ANC Comments on Proposed BS 8233: 2013

Section	Fill out both boxes below if you wish to propose a change	
	Comments on This Section	**Proposed Changes**
First section	The existing BS 8233 is generally good. It is thus extremely disappointing that many of the proposed changes are flawed. The change from 'code of practice' to 'guide' will be lost on most users, and requirements to 'comply with BS8233' are unlikely to be changed, for example in planning conditions.	Keep the current version or make it better – not flawed. Refer to guidance elsewhere and published Standards, stick to the code of practice form and improve where required.
2	Why is the BS EN 12354 series not a normative reference? If they are not included, this standard seeks to cover in less detail what is covered in more detail in specific standards, which is not appropriate. Especially true for BS EN 12354-1, -3, -4, and -6. Appropriate reference made in suggested comments below.	Include BS EN 12345 parts 1, 2, 3, 4, 6 as normative references
3	Terms and definitions	
3.1.10	The sound pressure level 1 m in front of the façade depends also on the façade shape as described in Annex	Use the terms from BS EN 12354-3, which supersedes the previous version of BS 8233
3.1.11	free-field level A free-field level at a location may be calculated or derived from measurements or calculations	'measured' should be removed
3.1.12	This should not refer to sources other than a standard tapping machine as per the definition in BS EN ISO 140-7. 'impact sound' may refer to footsteps or bouncing balls.	average sound pressure level in a specific frequency band in a room below a floor, when it is excited by ~~impulsive sources, such as footsteps, bouncing balls or~~ a standard tapping machine
3.1.18	This Standard is seeking to define a measurement parameter, but defining the use of the F-time weighting is only a part of the definition of the determination of the percentile level. This parameter should be defined elsewhere in more detail. Also note that although the L10 may be higher, the L90 level may be lower, so if it is maintained the following change is suggested.	"Time-weighting "F" is faster than "S" and so its use can lead to ~~higher~~ different values when rapidly changing signals are measured."
3.2	This is the only parameter in the symbol list not defined in the previous section – a definition should be included or it should be omitted	Define D if maintained
5.1	We suggest that it would be normal to consider the sound insulation of the building envelope (item e) before considering	Rearrange order

	the internal sound insulation requirements (item c).	
5.4.4	Section 5.4.4 of the draft makes the following statement, which could be misleading to those who are not experts: ”Barriers that are not complete enclosures (e.g. fences) are most effective when tall, long, sound absorbent, and close to either the source or the receiver.” The above statement may be true in a broad sense but it could give the impression that barriers should be sound absorbent to be most effective, when actually this is not always the case. We recommend the inclusion of an additional explanatory note to make it clear that making barriers sound absorbent does not necessarily have any benefit, depending on the situation. Again under section 5.4.4 the statement is made that a belt of trees less than about 30 m deep provides little extra sound attenuation. It may be of benefit to include additional information on this topic, for example to comment upon the potential effects of tree belts on the perception of noise. Also some of the HOSANNA study information may be of relevance.	Include comment making it clear that making barriers sound absorbent does not necessarily have any benefit, depending on the situation. Include additional information on the potential effects of tree belts on the perception of noise. Also some of the HOSANNA study information may be of relevance.
5.4.5.2.2	b) No reference to ventilation openings in the NOTE	*NOTE Annex A contains a method for estimating the sound insulation of a non-uniform facade comprising windows, ventilation openings and cladding.*
Table 1	Table 1 presumably relates to the sound insulation between internal spaces. It therefore should not be in a section titled “Sound insulation of building envelope”, since “envelope” refers to the external façade. Table 1 presumably is based on a specific building type (e.g. school, office, residential or hotel), which must be stated. For other types of building this table may be completely inappropriate.	State the context for this table and move it to the section dealing with that type of building.
Table 1	Table 1 implies that background noise is not a factor for determining privacy requirements, which is flawed. Table 1 should reference and coordinate with Section 7.6.6.3 & Table 11.	Incorporate guidance on the influence of background noise on privacy. Reference and coordinate with 7.6.6.3 & Table 11.
6.2	Some of the statements made in section 6 of the standard to have the potential to confuse the issues rather than provide clear guidance.	Clarify guidance

	Noise from Road Traffic (6.2) One such potentially confusing statement in the draft standard, at 6.2.1 a), is as follows: ”...traffic flow, which can vary considerably within and between days of the week; ” The above statement could lead the reader to think that such variations in traffic flow should be taken into account in noise assessments. This would not be a reasonable or realistic requirement. Similarly the following statement at 6.2.1 e) could lead the reader to think that interrupted traffic flows should be taken into account in noise assessments, when this is not possible under the UK CRTN methodology. ”. . .whether flow is continuous or interrupted.” On the subject of modelling traffic noise, the draft states that CRTN should be used but: "has been updated by additional guidance published by the Highways Agency (Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7, HD 213/11 — Revision 1)” At this juncture we note that DMRB makes reference to the DEFRA method for converting LA“, to LAeq (albeit only with respect to the night period).	Correct typo in: LAeq,16 hr = LA10, 18 hr - 2 dB. This is generally correct with a 95% con dence interval of +-2 dB for moderate and heavy traffic flows. BS 8233 could include guidance on the conditions under which the DEFRA method could be used. A statement could be made that while the DEFRA method is intended for strategic noise mapping purposes, it may be appropriate to use it as one potential method for estimating day and night period LAeq, noise levels from LA10, noise levels calculated in accordance with CRTN.
6.3	On the subject of aircraft noise the draft standard again makes the inference (under 6.3.2) that the assessor should take into account periods of more intense activity than the average or typical situation: ”That means that on a particular day, the noise exposure at a particular location might be higher than implied by the contours, and consideration should be given to designing the building envelope for those operational days.” To be able to do this properly would require that airports produce single mode noise contours (i.e. noise contours for aircraft all operating in either an easterly or westerly direction for both take off and landings). This is not currently done as contours take an aggregate operational conditions averaged over 92 days from mid-June to mid-September.	Clarify guidance

	The following statement also appears under 6.3.2: ”Where it appears that sound insulation treatment is necessary, noise exposure data should be obtained by on-site noise measurements, taking account of wind direction and runway usage. The survey duration of on-site measurements should be sufficient to take account of the various permutations of runway use that can occur, as certain flight paths might only be used under certain wind direction conditions.” This could significantly delay the production of design information if weather patterns preclude measurements in a specific direction for a period of time (for example, typically in March 2013 wind was almost exclusively from the east).	
6.5.1	the draft standard states: ”Industrial noise can originate from speci□c processes, either internal or external to buildings, or from related transport operations, such as loading/unloading vehicles or activities involving other plant such as fork lift trucl<s.” The implication is then that BS 4142 should be used to assess noise from all such sources affecting residential or mixed residential areas. We do not consider this to be appropriate in many cases where vehicle movements and loading/unloading activities are concerned. The two main reasons for this are as follows: It is our understanding that the BS 4142 methodology was developed on the basis that the noise sources under consideration are treatable (e.g. fixed plant which can be attenuated, enclosed etc). Vehicle movements do not fall into this category and it is therefore inappropriate to treat them in the same manner. The BS 4142 methodology tends to over-predict the likelihood of complaints where vehicle movements are concerned.	Clarify guidance
6.5.2	This directs us to use BS 4142 in all cases where industrial noise affects residential areas. There are situations in which it would not be appropriate.	Change wording to “the methods for rating the noise in BS 4142 can be applied”. Also make it clear that the BS4142 rating specifically provides an indication as to the likelihood of

		complaints.
6.7	The following statement under 6.7.1 is misleading unless it is modified, for example to include the term "any significant vibration”: "The hub is isolated from the tower and the blade assembly to prevent structure-borne noise occurring, which in turn prevents any vibrations being transmitted to the ground.” We again note that vibration is excluded from the scope of the draft standard and we therefore question the inclusion of the above statement of transmission of vibration from wind turbines into the ground. With regard to amplitude modulation of aerodynamic noise from wind turbines, the draft standard makes the following statement under 6.7.2 but does not specify how it should be addressed: "Excess AM can sometimes occur and should be considered. ” It does go on to make the following statement at 6.7.3: "Reliable estimates of wind turbine noise can be made using the procedures published in the Institute of Acoustics’A good practice guide to the application of ETSU-R-97 for wind turbine noise assessment (in preparation), which provides accepted methods of noise prediction. Following these procedures permits calculation of reliable noise levels at varying distances and locations for a range of operational wind speeds (typically 4 m/s to 12 m/s). ” However the July 2012 consultation document on the good practice guide to ETSU-R—97 states: "The IOA NWG has considered the available evidence in relation to "Excess" or "Other" Amplitude Modulation (AM), and awaits the conclusion of the RenewableUK study. The IOA NWC is not able at the present time to propose as current good practice methods for the prediction of AM at the Planning stage of a wind farm project, or its assessment during operation, but will keep this under review as part of the consultation.”	The hub is isolated from the tower and the blade assembly to prevent structure-borne noise occurring, which in turn prevents any significant vibrations being transmitted to the ground.” We do not consider it acceptable to include the statement that AM should be considered in BS 8233, unless specific guidance is provided on how it should be considered (with reference to other guidance as appropriate). It is not acceptable to simply make reference to guidance that concludes it is not currently possible to propose good practice methods of assessment of AM.

6.8	2dB increase in level downwind is rather a modest estimate, 5dB is more consistent with experience (and supported by CONCAWE?). Also, these approximations should be caveated and related to approximate distance ranges	Change the 2dB figure downwind increase to 5dB Change the 10dB upward decrease to '10dB or more' Indicate typical range values for these approximations (somewhere around 500-1000 m?)
6.9	The influence of 'natural noises' is understated, implying that this is an unusual phenomenon, which is not the case	Remove 'might' and replace 'could affect' with 'often affect'
7.3	The note under the first paragraph of section 7.3 refers to Tables 3, 4 and 5 of the draft standard. We suggest that those tables and their notes need to be reviewed in their entirety. In undertaking such a review it should be borne in mind that the standard is likely to be used as a point of reference by other national schemes or standards. For example BREEAM schemes are likely to make direct reference to BS 8233 and in doing so are likely to require certain recommendations therein to be met. Under such circumstances the guidance and recommendations in BS 8233 are then taken as rigid criteria which must be adhered to. While we acknowledge that the standard cannot seek to take account of all possible actions of other bodies, the likelihood of direct reference to the standard in other schemes must be remembered.	
7.3	This section treats ambient noise in open plan offices without consideration to the other acoustic performance parameters described in BS EN ISO 3382-3: 2012, which is only part of the acoustic conditions. Typically an ambient noise level of 44 dB(A) is ideal, but a 10 dB range is a little gentler on the contractor.	Include in normative references: BS EN ISO 3382-3: 2012 Acoustics - measurement of room acoustic parameters, Part 3: Open plan offices Refer to it for consideration of acoustic conditions in open plan offices. Suggest an ambient noise level limit of 40 - 50 dB(A)
7.3	Overly quiet conditions can also be a problem in dwellings and rooms for residential purposes.	Add dwellings to the list of instances in which noise masking is important
7.3	The last sentence could be used as an excuse for not properly studying the noise climate and establishing the noise level to be steady	Change "As the noise is fairly steady, it might not…" to "If it can be demonstrated that the noise is fairly steady, it might not..."
7.3	The statement " Privacy between adjacent spaces might be a concern where ambient noise levels are below 25dB Laeq,T" is flawed because the appropriate numerical value is dependent on the nature of the "receive" room. The receive room could	Replace "25dB LAeq,T" with "unnecessarily low in the appropriate frequencies".

	be a bedroom, library, open plan office etc. and the appropriate noise level varies widely. It is the level of background masking noise in the critical frequencies that matters. In most situations the critical frequencies are the speech frequencies from 500Hz to 2kHz. In our experience, when the background level at these frequencies is too low (due to absence of noise from FCU's) , the A-weighted noise level is often dictated by the level at 125Hz and 250Hz (e.g. low frequency traffic noise break-in), which provides no masking at speech frequencies. Thus LAeq is inappropriate.	
Table 3	Clarify that there is a lower limit and an upper limit by having a column for each – to avoid confusion where an upper limit is indicated as a range	Clarify that there is a lower limit and an upper limit by having a column for each – to avoid confusion where an upper limit is indicated as a range
Table 3	Residential contexts could be considered, but it would probably not be appropriate to stipulate a design range in the same way	Add a footnote along the lines "Privacy in residential settings can also be compromised by overly low ambient noise levels, but the relationship contextual and requires careful consideration"
Table 3	Although in the spaces listed in the table the privacy is from other people within the same space, privacy from adjacent rooms is also affected by the background noise level. In a meeting room/executive office with partitioning spanning from slab to slab 35 to 40dB may be appropriate. In a meeting room/cellular office with partitioning spanning from raised floor to underside of ceiling, higher ambient noise levels of 40 to 50 dB may be preferable to achieve sufficient acoustic privacy. In this case the ambient noise levels will be above the limits indicated in other sections – the users than face a choice between accepting the construction details and compromising on ambient noise levels, accepting the construction details and compromising on acoustic privacy, or undertaking remedial construction works. If privacy is important, it is likely to be more acceptable to suffer higher ambient noise levels and achieve acoustic privacy if appropriate building works are not an option.	
Table 3	Night club and Public house should not be included in this table because privacy is not a concern. If it is included it should	Delete public house or relax design range to 40 to 50dB.

	not be quieter than restaurant.	
Table 3	Ball-room should not be included in this table because privacy is not a concern. If it is included the criteria should be relaxed because at ball room occupancy levels (where occupants are standing rather than seated at tables so the mechanical services load can be very high) 40 dBA may be un-necessarily onerous.	Delete ball-room or relax design range to 40 to 55dB as per restaurants.
Table 3	Reception room is ambiguous and needs to be better defined. Many types of reception area should be not be included in a this table because privacy is not a major concern. If it is referring to a residential reception room then it should say so. If it is referring to an office reception area it should be relaxed because 35 to 40dBA in a reception having doors to a busy street and/or over door air curtains is un-necessarily onerous.	Delete reception area or define the type of reception area or relax the upper limit to 50dB (which would be perfectly acceptable in a reception area having doors to a busy street.
7.4	Noise indices Is it useful to have an "approximate" relationship between NR and dB(A)? If specifications are derived from this standard they are expressed in dB(A), and hence why quote an "approximate" NR value - the design needs to be aligned with the performance requirements. There are many more detailed criteria for assessing noise levels - would it not be better to refer to CIBSE Guide B5?	Omit approximate relationship between NR and dB(A) Refer to CIBSE Guide B5 for discussion of alternative descriptors of noise levels in rooms.
7.6.2 and Table 4	The requirement for adequate ventilation has become much more significant as buildings have become more airtight since 2006. It is essential that the ventilation conditions under which the noise levels are to be achieved is specified, in accordance with Part F of the Building Reg.s in England (and relevant parts in Scotland and Wales). The minimum provision is to achieve the stated noise limits while providing the minimum flow rates for whole house ventilation. Acceptable noise levels under intermittent extract (System 1 or 2), the minimum high rate (Systems 3 or 4) or purge ventilation (all systems) requires further research to determine appropriate conditions. See J. Harvie-Clark & M. Siddall, Proc. IOA Conference May 2013, which contains references to studies	Noise from general external (man-made) sources should be evaluated over the 8 hour night time or 16 hour daytime periods, and should align with WHO criteria. These should be achieved while at least the minimum whole dwelling ventilation rate is provided in accordance with the relevant national guidance, such as Approved Document F. The noise levels during purge ventilation may be considered, but appropriate limits are not known at the current time. Noise from building services should, as a minimum requirement, meet the default values from BS EN 15251: 2007, i.e. <=26 dB(A) in bedrooms, and <=32 dB(A) in living rooms. The percentage of annoyed people at these levels may be more than 20 %, which in turn leads to people turning down the flow rates and suffering

	and surveys in over 1000 dwellings.	the effects of inadequate ventilation. ~~If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open).~~
Table 4	External noise intrusion partially masks other sounds, such as the noise from neighbours, which may be more disturbing than the external noise. Also, the lower the criteria for external noise the greater the need for mechanical ventilation/cooling systems. Therefore, there are acoustic, sustainability and cost benefits, in avoiding overly stringent criteria. It should also be noted designs are not changed mid-façade and often not changed between facades. As a result, designing the worst case room(s) to a the existing BS8233 “reasonable” level results in the remaining rooms achieving “good” levels, whereas designing the worst case room to “good” results in the remaining rooms being too quiet. It is extremely unfortunate that WHO and a minority of local authorities fail to understand these points and ignore the widely respected guidance in the current BS8233 on what is “reasonable”. It is crucial for developers, occupants and sustainability that the guidance in the existing BS8233 is retained to help combat short-sighted counter-productive overly stringent criteria. It should also be noted that the proposed criteria are so quiet that acoustic consultants will wrongly be blamed for over-design because clients will not believe a British Standard is so flawed. Imposing criteria based on the highest Leq,1hour is flawed. This is not representative of the overall noise climate and is often unimportant or even irrelevant. For example, a slight increase in noise levels in bedrooms between 06:00 to 07:00hours is acceptable when people are naturally awakening, especially Monday to Friday, and/or their neighbours are using toilets/corridors and masking noise from road traffic can be especially beneficial. Similarly, slightly higher noise levels in living rooms during morning and evening rush hours when the majority of dwellings are unoocupied are inconsequential.	

Table 4	The proposed criterion for living/dining rooms is that the LAeq,1hour noise level does not exceed 35dB between 07:00 to 23:00 hours. This equates to around 30dB LAeq,16 hours, which is a massive 10dB more stringent than the current BS8233 advises is reasonable and around 5dB more stringent than WHO. It is clearly not necessary for a living room/dining room to be as quiet as a bedroom. It is widely accepted among acoustic consultants that an upper limit of 40dB LAeq,16 hours is reasonable for living rooms, as stated in the current BS8233. For many urban (i.e. sustainable/brown field) sites lower levels cannot be practically achieved within the design constraints (e.g. sliding doors, curtain walling, ventilation etc.). However, provided 40dBLAeq,16 hours is achieved in the worst case room the majority of rooms approach 35dB LAeq,16 hours which is ideal i.e. not too quiet.	The appropriate guidance for living rooms is that 40dB LAeq,16hours is reasonable (for worst case rooms) and 35dB LAeq,16hours is good. Therefore options include: Retain the existing guidance and ideally raise the existing figure of 30dB for good to 35dB which is in line with WHO and allows for daytime noise levels in living rooms to be 5dB higher than night-time noise levels in bedrooms – thus avoiding the need for higher performance glazing to living rooms (which is often impractical due to doors to balconies) than bedrooms (which is illogical). Alternatively, adopt the guidance proposed in the January 2001 Proposals for Amending Part E – which is the best attempt ever made on this subject.
Table 4	The proposed criterion for bedrooms is that the LAeq,1hour noise level does not exceed 30dB between 2300-0700 hours. This equates to around 25dB LAeq,8 hours, which is a massive 10dB more stringent than the current BS8233 advises is reasonable and around 5dB more stringent than WHO. It is widely accepted among acoustic consultants that an upper limit of 35dB LAeq,8 hours is reasonable for bedrooms rooms, as stated in the current BS8233. For many urban (i.e. sustainable/brown field) sites lower levels cannot be practically achieved within the design constraints. However, provided 35dBLAeq,8 hours is achieved in the worst case room the majority of rooms approach 30dB LAeq,8 hours which is ideal i.e. not too quiet.	As any acoustic consultant knows, the appropriate guidance for bedrooms is that 35dB LAeq,8hours is reasonable (for worst case rooms) and 30dB LAeq,8hours is good. Therefore options include: Retain the existing guidance and ideally raise the existing figure of 30dB for good to 35dB which is in line with WHO. Alternatively, adopt the guidance proposed in the January 2001 Proposals for Amending Part E – which is the best attempt ever made on this subject.
Table 4	The activities and location columns needs sorting. Resting occurs in a living room. Eating occurs in a dining room/area. Kitchens need not be included.	Resting occurs in a living room. Eating occurs in a dining room/area. Kitchens need not be included.
Table 4 Note 1	The Note says the recommended levels are the sum total of structure-borne and airborne noise sources. If the recommended noise levels are the sum of the noise from	Relax criteria as proposed above.

	traffic and mechanical ventilation/cooling, then the proposed criteria will be unachievable in even more situations and must be relaxed.	
Table 4 Note 2	The permitted exceptions are farcical. The levels will be unachievable in many circumstances and exceeded in millions of existing dwellings where there is acceptance of significantly higher levels without concerns.	Relax criteria as proposed above.
Table 4 Note 3	We support the proposed range because there are so many scenarios that prescriptive guidance is impossible. We therefore disagree with many of the comments made by others. In our experience, the Leq noise parameter alone is an adequate descriptor in most situations, especially for busy road traffic, whereas Lmax events are rogue by definition and difficult to design sensibly - ie which Lmax event do you use and what spectrum shape? – and the effect of different spectra means that a lower Lmax externally may have a greater impact internally. The standards for designing façade sound insulation refer to Leq noise levels, not to lmax levels – so the calculation cannot be reliable. The effect of Lmax levels internally, as a function of room absorption, is also little understood and not reliable to design for. Hence designing for Lmax levels is not desirable in general, and should only be done where designing to the Leq is not appropriate for the particular circumstances.	Note 3 should only apply where the Leq parameter is inadequate, which would not normally be the case for a busy road.
Table 4	The use of LAeq1hr makes these criteria much more onerous than they appear, and cannot be supported by any sensible analysis. A review of recent survey data shows the highest nighttime LAeq1hr is 4 to 7 dB above the 8hr value.	Revert to 16 and 8 hour periods for day and night respectively.
Table 5	For reasonable listening conditions all the examples have been deleted except for church, which is not helpful.	Re-instate other examples e.g. classroom, lecture theatre, cinema, concert hall, theatre, recording studio.
7.6.4.2	The second paragraph is welcomed as previous application of 50-55 on balconies in city centre environments has resulted in unrealistic expectation when precedent indicates acceptance at much higher levels without concerns. It may be beneficial to note that use of the spaces – including	No change, or add additional guidance as per the comments.

	which portions of the space are used may be a function of visual and acoustic privacy from others adjacent users, daylighting / sunlight and exposure to wind or rain. It is considered to be of greater amenity to have access to outdoor space that is above the 55 dB(A) noise level than to omit balconies if that limit is not achievable.	
7.6.4.3	Like it or not, bedrooms are frequently placed next to stairs and lifts. Stairs used for fire escape only should obviously be exempt.	Advise that where it is necessary to locate bedrooms adjacent to stairs or lifts precautions should be taken where practical to minimise noise transfer. Stairs used for fire escape only are obviously exempt.
7.6.4.3	There is nothing wrong with bedrooms next to stairs or lifts provided the adjacency is considered and the structure and equipment specified appropriately	State that special attention should be given to these areas, rather than always trying to avoid inevitable adjacencies.
7.6.4.5	The requirement for Rw40dB is an unnecessary duplication of Approved Document E's poorly conceived requirement that conveys no on-site resistance to airborne or structure-borne noise.	Replace with reference to ADE and hope that ADE is improved in the future or lead the way with a properly conceived recommendation and hope ADE follows.
7.6.4.5	The recommendation for sound absorbent ceilings is an unnecessary duplication of Approved Document E's poorly conceived requirement for absorptive ceilings despite ceilings being ineffective at addressing the main issue, namely footfall. The use of carpet should be encouraged by permitting it as an alternative to absorbent ceilings (as it is for hotels in the current BS8233)	Replace with reference to ADE and hope that ADE is improved in the future or lead with properly conceived guidance and hope ADE follows. The use of carpet should be encouraged by permitting it as an alternative to absorbent ceilings (as it is for hotels in the current BS8233)
7.6.5	Why is this section titled "Hotels and rooms for residential purposes" when it only applies/refers to hotels. Why do hotels warrant 3.5 pages when dwellings warrant less than 1 page? Broadly speaking we consider the section on hotels to contain far too much unnecessary information. It is our view that the standard should not be concerned with aspects that are determined by commercial considerations. We also note that the section contains standards that are more onerous than those recommended for residences.	Delete the entire section on the basis it is beyond the scope of this BS or title the section hotels or make the section appropriate for all types of hotel and rooms for residential purposes.
7.6.5.1	Section 7.6.5.1 is entitled design criteria for intrusive external noise. However subsections such as 7.6.5.1.1 then go on to set	Revise text

	out criteria for the sound insulation of internal building elements	
Table 7	The merits of a prescriptive set of criteria focusing on one type of hotel are questionable. This section should refer to the 'rooms for residential purposes' requirements which can be found in the building regulations, and identify other adjacencies which designers should consider carefully. Setting a DnTw value of 60dB as the required standard between a bar and a hotel room could range from inadequate to over-design, depending on the type of bar and likely opening times. These factors are all within the control of the hotel for whom the development is being constructed. Subject to the minimum performance required by Building Regulations, the values set out in Table 7 should reflect different hotel standards. For example some hotel brands require higher standards than building regulations for partitions separating adjacent bedrooms (e.g. Hilton 55 dB R'W and IHG 5-star 50 dB DnTw + Ctr).	Replace these overly specific standards with a reference to the building regulations and guidance on key areas which may require more careful consideration. It could also refer to the fact that different hotel operators have all developed their own brand standards for most of these areas which they have found to be acceptable to their clientele.
Table 7	This entire section is just a 'cut and paste' of the Premier Inn design criteria, contains the same flaws and ignores the requirements of a wide range of hotels and many types of rooms for residential purposes. All the important bits are a duplicate of ADE and thus unnecessary. The remainder may not be appropriate (especially in the case of a small independent hotels and most types of rooms for residential purposes) or achievable (i.e. in the case of a conversion). It's up to clients and their acousticians to determine any uplift over approved Document E – not Premier Inn! The most obvious examples of flaws are the criteria for bedroom to other tenancies (which could vary from a library to a nightclub) or plant room (which could vary from a tank room to a diesel generator) or bar (which could vary from a small boutigue bar or to a large one with load music or raucous groups watching football).	Delete the entire section, refer to Approved Document E and advise that specialist advice should be sought.
Table 7	Where hotel bedrooms have interconnecting doors it is unrealistic to maintain the room to room sound insulation	JLG to complete.

	performance within depth of the wall (as is invariably required). The reference to 7.6.5.1.2 is wrong.	
Table 7	The requirement that movable walls meet 48 dB DnT,w is unrealistic. The majority of commercially available movable walls, even when properly designed, will be limited to around 40 dB DnT,w. Remedy	Change the movable wall design to criteria to something that is practical, e.g. 40 dB DnT,w.
Table 8	Impact sound insulation recommendations (7.6.5.1.2 and Table 8) should also reflect the range of standards called for by hotel operators e.g. Hilton 50 dB L'nT,W and IHG 5-star 55 dB L'nT,W. Note that for Part E a Bathroom to Bathroom adjacency has to be designed to achieve 62 dB L',nT,W, although will not be tested.	This is hotel operator choice as for airborne sound
Table 9	This entire section is just a 'cut and paste' of the Premier Inn design criteria. It is completely flawed, as noted by others. The LAeq's given in Table 9 are far too stringent. A hotel must be less noise sensitive than a dwelling, not more. It is impossible to design within the lower and upper limits in Table 9 due to inevitable variations with time and space. Lower levels should be deleted. The music/patron noise criteria is unnecessarily stringent, unreaslistic and likely to entirely dominate the specification of the building façade in practice, resulting in internal noise levels likely to be far below the target design range given. Why should noise from building services plant serving adjacent demises be designed to NR 20 (25 dBA)? Building services noise should not be quoted in terms of L10, 1-hour.	Delete.
Table 9	The use of LAeq1hr makes these criteria much more onerous than they appear, and cannot be supported by any sensible analysis. A review of recent survey data shows the highest nighttime LAeq1hr is 4 to 7 dB above the 8hr value.	Revert to 16 and 8 hour periods for day and night respectively. Refer to the same internal levels as for dwellings. If need be, refer to the fact that some hotel operators have enhanced brand performance standards.
Table 9	The music and patron noise criteria are excessively stringent, and do not allow for the subtleties of customer expectation in	Retain the first sentence on seeking to avoid disturbance, but remove the objective test for this.

	different standards of hotel. This is not an area in which this BS needs to provide additional protection, as hoteliers are well versed in complaints, refunds and so on.	
7.6.5.1.4	Recommendations for internal noise levels from external sources, which in some cases are lower than those applying to dwellings. For hotel bedrooms different hotel operators have different standards and the British Standard should reflect the range. The following statement is made under section 7.6.5.1.4: "Noise from any building services plant serving neighbouring adjacent or connected demises should not cause noise levels to exceed NR20 L10 1 hour between 23:00-07:00 within any bedroom. ” The basis on which this is proposed is not made clear and nor is the manner in which the assessor is expected to predict such noise levels from third party equipment in terms of L10. Similarly, how can L10 noise levels in bedrooms due to neighbouring building services be measured onsite over a full hour while excluding all other noise sources? Section 7.6.5.1.5 relates to background noise levels form internal sources. Again building services noise criteria should reflect different hotel standards. For example: Travelodge NR30, Hilton/lHG5* NR 25 For en suite bathrooms Hilton recommend NR35, Travelodge NR45. In hotel restaurants Hilton recommend NR35. In a cafe type location levels up to NR45 could be appropriate.	Revise or omit section
7.6.5.1.5	This entire section is just a ‘cut and paste’ of the Premier Inn design criteria. It contains flaws as noted by others. The requirement for comfort cooling to achieve NR25 should be limited to night-time design duty i.e. set-back mode. The requirement for “even quieter” duties is unrealistic and unnecessary. Noise levels above NR25 should be permissible at normal daytime design duty (when thermal load is high) and “boost”.	Delete.
7.6.5.2	There is nothing wrong with bedrooms next to stairs or lifts provided the adjacency is considered and the structure and equipment specified appropriately	State that special attention should be given to these areas, rather than always trying to avoid inevitable adjacencies.

7.6.6	This section should be more explicit about the different acoustic challenges in open plan vs cellular offices	
7.6.6.1	There is no reference to the acoustic performance parameters in BS EN ISO 3382-3: 2012 for open plan offices, where the radius of distraction and radius of privacy may be used Detailed office acoustic design guidance can be found in the Association of Interior Specialists and British Council for Offices Guides.	Make reference to AIS Acoustic Design Guide for Offices Specialists and British Council for Offices Guides
7.6.6.2	The guidance on open plan offices concerns detailing of the space, rather than consideration of the acoustic performance parameters. See proposed text to include preceding the details on building fabric.	Noise is typically the most severe indoor environment problem in open areas, and speech is usually the most distracting source of noise. A term that describes the extent of distraction is the radius of distraction rD, measured in metres. A term that describes the extent to which speech at normal levels may be generally understood is the radius of privacy rP, / m. The terms of reference are described in ISO 3382-3, along with a description of the effect on work performance. The rD is defined, as the distance at which the speech transmission index (STI) is ≤ 0.5. The Speech Transmission Index is a measure that correlates well with the intelligibility of speech, so that lower values indicate that speech is less intelligible. Previous studies have found that distraction reduces when the STI falls below a value of 0.5, as speech which is readily intelligible is more distracting than less intelligible sounds. The rD measured in metres is a useful parameter when considering acoustic privacy in open plans areas, as a distance is a more tangible variable to conceive than a combination of acoustic descriptors. The rP, radius of privacy is defined as the distance at which the STI is ≤ 0.2. An STI value of less than 0.3 is classified as “poor” intelligibility; hence an STI ≤ 0.2 indicates that speech has very low intelligibility. The radii of distraction and privacy are functions of the rate of decay of sound within a space (i.e. a function of the physical environment), as well as the background noise level.
7.6.6.2	Standard notes that “Low and absorbent ceilings can assist in	Maintain guidance that it is more difficult to provide good

	reducing sound transmission between workstations." – i.e. omitting previous guidance on "low" and "absorbent"	acoustic conditions in open plan offices where ceilings are at more than 3 m and with less than Class A absorption coverage		
Table 11	It is the level of background masking noise in the critical frequencies that matters. In most situations the critical frequencies are the speech frequencies from 500Hz to 2kHz. In our experience, when the background level at these frequencies is too low (due to absence of noise from FCU's) , the A-weighted noise level is often dictated by the level at 125Hz and 250Hz (e.g. low frequency traffic noise break-in), which provides no masking at speech frequencies. The NR level at 125Hz and 250Hz is irrelevant.	Table 11 should be based on background noise level at speech frequencies.		
Table 11	It does not state if background noise is in terms of L90 or Leq. When assessing background masking noise the L90 level is more appropriate than the Leq.	Table 11 should be based on background L90 noise level.		
Table 11	This Table contains background noise levels in both NR and dB(A). Is this based on research that quotes both these measures of background noise? No references are cited. Having two measures is undesirable, as you may be in different categories for different measures, an indeterminate state to be avoided.	Include only one measure of the background noise, i.e. either NR or dB(A), as supported by the relevant research. Cite relevant research or reference.		
Table 11	Table 11 includes recommended levels of speech privacy. The inference is that the third row of the Table 11 (excluding header row) should apply to routine offices. This level of privacy being required would normally prohibit partitions being built from raised access floor to suspended ceiling, especially in offices with natural vent or chilled beams where background levels are very low.	Consider if implications of performance standards on building design are intended		
Table 11	The descriptions could be improved.	Average sound insulation (Dw) plus background L90 noise level at 1kHz	Description	Subjective Response
		60	No Privacy	Normal levels of speech clearly audible and intelligible
		65	Poor Privacy	Normal levels of speech

				audible and intelligible
		70	Basic Privacy	Normal levels of speech audible but not obtrusive
		75	Private	Normal levels of speech discernable but generally un-intelligible
		80	Confidential	Little or no normal levels of speech audible
Table 12	Do these distances for “reliable speech communication” relate to STI for free field propagation of sound from the talker? Is the “normal” and “raised” voices according to the ANSI standard?	Qualify the basis of the values in table 12		
7.6.10.3	Refer to BS EN 12354-6 for calculation of reverberation time, and BS EN ISO 3382 for measurements	Refer to BS EN 12354-6 for calculation of reverberation time, and BS EN ISO 3382-2 for measurement of reverb time in ordinary rooms, and BS EN ISO 3382-1 for measurements in larger rooms.		
7.6.10.3	Refer to parameters in Annex A of BS EN ISO 3382-1, such as C50, may be used to quantify speech clarity	Refer to parameters in Annex A of BS EN ISO 3382-1, such as C50, to quantify speech clarity		
Figure 1	This Figure omits the most common types of acoustic absorber utilised – mineral wool ceiling tiles	Include mineral wool ceiling tiles Clarify that the values are octave band values		
7.6.11.1	As in the hotel section, it seems perverse to have so much detail on cinemas, which are generally constructed to an exacting operator’s specification, whose commercial interests in providing an efficient effective complaint free facility have developed brand specific approaches to dealing with these issues.	Delete the cinema section		
7.6.11.1	The Scope of this BS states it does not cover specialist applications, so why does include a section on cinemas that is only applicable to multiplex cinemas and ignores other types of cinema?	Delete the entire section on the basis it is beyond the scope of this BS or title the section multiplex cinemas or make the section appropriate for all types of cinemas.		
7.6.11.1	The presented sound reduction values for walls between cinemas are excessive at low frequencies and in any event it would be better to advise performance in terms of R’ or DnT to reflect site performance. Modern commercial cinemas operate perfectly well with walls that are 450mm wide if properly specified and well constructed. Some commercial specifications require R’ values only around 40 dB at 63 Hz.	Revise or omit section		

7.6.11.1	It is not appropriate to set a criterion for building services noise in terms of NR30 LAmax,s. The reference to an A-weighted NR level must be erroneous, as must the use of Lmax,s for building services.	Set a criterion for building services noise in terms of NR30 Leq,T Lmax is the wrong parameter – change to Leq, refer to ANC guidance on measurement of noise in buildings
Table 13	It is unclear what the purpose of quoting the 'typical' sound insulation fit-out separating wall could be – the operators all have their own specifications which we must assume reflect their requirements. Different SI standards are required, for example, between digital auditoria than for analogue. This doesn't seem to add anything in terms of useful guidance.	Delete the cinema section
Table 13	These sound reduction indices presumably relate to the laboratory performance and must not be interpreted as conveying on site apparent sound reduction. A sound reduction indices of 48dB at 63Hz cannot be considered "typical" or realistic. A width of 600mm is not "typical" and neither is 500mm of insulation.	Title of table should state "Typical laboratory sound insulation performance for wall". Reduce the sound reduction indices to of 44dB at 63Hz. If these figures are intended to be on-site apparent sound reduction indices reduce by even more. Reduce width of wall to 550mm and reduce thickness of insulation to 300mm (omitted locally around beams)
7.6.11.2	As for the performance in table 13, this construction 'guidance' is too specific in the construction detail but too vague in applicability.	Delete the cinema section
8.4.22	This comment should be moved to 8.4.2.3, and edited as shown: Folding and sliding partitions generally provide about 30 dB Rw, but better performance can be achieved with careful design and installation.	Folding and sliding partitions generally provide about 30 dB R'w, but better performance can be achieved with careful design and installation.
Table 14	Surely better to refer to BS EN 12758: 2002, rather than quote a few random numbers? And refer to research for open window sound insulation.	Delete table and refer to open window research (by Napier Uni), and BS EN 12758: 2002 for glass sound insulation performance
8.4.5.4	This section is fundamentally flawed and uses incorrect terms.	Note that ventilation provision cannot be considered separately from the building envelope acoustic design strategy for achieving appropriate internal ambient noise levels. Consideration of the means of ventilation should be undertaken early in the design process, and may or may not rely on opening windows.
8.4.7	As rainfall noise can be a problem with lightweight roofs and skylights, these should be avoided in critical situations.	As rainfall noise can be a problem with lightweight roofs and skylights, these should be avoided where research indicates appropriate limits for rain noise. Rain noise is measured in the laboratory to ISO 140-18 (or has it

		been updated?), generally for the “Heavy rain” condition, which is rarely expected to occur in practice.
9.4	Refer to CIBSE Guide B for more rating systems and details	
Annex A.5	Note that for octave band levels, use the octave band level corresponding to the middle third octave band	Note that for octave band levels, use the octave band level corresponding to the middle third octave band in Table A.1
Annex A.6	This Standard should not provide overly simplistic methods for calculations that are dealt with appropriately in other Standards. This section should discuss the different methods for the simple calculation of reverberation time, e.g. Sabine, Eyring, etc, and refer to BS EN 12354-6 for the calculation.	Refer to BS EN 12354-6 for the calculation.
Figure A.1, A.2	Surely now that we all have calculators, these graphs are obsolete?	Omit graphs
Figure A.3	Surely now that we all have calculators, these graphs are obsolete?	Omit graph
Figure A.3	Ration should read Ratio	Ration should read Ratio
Annex B	This is the only place that NR levels are defined formally (although this is only an informative annex), so the definition needs to be accurate. This phrase requires clarification: The NR of the spectrum corresponds to the value of the first NR contour that is entirely above the spectrum Are the numbers to one decimal place in the Table B.1 the values to work to, or the values calculated with the equation? How many decimal places should the noise level be evaluated to? Suggested definition below.	Measured or calculated noise levels should be determined to no more than one decimal place. NR values may be determined in each octave band by the use of the equation given, rounded to the nearest single decimal place. The values at intervals of NR 5 are shown in Table B.1 for convenience. The NR level is that entirely above the spectral levels calculated. For example, if a spectrum contains a noise level of 48.6 dB at 500 Hz, the NR level would be at least NR 46.
Annex C	This section provides very confusion about laboratory and site measurements. Omit all the detail in here and refer to BS EN 12354-1 for the calculation of sound insulation between rooms, and BS EN 12354-2 for impact sound	Omit all the detail in here and refer to BS EN 12354-1 for the calculation of sound insulation between rooms, and BS EN 12354-2 for impact sound
Table C.1	Too much emphasis on Ctr, hopefully this will change in future	Include other spectral adaptation terms for completeness
Table C.2	Too much emphasis on Ctr, hopefully this will change in future	Include other spectral adaptation terms for completeness
Annex D	Special problems requiring expert advice are identified but the	In each case point out that advice should be sought from an

	expertise is not. A different level of expertise is required for a site noise survey than to design a broadcast studio.	expert who can demonstrate competence in this specific field, not all acoustics experts are the same. Members of the Association of Noise Consultants are required to provide links to the information they believe demonstrates their competence in each sub-category. www.theanc.co.uk
Table E.1A	Helpful guidance, and well-judged ranges to avoid any implication of greater level of precision than appropriate	No changes
Table E.1B	With a cut-off between the first and second categories at ADE compliance 45dB DnTw+Ctr this will be read as an OK to use constructions that may not be appropriate in combination with flanking structures etc	Add bold caveat about field performance, and margins required to ensure ADE compliance.
Annex G	It is totally inappropriate to include a "Simple calculation" which is a butchers job on the method given in BS EN 12354-3, and cannot take proper account of ventilation openings and so is fundamentally flawed and misleading.	Note that it is not appropriate to simply take the sound reduction index of an element from the incident noise, as this cannot account for ventilation openings, the area of faced elements, and the effect of the room on internal ambient noise levels. Refer to BS EN 12354-3 for the appropriate calculation method.
G.2.1	The 'more rigorous' calculation is still rather simplistic. Note 1 refers to simple façades, but it should be made clear that this is still a very basic analysis. Lay readers may get the impression that this is the full extent of the analysis involved.	Add beneath "This calculation method is based on that given in BS EN 12354-3" – and is a simplification of a full façade analysis which might be conducted by referring the assessment to an expert.
Table G.2	On the basis of the assumptions inherent in this analysis, the implied degree of precision is miseading	Add a note at the bottom of the table indicating that the expected precision of this calculation is (?) – say +-2dB ?