3: 1:3,989
Client
Ross on Wye Ranges
Noise Assessment
amec foster wheeler
Figure D.7
Illustration of Directivity
366m (400yds) Firing Point - Without Development
October 2015
37348 mxwj


361000
224000
N
B4260
Hildersley
Hildersley Farm
Model Farm
Ross Pk
Alton Road
Ind Est
Rifle Range
Waller Works
ROSS RURAL CP
Key
Noise Level, LAmax (dB)
65
75
85
95
105
115
0
50
100
150
200 Metres
Scale at A3: 1:3,989
Client
Ross on Wye Ranges
Noise Assessment
amec foster wheeler
Figure D.8
Illustration of Directivity
366m (400yds) Firing Point - With Development
October 2015
37348 mxwj


361000
224000
N
B4260
Hildersley
Model Farm
Hildersley Farm
Ross Pk
Alton Road Ind Est
Rifle Range
Water Works
ROSS RURAL CP
Key
Noise Level, LAmax (dB)
65
75
85
95
105
115
0
50
100
150
200 Metres
Scale at A3: 1:3,989
Client
Ross on Wye Ranges Noise Assessment
amec foster wheeler
Figure D.9
Illustration of Directivity
457m (500yds) Firing Point - Without Development
October 2015
37348 mxwj



Client

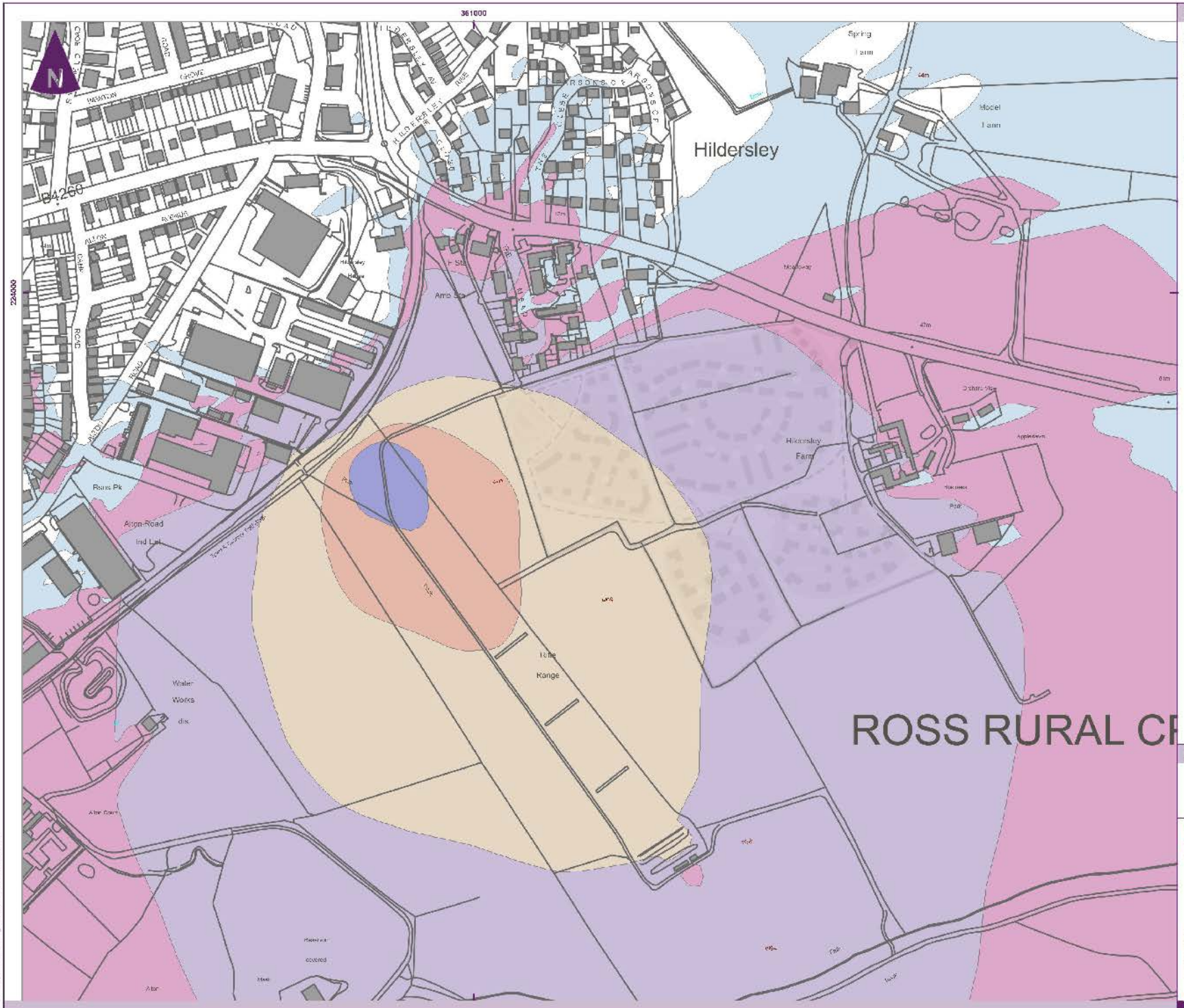
Ross on Wye Ranges
Noise Assessment

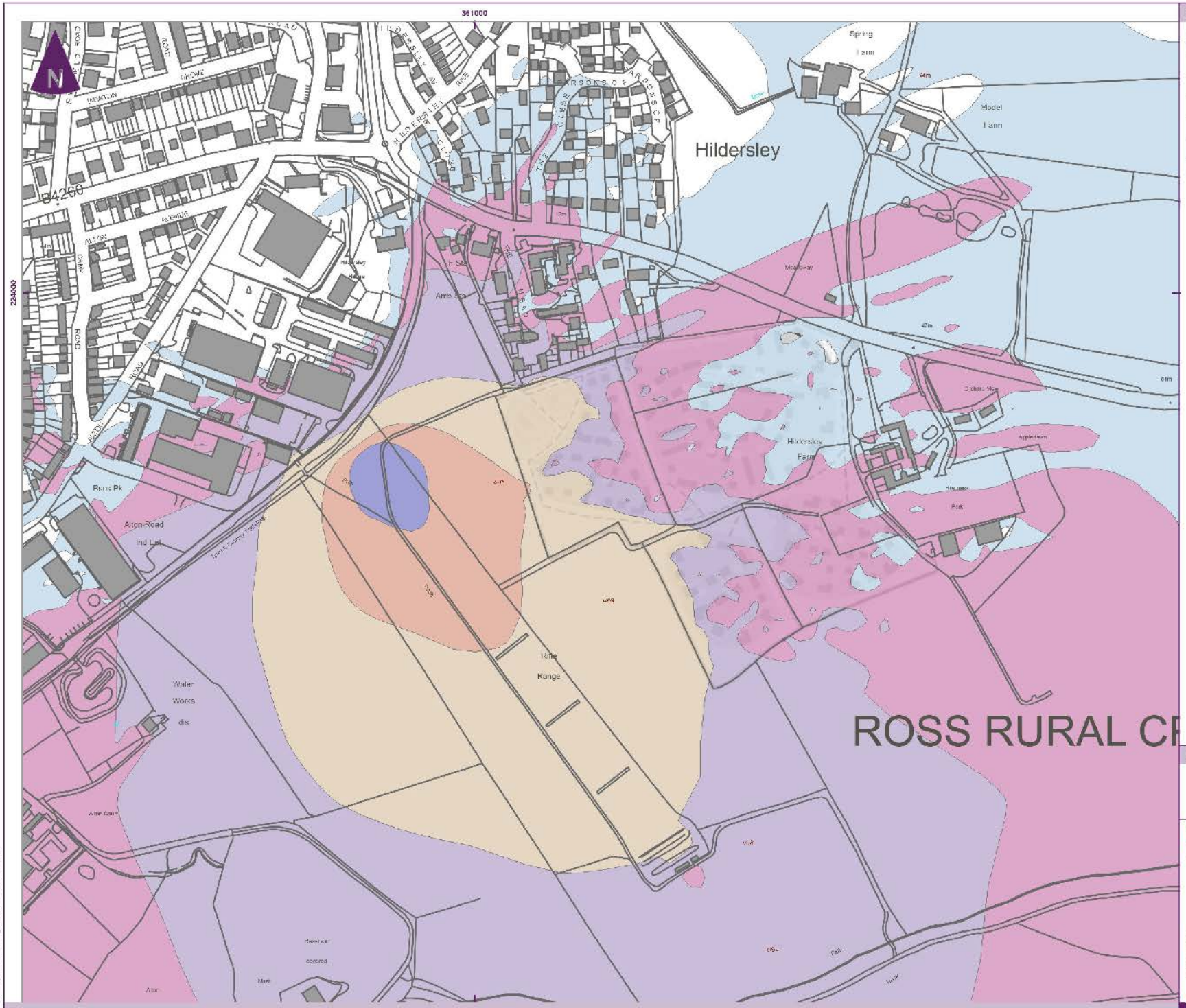
amec foster wheeler

Figure D.10
Illustration of Directivity
457m (500yds) Firing Point - With Development

October 2015

37348 rnwj


361000
224000
N
Hildersley
B4260
Ross Pk
Alton Road
Ind Est
Water Works
The Range
Hildersley Farm
Model Farm
Spring Farm
ROSS RURAL CP
Key
Noise Level, LAmax (dB)
65
75
85
95
105
115
0
50
100
150
200 Meters
Scale at A3: 1:3,999
Client
Ross on Wye Ranges
Noise Assessment
amec foster wheeler
Figure D.11
Illustration of Directivity
548.5m (600yds) Firing Point -
Without Development
October 2015
37348 rnwj


361000
224000
N
B4260
Hildersley
Ross Pk
Alton Road
Ind Est
Water Works
The Range
ROSS RURAL CP
Hildersley Farm
Model Farm
Spring Farm
Key
Noise Level, LAmax (dB)
65
75
85
95
105
115
0
50
100
150
200 Meters
Scale at A3: 1:3,999
Client
Ross on Wye Ranges
Noise Assessment
amec foster wheeler
Figure D.12
Illustration of Directivity
548.5m (600yds) Firing Point - With Development
October 2015
37348 mxwj

Defence
Infrastructure
Organisation

Ministry of Defence
Building 49
Kingston Road
Sutton Coldfield
West Midlands B75 7RL
United Kingdom

Telephone: +44 (0)121 311 2132
Facsimile: +44 (0)121 311 3636
E-mail: DIOSEE-EPSPTCP4a@mod.uk

Mr Andrew Banks
Planning Services
Herefordshire Council
Franklin House
4 Commercial Road
Hereford
HR1 2BB

15th October 2015

Dear Mr Banks,

Re: Planning Application Reference P150930/O – Proposed Development of Approximately 250 Dwellings Including Affordable Housing, Public Open Space and Associated Works on Land at Hildersley Farm, Ross-on-Wye, Herefordshire

Further to the Defence Infrastructure Organisation's (DIO) consultation responses, submitted on behalf of the Ministry of Defence (MoD), dated 5th June 2015, 24th June 2015 and 6th July 2015 respectively in connection with the above planning application, I write once again to outline the MoD's position in reference to their extant **objection** to the proposed development.

The Local Planning Authority are aware that an existing MoD rifle range adjoins the western boundary of the application site. This range facility, comprising of a 9-lane, 600 yard outdoor range, is frequently used by a number of different military groups/units. The existing range is not the subject of planning control with regard to restrictions which limit the nature of operations undertaken on the MoD range including: the nature of weapons operated, days/hours of operation, noise limit restrictions, etc. Notwithstanding this, this range facility is under license by the Headquarters 11 Sig & West Midlands Brigade.

The Applicant proposes residential development (of approximately 250 dwellings) on the application site, land adjoining the MoD range. In view of the nature of live firing operations undertaken on the MoD range, and their close proximity to the application site, the MoD has significant concerns regarding the proposed development and its appropriateness for the application site. These concerns include the potential noise levels that would be experienced by the future occupants of the residential scheme proposed as a result of live firing activities being undertaken on the MoD range, as well as other national security, public safety, highway and flood risk concerns. These concerns will be explored in further detail below.

Noise

Within the DIO's consultation response dated 5th June 2015, a copy of which I enclose for your reference, the MoD requested that the Applicant submit a Noise Impact Assessment in support of his/her planning application. This request was made on the basis that such evidence would allow the Local Planning Authority to make an informed decision as to whether or not the proposed development would be acceptable from a noise point of view. In addition, this request was made to ensure that the MoD's interests in respect of the MoD range are to be protected within the Local Planning Authority's consideration of this application.

The Applicant subsequently submitted an Acoustic Consultancy Report (reference 10816 Rev E dated 1st June 2015) to the Local Planning Authority on 9th June 2015. Having been afforded an opportunity to review the document by the Local Planning Authority, the MoD identified a significant number of issues with this

report, which resulted in the MoD's position that the report was insufficient and failed to adequately address the issue of noise from the MoD range. Accordingly, the MoD requested that the application should be supported by a new Noise Impact Assessment. This was reported in the DIO's consultation response dated 24th June 2015, a copy of which I enclose for your reference.

Having engaged in further correspondence with the Local Planning Authority in late June/early July 2015, the DIO's consultation response dated 6th July 2015, a copy of which I enclose for your reference, provided additional comments by the MoD in connection with Acoustic Consultancy Report referred to above.

Since early July 2015, the Applicant has failed to submit any further information/evidence in respect of the matter of noise, which may address the MoD's concerns and aid the Local Planning Authority's consideration of this planning application. Accordingly, it is the MoD's contention that the Local Planning Authority are still not in a position whereby they can make an informed decision as to whether or not the proposed development would be acceptable from a noise point of view.

Notwithstanding the above, within the DIO's consultation responses dated 24th June 2015 and 6th July 2015, the Local Planning Authority were advised that the DIO had commissioned Amec Foster Wheeler Environmental & Infrastructure UK Limited (Amec) to undertake a detailed noise survey in and around the MoD range, and the construction and calibration of a 3D noise model, using measured results from the range, to predict potential noise receptors around the range, with particular emphasis on the application site. This work was commissioned in order to provide the Local Planning Authority with a more informed evidence base in connection with the matter of noise, and to support our extant objection to the planning application.

Amec have now completed the above piece of work and have produced a 'Noise Survey and Assessment' document (Version 05 dated 13th October 2015), a copy of which I enclose for the Local Planning Authority's reference.

I summarise the findings of Amec's 'Noise Survey and Assessment' report, below:

The noise monitoring survey undertaken by Amec on 19th – 20th August 2015 measured ambient noise levels at 3 no. monitoring locations (LT1, LT2 and LT3) along the perimeter of the MoD range, at the boundary with the application site. This survey has enabled Amec to measure ambient noise levels during and in the absence of live firing activities at the range at these locations. The results of the survey indicated that the influence of live firing activities on the range has the potential to increase measured LAeq, 15 min noise levels by almost 50 dB (decibels) at LT2 and LAmax noise levels by up to 24 dB at LT1 and LT2.

In addition, Amec measured noise levels from the live firing of a selection of weapons typically used on the MoD range to determine the respective sound power levels of each weapon. These results were then used to determine the sound power levels from the use of each weapon and to help determine the directivity of the noise. This information was then input into a 3D model of the range and surrounding area, including the indicative site layout (Concept Plan) submitted by the Applicant in support of his/her application. Whilst assumptions were made for the purposes of Amec's assessment, i.e. that the residential scheme had been built out and assumed a building height of 8.0m, these are considered to be reasonable assumptions to make. Noise levels were calculated to the 3 no. monitoring locations as well as a selection of proposed dwellings on the application site. In summary, predicted LAmaxS at a selection of the closest proposed dwellings to the range boundary are within the range 89 – 103 dB; at a selection of proposed dwellings approximately 90m from the range boundary are within the range 78 – 96 dB, while a selection of properties approximately 160m from the range boundary would experience LAmaxS of between 63 – 84 dB.

Most of the predicted noise levels were above (and in many cases significantly above) the shooting noise level identified within the Clay Target Shooting: Guidance on the Control of Noise, 2003 published by the Chartered Institute of Environmental Health. However, it is acknowledged that this guidance is not particularly relevant to an existing MoD range in the context of the Assessment undertaken by Amec.

The modelled LAmax results have been used to calculate the break in noise (internal) levels in the bedrooms of a sample of the proposed dwellings on the application site for comparison with the LAmax criterion for sleep disturbance from the World Health Organisation (WHO) Guidelines of 45 dB LAmax. The calculations indicate that internal levels within the sample of the proposed dwellings closest to the range are between 49 - 60 dB; 42 – 54 dB for the proposed dwellings approximately 90m from the range boundary and 30 – 48 dB for the proposed dwellings approximately 160m from the range boundary. This assessment demonstrates that the WHO guideline value of 45 dB LAmax is likely to be exceeded across the application site. This would indicate, therefore, that sleep disturbance could occur during the night time for the proposed dwellings.

The work undertaken by Amec would add support to the MoD's position that the issue of noise should be a significant material consideration in the Local Planning Authority's consideration of this planning application.

As previously outlined to the Local Planning Authority, it is the MoD's contention that the achievement of a satisfactory residential environment is fundamental to the acceptability of the proposed development. Therefore, unless the proposed development can incorporate the necessary mitigation measures to satisfactorily address the impact of noise from the MoD range, to an acceptable level, the principle of residential development proposed on the application site comes into question.

Section 3.0 of the Amec report outlines the relevant planning policy and guidance associated with the issue of noise. Paragraphs 109 and 123 (and references 27 and 28) of the National Planning Policy Framework (NPPF) 2012, the Noise Policy Statement for England 2010 and Planning Practice Guidance 2014 are considered pertinent and set out the national position in respect of the issue of noise, while "saved" Policies S2, DR13 (Noise) of the Herefordshire Unitary Development Plan (March 2007) and Policy RW2 (Land at Hildersley) of the emerging Herefordshire Local Plan Core Strategy 2011-31 (Pre-Submission Publication, May 2014) are equally considered pertinent, and set out the local position in respect of the issue of noise.

At present, it is the MoD's contention that the Applicant has failed to demonstrate that the issue of noise can be satisfactorily mitigated. In addition, the MoD has concerns regarding whether or not the issue of noise can indeed be satisfactorily mitigated in any case. Accordingly, it is suggested that it would not be unreasonable for the Local Planning Authority to refuse planning permission in this case.

National Security

Within the DIO's consultation response dated 5th June 2015, the MoD outlined our concerns that the proposed development could potentially create a trespass risk onto the MoD range.

Given the rural nature of the MoD site's location, the range is currently either unfenced in parts or otherwise fenced with post and wire fencing, in which case unauthorised access to the range is entirely possible. Unauthorised trespass on Crown (including MoD) land is a criminal offence. The MoD currently experience issues with trespass within the local community. This issue could potentially become more severe by virtue of the proposed development introducing additional residential properties on a site immediately adjoining the MoD range.

The MoD would, therefore, like to request that the application site be fenced off from the adjoining MoD range. It is recommended that a minimum of 2.0m high trespass resistant fence, in accordance with details that are to be submitted to and approved by the Local Planning Authority, in consultation with the MoD, be erected along the boundaries of the application site which adjoin MoD land to ensure this concern is alleviated, wherever possible.

In addition, the MoD are concerned that the proposed development may well create a security risk by virtue of the potential to overlook the MoD site (from the application site) and observe live firing activities being undertaken on the range. With regard to this concern, the indicative site 'Concept Plan', which was submitted in support of the application, would suggest that it is likely that there will be houses directly overlooking the MoD range. This would provide the inhabitants of these houses with an opportunity to overlook the range and observe operations being undertaken by military personnel. This would have severe connotations in respect to the MoD site and the nature of its operations. Accordingly, the MoD would like to be satisfied that the proposed site layout will be designed in such a way to avoid direct overlooking of the MoD site and, in any case, this is supplemented with landscaping (as necessary) to provide a screen along the boundaries of the application site, in accordance with details which are to be submitted to and approved by the Local Planning Authority, in consultation with the MoD, to ensure this concern is also alleviated.

Whilst it is appreciated that the above matters would, in normal circumstances, form part of a Reserved Matters application, assuming Outline planning permission is to be granted by the Local Planning Authority, the MoD would prefer these matters to be considered at Outline stage to ensue that the MoD's interests are fully protected.

Public Safety

Notwithstanding the above concern regarding the potential for the proposed development to create a trespass risk onto the MoD range, there are also concerns regarding the public safety of those persons which may trespass onto the Range, and the Range Danger Area.

In view of the extant position regarding the fencing of the MoD site, or lack thereof, and the risk of trespass, the MoD relies on a system of Red Flags, Warning Signs and Patrols during live firing operations to ensure members of the public are kept from harm's way.

With regard to the proposed development, it is suggested that there will be a much higher risk of the inhabitants of the proposed development scheme being either new to the Ross-on-Wye area and/or unfamiliar with the MoD range and the dangers associated with its operations, in which case the residents may inadvertently stray into the danger areas putting themselves and others at risk. If this development scheme were to be granted planning permission, the MoD would expect that the Applicant/Developer would go to great lengths to educate all prospective house buyers/occupiers of the potential dangers of the Range and the Range Danger Area, in accordance with details which are to be submitted to and approved by the Local Planning Authority, in consultation with the MoD.

Highway Matters

The MoD acknowledge that the Applicant intends on utilising an existing private lane located to the west of the Ross-on-Wye Fire Station and the residential properties on The Mead to serve the application site and the proposed development scheme. Indeed, within the planning application documentation submitted by the Applicant, this lane is identified as an 'existing footpath', which would appear to link in with the proposed footpaths (within the application site) identified in the indicative site Concept Plan, submitted in support of the Applicant's planning application.

Following a review of Herefordshire Council's online map of public rights of way, it would appear that this lane is not identified as a public right of way (public footpath). In view of this, it is understood that no public rights of access exist in which occupants of the proposed development scheme could obtain access to/from the application site via this route.

Notwithstanding the above, it is important to inform the Local Planning Authority that the MoD own a strip of land adjacent to the northern boundary of Herefordshire Council's owned land, which also adjoins the end of the private lane.

By virtue of the application site including part of this MoD land, in order to ensure the lane can be utilised to serve the proposed development, it is apparent that the Applicant will require access over MoD land. Unfortunately, the DIO can confirm that the MoD will **not** be in a position to grant any rights of access over their land.

Accordingly, it is suggested that the application site will not be suitably accessible. By virtue of not being able to utilise a secondary access, in the form of a public footpath, the site would only be served by one point of access with the primary means of access being onto the A40 highway. With regard to this access, the provision for pedestrian access along the A40 is unclear.

In view of the above, it is the MoD's contention that the application in its current form is misleading.

Notwithstanding the above, where the private lane is perhaps able to provide pedestrian access to the application site, the MoD has significant concerns regarding the potential conflict of interest between vehicles and pedestrians. The MoD have an established right to use the lane, with *"motor or other vehicles of any description"* (taken from the 1954 Conveyance). Therefore, it is the MoD's contention that the introduction of pedestrian movements along this lane would introduce a greater risk of incursion from vehicles, which in turn would result in concerns regarding the safety of the users of this lane.

Furthermore, the existing condition of this lane is currently considered to be of a substandard construction to serve as a public footpath for the proposed development scheme. If it were perhaps able to provide pedestrian access to the application site, the MoD would request that this lane be upgraded to a suitable construction to cater for pedestrians and vehicles, in accordance with details which are to be submitted to and approved by the Local Planning Authority, in consultation with the MoD.

Flood Risk

The MoD are concerned that the proposed development could result in increased surface water run-off from the application site entering into MoD land. At present, in the absence of detailed proposals for the disposal of surface water run-off, the Applicant has failed to demonstrate that the issue of flood risk can be satisfactorily mitigated.

In view of the above, the MoD wishes to reinforce its extant objection to this planning application, and in doing so respectfully request that the Local Planning Authority refuse planning permission for the proposed development.

The DIO will leave the above for the Local Planning Authority's consideration. However, should you wish to discuss the above comments further, please do not hesitate to contact me.

Furthermore, in view of the DIO submitting additional evidence in support of our objection, which will be placed on the Herefordshire Council's online planning file (on their website), it is requested that the Local Planning Authority undertake an additional round of public consultation. The undertaking of such public consultation will ensure that members of the general public are aware of this additional evidence and are afforded an opportunity to comment on it. This is especially considered pertinent given the fact that a number of objection letters received by the Council from members of the general public include concerns relating to the issue of noise. Accordingly, the DIO would like to request that the Local Planning Authority formally re-consult on the application, for a period of a minimum of 14-days albeit we believe 21-days would be more appropriate given the circumstances. The DIO will leave this matter for the Local Planning Authority to further consider.

Notwithstanding the above, the DIO believe it is important to highlight to Herefordshire Council that the DIO/MoD have recently entered into discussions with the Agent and the Applicant's Lawyers, RPS Group and Robert Davies Partnership respectively, to establish whether a way forward can be found with regard to the MoD's objection to the above planning application. These discussions are at a very early stage, and both parties are unsure whether or not such discussions will be fruitful. However, it is suggested that by virtue of the DIO/MOD's willingness to engage in further discussions with the Applicant's representatives, that this would demonstrate our proactive attempts to resolve this current impasse. Please be advised that the DIO will ensure the Local Planning Authority are updated accordingly in the future in respect of this matter.

Yours sincerely,

(Signed by email)

Jeremy Eaton MRTPI

Enc.

- DIO consultation response dated 5th June 2015;
- DIO consultation response dated 24th June 2015;
- DIO consultation response dated 6th July 2015; and
- Amec Forster Wheeler Environmental & Infrastructure UK Limited's Noise Survey & Assessment (Version 05) dated 13th October 2015.