

3.6 Pollution

3.6.1 The planning system has an important role to play in ensuring that new and existing development does not contribute, or be put at risk from, unacceptable levels of pollution. Where possible, development should also help to improve local environmental conditions such as air quality and remediate and mitigate contaminated and unstable land. This section of the SPD provides further guidance in relation to policies on light pollution, contaminated land, noise pollution (including vibration), air quality and odour and other fugitive emissions.

Light Pollution

LOCATION:	Cambridge and South Cambridgeshire
POLICY:	<ul style="list-style-type: none">• Cambridge Local Plan (2018) Policy 34: Light Pollution Control• South Cambridgeshire Local Plan (2018) Policy SC/9: Lighting Proposals
SCALE OF DEVELOPMENT:	All development proposals including external lighting or changes to existing lighting
TYPE OF DEVELOPMENT:	Residential and Non-residential development
SUBMISSION REQUIREMENTS:	An Assessment of the Need for Lighting Lighting Impact Assessment
LINK TO THE SUSTAINABILITY CHECKLIST:	Pol.1, Pol.2, Pol.3, Pol.4, Pol.5 and Pol.6

Policy overview

3.6.2 The purpose of the Councils' light pollution policies is to ensure that all external lighting schemes are well designed, reducing the incident of light pollution in both rural and urban areas, maximising energy efficiency and ensuring public safety and perception of public safety.

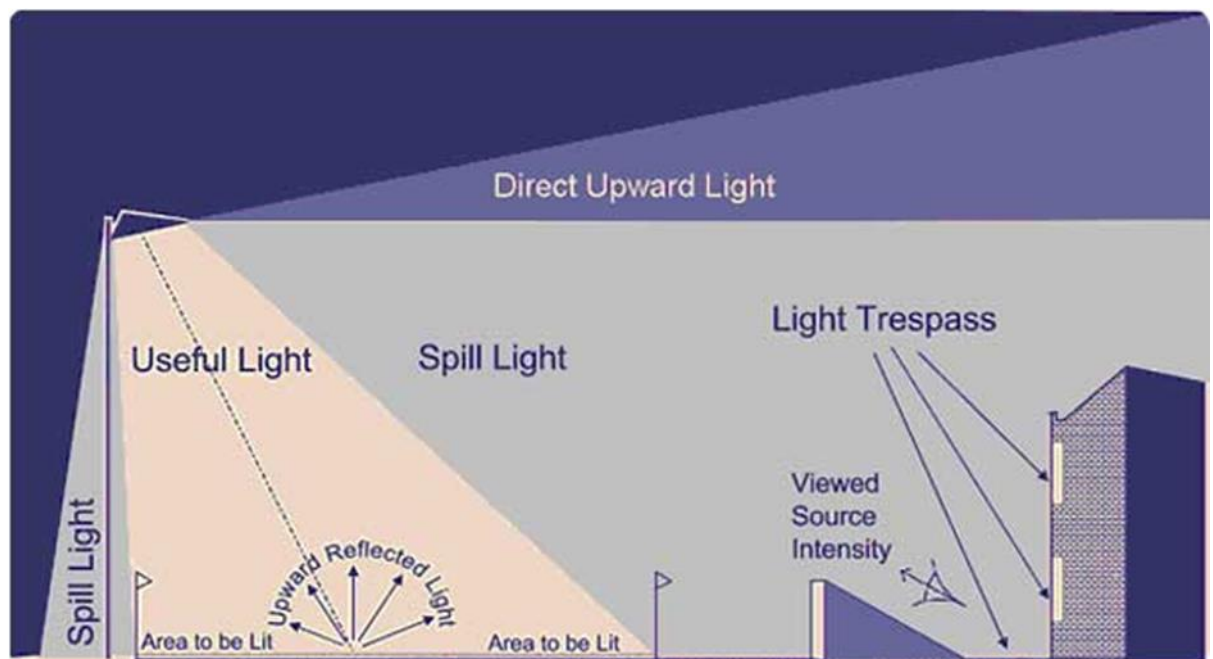
3.6.3 Light pollution is the term used to describe any adverse effect of artificial lighting and includes and can occur as:

- **Sky Glow** - upward light, the orange glow visible around urban areas resulting from the scattering of artificial light by dust particles and water droplets in the sky. Effects can be seen many miles from the polluting lights. Streetlights are the main cause of sky glow.
- **Glare** - visual source intensity, the uncomfortable brightness of a light source when viewed against a dark sky. It is light shining into the eye preventing a person from seeing the illuminated area properly. For example, an over-powerful 'security' floodlight at the wrong angle.
- **Light Trespass or Light Nuisance** - light spillage beyond the boundary of the property on which a light is located. Light is not only illuminating its target area, but also lighting another area where it is not wanted. This is most commonly found with security floodlights shining over a wide area.

3.6.4 Figure 6 below shows a number of examples of light pollution, from upward light, which produces a sky glow effect and obstructs the observation of the night sky, to light trespass into windows that is obtrusive and causes a nuisance. Under the Environmental Protection Act 1990 artificial lighting can be classified as causing a statutory nuisance in certain circumstances when 'artificial light emitted from premises so as to be prejudicial to health or a nuisance'. The cumulative effect of light pollution from a number of sources is known as 'sky glow'. The NPPF paragraph 180 c) states that planning decisions should 'limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.'

- 3.6.5 Impacts from light pollution, that good lighting design seeks to avoid, include:
- Disruption of natural habitats of a wide range of wildlife, impacting on feeding, breeding and migration patterns;
 - Unacceptable impact to local residential amenity;
 - Wastage of energy leading to an increase in energy consumption and associated carbon emissions;
 - Reduction in the visibility of the night sky.

Figure 6: Light Pollution Pattern and Effects (c) Institute of Lighting Engineers



3.6.6 Therefore it is necessary to try to find a balance between the need for lighting and the negative implications associated with it. Lighting in itself may not need planning permission but the Councils will use planning powers where appropriate to manage the effects of lighting to achieve the objective of this part of the SPD which is to reduce excessive, intrusive and unnecessary lighting in both rural and urban areas.

- 3.6.7 The local planning authority (LPA) will therefore expect that the design and layout of artificial light be considered ideally at the design stage of a scheme to prevent potential harmful effects of the development on occupiers and neighbours in terms of visual privacy, outlook and disturbance. Artificial lighting should only illuminate the intended area and not affect or affect the amenity of neighbours. By establishing the objectives of any lighting scheme and agreeing requirements and guidelines a compromise can be met to reduce the impact of any scheme and potentially save energy and expense to the Applicant/Developer.
- 3.6.8 In order to avoid adverse effects on existing businesses with levels of artificial light related to their operation, the Council will apply the 'agent of change principle' where light sensitive uses are proposed in close proximity to them. The agent of change principle identifies that the party responsible for a change should also be responsible for managing the impact of that change.
- 3.6.9 This is particularly relevant in cases where residential development is proposed near to an established sports, leisure, transport / warehouse or entertainment use. New residents moving into the new residential development, for example, have the potential to make complaints with regards to glare or light trespass which could have an impact on the future operation of the existing uses / premises.
- 3.6.10 Development sensitive to high levels of artificial light proposed near to an existing use which generate artificial light that could lead to unacceptable glare or light trespass be accompanied by a lighting impact assessment and shall include necessary measures at the design stage to mitigate the anticipated lighting effects of the existing lighting. The Council may seek to secure mitigation measures through the use of design / layout and or planning conditions if necessary. In some case mitigation may only be practicable or achievable of site at source off-site and in these circumstance S106 obligations may be required.

Will a Lighting Scheme Require Planning Permission?

- 3.6.11 Planning permission is usually required for lighting structures and equipment that is likely to substantially affect the external appearance of a building. Planning permission is not required for carrying out maintenance that affects only the interior of a building or does not materially affect its external appearance. Temporary lighting schemes also generally do not require planning permission.
- 3.6.12 Large-scale lighting installations such as the floodlighting of external recreational and sporting facilities/pitches are clearly a form of development, which comes within this statutory definition and would require planning permission. Listed building consent is required for lighting schemes if it is deemed that the character of the building would be materially affected by the lighting. Advice should be sought from the LPA prior to installation.
- 3.6.13 Examples of where planning permission is usually required include:

- illuminated advertisements, although there are some exceptions, such as those indicating medical services and some commercial advertisements on the front of business premises;
- the erection of columns to support lighting or other similar structures;
- floodlighting of external recreational and sporting facilities / pitches; and
- external lighting as part of domestic, industrial or commercial scheme.

3.6.14 Some proposals for new development, but not all, may have implications for light pollution. The Councils would advise prospective applicants to check with the planning department before installing any lighting scheme. Applicants are encouraged to submit details of lighting schemes (nature and extent), including light scatter diagrams, as part of the planning application in order to demonstrate that the proposed scheme is appropriate in terms of its purpose and setting. In so doing, the LPA aims to minimise potential pollution from glare and spillage to neighbouring properties, roads and rural areas.

3.6.15 For further information on land uses/developments with general lighting advice and requirements please see Appendix 6.

Submission requirements

3.6.16 A number of factors will be taken into consideration when determining of planning applications for proposals that include lighting. These are:

1. An assessment of the need for lighting;
2. The location of the proposal in relation to neighbouring uses

3.6.17 For all lighting proposals, the applicant should identify the purpose and use of the lights, the potential users of the lighting scheme (e.g. for recreation facilities) and the hours the lights will be in operation (summer-time and winter-time). The hours of operation will be expected to be kept to a working minimum and applicants should demonstrate this in their application. Keeping the use of the lighting to a minimum will reduce the impact the lighting may have on the environment.

The Design of the Lighting Proposed (General lighting requirements)

3.6.18 To achieve the necessary minimisation of obtrusive light the applicant should adhere to the following general principles taken from the Institute of Lighting Professionals, Guidance Notes for the Reduction of Obtrusive Light, GN01: 2011.

- i. Lighting is to be directed downwards wherever possible to illuminate its target. If there is no alternative to up lighting, then the use of shields and baffles will help reduce spill light to a minimum. Up lighting is a particularly bad form of obtrusive light and contributes to sky glow;
- ii. Lighting is to be designed so as to minimise the spread of light near to, or above the horizontal. Again any light that shines above the horizontal line of the light adds to the sky glow effect;
- iii. Lighting should be designed to the correct standard for the task and should not over light. 'Over' lighting is a cause of obtrusive light and also represents a waste of money and energy;

- iv. The main beam angle of all lights proposed directed towards any potential observer is kept below 70 degrees. It should be noted that the higher the mounting height, the lower the main beam angle could be. This will help reduce the effect of glare and light spill on neighbouring dwellings, passing motorists, pedestrians, etc.;
- v. Lighting should be directed to minimise and preferably avoid light spillage onto neighbouring properties;
- vi. Wherever possible use floodlights with asymmetric beams that permit the front glazing to be kept at or near parallel to the surface being lit;
- vii. The lights used should be the most efficient taking into account cost, energy use, colour rendering and the purpose of the lighting scheme required. All lighting schemes should meet British Standards.
- viii. Good design, correct installation and ongoing maintenance are essential to the effectiveness of lighting schemes.

3.6.19 Artificial lighting should be sited in the most appropriate locations to cause minimal disturbance to occupiers and wildlife, while still illuminating the intended area. This includes considering any occupiers located above the lighting source.

3.6.20 Consideration should be given to lighting associated with buildings of special historic and architectural interest in order to protect their special interest and that of the wider area. This applies both to the lighting of such buildings and the impact of the lighting installation when seen by day.

3.6.21 Artificial lighting on and off site shall meet the Obtrusive Light Limitations for Exterior Lighting Installations for an appropriate Environmental Zone as set out in table 3.8 below. Any mitigation measures to reduce and contain potential artificial light spill (light intrusion into windows) and glare (luminaire intensity – viewed source intensity) as appropriate shall be detailed.

Table 3.8: Obtrusive light limitations for exterior lighting installations (taken from the Institute of Lighting Professionals - Guidance Notes for the Reduction of Obtrusive Light - GN01:2011)

Obtrusive Light Limitations for Exterior Lighting Installations – General Observers						
Environmental Zone	Sky Glow ULR [Max %](1)	Light Intrusion (into Windows) Ev [lux]		Luminaire Intensity I [candelas] (3)		Building Luminance Pre-curfew Average, L [cd/m2]
		Pre- curfew	Post- curfew	Pre- curfew	Post- curfew	
E1: Natural - Intrinsically dark	0	2	0 (1*)	2,500	0	0
National Parks,						

Areas of Outstanding Natural Beauty etc.						
E2: Rural - Low district brightness	2.5	5	1	7,500	500	5
Village or relatively dark outer suburban locations						
E3: Suburban - Medium district brightness	5.0	10	2	10,000	1,000	10
Small town centres or suburban locations						
E4: Urban- High district brightness	15	25	5	25,000	2,500	25
Town/city centres with high levels of night-time activity						

ULR = Upward Light Ratio of the Installation - is the maximum permitted percentage of luminaire flux that goes directly into the sky.

Ev = Vertical Illuminance in Lux - measured flat on the glazing at the centre of the window.

I = Light Intensity in Candelas (cd)

L = Luminance in Candelas per Square Metre (cd/m²)

Curfew = the time after which stricter requirements (for the control of obtrusive light) will apply 10pm to 7am

* = Permitted only from Public road lighting installations

3.6.22 Applicants are encouraged to submitted full lighting design details at the application stage if possible. The level of information should be proportionate to the degree of lighting proposed. However, it is acknowledged that lighting is often a detailed design matter and in many circumstances may not have been finalised for all applications at the submission stage.

3.6.23 As lighting design and levels is a relatively precise engineering discipline, when lighting is low to medium level and there is confidence that acceptable lighting levels can be secured a condition will be imposed requiring that prior to the installation of any lighting an artificial lighting scheme or details will be submitted in writing for approval by the LPA.

3.6.24 For specific lighting schemes or with large-scale substantial artificial lighting installations such as the floodlighting of external recreational and sporting facilities/pitches or transport interchanges, the application should be accompanied by that information normally required for any other planning proposal and additionally the information set out below:

- A statement setting out why a lighting scheme is required, the proposed users, and the frequency and length of use in terms of hours of illumination;
- A site survey showing the area to be lit relative to the surrounding area, the existing landscape features together with proposed landscaping features to mitigate the impacts of the proposed lighting;
- The design details of lights and associated infrastructure, including:
 - the number of lights;
 - details of the make and catalogue number of any luminaires/floodlights - lighting levels, lux and lumen details, lamp types, wattage;
 - plans showing the area to be lit and the layout of lights, including orientation of beams of light;
 - the height of lighting columns;
 - the mounting location, height and orientation of the luminaires/floodlights specified;
 - control systems including types and location of sensors, times lighting will be on; and
 - the need for the lighting, that is, an explanation of what activity the lighting is supporting.
- A technical report prepared by a qualified Lighting Engineer or lighting company setting out the type of lights, performance, height and spacing of lighting columns. Modelled light levels (vertical and horizontal isolux contours) to be achieved over the intended area, at the site boundaries and, for large schemes, 50m outside of the boundary of the site should be superimposed on a plan / map of the site and its surrounding area. Glare luminaire intensity (viewed source intensity at the direction of receptor) calculations should also be included.

3.6.25 For further technical advice regarding sports floodlighting, guidance can be obtained from Sport England's 'Design Guidance Note Artificial Sports Lighting - Updated guidance for 2012' and also the Chartered Institute of Building Services Engineers (CIBSE) 'Lighting Guide 04: Sports Lighting - LG4'. In coming to a decision on the merits of a particular proposal, the Council will take into account the use of the facility and the likely benefits to the general public. Consideration will be given to the relationship between the use of the facility and the interests of conservation, amenity and safety. Where the impact of a proposal is considered to be unacceptable or cannot be mitigated through ameliorative measures, the protection of those recognised interests will prevail.

- 3.6.26 Any proposal for the display of illuminated advertisements should be accompanied by that information normally required for any other planning proposal and additionally the information set out below:
- Details of the proposed location, positioning and dimensions of the sign face;
 - The sign face maximum luminance in candelas per square metres;
 - The number, size and type of light sources and details of the sign face materials;
 - The type of illumination – internal or external; static or intermittent;
- 3.6.27 For certain major and Environmental Impact Assessment (EIA) development outline or full planning applications and in particular where lighting has the potential to have a significant adverse impact, a more detailed **lighting impact assessment** or strategy may be required at the determination stage. If this is the case the lighting impact assessment or strategy should be undertaken having regard to and in accordance with the Institute of Lighting Professionals 'PLG04 - Guidance on Undertaking Environmental Lighting Impact Assessments'.
- 3.6.28 Such applications can be provided with different levels of design detail. Typically there are three stages:
1. Preliminary investigation: without specific lighting design or levels
 2. Provisional design: indicative design meeting task lighting requirements and standards
 3. Final design: with full details and calculation data – isolux contours
- 3.6.29 The preliminary investigation will typically link into an outline planning application, having only general proposals for potential layouts of roads and buildings and so on. It is not possible, therefore, to undertake any actual lighting design, nor assess this fully. The preliminary and final site designs will require the appropriate lighting components to be developed and evaluated.
- 3.6.30 For each of the three planning stages listed in paragraph 3.6.28, the lighting assessment should generally follow the sequence set out below, which in turn follows the structure set out for the overall EIA:
- Background - Site description, in short form
 - Method of assessment, site visit and evaluation procedures
 - Consideration of national and local planning policy, legislation and industry standards /best practice technical guidance
 - Baseline assessment- what exists prior to any development and its visual impact
 - Environmental zone appropriate for the area, viewpoints
 - Proposed development – nature of the associated lighting proposals and designs
 - Residual effects – what changes in the lit scene are expected (good and bad) and significance of effects. They will include such elements as:
 - Illumination of roads and accesses, parking areas, buildings and so on
 - Spill light
 - Source intensity
 - Light presence
 - Effects on wildlife and so on
 - Potential mitigation – what is proposed to eliminate or limit lighting problems

- Mitigation strategies should be an inherent part of a professional lighting design. The formulation of a design approach for the development should therefore naturally involve both achieving the target lighting values and limiting spill light, in addition to minimising glare and light presence.
- Conclusions – including identification of any aspects / areas where there is a lack of information at the time of the report
- Appendices

3.6.31 PLG04 focuses on the lighting assessment aspects of such development applications in a holistic way. While most of the impacts are effects on people and their perception of the surroundings, assessments must also include impact on wildlife. This may involve consultation with specialists producing the ecological sections of the EIA and with the Council's Ecologists.

The role of planning conditions

3.6.32 Where planning conditions are used to secure the submission of a detailed lighting scheme and control lighting levels, these conditions may require:

- Compliance with an acceptable artificial lighting scheme design that has been submitted;
- Approval of a detailed lighting scheme, requiring light levels to be in accordance with obtrusive light limitations for exterior lighting installations;
- Limiting the time of use of the lighting: Lighting schemes could be turned off when not needed ('part-night lighting') to reduce any potential adverse effects e.g. when a business is closed or, in outdoor areas, switching-off at more sensitive night times between 10 or 11pm and 7am or 8am;
- Limiting the light levels to a designed uniformity;
- Limiting the use of lighting schemes to identified uses or users;
- Specifying lamps, luminaires and columns;
- Specifying the need for full horizontal cut-off;
- The design, height and position/angle of the lighting;
- The retention of screening vegetation;
- The use of planting and bunding to contain lighting effects;
- The future maintenance of the lighting schemes and post-installation compliance checks in accordance with the original design and planning approval;
- In exceptional circumstances, the granting of temporary planning permission to enable a review of lighting impacts after installation.
- It may be necessary to condition a planning approval to allow the LPA to monitor the development and enforce the condition if necessary.

3.6.33 For single householder and other minor applications with relatively low level lighting conditions may simply require approval of the location, height and position/angle of the lighting luminaire model / type to be installed.

3.6.34 For applications with a higher degree of lighting it is likely that a condition will be imposed to require that prior to the installation of any artificial lighting an external and internal artificial lighting scheme with detailed impact assessment shall be submitted to

and approved in writing by the local planning authority. The scheme shall include details of any artificial lighting of the site (external and internal building lighting) and an artificial lighting impact assessment with predicted lighting levels at proposed and existing residential properties shall be undertaken (including horizontal / vertical isolux contour light levels and calculated glare levels).

3.6.35 Modelling software can be used for the planning, calculation, modelling and visualisation of outdoor lighting based on the project's architectural drawings. A common software assessment technique that the Council would recommend the use of is the "outdoor site lighting performance (OSP) method" which is a comprehensive method for predicting and measuring three different aspects of light pollution: glow, trespass and glare.

Further guidance

3.6.36 For further guidance on designing lighting proposals please see:

- Institute of Lighting Professionals, Guidance Notes for the Reduction of Obtrusive Light, GN01: 2011. Available online at: <https://www.theilp.org.uk/documents/obtrusive-light/>
- Professional Lighting Guide - PLG04: Guidance on Undertaking Environmental Lighting Impact Assessments. For further information please see: <https://www.theilp.org.uk/resources/ilp-general-reports/plg04/>
- BRE Digest 529 - Obtrusive light from proposed developments, BRE 2013. For further information please see: <https://www.brebookshop.com/details.jsp?id=327145>
- BS EN 12464-2:2014- Light and lighting. Lighting of work places. Outdoor work places. Available from BSI: <https://shop.bsigroup.com/>
- Guide on the limitation of the effects of obtrusive light from outdoor lighting installations. Vienna, Commission Internationale de l'Eclairage (CIE 150 -2003, International Commission on Illumination).
- PLG 05: Brightness of Illuminated. For further information please see: Advertisements. For further information please see: <https://www.theilp.org.uk/resources/ilp-general-reports/plg05-the-brightness-of-illuminated-advertisements/>
- Guidance Note 8/18 Bats and artificial lighting (ILP, 12 September 2018). Available online at: <https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>
- Sport England's Design Guidance Note Artificial Sports Lighting - Updated guidance for 2012. Available online at: <https://www.sportengland.org/facilities-planning/design-and-cost-guidance/artificial-sports-facilities/>
- CIBSE - Lighting Guide 04: Sports Lighting - LG4 and other guides and publications. For further information please see: <https://www.cibse.org/Society-of-Light-and-Lighting-SLL/Lighting-Publications>

Contaminated Land

LOCATION:	Cambridge and South Cambridgeshire
POLICY:	<ul style="list-style-type: none">• Cambridge Local Plan (2018) Policy 33: Contaminated Land• South Cambridgeshire Local Plan (2018) Policy SC/11: Contaminated Land
SCALE OF DEVELOPMENT:	All major development and any development proposals on land subject to contamination or land that is suspected to be contaminated
TYPE OF DEVELOPMENT:	Residential and Non-residential development
SUBMISSION REQUIREMENTS:	Contaminated Land Assessment
LINK TO THE SUSTAINABILITY CHECKLIST:	Pol.7

Policy overview

3.6.37 Land contamination is a material consideration for the purposes of planning. Developers are responsible for ensuring that a proposed development will be safe and 'suitable for use' for the purposes for which it is intended. A **Contaminated Land Assessment** is required for all major developments as well as any development where there has been a previous potentially contaminative use.

3.6.38 The contaminated land regime in Part IIA of the Environmental Protection Act 1990 was introduced specifically to address the historical legacy of land contamination. It focuses on the identification and remediation of land which is in such a condition by reason of contamination that it gives rise to significant harm or the significant possibility of significant harm to certain named receptors, or gives rise to pollution of controlled waters or the likelihood of such pollution. It applies where there is unacceptable risk, assessed on the basis of the current use (including any use that already has the benefit of planning permission but might not yet be implemented, including development permitted under the General Permitted Development Order) and the relevant circumstances of the land.

3.6.39 The Part IIA regime extends to natural contamination, that is, naturally occurring substances in the ground that might pose a risk to the receptor. In the context of Cambridge and South Cambridgeshire this is usually limited to carbon dioxide, which is frequently found above the chalk.

Submission requirements

3.6.40 A phased approach to site investigation and risk assessment is required to ensure that resources are targeted to the areas most likely to be contaminated. Not all sites will require all of these phases to be carried out. A general overview of submission requirements is presented below, with further and more detailed guidance provided in Appendix 7, which incorporates the Joint Cambridge City Council and South

Cambridgeshire District Council Developers Guide to Contaminated Land. Early consultation with the LPA is recommended to ensure that site investigation strategies and remediation proposals are acceptable.

3.6.41 To summarise, the submission requirements related to contaminated land are as follows:

- The contaminated land assessment must include a desk study and must be submitted to the LPA for approval. The desk study must detail the history of the site's past land use and must propose a site investigation strategy based on the information presented by the desk study. This strategy must be approved by the LPA prior to investigations commencing on-site.
- The site investigation, including all of the relevant and necessary soil, gas, and water (surface and groundwater) sampling, must be carried out by a competent person with the relevant qualifications, accreditation, and experience in accordance with a quality assured sampling and analysis methodology.
- A site investigation report detailing all of the investigative works and sampling, together with the results of all analyses, risk assessment to relevant receptors, and a proposed remediation strategy must be submitted to the LPA. The LPA will approve the remediation works as required prior to any remedial work commencing on-site. The works must be of such a nature as to render harmless the identified contamination with respect to the proposed end use and the surrounding environment (including controlled waters).
- The approved remediation works must be carried out in full under a quality assurance scheme in order to demonstrate compliance with the approved methodology and current best practice.
- If during the works contamination is encountered which has not previously been identified then all site works must cease immediately and the LPA notified as soon as possible. The newly discovered contamination must be fully assessed and a remediation scheme agreed with the LPA. Site work can only restart with the consent of the LPA.
- Upon completion of the works a closure report must be submitted to the LPA for approval. The closure report must include full details of the remediation works undertaken and must include all relevant quality assurance certificates to show that the works have been carried out as agreed with the LPA. Details of any post-remediation sampling and analysis must be included in the closure report together with the necessary documentation detailing what waste materials have been removed off-site.

Further guidance

3.6.42 Please note that this list is a summary list only of the key guidance documents that are available.

- British Standards Institution (2011) Investigation of Potentially Contaminated Sites, Code of Practice, BS: 10175:2011
- British Standards Institution (2010) Amendment 2: Code of Practice for Site Investigation, BS5930:1999+
- British Standards Institution (2007) Specification for Topsoil and Requirements for Use, Code of Practice, BS: 3882:2007

- British Standards Institution (2002) Soil quality. Sampling. Guidance on sampling techniques, Code of Practice, BS: 10381:2002
- Chartered Institute for Environmental Health (2008), The Local Authority Guide to Ground Gas
- CIRIA Report C665 (2007) Assessing Risks Posed by Hazardous Ground Gases to Buildings
- CIRIA Report C685 (2009) The VOCs Handbook
- CL:AIRE and Chartered Institute for Environmental Health (2008) Guidance on Comparing Soil Contamination Data with a Critical Concentration
- CL:AIRE (2011) Definition of Waste: Development Industry Code of Practice
- Department of the Environment (1989) Waste Management Paper No 27, Landfill Gas
- Department of the Environment (1995) Industry Profiles
- Environment Agency (2010) Guiding Principles for Land Contamination
- Environment Agency (2004) Model Procedures for the Management of Land Contamination (CLR 11)
- Environment Agency (2006) Remedial Targets Methodology, Hydrogeological Risk Assessment for Land Contamination
- Environment Agency (2010) Petroleum Hydrocarbons in Groundwater: Supplementary Guidance for Hydrogeological Risk Assessment
- Environment Agency (2002) Technical Advice to Third Parties on Pollution of Controlled Waters for Part IIA EPA 1990
- Environment Agency (2005) Science Report P5-080/TR3, The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons for Soil
- Environment Agency (2003) MCERTS Performance Standard for Laboratories Undertaking Chemical Testing of Soil
- Environment Agency (2009) Science Report SC050021/SR2, Human Health Toxicological Assessment of Contaminants in Soil, Background to the CLEA Model
- Environment Agency (2009) Science Report SC050021/SR3, Updated
- Environment Agency (2009) CLEA Software Handbook version 1.04
- Environment Agency, National House Building Council and Chartered Institute for Environmental Health (2008) Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D Publication 66:2008
- Health and Safety Executive (1991) Protection of Workers and the General Public during the Development of Contaminated Land
- Raybould JG, Rowan DL and Barry DL, 1995, CIRIA Report C150, Methane Investigation Strategies
- Welsh Assembly Government (2006) Statutory Guidance on Contaminated Land
- Welsh Local Government Association (2012) Requirements for Chemical Testing of Imported Materials for Various End Uses
- Wilson S, Oliver S, Mallett H, Hutchings H and Card G, 2007, CIRIA Report C665, Assessing Risks Posed by Hazardous Ground Gases to Buildings

Noise Pollution (including vibration)

LOCATION:	Cambridge and South Cambridgeshire
POLICY:	<ul style="list-style-type: none">• Cambridge Local Plan (2018) Policy 35: Protection of human health and quality of life from noise and vibration• South Cambridgeshire Local Plan (2018) Policy SC/10: Noise Pollution
SCALE OF DEVELOPMENT:	All noise sensitive and noise generating developments
TYPE OF DEVELOPMENT:	Residential and Non-residential development
SUBMISSION REQUIREMENTS:	Noise Impact Assessment or Acoustic Assessment/Report with an Acoustic Design Statement where required
LINK TO THE SUSTAINABILITY CHECKLIST:	Pol.8, Pol.9, Pol.10, Pol.11, Pol.12, Pol.13 and Pol.14

Policy overview

- 3.6.43 Noise in society is defined as unwanted sound, which is unpleasant and causes disturbance/annoyance. It is an unavoidable part of everyday life and is commonly caused by environmental noise originating from various sources including transportation (road traffic, railway and aircraft), leisure/recreational and industrial, trade/commercial and business premises.
- 3.6.44 Noise can have a significant effect on the environment, human health and wellbeing including sleep disturbance, the amenity/quality of life experienced and enjoyed by individuals and communities and the utility of noise sensitive land uses. Consequently, noise can be a material planning consideration when new developments have the potential to create noise and when new developments would be sensitive to the existing noise conditions. Noise within the living and working environment is a key aspect of sustainable development.
- 3.6.45 The planning process is the primary mechanism for local authorities to prevent serious conflicts between different land uses. Many developments can generate significant amounts of noise or are sensitive to the impact of noise. It is the responsibility of LPAs to ensure that developments are appropriately located and designed so that they do not have an unacceptable impact on local communities and that noise sensitive developments are not subjected to unacceptably high levels of noise.
- 3.6.46 It is important that good acoustic design is considered at an early stage in the development management process. This guidance is intended to help protect occupiers of new or existing noise sensitive buildings from existing or introduced noise sources respectively and to seek to protect and improve the residential amenity of the area overall. It is government policy that noise should not be considered in isolation or separately from the economic, social and other environmental dimensions of proposed development.

- 3.6.47 Appendix 8, Annex A summarises the types of development and instances when an **acoustic assessment/report** is likely to be required for both (i) New Noise Sensitive Development (NSD) and (ii) Noise Generating Development (NGD). Appendix 8, Annex B details what a typical report should include and where details of acoustic consultants (Suitably Qualified and Competent Persons) may be obtained from.
- 3.6.48 NPPF policies are supplemented by additional advice contained in the NPPG. The NPPG does not provide numerical values for the different noise effect levels, instead recognising that ‘the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation’.
- 3.6.49 It therefore remains for local authorities to consider the NPPG noise exposure hierarchy and seek to align it with significance criteria, having regard to national and industry standards, codes of practice and best practice technical guidance such as British Standards, World Health Organisation guidance and other relevant sources of information.
- 3.6.50 The long term vision and aims of the Government’s policy on noise is contained in the Noise Policy Statement for England (NPSE) (March 2010) which is 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”. With regard to acoustic design and noise control, the NPPF provides a set of overarching aims and broad principles for the consideration of noise (and vibration) in accordance with the NPSE to be applied in the planning process as follows:
- Avoid significant adverse effects of noise on people living and working in the LPAs;
 - Mitigate and reduce to a minimum the adverse effects of noise within the context of sustainable development;
 - Prevent development which is unacceptable in terms of noise
 - Encourage good acoustic design as far as is reasonably practical;
 - Improve living and working conditions where the acoustic environment already has a significant adverse effect on people’s quality of life; and
 - Improve and enhance the acoustic environment and promote soundscapes that are appropriate for the local context, including the promotion of a vibrant acoustic environment where this is appropriate and the protection of relative tranquillity and quietness which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason, and are valued.
- 3.6.51 The NPSE and NPPG uses the following ‘noise exposure observed effect level’ terms when determining the significance of any noise impact - NOEL, LOAEL and SOAEL:
- **NOEL – No Observed Effect Level:** The level of noise exposure below which no effect can be detected. In simple terms, no effect on health and quality of life detectable due to noise.
 - **LOAEL – Lowest Observed Adverse Effect Level:** The level of noise exposure above which adverse effects on health and quality of life can be detected.
 - **SOAEL - Significant Observed Adverse Effect Level:** The level of noise exposure above which significant adverse effects on health and quality of life occur.

3.6.52 In terms of planning, increasing noise exposure results in a corresponding increasing 'observed effect level' and the likely planning actions and outcomes of these, based on the likely average response are explained in detail in NPPG and are summarised in table 3.9 'Noise Exposure Effect Level Hierarchy' below.

Table 3.9: - Noise Exposure Level Hierarchy (NOELs, LOAELs, SOAELs and Unacceptable Adverse Effect)

Perception	Examples of effects / outcomes	Increasing effect level	Planning Action
No Effect			
Not noticeable	No Effect	No Observed Effect	No specific measures required
No Observed Effect Level (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
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 Adverse Effect	Prevent

3.6.53 In determining whether noise is a material planning consideration the LPA will take account of the impact and effect on the acoustic environment and quality of life and in doing so will require that developments aim for:

1. A noise level between the **No Observed Effect Level (NOEL)** - this is the level of noise exposure below which no effect at all on health or quality of life can be detected) and the **Lowest Observed Adverse Effect Level (LOAEL)** - this is the level of noise exposure above which adverse effects on health and quality of life can be detected). Conditions may be attached.

If 1 cannot be achieved then:

2. If the assessment results in a level between the **Lowest Observed Adverse Effect Level** and the **Significant Observed Adverse Effect Level (SOAEL)** - this is the level of noise exposure above which significant adverse effects on health and quality of life occur), mitigation will be necessary to reduce to a minimum the adverse effects of noise and therefore conditions will be attached.

If 1 and 2 cannot be achieved then:

3. If the assessment results in a **Significant Observed Adverse Effect Level (SOAEL)** after mitigation, it is likely that the application will be recommended for refusal.

3.6.54 In summary following the SPD guidance will lead to the choice of one of four possible planning recommendations regarding the acoustic acceptability of the development proposal, as follows:

Planning Outcome

- A. Planning consent may be granted without any need for noise conditions - where a potential residential development site poses no or a negligible risk from a noise perspective, the GCPS will typically not require any specific measures (“**Grant Consent - No Objection on Noise Grounds**”);
- B. Planning consent may be granted subject to the inclusion of suitable noise conditions in order to mitigate and reduce to a minimum the adverse effects of noise for example to address specific acoustic design aspects of a particular site or require a noise insulation scheme (“**Grant Consent - No Objection – Minimise Noise**”);
- C. Planning consent should be refused on noise grounds in order to avoid significant adverse effects of noise (“**Refusal / Object - Avoid on Noise Grounds**”);
- D. Planning consent should be refused on noise grounds in order to prevent unacceptable adverse effects of noise (“**Refusal / Object - Prevent on Noise Grounds**”).

Existing Business and Agent of Change Principle

- 3.6.55 Existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because future noise sensitive uses are subsequently permitted (including by a change of use) and where people may object to the inevitable noise that is produced.
- 3.6.56 This is particularly important for existing industrial, trade/commercial or business premises that generate noise, where the introduction of noise sensitive receptors such as residential premises could result in complaints from future occupiers, which could be considered a statutory noise nuisance under the Environmental Protection Act 1990. If a statutory nuisance was ever witnessed as a result of the introduction of new residents being exposed to unacceptable noise from commercial activities/plant, the local authority would have a duty to serve a legal notice on the offending premises responsible for any statutory noise nuisance, requiring abatement. If abatement works or restrictions were required this may result in unreasonable restrictions being placed on the existing business and/or substantial abatement of the noise adding to the costs and administrative burdens.
- 3.6.57 In order that existing businesses do not have unreasonable restrictions put onto them because of changes in nearby land uses, the LPA will apply the ‘agent of change’ principle which identifies the person or business responsible for the change is also responsible for managing the impact of the change.
- 3.6.58 It is important to note that the statutory nuisance regime is not intended to secure a high level of amenity but is a basic safeguarding standard intended to deal with excessive emissions. Nuisance does not equate to loss of amenity/quality of life. Significant loss of amenity will often occur at lower levels of emission than would constitute a statutory nuisance. It is therefore important for planning authorities to consider properly, loss of amenity from emissions in the planning process in its wider context and not just from the narrow perspective of statutory nuisance. Where statutory nuisance arises from commercial or industrial uses, the defence of best practicable means is also available together with reasonable excuse. Thus, it follows that a LA may not be able to require the

complete abatement of a statutory nuisance. Broader amenity issues therefore need to be considered under the planning regime when considering individual applications.

- 3.6.59 The LPA will therefore expect proposed new noise sensitive developments to follow good acoustic design principles and to incorporate adequate mitigation measures and to work with existing businesses to ensure appropriate acoustic standards in the new developments and to ensure a statutory noise nuisance does not arise.
- 3.6.60 In certain exceptional circumstances if significant and unacceptable adverse noise impacts cannot be avoided on noise sensitive development sites as a result of existing industrial commercial or business noise sources off-site and relating to land not in control of the applicant then a Grampian condition or S106 agreement may be required with a third party for mitigation measures to reduce these noise sources to an acceptable level. This may allow delivery of otherwise unacceptable development. However, this approach is only likely to be acceptable where there is a reasonable degree of certainty and prospect of securing and delivering between all parties concerned.

Submission requirements: Noise Sensitive Development (NSD)

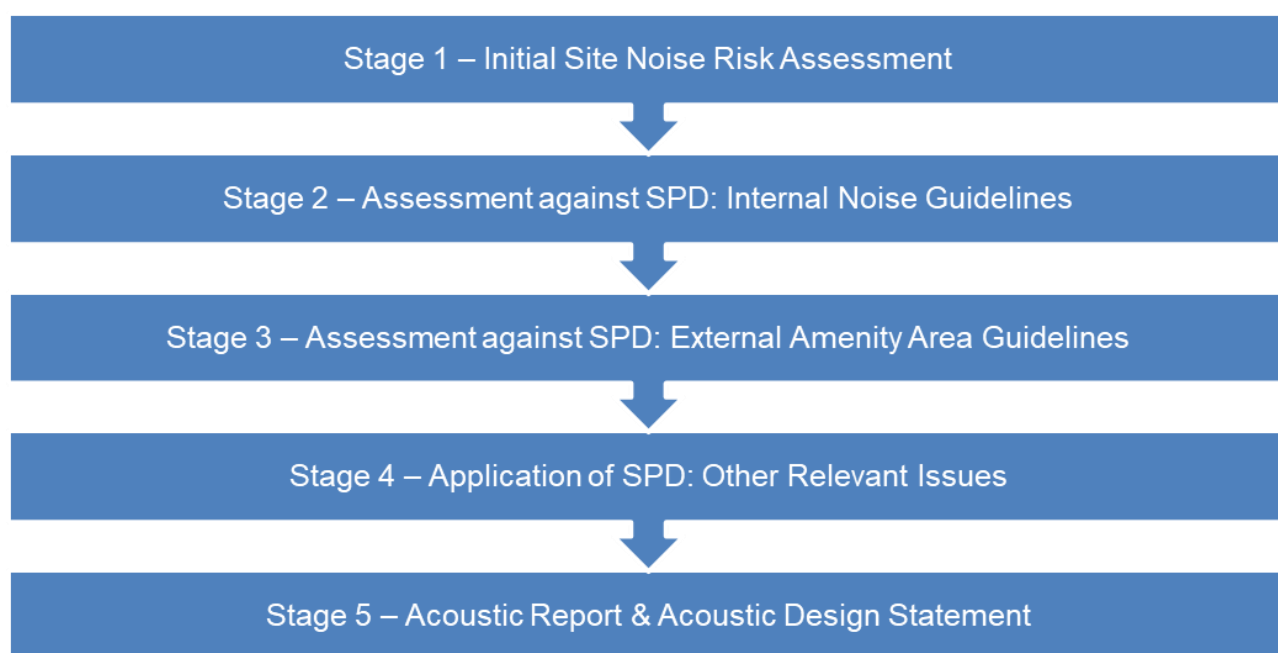
- 3.6.61 This includes any proposed NSD located in a noisy environment or near to a specific existing or reasonable foreseeable future noise generating source e.g. near to a busy road, railway line, noisy commercial/industrial premises including building services plant/equipment, Licenced Premises and general activities associated with the night time economy. NSD include residential properties, residential institutions, educational establishments (schools/libraries), hospitals, offices, workshops, laboratories, hotels as well as noise sensitive land valued for their amenity such as local green open spaces, certain parks and gardens.
- 3.6.62 The LPA will consider carefully in each case whether proposals for new NSD, including by a change of use would be incompatible with existing activities. Such new NSD will not normally be permitted in areas which are, or are expected to become, subject to high levels of noise or an otherwise unacceptable acoustic environment. When determining planning applications for development which will be exposed to an existing noise source, the LPA will consider both the likely noise exposure at the time of the application and any change that may reasonably be expected in the foreseeable future e.g. from future intensification of transportation noise sources or future changes in commercial/industrial activities or positive regeneration effects. Where the application site is considered to be otherwise suitable then the principle requirement will be to secure and achieve appropriate acoustic standards through the application of good acoustic design.
- 3.6.63 There will be a general presumption against new NSD that is likely to experience significant adverse effects from noise unless it can be demonstrated that the economic and/or social and/or environmental benefits associated with the proposed development outweigh the adverse effects.
- 3.6.64 For NSD the noise assessment shall follow the general approach detailed into the document 'ProPG: Planning and Noise - Professional Practice Guidance on Planning and Noise - New Residential Development, May 2017'

<https://www.ioa.org.uk/publications/proppg> as summarised in the process diagram figure 7 below.

Stage 1 – Initial Site Noise Risk Assessment

- 3.6.65 An initial **noise risk assessment** of the proposed development site should be conducted by a competent acoustic/noise consultant and practitioner at the earliest opportunity, before any planning application is submitted to determine the noise climate of the site when considering “anonymous noise”, without proposed mitigation, prior to development. The noise levels apply to steady relatively constant external noise as it affects the internal acoustic environment from sources without a specific character, commonly termed “anonymous noise”. Occupants are usually more tolerant of noise without a specific character than, for example, that from neighbours which can trigger complex emotional reactions. For simplicity, only noise without character is considered.
- 3.6.66 The noise risk assessment should provide an indication of the likely risk of adverse noise effects in terms of NOELs, LOAELs and SOAELs as a result of the existing noise climate with no subsequent noise mitigation or control to take place as part of the development proposal.
- 3.6.67 The risk assessment should not include consideration of any new or additional mitigation measures that may subsequently be included in development proposals for the site and proposed as part of a subsequent planning application. In other words, the risk assessment should include the acoustic effect of any existing site features that will remain (e.g. retained buildings, changes in ground level) and exclude the acoustic effect of any site features that will not remain (e.g. buildings to be demolished, fences and barriers to be removed) if development proceeds.
- 3.6.68 The noise risk assessment may be based on measurement or prediction (or a combination) as appropriate, and should aim to describe noise levels over a “typical worst case” 24 hour day either now or in the foreseeable future having regard to weekdays and weekends. Among other considerations, diurnal patterns can have a major influence on sound levels and, for example, the middle of the night can be distinctly different (and potentially of lesser importance) compared to the start or end of the night-time period for sleep purposes. Furthermore, in this general context it can also be necessary to separately assess weekends and weekday periods. Care should be taken so that the risk assessment includes the combined external free-field noise level from all relevant sources of transport noise that affect the site.

Figure 7: Noise Sensitive Development - Noise Assessment Process



3.6.69 The assessment may also include industrial/commercial noise where this is present but is “not dominant” (i.e. where the effect would not be rated as adverse if a BS4142:2014 assessment was to be carried out). Where industrial/commercial noise is considered to be “dominant” and is considered “non-anonymous”, due regard should be had to the guidance in BS4142:2014.

3.6.70 The indicative noise levels at the Initial Site Noise Risk Assessment are considered to be appropriate in most circumstances as they should give a broad indication of the extent of the noise challenge at a potential residential development site. The approach is intended to give the developer, the noise practitioner, and the decision maker an indication only of the likely suitability of the site for new residential development from a noise perspective.

3.6.71 It should be noted, however, that these levels could be varied (by local agreement) to suit local and project context without undermining the overall approach. In the final column, the initial noise risk assessment is aligned with pre-planning application guidance that reflects the increasing importance of good acoustic design as the noise risk increases.

Initial Site Noise Risk Assessment - Guideline “Absolute” Sound Levels for “anonymous noise”

3.6.72 For sites affected by relatively ‘anonymous noise’ such as transport noise the LPA will consider the noise effect levels and planning consideration/advice given in table 1 titled Guideline “Absolute” Sound Levels for “anonymous noise” in Appendix 8, Annex C.

Initial Site Noise Risk Assessment - Guideline “Relative” Sound Levels for “non-anonymous noise”

3.6.73 For sites affected by dominant ‘non-anonymous noise’ such as industrial, commercial or business noise the LPA will consider the noise effect levels and planning consideration/advice given in table 2 titled ‘Guideline “Relative” Sound Level Standards for “non-anonymous noise’ in Appendix 8, Annex C

Stage 2 – Internal Design Noise Levels

3.6.74 For steady external “anonymous” noise sources the LPA will normally expect applicants to achieve the design internal ambient noise levels contained in BS8233:2014 - Guidance on sound insulation and noise reduction for buildings (recreated as table 3.10 below and to consider the impact and effect of any noise events) in all noise-sensitive rooms. It should be noted that the acoustic performance of the building envelope will be reduced in the event windows are opened for ventilation or cooling and thermal comfort control purposes, therefore reducing attenuation/insulation, as the noise reduction across an openable window (outside to inside) is typically no more than 10 to 15 dB(A).

3.6.75 Most residents value the ability to open windows at will at the occupant’s choice, for a variety of reasons at any time, and the LPA normally requires that designers principally aim, through the use of good acoustic design, to achieve the internal noise level guidelines in noise-sensitive rooms with windows open.

Table 3.10: Internal Ambient Noise Levels for Dwellings

Situation / Activity	Location	07:00 – 23:00 hrs.	23:00 – 07:00 hrs.
Resting, listening and communicating	Living room	35 dB LAeq,16 hour	
Dining	Dining room/area	40 dB LAeq, 16 hour	
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16 hour	30 dB LAeq, 8 hour
Sleeping	Bedroom		45 dB LAMax (several times in any one hour)

Notes:

- (i) Table 3 provides recommended levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Groundborne noise is assessed separately and is not included as part of these targets, as human response to groundborne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.
- (ii) The levels shown in Table 3 are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the levels recommended in Table 4 of BS8233.
- (iii) These levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year’s Eve.

- (iv) Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{Amax,F}, depending on the character and number of events per night. Sporadic noise events could require separate values.
- (v) If relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation provision that does not compromise the façade insulation or the resulting noise level. If applicable, any room should have adequate ventilation (e.g. trickle ventilators should be open) during assessment. If there is noise from a mechanical ventilation system, the internal ambient noise levels should be reported separately with the system operating and with it switched off.
- (vi) Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as “unreasonable”. Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as “unacceptable” by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing “unacceptable” noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form
- (vii) The noise levels apply to steady external noise as it affects the internal acoustic environment from sources without a specific character, previously termed “anonymous noise”. Occupants are usually more tolerant of noise without a specific character than, for example, that from neighbours which can trigger complex emotional reactions. For simplicity, only noise without character is considered in Table 3.
- (viii) Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate.

Stage 3 – Design Noise Levels for External Amenity Spaces

- 3.6.76 The sound level within a residential building is not the only consideration and most residents will also expect a reasonable degree of peaceful enjoyment of their gardens or balcony and adjacent amenity areas. The acoustic environment of external amenity areas shall always be assessed and noise levels should ideally not be above the range 50 to 55 dB L_{Aeq}, 16hr for “anonymous noise”. It may be necessary to carefully locate and design amenity areas and/or to provide acoustic screening in order to meet this aim.
- 3.6.77 Developers are encouraged to enter into pre application discussion where noise levels in proposed amenity spaces are likely to be above 55 dB L_{Aeq}, 16hr. In such cases development should be designed to achieve the lowest practicable levels in these external amenity spaces and the availability of reasonable access to an outdoor recreational area away from but close to the development site, that meets the above target external levels will be taken into account in deciding whether the scheme is acceptable in noise terms. Soundscape management techniques, including psychological masking, may also help to provide a suitable outdoor acoustic environment in otherwise noisy locations. It is accepted that, in some circumstances it may be appropriate to vary, or not to apply, these goals in order to meet wider planning objectives.

Stage 4 – Assessment of Other Relevant Issues

- 3.6.78 The fourth element of the preferred process is an assessment of other relevant issues. For this element the SPD reflects and extends the advice contained in Government policy and guidance documents such as the NPSE and Noise Action Plans. Government guidance in the NPPG – Noise already lists examples of acoustic factors that influence whether noise could be a concern – these include:
- the source and absolute level of the noise;
 - the time of day noise occurs;
 - the number, frequency and pattern of noise events;
 - the spectral content of the noise (i.e. whether or not the noise contains particular high or low frequency content);
 - the character of the noise (i.e. the presence of tones or other features such as impulsiveness),
 - possible cumulative impacts from several sources as well as local topology and topography.
- 3.6.79 The NPPG also mentions some wider acoustic-related factors such as the planned character of the area (this should include consideration of the acoustic environment); the possible need to keep windows closed “most of the time” to keep out the noise; the possible need to provide acoustically suitable outdoor amenity space; and the potential effect on an existing business.
- 3.6.80 It is recommended that these factors and the following additional issues should always be included as part of a systematic assessment of other relevant issues before making a judgement about the noise aspects of a particular planning proposal for new residential development. Not all of the issues discussed will arise in each and every planning application and some may already have been addressed as an inherent part of good acoustic design. In addition, the LPA may add other relevant issues depending on local circumstances and priorities.
- 3.6.81 Design measures taken to reduce intrusion by noise may have unintended adverse consequences for the building or the nearby environment and may affect the attractiveness of the living environment for the occupants. Examples include sealed up balconies that result in a lack of connection with the external environment, environmental noise fences/barriers that remove views or prevent crossing roads and create significant visual impacts or secured by design issues, specialist ventilation/thermal comfort measures that affect personal control over the internal environment etc. Such unintended consequences should normally be avoided by good acoustic design.
- 3.6.82 Some wider planning objectives may have unforeseen acoustic implications. For example, the encouragement of ‘active frontages’ that overlook public footpaths etc. to promote natural surveillance and ensure ‘safe by design’ could result in some residential units facing recreational areas (MUGAs), noisy streets/roads or railways. The encouragement of active outdoor lifestyles may require the careful protection of amenity spaces from sources of transport noise. The creation of vibrant mixed use commercial and residential

neighbourhoods can introduce particular challenges that will need to be overcome by careful acoustic design.

Ventilation and Cooling Design

- 3.6.83 Ideally, the internal design noise levels in table 3.10 should be met with windows open. Where the LPA accepts that there is a justification that the internal target noise levels can only be practically achieved with windows closed, which is likely to be the case in some areas, special care must be taken to design the accommodation so that it provides good standards of acoustics, ventilation and thermal comfort without unduly compromising other aspects of the living environment.
- 3.6.84 It is often necessary to open windows during the warmer months of the year to achieve comfortable internal temperatures and to facilitate effective thermal comfort control. Windows might need to remain open for extended periods to cool the internal habitable rooms including bedrooms. This is often referred to as summer cooling and essentially means an increased flow of air through habitable rooms to cool these spaces and is a form of thermal comfort control. This is not discussed in detail in BS8233 or Approved Documents E or F of the Building Regulations which do not consider external noise impacts. However the requirements related to “purge ventilation” and the purpose of purge ventilation are comparable to the purpose of opening windows for reasons of cooling i.e. the internal environment is not comfortable and rapid air changes should serve to improve that comfort.
- 3.6.85 When windows are provided there is also a reasonable expectation by occupiers that they can open them for any reason at any time. Where the internal noise levels cannot be achieved with windows open, alternative ventilation such as mechanical ventilation heat recovery system (MVHR) or an acoustically treated passive free area of sufficient size should be provided. It is important to note this is not a request for air conditioning. It is a requirement to offer the option of alternative adequate ventilation with windows closed due to the local noise climate and for anonymous noise only. These arrangements will not be acceptable when there is a potential for a statutory noise nuisance to arise due to noise from industrial trade or business premises.
- 3.6.86 This ventilation system must:
- Be capable of providing air changes at volumes equivalent to an open window for the purposes of rapid cooling and ventilation. A ventilation rate of 2 - 4 air changes per hour (ACH) is required to achieve effective thermal comfort control.
 - Not compromise the façade insulation or the resulting internal noise level.
 - Operate at a level to comply with a noise rating curve NR25 or lower so as not to dissuade use.
 - Have full operational controls for occupants.
 - If whole house MVHR - the system should have a Summer Bypass to ventilate and provide good levels of fresh air, without the heat recovery by physically bypassing the heat exchanger for at least 90% of air volume flow.

Submission requirements: Outline Planning Permission for NSD

- 3.6.87 Details submitted as part of an outline application for NSD must be treated by the LPA as forming part of any subsequent “full” application. If material planning considerations, conditions cannot be used to reserve consideration of these details for subsequent approval unless the applicant has made it clear that they were only illustrative. It is therefore recommended that an initial site noise risk assessment should be undertaken and that LPAs should not grant outline planning permission for new residential developments at sites considered to pose a medium or high noise risk (LOAEL to SOAEL) without first being satisfied with a reasonable degree of confidence that good acoustic design can be secured to overcome the acoustic challenges.
- 3.6.88 In particular, where a site is considered medium or high risk (LOAEL to SOAEL) following an **initial site noise risk assessment**, it is recommended that the examination of acoustically critical design issues such as site layout, building heights, materials, landform contouring, detailed design and landscaping, the location of vehicle and pedestrian access, boundary treatments, amenity spaces etc. should not be left for agreement at a later stage as these are important fundamental design issues. Any changes in acoustically critical issues following grant of outline consent should be fully assessed in an updated **noise assessment and acoustic design statement**.

Other Noise Sensitive Development

- 3.6.89 New housing is the most common type of residential development in the LPA. However, the general principles outlined above will be applied to other types of residential development such as residential institutions, care homes etc. However there are other types of noise sensitive development.
- 3.6.90 **Schools and other Educational Establishments:** Many, but not all, activities undertaken at schools (including “free schools”), and other educational establishments are considered to be noise sensitive. The sound insulation criteria for schools formulated for the prevention of noise break-in is set out in Building Bulletin 93, Acoustic Design of Schools, Performance Standards, February 2015. Developers should adhere to these criteria. For schools due regard should also be given to ‘Acoustics of Schools: a design guide, November 2015’ published jointly by the Institute of Acoustics (IOA) and the Association of Noise Consultants (ANC).
- 3.6.91 Because some activities at educational establishments are also likely to generate noise then any such applications will be assessed on a case by case basis. Ancillary noise sources such as plant, air extraction, entertainment noise and the provision of MUGAs for school/after-school or community use should be considered using the appropriate guidance set out in this document.
- 3.6.92 **Hospitals and other Healthcare Buildings:** Advice on the acoustic design of and requirements for hospitals and other healthcare buildings is contained in Health Technical Memorandum 08-01: Acoustics.

3.6.93 **Hotels and Guesthouse:** The LPA does not prescribe noise and vibration standards for hotel bedrooms although it is recommended that hotels are designed to meet the criteria provided in BS 8233:2014. Other types of noise sensitive development will be dealt with on a case by case basis using similar principles and with reference to any authoritative specialist acoustic design guidance.

Submission requirements: Noise Generating Development (NGD)

3.6.94 NGD includes:

- new heating, ventilation, and air conditioning (HVAC) including combustion appliance / exhaust stacks and flues and air handling/refrigeration / chiller units, machinery, plant and equipment and extractor fans at new and existing premises;
- uses likely to create significant noise such as food/drink/entertainment and leisure uses, industrial uses, day nurseries, gyms, places of worship, schools and colleges and agricultural users / buildings;
- uses likely to generate a significant amount of traffic (defined as road traffic movements greater than 5% of Annual Average Daily Traffic); and
- developments emitting low frequency noise (e.g. electricity substations and wind turbines / farms).

3.6.95 The LPA recognises the contribution of industrial, trade/commercial or business developments in helping to achieve wider sustainable development goals. However, there are many kinds of industrial and commercial developments that have the potential to generate noise. The LPA will consider carefully in each case whether proposals for new NGD that may generate or lead to an increase in noise (including by a change of use) would be incompatible with existing noise sensitive activities and any noise sensitive activities that may reasonably be expected in the foreseeable future. The applicant will be expected to demonstrate, as part of the planning application, that noise has been mitigated and reduced to a minimum and that the principles of good acoustic design have been followed.

3.6.96 For schemes that may generate noise, developers must consider the cumulative noise impact from their proposed scheme and the existing acoustic environment and where appropriate the future cumulative impact of any already permitted or proposed noise generating development in the vicinity.

3.6.97 There will be a general presumption against noise generating development which gives rise to significant adverse effects from noise unless it can be demonstrated that the economic and/or social and/or environmental benefits associated with the proposed development outweigh the adverse effects.

3.6.98 Some of the most commonly occurring noise issues with commercial developments are associated with building services plant / equipment, usually air-conditioning equipment or kitchen ventilation / extraction systems. In addition to operational plant/equipment noise, noise associated with deliveries or collections and an increase in traffic noise levels may also impact on local residents.

3.6.99 An assessment of the impact of noise from these types of development will be required. Applicants should be aware that the LPA will always seek to encourage good acoustic design and will prevent development where unacceptable acoustic conditions are anticipated at nearby noise sensitive premises as a result of noise from new or intensified industrial, trade / commercial or business development. The process diagram in figure 8 below describes the stages that the assessment of noise for NGD should follow.

3.6.100 All industrial and commercial development with the potential to generate noise will need to be assessed and, where relevant, controlled by planning conditions in order to protect residential amenity/quality of life. Conditions may be used, for example for a noise insulation scheme to restrict noise levels and to control hours of operation. The most relevant standard for assessing new industrial, trade/commercial or business development is BS4142:2014 - Methods for Rating and Assessing Industrial and Commercial Sound. The methods described use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

3.6.101 The standard is applicable to the determination of the following:

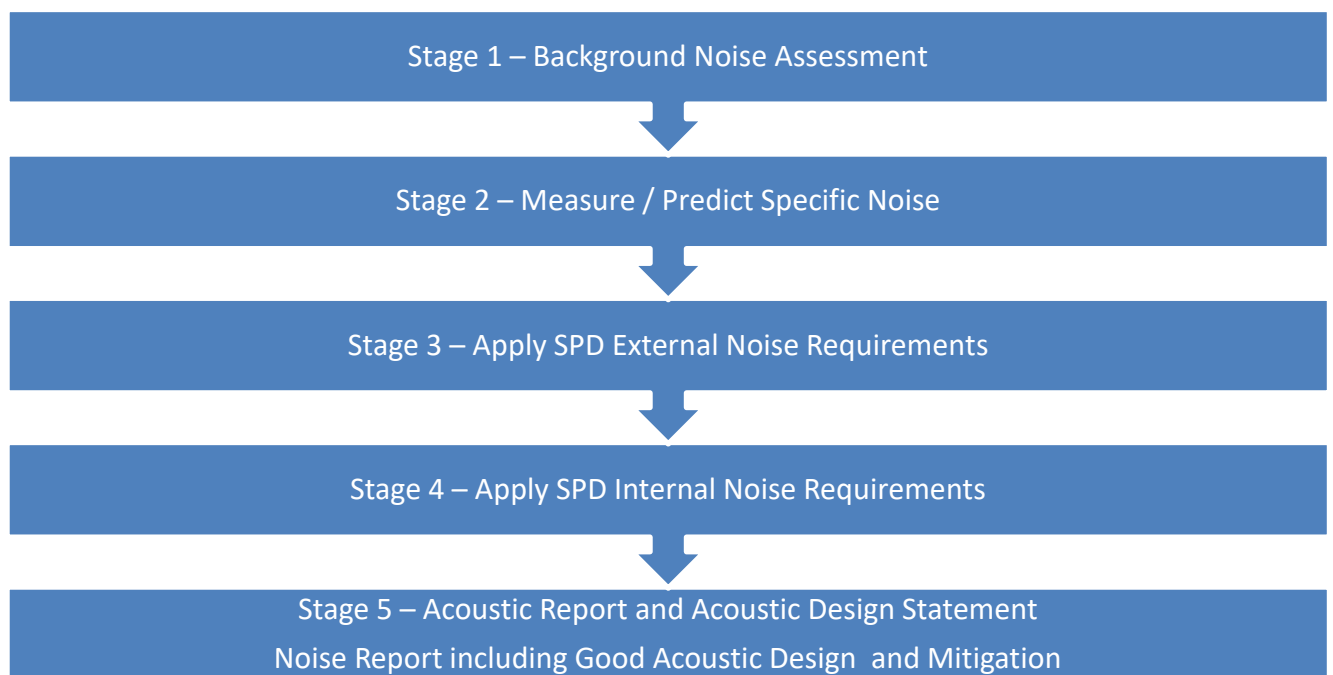
- rating levels for sources of sound of an industrial and/or commercial nature;
- ambient, background and residual sound levels, for the purposes of:
 - (i) assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature;
 - (ii) assessing sound at proposed new dwellings or premises used for residential purposes.

3.6.102 The significance of sound of an industrial and/ or commercial nature depends upon both the margin by which the rating level ($L_{Ar,Tr}$) of the specific sound source exceeds the background sound level (L_{A90}) and the context in which the sound occurs. The greater this difference, the greater the magnitude of the impact as follows:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context
- The lower the rating level is relative to the measured background sound level the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact

3.6.103 As NPPG does not provide numerical values for the different noise effect levels table 3.11 below details the approach and noise criteria requirements that will be adopted for assessing NGD that is industrial and/or commercial nature typically “non-anonymous noise” in external private residential amenity areas.

Figure 8: Noise Generating Development – Noise Assessment Process



3.6.104 The LPA will not impose unreasonable restrictions on businesses but applicants should be aware that it is usually simpler and less expensive to be proactive and design in noise management and noise control measures at the planning stage rather than wait for complaints to arise.

3.6.105 In addition to an assessment of NGD external noise as detailed above, in some cases it will also be necessary to predict internal noise levels at the closest and/or worst affected noise sensitive premises and to demonstrate the means of achieving suitable internal noise levels within noise sensitive rooms (with windows partially open for ventilation where this is the norm for the building likely to be affected, with windows closed where this is part of the mitigation of the existing noise climate and the potentially affected noise sensitive building is provided with adequate alternative means of ventilation). This is particularly important during night-time periods when external amenity areas are not in use.

Table 3.11: New Noise Generating Development - External Noise Standards for “non-anonymous noise”

Noise Significance Risk	Noise Significance of Effect	BS4142 Outcome rating level (L _A ,T _r) minus (-) background level (L _A 90)	Planning Advice
None	NOEL	L _A ,T _r – L _A 90,T ≤ -10	Sound is likely to be inaudible and have no discernible impact on health or quality of life. No objection from a noise perspective and no specific noise measures required.
Minimal	NOEL to LOAEL	L _A ,T _r – L _A 90,T is > -10 & ≤ -5	Where the rating level of noise is below the background noise level by at least 5dB, this indicates that the proposed NGD is likely to be acceptable from a noise perspective. The LPA will seek this level of compliance in most noise sensitive areas and/or where there is a requirement to mitigate creeping background effects.
Low	NOEL to LOAEL	L _A ,T _r – L _A 90,T is > -5 & ≤ 0	Where the rating level of noise is equal to, or below the background noise level by up to 5dB, this indicates that the proposed NGD may be acceptable from a noise perspective but will be more context dependent, i.e. extent and effect on noise sensitive receivers (externally and internally). Compliance within this range is more applicable to less sensitive sites or where there is no requirement to mitigate creeping background effects.
Medium	LOAEL to SOEL	L _A ,T _r – L _A 90,T is > 0 & ≤ +5	Where the rating level of noise is equal to, or above the background noise level by up to 5dB, this indicates that the proposed NGD is less likely to be acceptable from a noise perspective and will be context dependent, i.e. extent and effect on noise sensitive receivers (externally and internally). Compliance within this range is typically only applicable to non-sensitive sites or where there are overriding other reasons why development should be considered. It will typically be necessary for the applicant to confirm how adverse impacts from the NGD will be mitigated and minimised. It is less likely that planning

Noise Significance Risk	Noise Significance of Effect	BS4142 Outcome rating level (L _A ,T _r) minus (-) background level (LA ₉₀)	Planning Advice
			consent will be granted. Acceptable only if there are overriding economic or social reasons for development to proceed
High	SOEL	LA,Tr – LA ₉₀ ,T is > + 5 & +10	Where the rating level of noise is above the background noise level by more than 5dB, this indicates that the proposed NGD is unlikely to be acceptable from a noise perspective and planning consent is likely to be refused on noise grounds.
Very High	SOEL and unacceptable	LA,Tr – LA ₉₀ ,T is > +10	Where the rating level of noise is above the background noise level by more than 10dB, this indicates that the proposed NGD is unacceptable from a noise perspective and planning consent shall be refused on noise grounds.

Note:

- (i) Certain acoustic features e.g. Tonality, Impulsivity, Intermittency or sound features characteristics that are otherwise readily distinctive against the residual acoustic environment, can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. For example sound with prominent impulses has been shown to be more annoying than continuous types of sound (without impulses or tones) with the same equivalent sound pressure level.
Where such features are present at the assessment location, a character correction may need to be added to the specific sound level to obtain the rating level. Full justification for selecting and not selecting character corrections will need to be provided.
- (ii) All terms as defined in BS4142

3.6.106 In some cases, e.g. for steady continuous noise without a specific character, the guidance on suitable internal noise levels found in table 4 of BS8233 may be relevant. The application should demonstrate that these levels can be complied with. In other cases, it may be necessary to seek to achieve better standards in nearby dwellings, for example where the proposed industrial or commercial development may emit noise with tonal, impulsive or other discrete characteristics the LPA may consider it appropriate to apply a character correction penalty for internal noise standards. In such circumstances the advice given in table 3.10 of this SPD should be considered.

NGD and Creeping Background /Ambient Noise Levels

3.6.107 Creeping outdoor background and ambient noise levels may occur in situations where there are an increasing number of NGD/sources in an area, each of which makes a small contribution to an overall deteriorating and locally unacceptable situation.

Typically, this may occur, where there are multiple mechanical services e.g. HVAC installations on a number of industrial/commercial premises in close proximity to residential development. Furthermore, it may also be necessary to prevent creeping outdoor background noise levels affecting any specially designated quiet and/or tranquil areas in the LPA.

3.6.108 To limit such creeping ambient noise levels the LPA has the following general requirement for operational noise from all operational plant and equipment:

‘the rating level (in accordance with BS4142:2014) from all plant, equipment and vents etc. (collectively) associated with this application should be less than or equal to the existing background level (L90) at the boundary of the premises subject to the application and having regard to noise sensitive premises.

Tonal/impulsive sound frequencies should be eliminated or at least considered in any assessment and should carry an additional correction in accordance with BS4142:2014. This is to prevent unreasonable disturbance to other premises. This requirement applies both during the day (07:00 to 23:00 hrs over any one hour period) and night time (23:00 to 07:00 hrs over any one 15 minute period).

It is recommended that the agent/applicant submits an acoustic prediction survey/report in accordance with the principles of BS4142: 2014 "Methods for rating and assessing industrial and commercial sound" or similar, concerning the effects on amenity rather than likelihood for complaints. Noise levels shall be predicted at the application site boundary having regard to neighbouring premises.’

3.6.109 The LPA would also welcome the use of long-term maintenance agreements to ensure that equipment maintains acceptable noise levels over its lifetime and the use of timers to limit any unnecessary operation of the equipment.

Specific Noise Generating Development Uses - Industrial, Trade / Commercial or Business

3.6.110 Common sources of NGD include the following:

- Sound Insulation between Commercial and Residential Development – General
- Delivery and Collections
- Places of Entertainment (Food Restaurants, Clubs, Pubs and Bars)
- Multi Use Games Areas and Artificial Grass Pitches
- Gyms
- Nurseries / Childcare Facilities
- Wind Turbines
- Agricultural buildings

3.6.111 Further detailed technical advice including the noise requirements, typical good acoustic design and noise mitigation measures relating to these specific noise sources are included in Appendix 8 Annex D.

Good Acoustic Design

- 3.6.112 Following the principles of good acoustic design can deliver good acoustic conditions that can greatly increase the overall comfort level of a space, while poor acoustics can result in unhealthy living conditions and environments. Acoustic design can be applied to almost every design project with obvious benefits, including functionality. Building and design professionals can apply to and integrate good acoustic solutions into all projects. Considering acoustics is paramount to the collective health and safety and quality of life of those who live, work and play within the spaces created by building and design professionals.
- 3.6.113 It should be remembered that good acoustic design is a process that begins as soon as land is under consideration for development. The timeline for good acoustic design stretches from the conceptual design stage, through quality control during construction, and beyond to post construction performance testing.
- 3.6.114 Both internal and external spaces should be considered in the acoustic design process. Care should be taken to ensure that acoustic mitigation measures do not result in an otherwise unsatisfactory development. Good acoustic design must be regarded as an integrated part of the overall design process and sustainable development.
- 3.6.115 There should be a commitment to good acoustic design and a hierarchy of noise management should be followed to reduce noise impacts, including the following (but not limited to), in descending order of preference:
- Maximising the spatial separation of noise source(s) and receptor(s).
 - Investigating the necessity and feasibility of reducing existing noise levels and relocating existing noise sources (possible S106 agreement if noise sources off site).
 - Using existing topography and existing structures (that are likely to last the expected life of the noise-sensitive scheme) to screen the proposed development site from significant sources of noise.
 - Incorporating noise barriers as part of the scheme to screen the proposed development site from significant sources of noise - such as landscaping, fencing and solid balconies to reflect/shield sound.
 - Using the layout of the scheme to reduce noise propagation across the site.
 - Creating setbacks.
 - Using the shape and orientation of buildings to reflect and or shield noise to protect the most sensitive uses
 - Locating noise sensitive areas/rooms away from the parts of the site most exposed to noises and careful internal configuration of internal rooms to reduce the noise exposure of noise-sensitive rooms.
 - Stacking similar room use (such as kitchens and living rooms) above each other.
 - Positioning non-residential uses closer to the noise source in mixed use developments
 - Anti-vibration foundations/vibration reducing separation trenches
 - Incorporating 'sound proof' construction/cladding materials e.g. absorptive materials/finishes to soffits

- Using the building envelope to mitigate noise to acceptable levels - insulating and soundproofing doors, walls, windows, floors and ceilings with an appropriate level of acoustic performance
- Alternative forms of ventilation if internal noise levels exceeded with a partially open window to negate the need to ventilate passively e.g. mechanical ventilation systems and acoustically attenuated free areas

3.6.116 In instances where noise mitigation measures and noise insulation schemes are necessary in addition to good acoustic design, proposals will be expected to include appropriate attenuation to alleviate or mitigate the impact of noise and vibrations to an acceptable level. Where noise mitigation has not been proposed adequately, but is considered necessary, the LPA will consider the use of planning conditions or a legal agreement to secure.

3.6.117 Examples of mitigation as part of a noise insulation scheme include:

- reducing the noise emitted at its point of generation (e.g. by using quiet machines and/or quiet methods of working);
- containing the noise generating equipment (e.g. by insulating buildings which house machinery and/or providing purpose-built barriers around the site);
- use of acoustic enclosures / silencers
- protecting any surrounding noise-sensitive buildings (e.g. by improving sound insulation in these buildings and/or screening them by purpose-built barriers);
- ensuring an adequate distance between source and noise-sensitive buildings or areas;
- screening by natural barriers, buildings, or non-critical rooms in the development.
- limiting the operating time of the source;
- restricting activities allowed on the site;
- specifying an acceptable noise limit;
- use of noise management plans;
- restricting window openings;
- sound proofing internal and external walls; and
- using cladding specifically designed for sound reduction.

3.6.118 Further advice on good acoustic design for NSD and NGD is given in Appendix 8, Annex E.

Vibration

3.6.119 Vibrations transmitted through the structure of a building can be detected by its occupants and can result in adverse effects. Depending on the timing and the nature of the vibration, occupants may have disturbed sleep or struggle to work efficiently. Vibration at higher magnitudes can even act to damage a building over time.

3.6.120 Human response to vibration varies with the magnitude, the frequency and duration of exposure. Significant vibration within the LPA (apart from temporary construction works) is most likely to be generated by railways and possibly certain industrial uses that incorporate impact driven processes or activities such hydraulic and mechanical presses or forging processes. Road traffic is unlikely to generate significant

vibration where the road surface is in reasonable repair. Consequently, the LPA will normally require a vibration assessment where railways, either surface or underground, are within 30m of a proposed development site or close to industrial uses with impact driven processes. The need for a vibration assessment at other sites will also be assessed on a case by case basis.

3.6.121 Apart from construction, raw vibration acceleration (ms^{-2} rms) shall be measured at foundation level in each of the three orthogonal directions x, y and z in better frequency resolution than 1/3 octave. The Vibration Dose Values (VDV measured in $\text{ms}^{-1.75}$) should be calculated and assessed from the measured acceleration levels in accordance with 'BS6472-1:2008 - Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting.' For residential development, the VDV vibration thresholds after any required mitigation should not exceed the levels in table 3.12 below (taken from Table 1 of BS 6472-1:2008).

Table 3.12: Residential Development – Vibration Dose Values

07:00 – 23:00 16 hour day	23:00-07:00 8 hour night
< 0.2 $\text{ms}^{-1.75}$	< 0.1 $\text{ms}^{-1.75}$

3.6.122 The VDV's given above are for in-property levels of exposure. Measurements made on an undeveloped site should allow for transfer functions from the ground into foundations, and amplification of vibration magnitudes in suspended floors. Where a site has existing buildings, vibration should, if possible, be measured on the foundations, ground beams or pile caps, as well as on the ground. Measurements made within existing buildings need to be corrected to derive VDV which would apply to the new buildings on the same site.

3.6.123 Ground / structural borne vibration which can result in re-radiated noise, as a result of vibration from adjacent railways and other sources, shall not exceed 30 dB $L_{Amax}(slow)$ within habitable residential rooms. Where it is predicted that noise from this source will exceed 30dB $L_{Amax}(slow)$, proposals to mitigate re-radiated noise to acceptable levels shall be submitted to and approved in writing by the LPA. However, due to the high cost of mitigating vibration effects, this should be subject to early discussion with the LPA.

3.6.124 All building services plant and equipment such as air conditioning and air handling plant can generate vibration which in turn can re-radiate as noise within buildings. All services and equipment plant shall be supported on proprietary anti-vibration mounts. Any permission granted for the installation of services and equipment plant will normally contain a condition necessary to control plant vibration.

3.6.125 The content of a vibration assessment report shall follow the format suggested in Annex A (informative) of BS 6472-1:2008.

Construction and Demolition Work

3.6.126 The Control of Pollution Act 1974 is primary legislation which can deal with the control of noise from construction sites. However in certain situations, for instance where there is a proposal for a substantial development or infrastructure project, a Noise and Vibration Demolition and Construction Environmental Management Plan, detailing the management and control of noise and vibration, will be required as part of planning consent.

Noise and Vibration Demolition and Construction Environmental Management Plans

3.6.127 The Noise and Vibration Demolition Environmental Management Plan (DMP) and Construction Environmental Management Plan (CEMP) or a combined Demolition and Construction Environmental Management Plan (DCEMP) will typically include an acoustic report undertaken by a suitably qualified and experienced consultant. They are expected for major developments and the LPA will assess the need for them for smaller developments on a case-by-case basis.

3.6.128 These documents should be undertaken in accordance with:

- BS 5228-1:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites. Noise
- BS 5228-2:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites. Vibration

3.6.129 These documents set out the measures that a contractor will take both on-site and off-site, in order to reasonably minimise the detrimental effects of construction and incorporate mechanisms that overlap with other regulatory regimes (particularly highways and environmental protection). Most are 'umbrella' documents managing all impacts of the demolition, excavation and construction processes.

3.6.130 Besides ensuring that measures under these different service areas are coordinated in one document, DCEMPs represents a proactive approach to addressing construction issues. Their purpose is to encourage developers to work with the LPA and local people in managing the construction process with a view to ensuring that problems are foreseen and addressed with appropriate mitigation.

3.6.131 They should include all the information below:

- **Baseline Noise Assessment** – undertaken for a least 24-hours under representative conditions to determine the pre-existing ambient noise environment against which to judge any impact.
- **Noise predictions and the significance of noise effects** – Predictions should be included for each phase of the demolition, and construction, vehicle movements and an assessment of the significance of noise effects must be included based on the guidance in BS 5228 and best practical means shall be used to mitigate noise.
- **Piling** – Where piling forms part of the construction process, a lower noise and vibration method such as continuous flight auger (CFA) or press-in piling must be utilised wherever possible, particularly in built-up and environmentally sensitive

areas. Good practice guidelines including best practical means to mitigate vibration should be followed. **Vibration Predictions and the significance of vibration effects** – Predictions should be included for each phase of demolition, and construction, and an assessment of the significance of vibration effects must be included e.g. as per BS 5228.

- **Noise and Vibration Monitoring** – Permanent real time web enabled and/or periodic noise and vibration monitoring should be undertaken for the duration of the demolition and construction phases which may result in a significant impact and at request of the LPA following substantiated complaints. The location, number of monitoring stations and the measurement data must be agreed in advance with the LPA prior to the start of construction.
- **Community relations / engagement** – The steps that will be taken to notify and update residents and businesses that may be affected by the construction of the proposed development.
- **Provision of additional mitigation** – If best practicable means mitigation applied, i.e. all reasonable measures have been taken to reduce the noise/vibration levels but levels are still such that widespread community disturbance or unacceptable interference with activities or sleep is likely to occur for a prolonged period, then consideration of noise insulation to affected properties or temporary or permanent re-housing (TRH).

Further guidance

- 3.6.132 For further guidance on noise, please see:
- BS 4142:2014 - Methods for rating and assessing industrial and commercial sound
 - BS 8233:2014 - Guidance on sound insulation and noise reduction for buildings
 - BS 5228-1:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites. Noise
 - BS 5228-2:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites. Vibration
 - BS 6472-1:2008 - Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting
 - BS 5502-32:1990 - Buildings and structures for agriculture. Guide to noise attenuation. All available online at: <https://www.bsigroup.com/en-GB/>
 - Noise Policy Statement for England (NPSE, March 2010). Available online at: <https://www.gov.uk/government/publications/noise-policy-statement-for-england>
 - World Health Organisation (WHO):
 - ‘Guidelines for Community Noise’, 1999
 - ‘Night noise guidelines for Europe’, 2009
 - ‘Environmental Noise Guidelines for the European Region, 2018’. All available online at: <http://www.euro.who.int/en/health-topics/environment-and-health/noise>
 - ProPG: Planning and Noise - Professional Practice Guidance on Planning & Noise - New Residential Development, May 2017 with Supplementary Document 1 (Policy and Guidance) and 2 (Good Acoustic Design). Available online at: <https://www.ioa.org.uk/publications/propg>

- Sport England - Design Guidance Note 'Artificial Grass Pitch (AGP) Acoustics - Planning Implications, New Guidance for 2015'. Available online at: <https://www.sportengland.org/media/4515/agp-acoustics-planning-implications.pdf>
- Acoustic design of schools: performance standards - Building bulletin 93 (Department for Education (DfE), February 2015). Available online at: <https://www.gov.uk/government/publications/bb93-acoustic-design-of-schools-performance-standards>
- Acoustics of Schools: a design guide (IOA / ANC, November 2015). Available online at: <https://www.ioa.org.uk/publications/schools-acoustics-guide>
- Health Technical Memorandum 08-01: Acoustics. Available online at: <https://www.gov.uk/government/publications/guidance-on-acoustic-requirements-in-the-design-of-healthcare-facilities>
- IEMA Guidelines for Environmental Noise Impact Assessment (IEMA, 2014). Available online at: <https://www.iema.net/event-reports/2016/01/07/Launch-Webinar-IEMA-Guidelines-for-Environmental-Noise-Impact-Assesment-2014/>
- 'The Assessment and Rating of Noise from Wind Farms' and 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine – Noise, 2013 with Supplementary Guidance Notes 1 to 6 (Institute of Acoustics, various dates). Available online at: <https://www.ioa.org.uk/publications/wind-turbine-noise>
- Guide B4: Noise and Vibration Control for Building Services Systems (GVB4/16, CIBSE 2016). Available online at: <https://www.cibse.org/>

Air Quality - Cambridge

LOCATION:	Cambridge
POLICY:	Policy 36: Air quality, odour and dust
SCALE OF DEVELOPMENT:	All scales of development (apart from householder)
TYPE OF DEVELOPMENT:	Residential and Non-residential development
SUBMISSION REQUIREMENTS:	Air Quality Statement (see templates below) Air Quality Assessment (where one or more of the criteria set out in the Sustainability Checklist are met)
LINK TO THE SUSTAINABILITY CHECKLIST:	Pol.15, Pol.16, Pol.17, Pol.18, Pol.19, Pol.20, Pol.21, Pol.22, Pol.23, Pol.24, Pol.25 and Pol.26

Policy overview

3.6.133 Every new development will have an impact on air quality, usually (but not always) by increasing emissions from buildings or from traffic generation. There is no safe level of air pollution; Cambridge City Council's policy is to reduce pollution wherever possible.

3.6.134 The planning system has an important role to play in driving forwards improvements in local air quality, minimising exposure to pollution, and improving the health and well-being of the population. Whilst land-use planning and development controls rarely provide immediate solutions to improving air quality, they can ensure that future problems are prevented or minimised. Consideration of air quality in the development design will lead to lower emissions and an improved environment. Good design at the outset is the most effective and straightforward way to a low emission development.

3.6.135 The National Planning Policy Framework (NPPF) 2019 states that planning policies and decisions should contribute to and enhance the natural and local environment. Development should, wherever possible, help to improve local environmental conditions such as air quality. Planning decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local Air Quality Action Plan. An Air Quality Action Plan is a legal requirement for councils with an Air Quality Management Area, which sets out the councils' planned actions to meet the National Air Quality Objectives.

3.6.136 The 2018 Cambridge Air Quality Action Plan²³ has three key priorities. These are in line with the principles of the NPPF and re-iterate Cambridge City Council's continued commitment to improve air quality now and in the future.

- Priority 1 – Reduce emissions in the central areas of Cambridge. Source apportionment shows that traffic emissions are the main source of air pollution in the city and that a reduction in emissions is required to meet the National Air Quality Objectives.
- Priority 2 – Reduce emissions across Cambridge. The planned growth in population and economic activity in the Greater Cambridge area could threaten the success of an Air Quality Action Plan if just considering short term objectives.
- Priority 3 – Keep emissions low in the future. Keeping emissions low and reducing emissions further will improve public health for all who live, work and visit Cambridge.

Planning for new development has a key role to play in achieving these priorities.

3.6.137 Pollution to air can arise from many sources and activities, including traffic and transport, industrial processes, domestic and commercial premises, energy generation, agriculture, waste storage/treatment and construction sites. This section relates to air pollution from all potential sources, in any potential form and includes temporary dust pollution.

3.6.138 The primary local impacts on air quality in Cambridge are from road transport, as well as some contribution from domestic, commercial and industrial heating sources. One of the most effective ways to improve air quality or to reduce the impact of new developments is to reduce the need to travel, as well as rule out the use of solid fuels or

²³ <https://www.cambridge.gov.uk/air-quality-action-plan>

oil for heating, and to encourage non-emitting heating sources or optimised gas systems where appropriate²⁴.

3.6.139 There is no safe level of air pollution (COMEAP, 2018)²⁵; developments coming forwards should be assessed for air quality impact and ensure that effective mitigation will be in place. Developers should aim for an 'air quality neutral'²⁶ development; air quality positive developments will be welcomed.

3.6.140 Applicants should consider air quality issues as early as possible in the design process to ensure that appropriate measures are integrated into the development in line with the requirements set out in the Cambridge Air Quality Action Plan, which has been produced in line with the requirements of Part IV of the Environment Act 1995; Local Air Quality Management.

3.6.141 Theme 5 of the Cambridge Air Quality Action Plan (Maintaining Low Emissions) introduced the requirement for installation of electric vehicle charge points and low emission boilers to mitigate the impact of additional development in Cambridge, as well as the provision of car clubs where appropriate. The development management measures are listed in table 3.13 below.

Table 3.13: Development Control measures to improve air quality

Electric Vehicle Charge Points Provision

- Any new or replacement car park will have EV Charge Points
- Any increase in vehicle trip generation related to the intensification of use at a site will require additional EV Charge Point provision at an appropriate scale
- A site-wide EV charging strategy for large-scale Major sites – detailing the location and phasing of the charge point installations
- One slow EV Charge Point for each dwelling with allocated parking
- At least one slow EV Charge Point for every two dwellings with communal parking (at least half of all non-allocated parking spaces to have electric vehicle slow charging points)
- At least one slow EV Charge Point for every two parking spaces in non-residential developments
- At least one rapid EV Charge Point for every 1,000m² non-residential floor space (as per Institute of Air Quality Management guidance) or one fast EV Charge Point for every 1,000m² non-residential floor space (if the installation of a rapid charge point is technically impossible due to grid supply constraints (evidence must be provided))
- At least one rapid EV Charge Point for large-scale Major developments, or at least one fast EV Charge Point (if the installation of a rapid charge point is technically impossible due to grid supply constraints (evidence must be provided))
- Installation of passive charge points - electric vehicle charging infrastructure for

²⁴ See Appendix 3, which sets out emissions standards for schemes looking to utilise Combined Heat and Power.

²⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/734799/CO_MEAP_NO2_Report.pdf

²⁶ https://www.london.gov.uk/sites/default/files/gla_migrate_files_destination/Sustainable%20Design%20%26%20Construction%20SPG.pdf

future activation - at all vehicle parking spaces without active charge points (to provide 100% coverage)

Combinations of provision can be proposed, depending upon the requirements of the future site users.

Car Club provision, where appropriate

- A minimum of one car club vehicle per 500 parking spaces in new residential developments; a minimum of one vehicle per 10,000 m² in non-residential developments
- A site-wide car club strategy for large-scale Major sites – detailing the location and phasing of the charge point installations.

There may be other sites where car club provision is appropriate, for example, major development sites with little or no parking.

Energy sources

- Encourage the installation of zero-emission heating sources, such as electric heating, ground-source and air-source heat pumps
- All gas boilers to have low NO_x emissions (boilers that meet a dry NO_x emission rating of 40mg/kWh)
- Minimum emission standards for CHP emissions (Spark ignition engine: less than 150 mgNO_x/Nm³, Compression ignition engine: less than 400 mgNO_x/Nm³, Gas turbine: less than 50 mgNO_x/Nm³)

3.6.142 The Cambridge Air Quality Action Plan is a flexible document and will evolve to respond to funding and policy changes. However, the national policy background may change shortly after publication of this SPD. The UK Government is considering tightening UK standards to match World Health Organisation standards²⁷ in the forthcoming Environment Bill²⁸ and as set out in the Clean Air Strategy 2019²⁹, with a change in focus towards prevention of pollution. The intention is to improve public health and the environment. Therefore, the applicant should always refer to the Cambridge City Council's Air Quality Guidance for Developers web page³⁰, which will be updated as changes are made. Early engagement with the Development Management and Environmental Quality and Growth teams as part of the pre-application process is, therefore recommended.

Submission requirements

3.6.143 The developer has the responsibility for providing information to enable the local planning authority to make a decision. Where uncertainty exists over the likely impact upon air quality or the expected levels of pollution, the Local Planning Authority will take a precautionary approach.

²⁷ <https://www.who.int/airpollution/publications/agg2005/en/>

²⁸ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/766849/draft-environment-bill-governance-principles.pdf

²⁹ <https://www.gov.uk/government/publications/clean-air-strategy-2019>

³⁰ <https://www.cambridge.gov.uk/air-quality-guidance-for-developers>

- 3.6.144 Any air quality issue may be a material planning consideration. However, air quality will be a material consideration where any of the following apply:
- there is an adverse effect on air quality in an Air Quality Management Area
 - pollution levels within the Air Quality Management Area will have a significant adverse effect on the proposed use/users
 - the development will lead to the declaration of a new Air Quality Management Area
 - the development will interfere with, or not be consistent with the implementation of the current Air Quality Action Plan (or any future Air Quality Strategy)
 - any sources of emissions to air, odours and fugitive dusts generated by the development are not adequately mitigated
 - any impacts on the proposed use from existing poor air quality, odour and emissions are not appropriately monitored and mitigated by the developer.

What air quality information is required to support a planning application?

- 3.6.145 Figure 9 below sets out the air quality information required to support applications of different scales, from householder through to major developments.

Air Quality Statements

- 3.6.146 To establish whether air quality impacts are acceptable, all large-scale major, small-scale major and minor planning applications (but not householder developments) are required to identify sources of emissions to air from the development in the form of an **Air Quality Statement**. Tables 3.14 and 3.15 provide Air Quality Statement Templates for completion and submission with all minor and major applications.
- 3.6.147 An Air Quality Statement sets out the existing air quality at the site, qualitatively identifies sources of emissions to air arising from the proposed development with any likely impact on air quality and confirms that basic and appropriate mitigation measures will be in place. The Statement will require approval by the Local Planning Authority. A template is provided below and a downloadable version is available from the website³¹.
- 3.6.148 Details of air quality mitigation should be provided at the point of application. Development will only be permitted if the impact on air quality is acceptable and mechanisms are in place to mitigate adverse impact and prevent further exposure to poor air quality. Pre-application discussions are recommended so that the developer can be confident that their application includes all relevant information.
- 3.6.149 Consideration of air quality and air pollution will be relevant during both the operational and the development phase. Development may give rise to air pollution as well as, for example, air quality issues associated with demolition, construction and remediation of contamination.

³¹ <https://www.cambridge.gov.uk/air-quality-guidance-for-developers>

Figure 9: Flow Diagram – what air quality information do I need to submit to support my application?

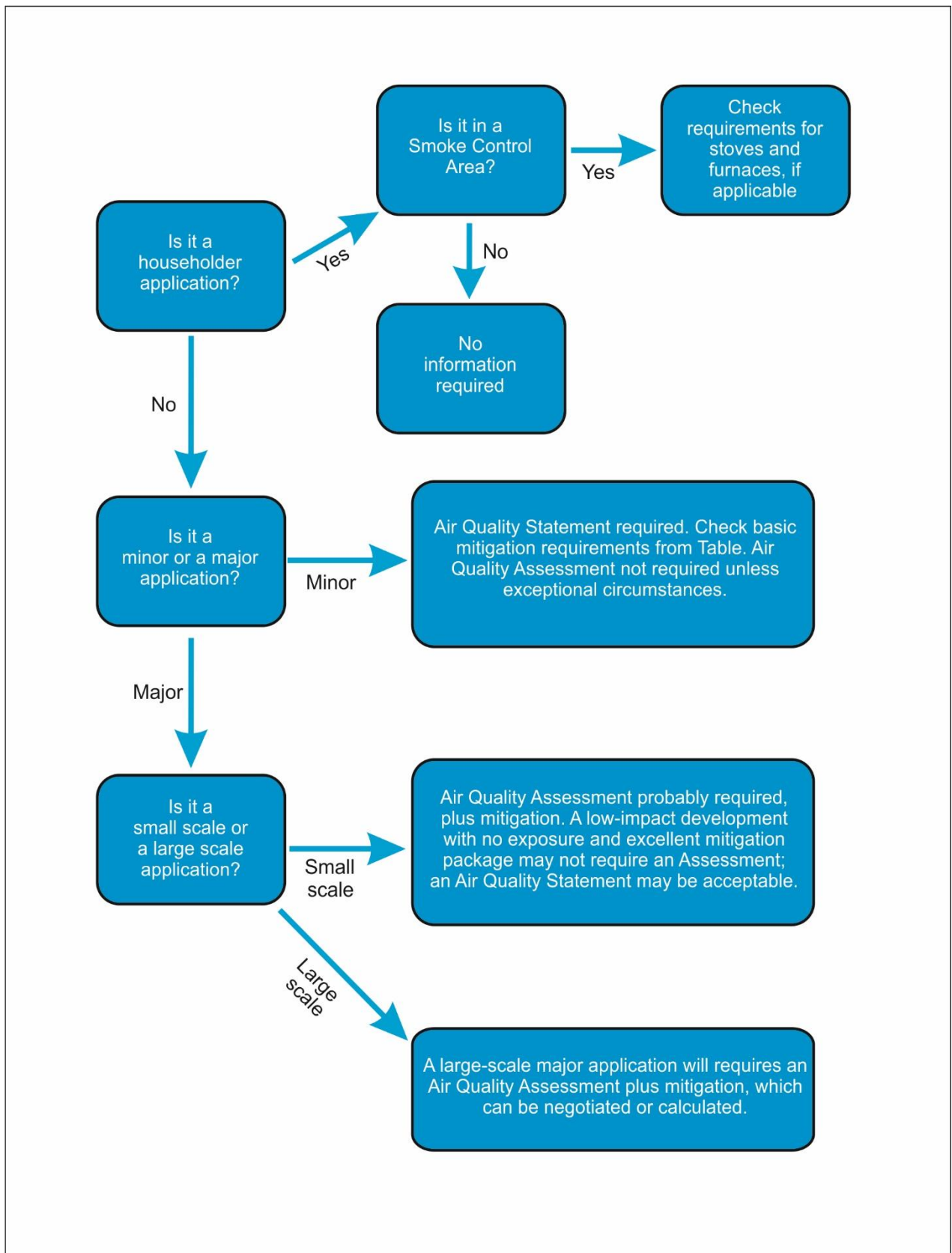


Table 3.14: Air Quality Statement template for minor developments

Name and address of site	
Description of proposed development <ul style="list-style-type: none"> • Size (e.g., number of units or area in Ha) • Type (e.g., residential or commercial) • Proximity to pollution sources, such as roads, industrial areas 	
Additional information about the proposal <ul style="list-style-type: none"> • Parking arrangements including reserved spaces for EV/car clubs/disabled; comparison of current and proposed provision • Heating provision, type and fuel, location of flue vent • Is the site in the Air Quality Management Area? • Is the site in a Smoke Control Area? • Layout if site adjacent to busy road 	
Basic Mitigation Proposed	If yes, provide details If no, state reason why not
1. Electric heating or low NO _x ³² boilers	Yes/No
2. low emission standards for CHP ³³ , where appropriate	Yes/No
3. EV charge points where there are car parking spaces (number, type)	Yes/No
4. Dust Management Plan (see template below – ref to figure)	Yes/No

Table 3.15: Air Quality Statement Template for major development

Name and address of site	
Description of proposed development <ul style="list-style-type: none"> • Small-scale or large-scale Major site • GFA compared with existing 	

³² Low NO_x boilers - ., individual gas fired boilers that meet a dry NO_x emission rating of ≤40mg/kWh

³³ CHP - Spark ignition engine: less than 150 mgNO_x/Nm³, Compression ignition engine: less than 400 mgNO_x/Nm³, Gas turbine: less than 50 mgNO_x/Nm³

<ul style="list-style-type: none"> Type (residential, commercial, academic, research, other) Proximity to pollution sources 	
<p>Additional information</p> <ul style="list-style-type: none"> AADT trip generation Parking arrangements including reserved spaces for EV/car clubs/disabled; comparison of current and proposed provision Heating provision, type and fuel, location of flue vent Is the site in the Air Quality Management Area? Is the site in a Smoke Control Area? Is a detailed Air Quality Assessment provided? Layout if adjacent to busy road 	
Design Features	Please provide details about the design features selected to deliver no/very low air quality impact (see examples in Table 3.17).
Mitigation Proposed	Please provide details about the mitigation features selected to deliver no/very low air quality impact (see examples in Table 3.18).
1. Electric heating or low NOx boilers	Yes/No
2. Low-emission standards for CHP, where appropriate	Yes/No
3. EV charge points where there are car parking spaces (number, type) or EVCP strategy	Yes/No
4. Demolition and construction or Dust Management Plan	Yes/No
5. Other Mitigation Measures	Please provide details about the design features selected to deliver no/very low air quality impact if the air quality impact cannot be designed out.
Offset offered	Please provide details about the features selected to offset the remaining air quality impact (see examples in Table 3.19).

3.6.150 Developers of all major planning applications should also complete the air quality questions within the Sustainability Checklist (See Appendix 1). If one or more of these criteria are met a detailed **Air Quality Assessment** including dispersion modelling may be

required. Further guidance should be sought from the Environmental Quality and Growth team. Given the time required for dispersion modelling and monitoring of air quality for a detailed assessment as well as collection of traffic data to support the planning application, discussions should be sought with the local authority well before submission of a planning application.

Detailed Air Quality Assessment

3.6.151 If a detailed **Air Quality Assessment** with dispersion modelling is required, it should be carried out in line with the best practice guidance set out in the latest industry-prepared best guidance documents. At present, these are the IAQM document “Planning for Air Quality” (2017)³⁴ and the Defra document “Local Air Quality Management; Technical Guidance TG16” (2018). The latest available emission factors, background maps and conversion factors shall be used. Guidance may be updated to reflect changes in Government policy; the latest version of the relevant guidance should be consulted. The assessment may be incorporated into the full Environmental Statement if required for an Environmental Impact Assessment.

3.6.152 An Air Quality Assessment might not be required if the mitigation package (see below) is comprehensive and demonstrates that it will adequately offset any additional emissions produced by the development, or preferably lower emissions from the footprint of the site. In this case an Air Quality Statement may be sufficient. An example template is provided below and a downloadable version is available from the website³⁵. Early discussion with the Environmental Quality and Growth team is strongly recommended.

Cumulative Impact

3.6.153 A single development may have a very small impact on air quality, but many developments will, together, have a larger impact. For this reason it is important that:

- All developments, including minor developments, do not contribute to air pollution
- The cumulative impact of all developments is considered

3.6.154 Air quality assessments are required to consider the cumulative impact of known future developments within an area. With considerable growth planned for the Cambridge sub-region, most large developments will need to consider the traffic impact from those developments contained in the Local Plan. These scenarios will have to be quantified with the same level of traffic flow.

Dust

3.6.155 Temporary emissions of dust during the construction phase are of concern as they add to the overall exposure of particulate matter to residents, visitors and site workers. Cambridge City Council, in association with the Cambridge Forum for the Construction

³⁴ Land-Use Planning & Development Control: Planning for Air Quality, IAQM and EPUK, 2017

³⁵ <https://www.cambridge.gov.uk/air-quality-guidance-for-developers>

Industry, runs a ‘Considerate Contractor Scheme’³⁶ designed to ensure that construction can progress without making life unpleasant for people who live and work nearby.

3.6.156 Each site and operation will need its own separate consideration and the amount of detail required will depend upon the type and scale of the development. For Minor applications, details in simple terms of the operations to be undertaken and the dust control and mitigation measures to be adopted shall be submitted by the applicant. Each stage should be considered through demolition, site preparation, ground works, construction as well as materials storage, transport and handling, both on and off site. This could be in the form of a written statement or a table of activities and mitigation, and will be included in the Air Quality Statement if there will be demolition or earthworks. The activities should be selected from the table 3.16 below.

Table 3.16: Example of approach to consideration of dust as part of Minor applications

Operation / Activity	Site Control Methods
All dust generating activities on-site	<ul style="list-style-type: none"> • All site operatives to be made aware of the requirements to minimise airborne dust • Site hoarding and screening to be erected • Consideration of weather conditions –activities and mitigation to be reviewed on dry and windy days
Demolition	<ul style="list-style-type: none"> • Consideration of demolition methodology • Minimise drop heights • Watering / spraying of the structures during demolition
Stockpiles	<ul style="list-style-type: none"> • Stockpiles to be located away from most sensitive boundaries • Stockpiled materials to be covered and / or damped down • Stockpiled materials to be below the height of the site hoarding
Vehicles	<ul style="list-style-type: none"> • Vehicle engines to be switched off when not in use and not left running unnecessarily • Vehicle maintenance in accordance with the manufacturer’s specifications
Plant and equipment	<ul style="list-style-type: none"> • Choice of plant and equipment and method of work to reflect best practicable means for control of dust • Cutting and grinding: use of water sprays or local extraction • Equipment to be maintained in accordance with the manufacturer’s specifications
Handling of waste materials	<ul style="list-style-type: none"> • Use of enclosed chutes and covered skips • Minimise drop heights from chutes • Use of fine water sprays during waste handling activities • Material leaving the site to be loaded onto covered wagons or skips
Burning of waste	<ul style="list-style-type: none"> • The burning of waste will be prohibited on site

³⁶ <https://www.cambridge.gov.uk/considerate-contractor-scheme>

General housekeeping

- Internal access routes and hard-standing will be cleaned / damped down on a regular basis

3.6.157 For Major applications, a detailed dust management plan may be required to ensure that temporary emissions of dust are minimised. This may form part of a Construction Environmental Management Plan (CEMP). The risk of dust emissions from a demolition/construction site is assessed on a site-by site basis and the need for a detailed Dust Risk Assessment or a Dust Management Plan is judged based on various factors, including:

- the activities being undertaken (demolition, number of vehicles and plant etc.)
- the duration of these activities
- the size of the site
- the proximity of receptors to the activities
- the adequacy of the mitigation measures.

3.6.158 A dust management plan should reference and have regard to national and industry best practical technical guidance.

- The document 'Guidance on the assessment of dust from demolition and construction'³⁷ (IAQM, 2014) includes Dust and Air Emissions Mitigation Measures in section 8.2 for consideration including measures specific to demolition, earthworks, construction and track out.
- The GLA document 'Control of dust and emissions during construction and demolition'³⁸ (2016) provides details of undertaking a dust risk assessment which identifies suitable mitigation measures to be implemented. For major developments, we may require a risk assessment in accordance with this document.
- Guidance on dust monitoring is given in the document Guidance on Monitoring in the Vicinity of Demolition and Construction Sites³⁹, version 1.1 (IAQM, 2018). A commitment to undertake dust monitoring is also required for major sites. Whilst it may not be necessary to undertake continuous dust monitoring, agreement should be reached on when it will be undertaken. For example, spot checks could be undertaken on a regular basis at site boundary locations closet to sensitive receptors.

3.6.159 Longer term continuous monitoring of dust may need to be undertaken when agreed target levels are likely to exceeded, or upon the receipt of substantiated complaints.

3.6.160 It will be essential that the control methods prevent a statutory nuisance and any offence under Part III of the Environmental Protection Act 1990. However it is expected that controls should go beyond that minimal level of compliance and be more in line with the provisions of the Considerate Contractor Scheme.

3.6.161 It will be essential to detail if mobile crushing and screen equipment is used and if so to confirm that it will be used in accordance with the manufacturer's instructions. In

³⁷ <http://iaqm.co.uk/text/guidance/construction-dust-2014.pdf>

³⁸ https://www.london.gov.uk/sites/default/files/gla_migrate_files_destination/Dust%20and%20Emissions%20SPG%208%20July%202014_0.pdf

³⁹ https://iaqm.co.uk/text/guidance/guidance_monitoring_dust_2018.pdf

most cases such plant will need to be permitted for use by the Pollution Prevention and Control Act 1999. Such plant is usually hired. A copy of the permit from the local authority home base for the plant should be provided to the City Council prior to it being used on site.

Smoke

3.6.162 Open fires and wood-burning stoves have risen in popularity over recent years, however, smoke from burning causes particulate air pollution. The Clean Air Act 1995⁴⁰ is the legislation that regulates emissions from stoves. There are currently three Smoke Control Areas in Cambridge⁴¹. New legislation and/or guidance is expected from Defra in 2019. Developers are recommended to:

- Ensure that any applications are compliant with the Clean Air Act 1995 if their site is in a Smoke Control Area and
- Check our website⁴² to ensure adherence with the latest guidance

How to approach improving air quality in Cambridge

3.6.163 In line with NPPF, which states that development should contribute to and enhance the environment, there is a hierarchy within the approach to air quality improvements that should be followed, as illustrated in figure 10 below.

Figure 10: Hierarchical approach to air quality improvements as part of new development



3.6.164 The role of integrating the air quality impacts into a good development design at the outset of the design process cannot be understated. Effective planning can reduce the need to travel by car to the workplace, schools, shopping and leisure facilities by ensuring new dwellings are located in areas where such facilities are readily available, or where alternative transport modes are available. Careful consideration to building design and layout can assist in minimising exposure to future occupants. Policies that enforce high building standards can play an important role in reducing emissions from services that provide heating and hot water. Some examples of design features that can be incorporated are provided in table 3.17 below. The lists in these tables are not exhaustive and additional measures may be proposed for consideration. The standard mitigation measures required for both minor and major developments are highlighted in bold.

⁴⁰ <https://www.legislation.gov.uk/ukpga/1993/11/contents>

⁴¹ <https://www.cambridge.gov.uk/smoke-pollution>

⁴² <https://www.cambridge.gov.uk/smoke-pollution>

Table 3.17: Design measures to help reduce air quality impacts

- **Installation of electric vehicle charge points⁴³**
- Car free development
- Reduced car parking provision/parking restrictions
- Reserved parking for EV/car clubs
- Design/layout of the development to promote walking, cycling and public transport
- Design and layout of infrastructure to increase separation, for example, set buildings back from the roadside
- Locate habitable spaces away from busy roads
- Arrange site to separate polluting and sensitive uses
- Arrange site to centrally locate trip attractors
- Ensure high quality walking and cycling routes
- Plan mixed-use developments where appropriate
- Home Zones
- Consider impact on local road network
- Avoid creation of non-dispersive canyons
- **Install combined heat and power (CHP) to the emissions standards set out in Appendix 3**
- **Provision of efficient electric heating, low or ultra low NOx boilers only**
- Incorporation of solar thermal and/or PV technology to reduce emissions
- Incorporation of air source or ground source heat pumps to reduce emissions

3.6.165 Initially the development design and location should be looked at in terms of air quality impacts. If design cannot fully reduce the impact to an acceptable level then mitigation measures may be used to either protect receptors or minimise the need for vehicle use. Cambridge City Council recommends that a mitigation package is submitted for approval as part of an Air Quality Statement or Air Quality Assessment in support of the planning application. Some examples of mitigation features that can be incorporated are provided in table 3.18 below. The standard mitigation measures required for both minor and major developments are highlighted in bold.

Table 3.18: Mitigation measures

- **Dust Management Plan , where appropriate (for major sites, this may be incorporated into a Construction and Environmental Management Plan)**
- Support access to a car share scheme, with financial incentives and promotion
- Provision of bike hire scheme, including E-bikes and off-gauge bikes
- Travel planning
- Mechanical ventilation with clean air intake, if appropriate
- Eco-driving training, where appropriate
- Low emission fleet strategy
- Large-scale major developments could consider:
 - Support measures to reduce the need to travel:

⁴³ The UK Electric Vehicle Supply Equipment trade association has useful information. <http://ukevse.org.uk/>

- Alternative working practices – flexitime, teleworking, homeworking, videoconferencing, compressed work periods.
- Local sourcing of staff, products and raw materials.
- Development and use of hub distribution centres employing low emission deliveries.
- Provision of discounted on-site shopping, eating, child-care, banking facilities.
- Support measures to reduce polluting motorised vehicle use:
 - Use of pooled low emission vehicles – cars, vans, taxis, bicycles.
 - Provision of dedicated low emission shuttle bus including managed pick-up and drop-off.
 - Contribution to the emerging low emission vehicle refuelling infrastructure.
 - Contribution to site low emission waste collection services.
 - Incentives for the take-up of low emission vehicle technologies and fuels.
- Measures to support improved public transport:
 - Provision of new or enhanced public transport services to the site.
 - Shuttle services to public transport interchange, rail station or park and ride facilities.
 - Support improving information systems for public transport.
 - Supporting city free bus expansion schemes.
 - Promoting low emission bus service provision.
 - Support air quality monitoring programmes.
 - Subsidised bus passes
- Further measures to promote walking and cycling:
 - Improvements to district walking and cycling networks including lighting, shelters, and information points and timetables.
 - Support cycle training and awareness schemes.
 - Guaranteed ride home in emergencies.
 - Support secure and safe cycle parking facilities.
 - Installation of charge points for EV bikes
 - Provision of pool EV bikes
- Measures to promote sustainable travel plans:
 - Support local travel to school and school travel plans initiatives.
 - Marketing aimed at persuading a switch to sustainable modes with incentives
 - Promotion of subsidised/sponsored travel plan measures
 - Supporting community/local organisation groups to promote sustainable travel

3.6.166 Many developments will require a mix of design and mitigation measures that have been tailored to be appropriate for the site. The design and mitigation package should be presented with the planning application. Standard mitigation is required for minor sites and highlighted in bold in the boxes above. The design and mitigation measures can be secured by relevant planning conditions.

3.6.167 Offsetting by providing money for schemes that improve overall air quality should be a last resort but may need to be combined with good design and mitigation in some circumstances. Appropriate contributions can be negotiated or contributions can be

calculated using Defra's damage cost approach⁴⁴. Table 3.19 below provides some examples of possible offsetting measures. Early discussion with the Development Management team and the Environmental Quality and Growth Team is recommended if offsetting/contributions will be required.

Table 3.19: Possible offsetting measures

- Financial contribution towards traffic management measures
- Financial contribution towards improvements in public transport facilities and/or support for new services
- Financial contribution towards improvements in walking and cycling facilities
- Financial contribution towards air quality improvement projects

3.6.168 Framework developer contribution procedures provides clarity for developers and planners, speeds up the negotiation process, and is considered to be a fair and transparent process for all types of development. This approach has the added advantage of being able to ensure that mitigation is in place for the cumulative impacts of a number of smaller developments, which can jointly lead to a slowly increasing air pollution baseline. The basic concept of the approach is that best practice is to reduce emissions and exposure and that this is incorporated at the outset, at a scale commensurate with emissions.

3.6.169 One approach that has been widely used to quantify the costs associated with pollutant emissions from transport is:

- Identify the additional trip rates generated by proposed development (trips/annum)
- Assume an average distance travelled of 10km/trip
- Calculate the additional NOx and PM emissions, based of emission factors in the Emissions Factor Toolkit at 35 kph
- Multiply the calculated emissions by 5 (for 5 year total)
- Use HM Treasury and Defra IGCB damage cost approach⁴⁵ to provide a valuation of the excess emissions, using the currently applicable values for each pollutant⁴⁶
- Sum the NOx and PM costs

3.6.170 The cost calculated by these means provides a basis for defining the financial commitment required for offsetting the emissions reductions or the contribution provided by the developers as 'planning gain'.

3.6.171 Air Quality emissions from buildings can also be significant if the energy demand is high, for example high tech research facilities. Building emissions can and should be designed out at the initial development design phase, with consideration to site-wide approaches to energy.

3.6.172 This is an approach that can be used for Cambridge planning applications.

⁴⁴ <https://www.gov.uk/guidance/air-quality-economic-analysis>

⁴⁵ <https://www.gov.uk/guidance/air-quality-economic-analysis>

⁴⁶ <https://www.gov.uk/guidance/air-quality-economic-analysis#damage-costs-approach>

Further guidance

- 3.6.173 For further guidance on air quality please see:
- Cambridge City Council (2018). Air Quality Action Plan. Available online at: <https://www.cambridge.gov.uk/media/3807/air-quality-action-plan.pdf>
 - IAQM and EPUK, (2017). Land-Use Planning and Development Control: Planning for Air Quality. Available online at: <http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>
 - Defra (2018). Local Air Quality Management; Technical Guidance TG16. Available online at: <https://iaqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf>
 - IAQM (2014). Guidance on the assessment of dust from demolition and construction. Available online at: <http://iaqm.co.uk/text/guidance/construction-dust-2014.pdf>
 - GLA (2016). Control of dust and emissions during construction and demolition. Available online at: https://www.london.gov.uk/sites/default/files/gla_migrate_files_destination/Dust%20and%20Emissions%20SPG%208%20July%202014_0.pdf
 - IAQM (2018). Guidance on Monitoring in the Vicinity of Demolition and Construction Sites, version 1.1. Available online at: https://iaqm.co.uk/text/guidance/guidance_monitoring_dust_2018.pdf

Air Quality – South Cambridgeshire

LOCATION:	South Cambridgeshire
POLICY:	Policy SC/12: Air Quality
SCALE OF DEVELOPMENT:	All major development requiring a Transport Assessment and a Travel Plan Any development where air quality is likely to be a significant issue
TYPE OF DEVELOPMENT:	Residential and Non-residential development
SUBMISSION REQUIREMENTS:	<ul style="list-style-type: none">• Air Quality Assessment• Low Emission Strategy
LINK TO THE SUSTAINABILITY CHECKLIST:	Pol.15 and Pol.16

Policy overview

- 3.6.174 Policy SC/12 seeks to ensure that new development does not exacerbate, or be impacted by air pollution and pollution from odour and other fugitive emissions to air. Air quality issues within South Cambridgeshire have been linked directly to the volume of traffic that runs through the district, specifically along the A14. The A14 is congested on a regular basis between Bar Hill (to the west of Cambridge) and Milton (to the north north-east of Cambridge). This has resulted in the declaration of an Air Quality Management

Area (AQMA) for nitrogen dioxide (NO₂) and PM₁₀ along a stretch of the A14 between Bar Hill and Milton. The Joint Air Quality Action Plan for Huntingdonshire, Cambridge City and South Cambridgeshire incorporates priority actions for tackling air quality issues through the land use planning process. Cambridge has also recently adopted its new Air Quality Action Plan, covering the period from 2018 to 2023⁴⁷, which will need to be taken into consideration for cross boundary applications. The requirements set out in these documents, along with successor documents, will need to be taken into consideration when developing planning proposals.

Submission requirements

3.6.175 A Low Emission Strategy (LES) will need to be submitted alongside planning applications for major developments requiring a Transport Assessment and a Travel Plan and developments with significant transport implications as follows:

- In particularly congested locations and/or generating large number of trips;
- Where there are particular travel problems; or
- That will have an adverse impact on an existing, or will result in the declaration of a new, Air Quality Management Area, or an unacceptable adverse impact on local air quality.

3.6.176 An LES provides a package of measures to help mitigate the transport impacts of development on local air quality and on climate change. They complement other design and mitigation options, such as travel planning and the provision of public transport infrastructure. Strategies are often secured through a combination of planning conditions and planning obligations. They may incorporate policy measures and/or require financial investments in and contributions to the delivery of low emission transport projects and plans, including strategic monitoring and assessment activities.

3.6.177 Table 3.20 below sets out the Council’s preferred sustainable transport measures to be included within any LES to support planning applications for Major developments. These measures are taken from South Cambridgeshire District Council’s emerging Air Quality Strategy.

Table 3.20: Sustainable Transport Measures to be included in Low Emission Strategy

CATEGORY	MEASURES
Electric and Low Emission Vehicles Uptake	
Residential developments	<ol style="list-style-type: none"> 1. Charging Point (standard or fast where possible) for all private and allocated parking spaces 2. Charging Point (Fast or Rapid where possible) for every 10 communal parking spaces

⁴⁷ Available online at: <https://www.cambridge.gov.uk/air-quality-action-plan>

CATEGORY	MEASURES
Commercial Developments	<ol style="list-style-type: none"> 1 Rapid Charging Point/station Per 1000m² of floorspace or per 20 parking spaces or 2. Allocated fast Charging Point for 50% of proposed parking spaces
Supporting Infrastructure	<ol style="list-style-type: none"> 1. Provision of infrastructure to facilitate additional charging points 2. Support for other Low Emission technologies is welcome and considered on site-by-site basis
Behavioural Change and Travel Plan	
Modal Shift Facilities and Incentives	<ol style="list-style-type: none"> 1. Phasing of the cycling/pedestrian infrastructure 2. Membership for Car Share and Car Hire schemes 3. Subsidised Bus and Rail Pass 4. Discount Vouchers/arrangements for shops (local) to assist with cycling uptake i.e. purchase, servicing , repairs and training 5. Promoting non-idling 6. Electric Shuttles, or other low emission alternative, to local facilities i.e. schools & public transport hubs (funded long-term) 7. Sheltered bus stops 8. Provision of Car Share Scheme 9. Provision of a Car Club Scheme 10. Provision of Bike-sharing schemes 11. Secure bike storage facilities (site wide) 12. Sufficient bike storage within housing and apartment blocks 13. Parking enforcement for non-allocated spaces 14. Personalised Active Travel Plans
Parking Provision (In line with cycle parking requirements set out in policy TI/3)	
Parking Allocation and Facilities	<ol style="list-style-type: none"> 1. Non-idling policy 2. Priority Parking Bays for Low Emission Vehicles (with provision of Charging Points) 3. Priority Parking Bays for Car Share Schemes 4. Secure and sheltered parking area for cycles 5. Provision of charging points for electric bikes and provision for off-gauge bikes
Public Transport	

CATEGORY	MEASURES
Support for Sustainable and Low Emission Public Transport	<ol style="list-style-type: none"> 1. Participation in district wide public transport schemes 2. Contributions for sustainable transport infrastructure enhancement, such as new guided busways, cycle routes, train stations etc. 3. Contributions for Low Emission Buses or Retrofitting the existing fleet (serving the area of the development) 4. Participation in Greater Cambridgeshire Partnerships projects near the development 5. Sheltered bus stops 6. Local Shuttles to public transport hubs
Offsetting Emissions	
Financial contributions	Appropriate mitigation contributions can be calculated using Defra's damage cost approach (Guidance). Offsetting should be a last resort and will be considered on site-by-site basis.

3.6.178 In addition to the measures outlined in table 3.20 above, there are a range of additional measures that can be incorporated into new developments that will have additional benefits in terms of improving air quality as well as meeting other policy requirements set out in the South Cambridgeshire Local Plan (2018). Some of the measures which could be included are outlined in table 3.21 below. Note that this table is not exhaustive.

Table 3.21: Additional measures which can assist with improving air quality

CATEGORY	MEASURES	LINKS TO LOCAL PLAN POLICY AND/OR RELEVANT GUIDANCE IN THIS SPD WHERE APPROPRIATE
Renewable and low carbon energy	At least 10% of the buildings carbon emissions through the use of on-site renewable and/or low carbon energy	South Cambridgeshire Local Plan (2018) Policy CC/3 Section 3.2 (paragraphs 3.2.14 – 3.2.38)
Combined Heat and Power (CHP) – emissions standards	Any gas fired CHP should meet an emissions standard of:	Section 3.2 (paragraph 3.2.31) and Appendix 3
Gas boiler efficiency	<ul style="list-style-type: none"> • Spark ignition engine: less than less than 150 	

CATEGORY	MEASURES	LINKS TO LOCAL PLAN POLICY AND/OR RELEVANT GUIDANCE IN THIS SPD WHERE APPROPRIATE
	<p>mgNO_x/Nm³</p> <ul style="list-style-type: none"> • Compression ignition engine: less than 400 mgNO_x/Nm³ • Gas turbine: less than 50 mgNO_x/Nm³ <p>A low NO_x boiler would meet a dry NO_x emission rating of 40mg NO_x /kWh</p>	
Biomass boilers	A standalone checklist should be obtained from Environmental Services for all biomass boilers	South Cambridgeshire Local Plan (2018) Policy SC/12
Optimised design	<p>New development should be designed to minimise public exposure to pollution sources by</p> <ul style="list-style-type: none"> • Locating habitable rooms away from busy roads • Avoiding building configuration along busy roads that inhibits effective pollution dispersion (street canyons), • Considering the proximity of sensitive receptors such as schools to busy roads. • Introducing green infrastructures and barriers to reduce pollutants 	
Construction standards	Many measures to enhance the sustainability and energy efficiency of the built environment also have the additional benefit of delivering mutually beneficial	South Cambridgeshire Local Plan (2018) – Chapter 3 Strategic Sites. Can assist with those sites that have policy criteria related to exceeding baseline policy

CATEGORY	MEASURES	LINKS TO LOCAL PLAN POLICY AND/OR RELEVANT GUIDANCE IN THIS SPD WHERE APPROPRIATE
	<p>air quality objectives. Construction standards such as BREEAM and Home Quality Mark (HQM) include consideration of air quality. While not specifically required by policy in the South Cambridgeshire Local Plan (2018), use of these construction standards is fully supported.</p>	<p>requirements set out in the climate change chapter of the Local Plan (2018).</p>
<p>Building ventilation</p>	<p>The preference should be for buildings to be naturally ventilated wherever possible.</p> <p>Sealed fascia's with active ventilation or active air filtration should only be used in cases where other options are not available, for example in areas around AQMA's or areas that could suffer from excessive noise. Care must be taken in designing such systems that the thermal comfort of building users can be guaranteed, with consideration given to future climate scenarios. Note that this should not preclude mechanical extract systems in bathrooms and kitchens, and the Council would be supportive of the use of Mechanical Ventilation with Heat Recovery (MVHR) to supplement natural ventilation, where systems are correctly specified, installed and maintained.</p>	<p>Section 3.4 (Climate change adaptation, paragraphs 3.4.10 – 3.4.15)</p>

CATEGORY	MEASURES	LINKS TO LOCAL PLAN POLICY AND/OR RELEVANT GUIDANCE IN THIS SPD WHERE APPROPRIATE
Construction Phase		
Construction dust monitoring	Monitoring will be requested on a site by site basis. In line with best practice guidance (see further guidance below).	South Cambridgeshire Local Plan (2018) policy SC/12)
Construction vehicles	Any diesel-powered machines used on, or otherwise serving the site, must be run on ultra-low sulphur diesel (also known as ULSD 'cleaner diesel' or 'green diesel'). "Ultra-low sulphur diesel" means fuel meeting the specification within BS EN 590 .	
Construction road layout	Using design measures including speed restrictions and traffic management.	South Cambridgeshire Local Plan (2018) Policy CC/6: Construction Methods
Construction Environmental Management Plan (CEMP)	<p>A CEMP will cover impacts to air quality mainly associated with dust and odour. The CEMP will also cover more general environmental health issues such as noise and light pollution.</p> <p>Site activities include plant emissions – measures could include switch-off policy, plant maintenance and alternative fuel use.</p>	South Cambridgeshire Local Plan (2018) Policy CC/6: Construction Methods

3.6.179 An **Air Quality Assessment** will be required for applications where air quality is likely to be a significant issue. This could either be from:

- Emissions to the air arising from the proposed development including changes in traffic generation / distribution / composition, combustion appliances or other point

sources of air pollution and the potential effect on local air quality, public health, the environment or amenity.

- Where a development would adversely affect air quality in a designate AQMA, or lead to the declaration of a new or increase an existing AQMA, or render unworkable elements of the Council's Air Quality Action Plan.
- Proposed introduction of a sensitive use (e.g. residential) into an area of poor air quality.
- Proposed introduction of a sensitive use (e.g. schools and care homes) near busy roads where pollution from traffic is of concern.

3.6.180 The exact level of assessment to be included in the Air Quality Assessment will need to be discussed with officers from the Air Quality team on a case by case basis. These discussions will need to take place at an early stage in the design of the development to ensure that all possible mitigation measures are integrated into the scheme.

Further guidance

3.6.181 For further guidance on the assessment of air quality as part of the planning application process see:

- Land-Use Planning and Development Control: Planning for Air Quality, January 2017 - Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM). Available online at:
<http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>
- Guidance on the assessment of dust from demolition and construction, v1.1 June 2016 - Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM). Available online at:
<https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf>
- Guidance on Monitoring in the Vicinity of Demolition and Construction Sites, October 2018 - Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM). Available online at:
https://iaqm.co.uk/text/guidance/guidance_monitoring_dust_2018.pdf
- National Planning Practice Guidance (NPPG) – Air Quality. Available online at:
<https://www.gov.uk/guidance/air-quality--3>
- National Clean Air Strategy 2019. Available online at:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf
- Department for Environment, Food and Rural Affairs (Defra) Damage Cost Guide:
<https://www.gov.uk/guidance/air-quality-economic-analysis#damage-costs-approach>
- Greater Cambridgeshire Partnership
<https://www.greatercambridge.org.uk/>
- [Cambridgeshire Local Transport Plan](#)
- [South Cambridgeshire Community Transport Strategy](#)

Odour and Other Fugitive Emissions to Air

LOCATION:	Cambridge and South Cambridgeshire
POLICY:	Cambridge: Policy 36: Air quality, odour and dust South Cambridgeshire: Policy SC/14: Odour and Other Fugitive Emissions to Air
SCALE OF DEVELOPMENT:	All Major Development (add details),
TYPE OF DEVELOPMENT:	Residential and Non-residential
SUBMISSION REQUIREMENTS:	<ul style="list-style-type: none">• Odour impact risk assessment or detailed odour impact assessment
LINK TO THE SUSTAINABILITY CHECKLIST:	For applications in Cambridge see Pol.27, Pol.28 and Pol.29 For applications in South Cambridgeshire see Pol.17, Pol.18 and Pol.19

Policy context

3.6.182 Potential odour impacts/effects associated with new development can be a material planning consideration, as odours can have an unacceptable adverse impact/effect on amenity, quality of life and living conditions. Impact on amenity as a result of odour annoyance can occur when a person exposed to an odour perceives the odour as unwanted and it detracts from the overall character or enjoyment of an area. Odours can give rise to unpleasantness, annoyance, nuisance or complaints. Due to chemical complexity and smell variety, it is difficult to completely eliminate all odour / smells. The odour effect that the planning process needs to be concerned with is the negative adverse appraisal by and effect on a human receptor as a result of odour exposure.

3.6.183 Odours arising from industrial, trade or business premises can also be considered a statutory nuisance by local councils under the Environment Act 1990, if they unreasonably and substantially interfere with the use or enjoyment of a home or other premises. It is important to note that loss of amenity or disamenity does not equate directly to nuisance and significant loss of amenity will often occur at lower levels of odour exposure than would constitute a statutory nuisance. Nuisance is not intended to secure a high level of amenity but is a basic safeguarding standard intended to deal with excessive emissions. It is therefore important for the planning authorities to consider properly, loss of amenity from emissions in the planning process in its wider / broader context and not just from the narrow perspective of statutory nuisance.

3.6.184 Odour is a complex issue that air quality professionals are frequently required to assess, particularly in respect to planning. Potential odour impacts may need to be assessed when considering a new development planning application for:

- i. **Odour Generating Development** - a source, process, activity or use that may generate / release odours (odorous activities) and in particular when near existing sensitive uses / premises, or
- ii. **Odour Sensitive Development** - a new sensitive use / premises that is being proposed near to an existing / established odorous source, process, activity or use (often referred to / known as 'encroachment').

3.6.185 The planning system should ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.

3.6.186 Ideally, significant sources of odour generating development should be separated from odour sensitive users of the neighbouring land (sensitive receptors). If this is not practicable or achievable, it may be possible to employ odour abatement / control and mitigation measures and other design solutions to make a proposed development acceptable in principle from a land-use perspective.

Submission requirements

3.6.187 New proposals for odour generating developments may require an odour impact risk assessment statement or detailed odour impact assessment to be submitted, either as a stand-alone assessment or as part of an Environmental Statement if 'Environmental Impact Assessment' development, to accompany the planning application to determine if the proposals are acceptable. Odours can be associated with a wide range of activities. Typical examples of potentially odorous activities are:

- sewage / wastewater and sludge treatment works
- intensive livestock and animal rearing / farming
- processing / rendering of animals / animal by-products
- landfill and waste disposal and recycling sites
- solid waste management, handling and treatment plants (for example compost windrows turning)
- biofuels and anaerobic digestion facilities
- food production and manufacturing sector
- pet food processing
- foundry emissions
- some industrial processes such as B2 - General industrial
- 'sui generis' uses such as launderettes and nail bars
- the majority of hot food premises

3.6.188 An odour impact assessment may also be required for any development that will introduce new receptors to an area that may be subject to odour. In all cases where the generation of odours from the development can be readily anticipated, the LPA shall expect to be provided with objective evidence that demonstrates that odour emissions will be adequately controlled to prevent any significant loss of amenity to neighbouring sensitive land uses. The degree of detail provided in such assessments should be proportionate to the risk of odour impact, taking account of factors including the

proximity of receptors, the scale of the proposed activity and the nature of the proposed development.

3.6.189 Careful consideration should be given to the location of new odour sensitive developments such as residential developments, schools and hospitals near to existing odour sources at industrial type premises / activities. Encroachment of odour sensitive development around such odour sources may lead to problems with the site becoming the subject of complaint, essentially creating a problem where there was not one before. In order to avoid adverse effects on existing businesses with odour generation the LPA will apply the 'agent of change principle' where odour sensitive uses are proposed in close proximity to them. The agent of change principle identifies that the party responsible for a change should also be responsible for managing the impact of that change. The LPA may seek to secure mitigation measures through the use of design / layout and or planning conditions if necessary. In some case mitigation may only be practicable or achievable off- site at source and in these circumstance s106 obligations may be required.

3.6.190 Ideally a robust screening process at the application submission stage should help to identify new developments where adverse odour impacts may arise. Screening should aim to identify applications where odours are a potential issue, whether the application site is the source, or the application site is close to potential odour sources. At the pre-application stage, sources of odour from or near to proposed developments need to be identified and assessed for potential impact.

Content of an odour impact assessment for planning

3.6.191 An assessment of the impact and resulting effects of an odour source, process, activity or use on surrounding users of the land should usually seek to identify and contain the following key elements:

- A description of existing baseline odour conditions (including complaints history) where relevant.
- A description of the location of receptors (either existing or proposed) and their relative sensitivities to odour effects. Sensitivity to odours is based upon the level of expected amenity and the length of time users would be exposed to odour (Uses such as residential, hospitals, schools are classified as high sensitivity because users would expect enjoyment of a high level of amenity and would be present for extended periods of time. Places of work and retail premises are classified as medium sensitivity and industrial and farm use, roads / footpaths are low sensitivity.
- Details of potential odour sources (whether existing or proposed), including the activities and materials involved (including a brief outline of quantities, durations, methods of handling and storage, etc.) and the resulting potential for generating odours, covering fugitive sources, diffuse sources and point sources as applicable. Undertake odour source- evaluation, management, treatment and control.
- A description of control/mitigation and design measures incorporated into the scheme proposals (including: management controls and, where appropriate, odour abatement engineering controls).

- Depending on the nature of the proposals prediction or observation (or combination of both), using appropriate assessment tools, of the likely odour impact and resulting effects at relevant sensitive receptors, and taking into account:
 - the likely magnitude of odour emissions (after control by measures incorporated into the scheme, if applicable);
 - the likely meteorological characteristics at the site;
 - the dispersion and dilution afforded by the pathway to the receptors and the resulting magnitude of odour that could result;
 - the sensitivity of the receptors either existing or proposed; and
 - the potential cumulative odour effects with any odours of a similar character, (e.g. if odours from kitchen waste are in addition to an existing municipal solid waste throughput.)
 - consideration and justification for any odour benchmark/odour assessment acceptability criteria used
- Where odour modelling has been used the report should contain full details of the input data and modelling options used to allow a third party to reproduce the results.
- Where odour effects are assessed as significant, details of appropriate further design, mitigation and odour abatement control measures that could allow the proposal to proceed without causing significant loss of amenity.
- The residual odour impacts and their effects on a receptor of a particular sensitivity.
- A conclusion on the significance of the residual effect, i.e. whether “significant” or “not significant” and whether there is likely to be an unacceptable adverse impact on amenity / quality of life.

3.6.192 Assessing the odour impact of particular activity can be a complex process and is dependent on the complexity of the activity and the systems in operation concerned. We would therefore recommend that applicants and their consultants to consult with the environmental health as part of the pre-application process to gain agreement on the approach and methodology that will be used and what elements should be included.

Submission Requirements - Level of Odour Assessment / Risk Assessment Required: Low to Medium Risk Developments - Hot Food Premises

3.6.193 For small scale developments such as a new hot food takeaway, a relatively simple risk assessment based approach is likely to be appropriate, providing it is carried out in a thorough manner. An example of an Odour Risk Assessment Protocol for commercial kitchens is provided in the document ‘Control of Odour and Noise from Commercial Kitchen Exhaust Systems - An update to the 2004 report prepared by NETCEN for DEFRA (EMAQ, 5-9-2018)’.

3.6.194 A simple risk assessment approach is suggested as a means of determining odour control requirements based on the height of flue discharge, proximity of sensitive receptors, size of kitchen and type of cooking (odour and grease/smoke loading). Odour controls systems will need to include an adequate level of odour control and stack dispersion or a combination. The equipment installed to remove cooking odours from the extract air will depend upon the level of control required and will need to deal with the two main phases of contaminants within cooking emissions: the particulate (grease,

small food and smoke particles) and gaseous (odour vapour/volatile organic compounds). The aim of any ventilation/extraction is to ensure that no nuisance, disturbance or loss of amenity is caused by odour or smoke/fumes, food droplets to nearby properties. A suitably qualified and experienced person with specialist knowledge of ventilation schemes should undertake the design and installation of a ventilation system. Designing and installing appropriate ventilation systems may involve considerable expense. In circumstances where the end user of the premises is unknown, or where the specific type of food to be cooked is unknown, the installation should be designed to achieve the highest level of odour control in order to cater for a worst case scenario.

- 3.6.195 Additionally, the visual appearance of the flue may be important and the flue itself may require a separate planning permission. This is important not least because possible odour mitigation measures could in themselves impact on other land use planning requirements and amenity or quality of life implications. The installed systems must not appear as an incongruous feature in the street scene and this could be a constraining factor. To be acceptable the proposed extraction system will have to be:
- Located preferably to minimise its visual impact on the street scene
 - Of a colour, finish and design to blend in with the buildings to which it is attached, incorporating cladding where appropriate; and
 - Installed within the building where practicable and particularly where the proposal is within a conservation area or within the setting of a listed building.

- 3.6.196 To enable the LPA to assess the suitability of a ventilation scheme, the following information should be provided:
- Information on premises: the following information should be supplied:
 - i. the number of meals to be served per day;
 - ii. the method(s) of preparation and cooking;
 - iii. the types of meal served; and
 - iv. proposed hours of operation of the business and any ventilation plant.
 - Plans and drawings: a scaled plan showing the internal arrangement of the premises and the dimensions/location of the ventilation system should be provided. The plan must contain external elevations of the buildings showing the dimensions, route; and exhaust termination characteristics (i.e. appearance) of the ductwork in relation to the building. The location of all filters and the fan must be clearly marked. Where the location of a filter is shown the type must be clearly identified and cross-referenced to the detailed product specification.
 - Pre-filters - A copy of the manufacturer's product data sheet should be supplied
 - Electrostatic precipitators (where proposed) A copy of the manufacturer's product data
 - Carbon Filters (where proposed) - The details and type of carbon filter units should be identified
 - Odour counteractant or neutralising system (where proposed) - The details and type of counteractant or neutralising system should be identified
 - Cooker hood characteristics – dimensions, dwell time of the gases in the carbon filtration zone, efflux velocity
 - System Operation - extract rate, dwell time of the gases in the carbon filtration zone, efflux velocity

- Flue Design: the height and velocity of the final discharge stack are the two important factors. Generally, the greater the flue height, the better the dispersion and dilution of odours. The discharge stack should:
 - i. discharge the extracted air not less than 1 m above the roof ridge of any building within 15 m of the vent serving the commercial kitchen. Additional odour control measures may still be required depending on cooking type and frequency.
 - ii. If (i) cannot be complied with for planning reasons, then the extracted air shall be discharged not less than 1 m above the roof eaves or dormer window of the building housing the commercial kitchen. A high level of odour control measures than those required in part (i) may be required.
 - iii. If (i) or (ii) cannot be complied with for planning reasons or ownership or structural constraints, then an exceptionally high level of odour control measures than those required in part (i) or (ii) may be required in order to reduce odours, such as an increase in efflux velocity and additional filters, etc. The final discharge should be vertically upwards with a jet cowl or similar, unimpeded by flue terminals, such as rain cowls/caps. The number of bends in the ducting should be minimised and the ducting should have a smooth internal surface.
- Maintenance schedule for all systems.

Submission Requirements - Level of Odour Assessment / Risk Assessment Required: Medium to Higher Risk Developments

- 3.6.197 For higher risk odour generating uses, such as a new sewage treatment works or when odour sensitive uses are proposed near such uses, a more rigorous approach to evaluating odour impact may be appropriate. For such proposals odour assessment should be undertaken in accordance with the Institute of Air Quality Management document 'Guidance on the assessment of odour for planning (IAQM, Version 1.1 - July 2018)' and Environment Agency 'H4 Odour Management Guidance, March, 2011'.
- 3.6.198 Environmental health officers must be contacted prior to any odour assessment for agreement on the most suitable method.
- 3.6.199 The odour impact information, statement and assessment as appropriate, that has been submitted will be assessed and relative weight given to the significance of any odour impacts/effects. If unacceptable odours cannot be prevented by means of an effective design and mitigation planning permission will not normally be granted.
- 3.6.200 If it is concluded that odour/fume generation can be abated to an acceptable level then a planning condition may be imposed requiring the submission of the final design and specific details of an odour mitigation scheme and odour management plan (odour overview, source identification, control/mitigation including maintenance, monitoring, complaints handling and review) as necessary, in writing for approval by the LPA.

Odours – Planning and Industrial Pollution Prevention and Control Regimes

3.6.201 Following the granting of planning consent, some potentially odorous new developments e.g. industrial or waste activities may be required to operate under separate pollution control regimes such as an Environmental Permit, whereby on-going pollution control of many (though not always all) of the operations will be regulated by the Environment Agency or other agencies. Therefore the council should be contacted prior to any planning application or permit application being submitted for an agreement on the type and scale of any assessment that may be required. Even with effective operational pollution regulation in place some residual odour can remain and there may be some situations where such residual effects would make a development an unsuitable use of land at its proposed location. For sites that will be subject to an Environmental Permit it is still necessary, therefore, for the Planning Authority to consider at the planning stage whether the proposed development at the site will be a suitable use of the land - in particular, with regard to the likely residual effects of odour on nearby sensitive users.

3.6.202 Where a development requiring planning permission will also require a permit, it is recommended that the operator makes both applications in parallel, whenever possible, to allow a consistent approach. This will allow the council to begin its formal considerations early on, thus allowing it to co-ordinate both the planning process and permit application process. Joint pre planning discussions with the Environment Agency, the planning authority and the developer are also recommended in order that all interrelated issues can be considered at an early stage. This is particularly important where fundamental issues exist which may affect whether the development is acceptable. Guidance for developments requiring planning permission and environmental permits, October 2012, is available on the Environment Agency website: <https://www.gov.uk/government/organisations/environment-agency>

Odour Control Mitigation

3.6.203 Before an adverse effect (such as disamenity, annoyance, nuisance or complaints) can occur, there must be odour exposure. For odour exposure to occur all three links in the source-pathway-receptor chain must be present:

- a. an emission **source** - a means for the odour to get into the atmosphere
- b. a **pathway** - for the odour to travel through the air to locations off site
- c. the presence of **receptors** (people) that could experience an adverse effect, noting that people vary in their sensitivities to odour.

3.6.204 The option of preventing and controlling odours relies on an ability to intervene effectively at one or more stages of the 'Source-Pathway-Receptor' process, as follows:

- Preventing the release of odorous air to the atmosphere by containment and odour control
- Preventing the formation of odorants in solid and liquid material within a process;
- Preventing the transfer of odorants from a mixture to gas phase [air] and reducing concentration by abatement and control;
- Preventing the transportation of odorants from the source reaching receptors: anything that increases dilution and dispersion of an odorous pollutant plume as it

travels from source to receptor will reduce the concentration at the receptor, and hence reduce exposure.

- Influencing the quality of the odour to reduce the perception of odours as a nuisance by receptors;
- Implementation of an odour management plan (ongoing odour overview, source identification, control / mitigation including maintenance, monitoring, complaints handling and review)
- Prevent or reduce exposure to odour at receptor location, and
- Ensuring effective communication

3.6.205 Table 3.22 below provides examples of odour control and mitigation measures. Where mitigation measures are required, these should be detailed within the Odour Impact Assessment.

Table 3.22: Examples of odour control measures

Odour Source	Proactive / Planned Measures
Sewage treatment	<p>Closed-containment process over high emission areas</p> <p>Odour control systems / filters</p>
Paints and solvents	<p>Ventilation design</p> <p>Solvent extraction and recovery systems</p> <p>Vents located away from residents</p>
Animals, livestock and poultry	<p>Site assessment and building design for odour control;</p> <p>Stocking density planned and agreed</p>
Storage and spills	<p>Design of containment and covered areas for moving liquid</p>
<p>Hot food takeaways, food processing and commercial kitchens and;</p> <p>Industrial/chemical processes</p>	<p>Ventilation design – high level of discharge to facilitate the adequate dispersion and dilution of odours;</p> <p>Extraction and filtration / odour abatement and control systems;</p> <p>Vents located away from residents</p>

Further guidance

3.6.206 For further guidance please see:

- Institute of Air Quality Management. Guidance on the assessment of odour for planning (IAQM, Version 1.1 - July 2018). Available online at: <http://www.iaqm.co.uk/text/guidance/odour-guidance-2014.pdf>
- Environment Agency - H4 Odour Management Guidance. Available online at: <https://www.gov.uk/government/publications/environmental-permitting-h4-odour-management>
- Control of Odour and Noise from Commercial Kitchen Exhaust Systems - An update to the 2004 report prepared by NETCEN for DEFRA (EMAQ, 5-9-2018). Available from: <https://ee.ricardo.com/downloads/air-quality/control-of-odour-and-noise-from-commercial-kitchen-exhaust-systems>
- DW 172: Specification for Kitchen Ventilation Systems - Building Engineering Services Association (BESA, Second Edition 2018). Available from: <https://www.thebesa.com/knowledge/shop/products/dw-172-specification-for-kitchen-ventilation-systems/>
- Protecting our Water, Soil and Air: A Code of Good Agricultural Practice for farmers, growers and land managers (Defra, updated 27 July 2018). Available online at: <https://www.gov.uk/government/publications/protecting-our-water-soil-and-air#history>
- Technical Guidance Note IPPC SRG 6.02 (Farming) 'Odour Management at Intensive Livestock Installations', (Environment Agency, May 2005. Available online at: <https://www.gov.uk/government/publications/intensive-farming-introduction-and-chapters>