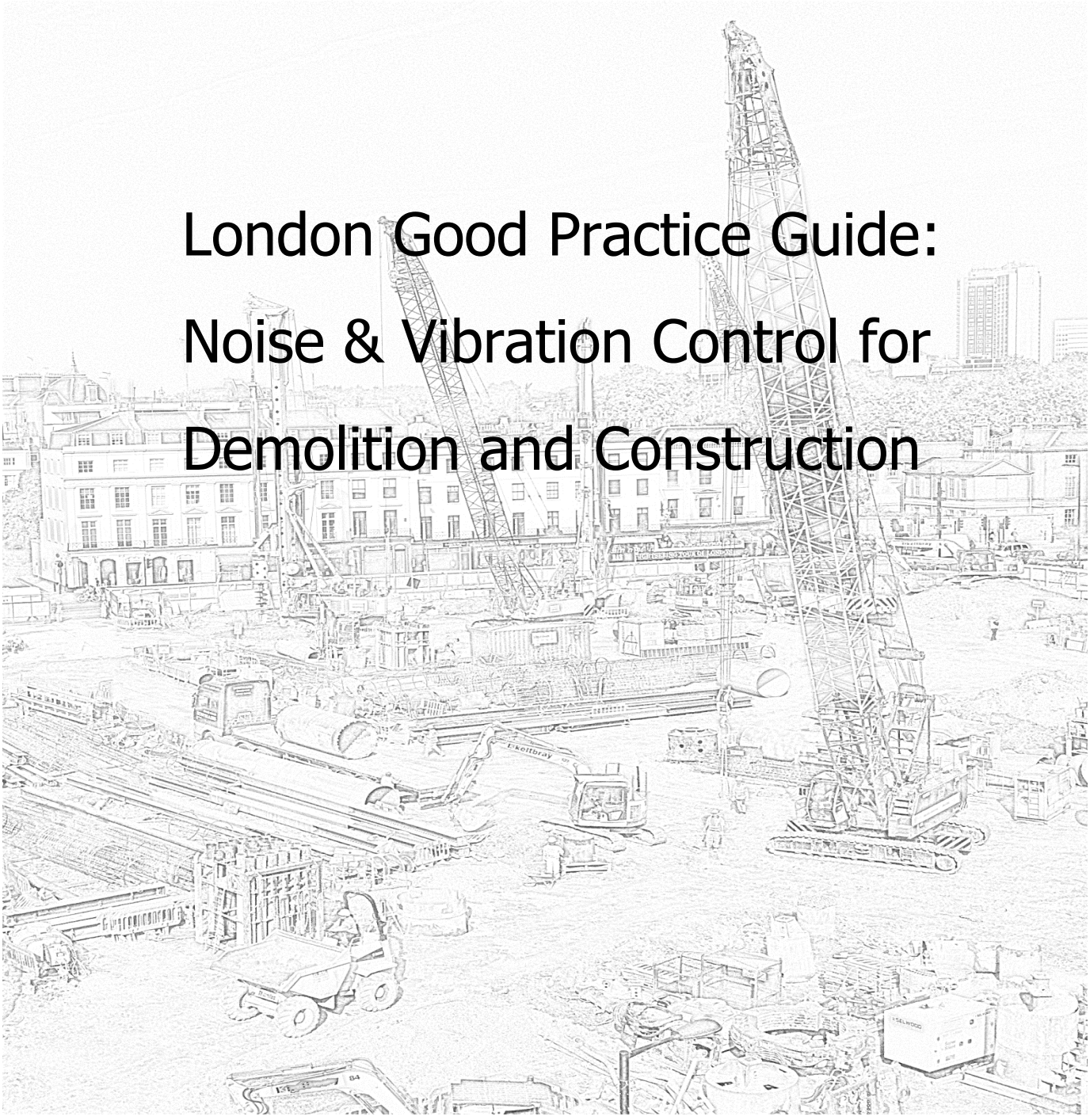

London Good Practice Guide: Noise & Vibration Control for Demolition and Construction

The London Authorities
Noise Action Forum
July 2016

Chartered Institute of Environmental Health

ARUP

AECOM

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LANAF
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Disclaimer: This Guide does not constitute an Approved Code of Practice and it neither replaces nor provides an authoritative statement of the law or of the policies and standards of any local authority on which users should take their own advice if required.

July 2016

ISBN 978-1-910676-26-4

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Preface

London has, in the past 15 years, been home to some of the largest construction developments in the country, many of which have been undertaken in locations in close proximity to neighbouring properties sensitive to noise and vibration.

Experience from these developments shows that effective early planning, consideration of noise and vibration through the design process and early identification of on-site noise and vibration mitigation can minimise the disturbance to these neighbouring properties.

This guide has been produced by representatives from the London Authorities Noise Action Forum (LANAF), a subgroup of the London Pollution Study Group working under the umbrella of the Chartered Institute of Environmental Health (CIEH), in collaboration with acoustic consultants who work with building contractors in controlling noise and vibration from demolition and construction sites. Their experience includes Crossrail, Thameslink, Heathrow Terminal 5, High Speed 1, London Overground and many other schemes, both large and small

Using this wealth of experience this guide has been collated primarily to provide good practice measures to be applied to control noise and vibration on site.

Additionally the guide provides advice to assist developers and contractors in applying the appropriate level of noise and vibration control on their site, based on a 'risk assessment' approach, where promoters, developers and/or contractors can establish the appropriate risk category for the site. Guidance is provided regarding Government noise policy, vibration levels and details of industry good practice schemes.

The steering group

Ian Hooper	Royal Borough of Kensington and Chelsea
Chris Howard (Chair)	London Borough of Lewisham
Muhammad Islam	London Borough of Hillingdon
Bill Legassick	London Borough of Southwark
Yuyou Liu	AECOM
David Owen	Arup
Mark Partridge	London Borough of Newham
Garry Seal	City of London
Barbara Terres	City of Westminster

A detailed review of the document was undertaken by Colin Cobbing (Arup) and Rick Methold (Southdowns Environmental).

The document was issued to LANAF members and other interested parties for consultation in December 2014. The responses from the consultation were considered by the steering group and changes were made as a result, where appropriate.

Good Practice Measures

The underlying legal principle of controlling noise and vibration on site is that the activities should be undertaken in a manner which demonstrates that Best Practicable Means (BPM), as defined in Section 72 of the Control of Pollution Act 1974, is being adopted at all times.

This effectively means that all reasonable and practicable steps should be taken to minimise noise and vibration. The practicable element to requirements needs to consider the site itself, the neighbouring property sensitivity, engineering requirements, safety, etc. For example, for two worksites undertaking the same activities, but one for one week, and the other one month, all other things being equal more mitigation could be expected to be installed on the site which is being operated for longer. Furthermore, if noise and vibration has been considered at each step and evidence of such can be provided, but despite the best efforts a noisy activity is required to be undertaken, then that process could be deemed to demonstrate that best practicable means has been adopted. The reasonable element to best practicable means includes the programme and cost implications of restrictions and requirements and whether the technology is available for such measures.

The identified good practice measures are, for ease of reference, set out in tables where for each measure the low, medium and high risk sites, are either 'highly recommended', 'desirable' or 'not applicable'. This guide sets out levels of detail typically required by the Local Authorities, in a Section 61 Control of Pollution Act (CoPA) 1974, application. For further details regarding Section 61 consent applications see Appendix 2.

Early Planning During the Design Phase

During the design phase it is recommended that the constructability of any proposals considers, among other things, the practicality of employing measures that can be incorporated to minimise noise and vibration levels.

In many cases, simple measures can be highly effective if properly planned. For example, the provision of electrical power on site can be used to avoid the later use of generators. Demolishing structures in a manner which means that any structure providing screening to neighbouring properties remains in place as long as practicable, thus minimising the noise level at that neighbouring property.

In controlling the noise from construction sites the choice of plant (i.e. controlling noise and vibration at source) and obstructing the path of noise to the receiver through the introduction of hoardings / acoustic barriers / layout design etc., are the primary considerations which need to be planned early on in the development process.

The hours of work also need to be considered in order to mitigate the effects of the noise and vibration on sensitive receptors.

The risk assessment approach described in 'Risk Assessment Approach' on page 11, can further assist in early planning of construction works.

Controlling Noise and Vibration on Site

The measures identified in the following tables are by no means an exhaustive list, but do capture good practice measures which the members of the steering group have either observed, specified or had recommended by others.

As construction processes evolve so should the measures which control noise and vibration and developers / contractors are recommended to contact the relevant local authority Environmental Health Team at the earliest opportunity to discuss any new innovative methods that the developer or contractor may wish to trial. Contact details for some London Boroughs are presented on page 17.

Further guidance and mitigation measures are contained in:

- BS5288, 'Code of practice for noise and vibration control on construction and open sites';
- CIRIA *Environmental good practice on site*
- Network Rail *Best Practicable Means: Control of Noise and Vibration from Construction Operations*

Please note that following this guidance does not constitute a legal defence for the use of Best Practicable Means, and that the specific guidance presented in the approved Codes of Practice (BS 5228) under s71 of Part III of the Control of Pollution Act 1974 are relevant to the carrying out of works to which Section 60 of the Act applies.

The following tables present good practice measures to be applied through various stages of a construction project, split into the following categories:

- General Considerations
- Plant
- Vehicle Activity
- Demolition Phase
- Ground Works and Piling Phase
- Construction Phase
- Monitoring
- Communication and Liaison

The measures to be adopted are dependent upon the works proposed and the risk allocation process defined in 'Risk Assessment Approach' on page 11.

General Considerations
General considerations are measures which apply to all sites, to be considered when planning the site, prior to commencement of works or those which are not identified by the other categories.
Mitigation for all Risk Sites
Designated site-based staff shall have the authority to take the steps necessary on behalf of the contractor(s) to ensure noise and vibration is adequately controlled and managed, according to the circumstances associated with each worksite.
At the commencement of their appointment on a project (or prior to start of works on site), all site staff are to be briefed on their responsibilities to the application of BPM to minimise construction noise and vibration and the content of any planning consents, codes of construction or other legal agreements. The performance of the training should then be regularly reviewed and repeated throughout the construction programme as appropriate.
Site hoarding to be built and maintained to maximise the reduction in noise levels to sensitive buildings and land uses.
Display contact details of contractor and responsible site manager as well as working hours and other site information on the hoarding.
Locate the site access away from noise sensitive receptors.
Keep internal haul routes well maintained and avoid steep gradients.
Limit material and plant loading and unloading to normal working hours.
Reduce loading / unloading heights for muck away and material movement to mitigate impact noise.
Handle all material in a manner that minimises noise.
Join the Considerate Constructors Scheme for the site (see Appendix 6 for further information).
Consult the respective Borough's Code of Construction Practice / Technical Guidance.

Mitigation Measures to be Considered	Low Risk	Medium Risk	High Risk
Submit a Section 61 consent application to the local authority (see Appendix 2)[1].	◇	○	●
Adhere to 'quiet hours' as agreed and/or adopted by the local authority.	○	○	●
Maximise the screening effect of buildings and temporary stockpiles through programming / phasing of works.	◇	○	●
Use rubber linings in chutes, dumpers and hoppers to reduce impact noise.	○	●	●
Minimise opening and closing of site access gates through good coordination of deliveries and vehicle movements.	○	●	●
See Vehicle Activity for additional good practice with regards to the transportation of material.	○	●	●

● Highly Recommended ○ Desirable ◇ Not applicable

[1] For low risk sites (refer to 'Risk Assessment Approach' on page 12 for a definition) a formal Section 61 consent application would not typically be necessary, but the contractor can submit details to the local authority (see Appendix 1 for details).

Plant
Construction plant and equipment, in one form or another, will be used on a construction site throughout the duration of a project. They are a source of noise and vibration and can disturb local residents and users of other receptors and form the basis of a large proportion of complaints received by a local authority. It is important that the appropriate plant and equipment for the task is selected and the correct procedures are followed to ensure the plant is used at its most effective and efficient.

Mitigation for All Risk Sites
Ensure that each item of plant and equipment complies with the noise limits quoted in the relevant European Commission Directive 2000/14/EC, United Kingdom Statutory Instrument (SI) 2001/1701.
Fit all plant and equipment with appropriate mufflers or silencers of the type recommended by the manufacturer.
Follow manufacturer's guidance and measures to operate plant and equipment and use it in a manner which minimises noise.
Use all plant and equipment only for tasks for which it has been designed for.
Shut down all plant and equipment in intermittent use in the intervening periods between works or throttle it down to a minimum.

Mitigation Measures to be Considered	Low Risk	Medium Risk	High Risk
If possible power all plant and equipment by mains electricity or other quieter technology rather than locally powered sources such as generators.	○	●	●
Maximise screening from existing features / structures, or employ the use of full or partial enclosures for fixed plant. The enclosures should be well maintained. Fixed plant can include generators, compressors, pumps, batching plant and ventilation plant.	○	●	●
Locate and orientate fixed or semi-static plant away from noise sensitive receptors.	○	●	●
Consider additional measures to control noise for any plant required to operate on a 24 hour basis; for example, dewatering pumps or generators used to power site security.	○	●	●
Vibratory compaction equipment shall be used in a mode which minimises the incident vibration at nearby residential and other sensitive properties. Consideration should be given to engaging concentric weights only when running at speed to avoid run up, run down resonances, the use of smaller equipment, or turning off the mechanical vibration on vibratory rollers and undertaking more passes for areas where there is a particular risk that disruption may occur at neighbouring properties.	○	●	●

● Highly Recommended ○ Desirable ◇ Not applicable

Vehicle Activity
Material deliveries and removals are major noise sources that can have an impact on receptors both close to and at a distance away from a construction site. Measures to minimise this impact should be considered as early as possible in the planning stage of a project, so site layout and logistical plans can be developed accordingly. Measures are especially necessary for sites close to schools or where a number of construction sites are operating within close proximity to each other.
Mitigation for all Risk Sites
Ensure all vehicle movements occur within normal hours or at agreed times, taking into account the primary function of sensitive receptors in the vicinity (i.e. avoiding school drop-off/pick-up periods).
Maximise the reuse of any waste arising on site to minimise vehicle movements.
Plan deliveries and vehicle movements so that vehicles are not waiting or queuing on the public highway. If waiting or queuing is unavoidable then engines should be turned off.
Minimise opening and closing of site access through good coordination of deliveries and vehicle movements.

Mitigation Measures to be Considered	Low Risk	Medium Risk	High Risk
Plan site layout to ensure that reversing is kept to a practicable minimum, and where practicable eliminated altogether.	○	○	●
Where reversing is required, use broadband reverse sirens / alarms or, where it is safe to do so, disengage all sirens and alarms and use banks-men.	○	○	●
Produce a robust Construction Traffic Management Plan which may also be required by the Local Planning Authority to plan, manage and minimise vehicle movements. Avoid unnecessary impact on sensitive receptors, traffic diversions via other sensitive areas or bottlenecks (see TfL guidance[2]).	○	●	●
Consider potential accumulation of traffic from other local construction sites and plan delivery routes and times to avoid congestion.	○	●	●
Rubber/ Neoprene (or similar non- metal lining material) matting to line the inside of material transportation vehicles so as to avoid the 'first drop' high noise levels.	◇	○	●
Where site space is limited and volume of vehicles attending site is high, seek vehicle holding bay(s) to use with 'Just in time' delivery management systems[3].	◇	○	●
Space planning for stockpiling of material (over weekends and, evening and nights) within the site to allow removal during normal working hours only.	◇	○	●
Consider alternative means of transport, e.g. river and rail.	◇	○	●

● Highly Recommended ○ Desirable ◇ Not applicable

[2] Construction Logistics Plan Guidance for Developer http://www.tfl.gov.uk/cdn/static/cms/documents/construction-logistics-plan-guidance-for-developers.pdf

[3] Consult with Highways Department at the local council for possible locations.

Demolition[4] Phase
Demolition has the potential to cause the most disruption to a neighbouring receptor. Modern non-percussive demolition techniques need to be considered wherever practicable to limit its noise and vibration impact. Where these methods are not possible, due to site or other constraints[5], then measures to minimise the amount and intensity of percussive breaking on site should be given priority. Percussive demolition methods have been used for years to dismantle buildings and break up the resulting concrete and brickwork. These methods can be particularly intrusive and can have a major impact on the local environment with only limited noise mitigation measures available.
Mitigation for all Risk Sites
Employ the use of acoustic screening; this can include planning the demolition sequence to utilise screening afforded by buildings to be demolished.

Mitigation Measures to be Considered	Low Risk	Medium Risk	High Risk
If working out of hours on safety grounds, limit high noise/vibration demolition activities to normal hours wherever practicable.	○	○	●
Avoid demolition activities outside of normal working hours through the use of temporary measures, such as safety / protection fences, to enable works to be conducted during normal working hours.	○	○	●
Utilise low impact demolition methods such as non – percussive plant wherever practicable[6].	◇	●	●
Use rotary drills and "bursters" activated by hydraulic or electrical power, or chemically based expansion compounds, to facilitate fragmentation and excavation of hard material.	◇	○	●
Avoid the transfer of noise and vibration from demolition activities to adjoining occupied buildings through cutting any vibration transmission path or by structural separation of buildings.	◇	○	●
Rather than breaking in-situ, consider the removal of larger sections by lifting them out and breaking them down either in an area away from sensitive receptors or off-site.	◇	○	●

● Highly Recommended ○ Desirable ◇ Not applicable

[4] Including removal of temporary structures
[5] Including cost
[6] Lower noise impact demolition or mitigation measures may include pulverisers (munchers), saws and rotary drills and "busters" activated by hydraulic or electrical power and hydraulic cracking or splitting.

Ground Works and Piling Phase			
There are many non-percussive methods available on the market for breaking-out and piling that make percussive methods obsolete in many cases and these should take priority when works are in the planning stage. Percussive piling methods can create both intrusive noise and vibration at local receptors and can continue for a long period of time, depending on the size of the new development. Where percussive methods are used measures within the Good Practice Table will help mitigate noise and vibration impacts.			
Mitigation for all risk sites			
Avoid percussive piling wherever possible.			
Mitigation Measures to be considered	**Low Risk**	**Medium Risk**	**High Risk**
If working outside of normal hours on safety grounds, limit major excavation works to normal working hours.	○	○	●
Adopt the following hierarchy of groundwork / piling methods, in order of preference to minimise the impact of piling, if ground conditions, design and safety allows: • Pressed-in methods, e.g. Hydraulic jacking • Auger / bored piling • Diaphragm Walling • Vibratory piling or vibro-replacement • Driven piling or dynamic consolidation	○	●	●
Consider the location and layout of the piling plant for efficient operation and potential noise control of generators and any electric or hydraulic motors used by plant.	○	●	●
Where impact piling is the only option, utilise a non-metallic dolly between the hammer and driving helmet, or enclose the hammer and helmet within an acoustic shroud.	○	●	●
Consider concrete pour sizes and pump locations. Plan the start of concrete pours as early as possible within normal working hours to avoid overruns.	○	●	●
Where obstructions are encountered stop works and review approach; adopt work methods that minimise noise and vibration.	○	●	●
When using an auger (for bored piling), rather than dislodging material from the auger by rotating the drill back and forth quickly, use alternate methods where safe to do so. For example, some piling rigs are equipped with metal brush to remove spoil as the auger is taken out of ground.	○	○	○
Prepare pile caps using methods / procedures which minimise the use of breakers, e.g. using hydraulic splitters to crack the top of the pile.	○	●	●

● Highly Recommended ○ Desirable ◇ Not applicable

Construction Phase
During the construction phase many of the problems can be minimised or even removed by careful planning and organisation of the site. As the height of the building structure increases receptors further away from the site can potentially become more exposed to noise due to removal of shielding effects of neighbouring buildings. Each site and building method will offer its own opportunities to reduce its impact on local receptors.
Mitigation for all Risk Sites
When working within a building ensure all openings (e.g. windows and doors) are closed or sealed up.
Plan the site layout to maximise screening from existing features / structures.

Mitigation Measures to be Considered	Low Risk	Medium Risk	High Risk
Use prefabricated building structures or elements to minimise noise on site.	◇	○	●
Where on-site fabrication is unavoidable, all high noise level works should be carried out within normal hours.	◇	○	●
Consider concrete pour sizes and plan the start of concrete pours as early as possible within normal working hours to avoid overruns.	○	●	●
Where practicable consider using an on- site, noise attenuated, concrete batching plant to minimise overruns and disturbance from queuing delivery wagons from off-site and remote facilities.	◇	○	●
Obtain and agree a protocol with concrete suppliers and sub-contractor with measures to ensure that as far as practicable overruns on concrete pours do not occur.	○	●	●

● Highly Recommended ○ Desirable ◇ Not applicable

Monitoring
Monitoring may include either physical measurement or observational on-site monitoring. Noise and vibration monitoring is the most obvious way of demonstrating to a local authority that you are complying with the noise and vibration levels presented within any agreements (see Appendix 2 for Section 61 example) and works are being carried out in accordance with the British Standard BS5228. Any monitoring regime should be agreed with the local authority prior to being implemented to avoid unnecessary costs. Any personnel undertaking noise and vibration monitoring shall be able to demonstrate their competency for the task. Any monitoring undertaken should be readily available for the local authority to review upon request.
Mitigation for all Risk Sites
Establish pre-existing levels of ambient noise.
Carry out attended noise monitoring at the start of any new phase of works, to check source sound emission data from plant on-site and following any complaints.
Carry out regular on site observation monitoring and checks/ audits to ensure that BPM is being employed at all times. Such checks should include: • Hours of working • Presence of mitigation measures, equipment (engine doors closed, airlines not leaking, etc.) and screening (location and condition of local screening, etc.) • Number and type of plant • Construction method, and • Where applicable, any specific Section 61 consent conditions. The site reviews should be logged and any remedial actions recorded.

Mitigation Measures to be Considered	Low Risk	Medium Risk	High Risk
Monitor noise continuously during demolition, piling, excavation and sub- and superstructure works at agreed locations and report to the local authority at agreed intervals.	◇	○	●
Monitor vibration continuously during demolition, piling, excavation and sub-structure works at agreed locations and report to the local authority at agreed intervals.	◇	○	●
Appraise and review working methods, procedures and logistics on a regular basis to ensure continuous development of BPM.	◇	○	●
Establish level trigger alerts in agreement with the local authority and guided by BS5228. Monitor noise and vibration to trigger text alerts; where levels exceed the triggers then inform the local authority, review work practices and agree additional mitigation measures with the local authority.	◇	○	●
Use monitoring equipment with web access capabilities to view and inspect real time measurement and/or audio data.	◇	○	●

● Highly Recommended ○ Desirable ◇ Not applicable

Communication and Liaison

It is important that good relations are built with people living and working within the vicinity of the worksite.

The developer or contractor should communicate with neighbours on all planned works, especially for periods outside of normal working hours, where agreed. Methods of communication, as a minimum would involve letter drops prior to and during works. Other forms of communication could include newsletters, meetings which residents or community groups can attend, notice boards, websites or social media, depending on the size of the project.

All correspondence to be sent to residents or other neighbouring receptors should be forwarded to the local authority prior to its distribution, ideally for comment. The local authority can also provide guidance on the area to be included within the letter drops.

Mitigation for all Risk Sites

Develop a Community Liaison Plan. Develop a Complaint Procedure (see Appendix 6) with timescales for responses and a nominated liaison person to engage with residents and to handle complaints. These should be agreed with the local authority.

Display contact details for the site manager and liaison officer prominently on the site hoarding.

Brief all site staff regarding the complaints procedure and mitigation requirements and their responsibilities to register and escalate complaints received.

Mitigation Measures to be Considered	Low Risk	Medium Risk	High Risk
Send regular updates at appropriate intervals to all identified affected neighbours via newsletter and posting information on the site hoarding. Also make information available via email when requested.	◇	○	●
Develop and maintain a website to provide information about the project and to receive feedback.	◇	○	●
Arrange regular community liaison meetings at appropriate intervals including prior to commencement of project. Respond to issues raised and report back to attendees.	◇	○	●
Arrange meetings and communicate on a regular basis with neighbouring construction sites to ensure activities are coordinated to minimise any potential cumulative issues.	◇	○	●
Advise neighbours about reasons for and duration of any permitted works outside of normal working hours.	○	●	●
Arrange meetings and communicate on a regular basis with the local authority to monitor the progress of the works and to consider any concerns or complaints raised by the local community.	◇	○	●

● Highly Recommended ○ Desirable ◇ Not applicable

Risk Assessment Approach

The management and control of noise arising from construction activity is most effective if it is considered at an early stage in the design and planning of the works. The risk assessment approach included in this guide assists the contractor in assessing the level of noise and vibration control required. All those with responsibility for the work are encouraged to consider the steps that will be used to minimise noise and vibration from works, including the design and formulation of the contract requirements. The guide sets out a 'no surprise' approach and has associated benefits to local authorities as it provides a uniformity in approach and consistency in good practice measures across a variety of demolition and construction projects.

Locality / Site Information

It is important to establish the sensitivity of the area in which the works will be undertaken. Each worksite should be categorised according to the level of risk that the site may potentially cause with regards noise and vibration affecting people living and working in the vicinity of the site. The risk assessment is based upon a basic knowledge of the area, the sensitivity of the receptors in that area and the nature and duration of the works.

One factor informing the locality/site information assessment is the existing daytime ambient noise level, characterised as 'low ambient noise level', 'medium ambient noise level' or 'high ambient noise level', defined for an urban or suburban context as follows:

High ambient noise level

- Close to a major transportation noise source (busy main road, mainline rail, rail station, low flight path, bus / vehicle depot, etc.)
- As a guide – day-time ambient levels are greater than 65dB$L_{Aeq,\ 10hour}$[7]

Medium ambient noise level

- Close to a transportation noise source (road, railway line, distant flight path, etc.)
- As a guide – day-time ambient levels are 55dB$L_{Aeq,\ 10hour}$ to 65dB$L_{Aeq,\ 10hour}$

Low ambient noise level

- Quiet suburban location
- Local roads only, infrequently used railway line
- As a guide – day-time ambient levels are less than 55dB$L_{Aeq,\ 10hour}$[7]

Often as part of the planning process a baseline noise survey will be conducted, but if this is not available to the contractor then the Local authority Environmental Health can be contacted for advice. Further guidance on typical ambient noise levels in an area can be obtained from the "England Noise Map Viewer" - http://extrium.co.uk/noiseviewer.html

[7] Assuming a 10 hour working day, where a short or longer working day is considered then it may be appropriate to adjust the period accordingly.

The locality / site information also requires information on the programme duration and the working hours required as discussed below.

Working Hours

The sensitivity of an occupant of a residential property to construction noise and vibration is typically dependent upon the time of day when the noise or vibration is being undertaken in addition to other factors. In the typical situation, in a residential community where dwellings are in close proximity to the construction site, construction noise is considered to be less sensitive, in order of preference, during the daytime, evening and night-time.

In this typical situation, as a general rule, works within the following normal hours are preferred, unless the local authority in which the site is based has expressly specified alternative hours.

Table 1 - Normal Working Hours

Day	**Time period**
Mondays to Fridays	08:00 to 18:00
Saturdays[8]	08:00 to 13:00
Sundays and Public and/or Bank Holidays	No works permitted

Some local authorities may consider the use of start-up and shut-down hours either side of the normal working hours above, to undertake certain activities, which may include site inspection, abnormal deliveries, site briefings and maintenance. Start-up and shut-down activities would not be considered as an extension of the working day and agreement with the relevant local authority should be discussed on a case-by-case basis. .
If you believe there are reasons why you should deviate from the normal working hours you should contact the local authority with reasons and justification for the deviation as soon as possible.
Instances where work outside the hours above may be permitted may include:

- Works are of a critical engineering nature or are of a scale that requires extended working hours[9];
- Works are required to take place on or close to a highway or operational railway;
- Work times are restricted for Health and Safety or traffic reasons;
- Abnormal deliveries as required by Metropolitan Police[10] and
- Residents' circumstances[11] or other local factors.

Where these hours have been accepted, nearby residential and other sensitive receptors who are likely to be affected by the works should be informed as soon as reasonably practicable about the

[8] The use of Saturday working hours does vary across London. It is advised to check with the relevant local authority
[9] For example extended concrete pours
[10] Abnormal loads are defined by the Metropolitan Police in the link. For most central London sites need to make deliveries prior to 7am, or load to leave site post 7pm.
See http://content.met.police.uk/Article/Abnormal-loads/1400007692804/traffic
[11] For example, shift workers, vulnerable and long-term sick

nature and likely duration of the works. See 'Communication and Liaison' good practice measures for the level of detail recommended.

Planning Prior to the Start of the Works

One of the key measures in ensuring that adequate noise and/or vibration mitigation is provided is careful planning before the start of the works to ensure that appropriate mitigation is factored into the programme and cost model. Government policy should be considered (see Appendix 3 for further information).

The following risk assessment has been developed to enable initial identification of the overall noise and vibration risk associated with the site and the proposed works. This enables early identification of constraints (including local authority preferences, codes of practice and legal agreements), generic and specific noise or vibration mitigation measures likely to be required, procedures which may need to be developed and any external consents which may be required.

The risk category is identified by the highest number of ticks in either the low, medium or high risk column of the table. The following gives an explanation of how to use the Risk Assessment Tool:

Risk Assessment A – Locality / Site information

Assess your site with regards to duration of the works, distance to sensitive receptors, ambient noise levels and working hours. Tick the field that is most likely to apply. Add up the number of ticks in each column.

Risk Assessment B – Works information

To be able to complete the risk assessment a sufficient level of information about the works will be necessary. Tick the field that is most likely to represent the works in each category. Count the ticks for each column (low, medium and high).

Identified Risk Category

The table 'Total Risk Assessment' includes the sub-total numbers from table 'Risk Assessment A – Locality / Site information' along with an additional tick from the column with the highest number of ticks in table 'Risk Assessment B – Works information'. The column in the 'Total Risk Assessment' table with the most ticks indicates the risk category that should be employed for the site.

If you have the same total in two risk categories, then the higher risk applicable mitigation measures should be employed.

Once the risk allocation is known the 'Good Practice Measures' tables are used to identify specific measures expected to be employed on site. There are minimum considerations that are presented at the top of the tables that are applicable for all risk sites.

Furthermore it should also be noted that if a particular aspect of the works has a higher identified risk than categorised through the above process, then for this phase/part of the works the higher risk mitigation measures should be allowed for. For example, if a site has an overall 'low risk' but involves "External demolition between 2 weeks and 3 months duration (total across the entire programme)", which is a medium risk works activity, then the medium risk applicable mitigation should be adopted.

Examples for using the risk assessment are found in Appendix 5.

Risk Assessment A – Locality / Site information

		Low	Medium	High
Locality / Site information	Programme Duration			
	<6 months			
	6 months to 12 months			
	> 12 months			
	Proximity of nearest sensitive receptors			
	>50m from the site boundary			
	Between 25m and 50m			
	<25m			
	Day-time Ambient Noise Level			
	High ambient noise level			
	Medium ambient noise level			
	Low ambient noise level			
	Working hours			
	Normal working hours only^			
	Some extended evening or weekend working			
	Some night-time working			
	SUBTOTAL A Add up the number of ticks in each column			

^ Normal working hours: Monday to Friday, 08:00 – 18:00 hrs; Saturday, 08:00 – 13:00 hours

Risk Assessment B – Works information

		Low	Medium	High
Works information	Location of works			
	Majority within existing complete building envelope			
	Majority of works external			
	External demolition			
	Limited to 2 weeks[12]			
	External demolition between 2 weeks and 3 months[12]			
	External demolition greater than 3 months[12]			
	Ground works			
	Limited to non-percussive methods (i.e. hand tools / small excavator / small backhoe)			
	Percussive methods[13] less than 3 months[12]			
	Percussive methods greater than 3 months[12]			
	Piling			
	Limited to 1 week [12, 14]			
	Bored piling only. No impact or vibratory piling			
	Impact or vibratory piling			
	Vibration generating activities			
	Limited to less than 1 week			
	Between 1 week and 1 month			
	Greater than 1 month			
	Street management			
	Required for less than 1 week / or not at all			
	Required for less than 1 month			
	Required for greater than 1 month			
	SUBTOTAL B Add up the number of ticks in each column			

Total - Risk Assessment

	Low	Medium	High
Risk Assessment A – Locality / Site Information Carry over SUBTOTAL A			
Risk Assessment B - Works information For the highest number of ticks in SUBTOTAL B add one tick to the equivalent risk column			
TOTAL			

[12] Total across entire programme.
[13] For example, breaking out using hydraulic or pneumatic breakers
[14] Hydraulic jacking (or press-in piling) is considered to be acceptable for longer periods

Local Authority Contact Details

Local authority	Team	Contact Telephone/e-mail
Royal Borough of Kensington and Chelsea	Environmental Health	environmentalhealth@rbkc.gov.uk Tel: 020 7341 3002
London Borough of Hillingdon	Environmental Protection Unit	environmentalhealthepu@hillingdon.gov.uk Tel: 01895 277401
London Borough of Lewisham	Environmental Protection Team	environmentalprotection@lewisham.gov.uk Tel: 020 8314 2070
City of London	Pollution Team	publicprotection@cityoflondon.gov.uk Tel: 020 7606 3030
London Borough of Newham	Pollution Control Unit	pollution.inquiry@newham.gov.uk Tel: 020 3373 0643
London Borough of Southwark	Environmental Protection Team	environmental.protection@southwark.gov.uk Tel: 020 7525 2000/5777
City of Westminster	Environmental Health	environmentalactionline@westminster.gov.uk Tel: 020 7641 2000

Appendix 1 - Good practice measures - statement of intent for small sites

When completed please send and/or e-mail to London Borough of

…….

together with any supporting documents. Use separate sheets if required.

Company
Name**……**

Registered Office ……

Telephone …… Fax ……

Address for
Correspondence ……

E-mail …….

On Site Contact

Name ……. Tel ……

Location and outline description of works:

Proposed start date ……..

Estimated duration of works ……..

Programme of works, giving details of method of demolition and construction, plant and equipment:

Detail measures to be used to demonstrate the use of Best Practicable Means when choosing machinery and methods of demolition and construction:

Details of publicity proposed and procedure for dealing with complaints:

Signed: ……..

Date: ……

Designation: ……

Appendix 2 - Section 61 CoPA application

Control of Pollution Act

The Control of Pollution Act 1974 (CoPA) provides two mechanisms to managing construction noise and vibration on worksites.

Full details of the CoPA are available via the weblink:
www.legislation.gov.uk/ukpga/1974/40/part/III/crossheading/construction-sites

The first, under Section 60 of the Act, is a reactive mechanism that enables Local Authorities to serve a Section 60 Notice, which can include controls on working hours and methods of works to be used and can specify onsite mitigation. The site must then be operated under the constraints of the notice (subject to appeal) which can lead to delays and associated costs.

The second, under Section 61 of the Act, is a proactive mechanism which enables the contractor to submit a Section 61 consent application for approval 28 days prior to the commencement of construction. The application should detail, among other things, the construction activities, working hours and measures to be employed to demonstrate that best practicable means is being adopted at all times to minimise noise and vibration on site. If the works are undertaken in a manner compliant with a consented Section 61 application, then the local authority can not serve a Section 60 Notice and therefore the contractor can have more certainty in the programme.

For low risk sites a formal Section 61 consent application would not typically be necessary, but the contractor can submit details to the local authority (see Appendix 1 for details). However it should be noted that this is not a formal Section 61 application and therefore the local authority could serve a Section 60 notice.

For medium sites a Section 61 application is desirable and for high risk sites, highly recommended and as such early discussions with the local authority are encouraged, to discuss the issues associated with the planned construction works.

It is recommended that a draft Section 61 application is made to the local authority in the first instance at least one month before the intended formal submission date to facilitate these discussions. If the Local authority is satisfied that there is sufficient information submitted within the Section 61 application it will give prior consent for the works usually with:

- attached conditions
- limiting or qualifying the consent to allow for any change in circumstances
- limiting the duration of a consent

The required level of detail in a Section 61 application should be discussed with the Local Authority but a guide is included in the following example.

Section 61 – guidance on completing the Section 61 prior consent application

1. **Address or location of proposed works**
   Address / location of the work site.
   A site location plan should be included to a scale of not less than 1:1250

2. **Name and address of main contractor**
   Company name and address (Registered Office) of Applicant.
   The name and telephone number (and e-mail address) of an appropriate contact within organisation should be provided (e.g. from site manager).

3. **Particulars of the works to be carried out**
   Details should be provided of the type of work to be carried out at each stage.

4. **Working hours**
   Hours of work proposed for each method or stage of work should be provided, and can include a programme detailing work operations to be carried out on daily (or other) cycles

5. **Methods to be used in each stage of the development**
   Method statement of the works involved at each stage of the project should be provided, including the nature of work and duration of each phase. The application should set out how the work will be carried out and provide an outline justification on why the methods selected constitute Best Practicable Means.

6. **Number, type and make of equipment and machinery stating Sound Power Levels**
   A full list of plant and equipment proposed to be used. Sound power levels should be included for each piece of equipment. Sound power levels may be extracted from guidance offered by British Standard 5228 or from other appropriate sources, e.g. manufacturers' specifications.

7. **Proposed steps to minimise noise and vibration**
   The use of best practicable means (BPM) at all times, details of the specific BPM measures to be employed should be indicated (see British Standard 5228 for guidance).

8. **Predicted noise and vibration levels**
   Noise levels should be predicted at locations identified on the Site Plan and, in particular, at "sensitive receptors" identified beyond the site boundary. "Sensitive Receptors" will include residents, schools, hospitals, places of worship and businesses having particular sensitivity to noise.

9. **Noise and vibration monitoring**
   A strategy for noise monitoring throughout the project, which should also relate to any noise surveys undertaken prior to the commencement of noisy work i.e. background noise levels, should be provided.

10. **Approximate duration of works**
    The application should set out the project duration including the anticipated start date and completion date. Also an indicative Construction Programme, showing the duration of each phase of work should be provided, where possible, acknowledging that the programme may be subject to change.

11. **Community liaison**
    Engagement and notification measures, such as newsletter and letter drops to all those affected, and the setting up of a telephone "hotline" for complaints (where appropriate), should be included in the application as good public relations can substantially reduce potential conflicts between residents and contractors.

12. **Other information**
    May include contact names, telephone numbers and e-mail addresses. This section may also make reference (for information only) to other off-site control measures that the project in question may have committed to and which is material to understanding the likely effects on persons in the locality.

13. **List of Appendices**
    All attached plans and documents should be listed. The use of numbered appendices is recommended.

Section 61 Application - Example

PROJECT X - Fit Out Works

CONTROL OF POLLUTION ACT 1974
S61 Consent Application

Submission No:	
Submission Reference:	
Local authority Reference:	

To London Borough of XX

I/WE HEREBY MAKE APPLICATION to xxx Council for prior consent in respect of works to be carried out on the xxx site specified below, under Section 61 of the Control of Pollution Act 1974.

Signed ..... Date .....

Contractors name + Address

Telephone No:
Fax No:

1. Address or location of proposed works	*[Site address]* see site location map Appendix A
2. Name and address of main contractor	*[name]* Telephone No: Fax No:
3. Particulars of works to be carried out	This application for consent covers Station Fit Out Works. The specific activities comprise: 1. Building works (cutting holes, chases, demolition of walls) 2. Mechanical, Electrical & Plumbing 3. Flooring (timber, terrazzo & raised floor) 4. Dry Lining 5. Ceilings 6. Joinery 7. Decorating 8. General site clearance
4. Working hours	All Activities (except those specified below) to be undertaken during Normal Working Hours defined as follows: <u>Normal Working Hours</u> ··Monday to Friday 08:00 to 18:00 ··Saturdays 08:00 to 13:00 There will be no working on Sundays and Bank Holidays
5. Methods to be used in each stage of development	See Appendix B (see example below)
6. Number, type and make of Equipment and machinery stating Sound Power Levels	See Appendix C
7. Proposed steps to minimise noise and vibration.	Best Practicable Means' (BPM) (as outlined in Section 72 of the Control of Pollution Act 1974) will be employed in order to minimise noise and vibration levels throughout the period of the works. General measures will include the following as appropriate: · Careful selection of plant, construction methods and programming. Only plant conforming with relevant national or international standards, directives and recommendations on noise

	and vibration emissions will be used; · Design and use of site hoardings and screens, where practicable and necessary, to provide acoustic screening at the earliest opportunity; · Where practicable, doors and gates will not be located opposite occupied noise-sensitive buildings. The mechanisms and procedures for opening doors/gates will minimise noise as far as reasonably practicable; · Construction plant will be located, as far as is reasonably practicable, away from adjacent occupied buildings or as close as possible to noise barriers or site hoardings where these are located between the plant and the buildings; · Static and semi-static plant/equipment (e.g. compressors and generators) will be fitted with suitable enclosures where practicable; · Personnel will be instructed on BPM to reduce noise and vibration as part of their induction training and as required prior to specific work activities; and, · When plant is not being used it shall be shut down and not left to idle. Our General Site Rules will ensure: • Materials will be scheduled for delivery during normal working hours • We will use Noise Marshals to avoid reversing alarm as reasonably practicable. • Our Site Induction will include a section of operatives' behaviour and conduct when arriving on and leaving the site.
8. Predicted Noise and Vibration Levels	A map of the noise sensitive receptors likely to be impacted by the site is attached to the application (see Appendix D). The predicted noise levels are presented in Appendix E.
9. Noise and Vibration monitoring	If deemed necessary, XXX Contractors Limited will undertake short term, hand held noise monitoring exercises. XXX Contractors Limited will attend or carry out monitoring sessions as requested. Due to the nature of the works proposed and the proximity of residential receptors it is not envisaged that there will be a requirement to undertake vibration monitoring. However, vibration monitoring will be undertaken in response to compliant, or request from the local authority.
10. Approximate duration of works	Consent period is *[start date]* to *[end date]*. An anticipated construction programme is presented in Appendix F.
11. Community liaison	Name and contact details of the construction company including a complaints hotline are printed outside of the hoarding.

	A regular monthly letter drop as well as an electronic newsletter (see Appendix G) will be distributed to residents and businesses around the site with information about the planned site activities and expected noisy period of works.
12. Other Information	**Contacts:** *[name & number]*
13. List of Appendices	Appendix A: Site location map Appendix B: Method Statements Appendix C: List of equipment used, sound power levels and % of use Appendix D: Location of noise sensitive receptors (map) Appendix E: Predicted noise levels Appendix F: Programme of works Appendix G: Example of a newsletter

Appendix B of Section 61 application: Example of Method Statement

The work will be carried out during normal working hours. Note that plant sizes are indicative. A plant list summary is provided in Appendix C. Before works commence a permit to dig is required and the area of works is to be CAT scanned by competent person.

1. **Building works**

Removal of a basement slab of approximately 200m^2 of screed and masonry. A number of potential methods have been considered for this process and given the proximity of a local school and residential properties, the use of an excavator with a muncher attachment will be used where practicable. There may be a requirement to use a breaker attachment to remove certain elements, but this will be kept to a practicable minimum and outside of the school working day.

Materials arising to loaded into a nylon bag on pallet, moved by electric pallet truck and then loaded into a skip. Skip to be removed by skip lorry in accordance with local waste regulations, to a registered tip by persons with waste carrier license. Note all materials to be recycled where possible.

Materials for screed replacement to be brought to site in bagged form on pallets. Pallets to be moved from set-down area via 3T telehandler to Barlow Shed loading bay. Materials to then be transferred to workface via electric pallet trucks.

Plant	No.	L_{WA} [dB]	% on-time	L_{WA} Data Source

2. **Mechanical, Electrical & Plumbing**

The high level and low-level installation of bracketry, ductwork, pipes and cable trays shall be completed within the building using hand and small power tools. Material lengths will generally be ordered to size or nearest size to avoid wastage and minimize on-site cutting. Access at high level will generally be via aluminium towers and podiums with use of electrically operated MEWPS kept to a minimum.

In addition, we anticipate there to be 2No crane lifts of chillers and AHUs to high-level plant rooms.

Plant	No.	L_{WA} [dB]	% on-time	L_{WA} Data Source

3. **Flooring (Timber, terrazzo & raised floor)**

The Jatoba raised floor will be procured with the timber components being manufactured to the exact size off-site at the suppliers' workshop. Perimeters to the floors will need to be scribed-in and cut on site in the Barlow Shed with hand tools or electric cutting tools. Raised floor tile installation

is a quiet operation with the pedestals lightly tapped into location when placed onto the floor adhesive. Scribing in of perimeter raised floor tiles will be undertaken by electric saw cutters. Terrazzo floor tiles will be laid on new screed and lightly tapped into position. The stones will be site measured and cut off-site wherever possible to ensure best quality. Where site cutting is required then and acoustic enclosure will be created. - see comments above. Polishing of the stone will be undertaken by electric buffers.

Plant	No.	L_{WA} [dB]	% on-time	L_{WA} Data Source

4. **Dry Lining**

Dry lining will be undertaken predominantly in the Business Premier Lounge, Retails Units, Eurostar Management Offices and Border Control. The metal studs are fixed by a screw fixing. The plasterboard sheets will be screw fixed to the metal stud. This is a silent operation. Cutting of the metal studs will be undertaken in acoustic enclosures if the noise level exceeds 80 dB(A) - see comments above.

Plant	No.	L_{WA} [dB]	% on-time	L_{WA} Data Source

5. **Ceilings**

Fixings for the ceiling sub-grid will be fixed to the slab soffit / perimeter walls via mechanical means. These fixings will be installed by electric hand-held tools. Noise levels will be less than 80 dB(A). - see comments above. In areas where there is Holorib soffit hand held tools will not be required as wedge nut fixings and drop rods will be installed manually.

Plant	No.	L_{WA} [dB]	% on-time	L_{WA} Data Source

6. **Joinery**

Joinery items will be manufactured off-site and brought to site for final installation. Fixing of timber grounds will be undertaken by hand held electric power tools creating minimal noise. Some items of joinery will require site-cut make-up pieces. Should the power tools for cutting create noise greater than 80 dB(A) - see comments above. then these works will be undertaken within an acoustic enclosure.

Plant	No.	L_{WA} [dB]	% on-time	L_{WA} Data Source

7. **Decorating**

Decoration shall be installed using hand tools, and occasionally small power tools.

Plant	No.	L_{WA} [dB]	% on-time	L_{WA} Data Source

8. **General Site Clearance**

This will be undertaken by removing waste materials from the workface by either wheel-barrow or electric pallet trucks. The waste will then be transferred to either a skip of wait and load compactor. These plant items are detailed in Appendix F. Skip lorries and compactors will only be allowed onto site during normal working hours.

Plant	No.	L_{WA} [dB]	% on-time	L_{WA} Data Source

Appendix 3 - Guidance on government noise policy and vibration levels

Government Noise Policy

The advice set out in the National Planning Policy Framework is based upon the vision and aim of the Noise Policy Statement for England (NPSE). The NPSE, issued in March 2010, aims to provide clarity regarding policies and practices to enable noise management decisions to be made within the wider context of the project and the Government's policies regarding sustainable development.

The NPSE states the following Noise Policy Vision:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development

The long term vision is supported by the following Noise Policy Aims:

Through the effective management and control of environmental, neighbour and neighbourhood[15] noise within the context of Government policy on sustainable development:
Avoid significant adverse impacts on health and quality of life;
Mitigate and minimise adverse impacts on health and quality of life; and,
Where possible, contribute to the improvement of health and quality of life.

NPSE provides the following guidance regarding the terms "significant adverse" and "adverse":

NOEL – No Observed Effect Level - This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
LOAEL – Lowest Observed Adverse Effect Level - This is the level above which adverse effects on health and quality of life can be detected.
Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.
SOAEL – Significant Observed Adverse Effect Level - This is the level above which significant adverse effects on health and quality of life occur.
It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

Therefore, any construction project should be compliant with the National Planning Policy Framework and construction noise should be compliant with the NPSE.

[15] "Neighbourhood noise" includes construction sites.

Planning Policy Guidance Noise is clear that it is up to the LPAs to define their own values should they choose to do so, and some Local Planning Authorities may already have published differing values or may declare a preference of alternate values to those presented below. However, to assist the promoter, developer and/or contractor, the following guidance is provided with respect to the Noise Policy Aims defined in NPSE.

Compliance with NPSE – Residential Properties

Adopting the good practice measures included in this guide will help reduce the overall noise and vibration levels. Where, however the SOAEL values are likely to be exceeded then every reasonable effort should be made to reduce noise and vibration levels further to 'avoid' such effects.

Noise Policy Aim 1:

Avoid significant adverse impacts on health and quality of life;

The NPSE does not provide specific guidance regarding SOAEL threshold values or temporal exposure. SOAELs for daytime, evening and night-time periods from construction noise at **individual residential properties**, where, the construction noise is greater than the specified daytime, evening or night levels for 10 days in any 15 days or 40 days in any six months are defined in this guidance document as:

Daytime	75 dB (L_{pAeq})[16], or above the existing ambient if this is higher.
Evening	65 dB (L_{pAeq})[17], or above the existing ambient if this is higher.
Night	55 dB (L_{pAeq})[18], or above the existing ambient if this is higher.

In the absence of specific local authority guidance which takes into account local circumstances, or other project specific commitments, it is considered appropriate to use the SOAEL values defined above as the basis demonstrating compliance with the Government's Noise Policy Aim 1.

Noise Policy Aim 2:

Mitigate and minimise adverse impacts on health and quality of life

The Noise Policy Aim 2 is further clarified as follows:

The second aim of the NPSE refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur.

[16] The daytime SOAEL of 75 dB L_{PAeq} is based upon experience from other construction projects such as High Speed 1 (formerly Channel Tunnel Rail Link), Crossrail and Thameslink.
[17] For the evening the SOAEL is set 10 dB lower than the daytime level and 10dB above the night-time level.
[18] For night-time, the World Health Organization's Night Noise Guidelines for Europe introduced an Interim Target of 55 dB L_{night} measured outdoors, and could be interpreted as a SOAEL threshold.

Therefore Government policy in essence requires that 'all reasonable steps' are taken to mitigate noise, i.e. Best Practicable Means (BPM) should be applied between LOAEL and SOAEL, which is identified within this good practice guide.

LOAELs for daytime, evening and night-time periods from construction noise at **individual residential properties**, are defined as:

Daytime 65 dB (L_{pAeq})[19], or above the existing ambient if this is higher.
Evening 55 dB (L_{pAeq})[19], or above the existing ambient if this is higher.
Night 45 dB (L_{pAeq})[19], or above the existing ambient if this is higher.

In the absence of specific local authority guidance which takes into account local circumstances, or other project specific commitments, it is considered appropriate to use the LOAEL and SOAEL defined above as the basis demonstrating compliance with the Government's Noise Policy.

Compliance with NPSE – Non-Residential Properties

As discussed above, adopting the good practice measures included in this guide will help reduce the overall noise and vibration levels.

Any buildings other than residential, including commercial buildings and, if appropriate, schools, hospitals and clinics, will be separately identified, and subject to individual assessment as considered necessary. In delivering values for LOAEL and SOAEL due regard will be given to their construction, use and location. It is not possible to establish generic standards for such buildings because of the individual differences in use, sensitivity, layout and structure. Relevant national standards and guidelines, existing internal noise levels and precedents will be used as a basis for setting trigger levels for individual buildings.

An assessment will then be required to demonstrate compliance with the Noise Policy Aims. Where, however, the SOAEL values are likely to be exceeded then alternative approaches may be required to further reduce the noise exposure at local receptors. This could include, for example, changing the work programme to limit the length of time within any one day that a particular noisy operation can take place.

[19] The daytime, evening and night-time LOAEL is based upon experience from other construction projects such as High Speed 1 (formerly Channel Tunnel Rail Link), Crossrail and Thameslink.

Appendix 4 - Vibration

Typically, vibration generated as a result of construction has the potential to result in either:

- Damage to adjacent buildings
- Disruption to building occupants within adjacent buildings
- Interference or damage to vibration sensitive activities / equipment

Building occupants can be disturbed by vibration at levels appreciably less than that which would result in building damage. Therefore, in the absence of any other restrictions, to minimise disruption to building occupants, the following upper vibration guidance levels, as measured at the worst-affected floor of the relevant property, are recommended to provide an initial indication of the risk of disturbance:

1 mm/s Peak Particle Velocity (PPV) for occupied residential and educational buildings

3 mm/s PPV for occupied commercial premises where the activities are not of an especially vibration sensitive nature or for potentially vulnerable unoccupied buildings

5 mm/s PPV for other unoccupied buildings

Where construction activities are identified which are predicted to result in levels in excess of these values, then the local authority shall be informed. There may be a requirement to: review and amend the proposed working methods; undertake vibration monitoring throughout the vibration generating works; complete a condition survey of the building affected before and after the works.; and if necessary review the likely impact of the works by considering alternative vibration indicators including the Vibration Dose Value (as advocated by BS 5228 Pt 2 2009 + A1:2014).

An exception to the guidance levels are where a facility operates equipment or undertakes processes which are very vibration sensitive[20]. Depending upon the proximity of the facility to the worksite there may be a requirement to undertake a specific assessment, which may identify a need for more onerous guideline levels. It should be noted that in urban locations such processes or equipment are unusual and where they are present, due to the proximity of existing vibration sources, they often have mitigation measures already implemented to control vibration.

[20] For example, these can include research facilities, medical equipment, manufacturing plant (microchip manufacturing, etc.), medical facilities, print works, etc.

Appendix 5 - Worked examples of risk assessments

Example 1

Demolition of existing buildings and partial demolition and extension of Random House, the subsequent development of six new buildings of between 3 and 43 storeys (plus roof plant level) and the restoration and extension of Random House to provide 1261 sqm of community or commercial floorspace including 27 subsidised workspace units (A1/A2/B1/D1 uses), 1017 sqm commercial floorspace (suitable for A1-A4/B1/D1 uses) a 6,256 sqm 153-bedroom hotel (C1) and 655 x no. studio, one, two, three and four bedroom residential units (C3), plus associated car and cycle parking and landscaped amenity space.

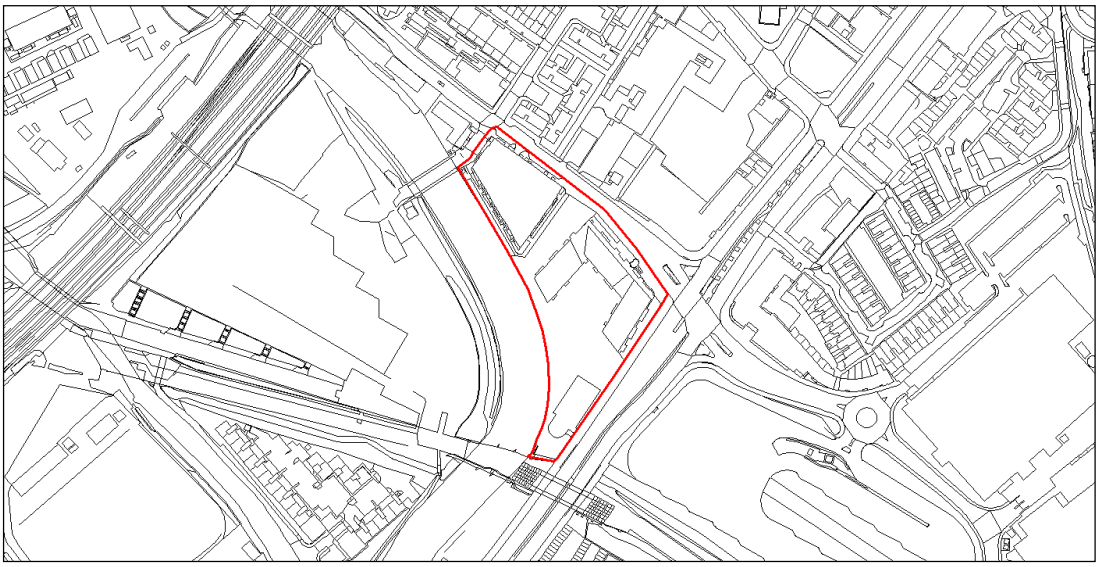

Figure 1.1 : Planning application site boundary

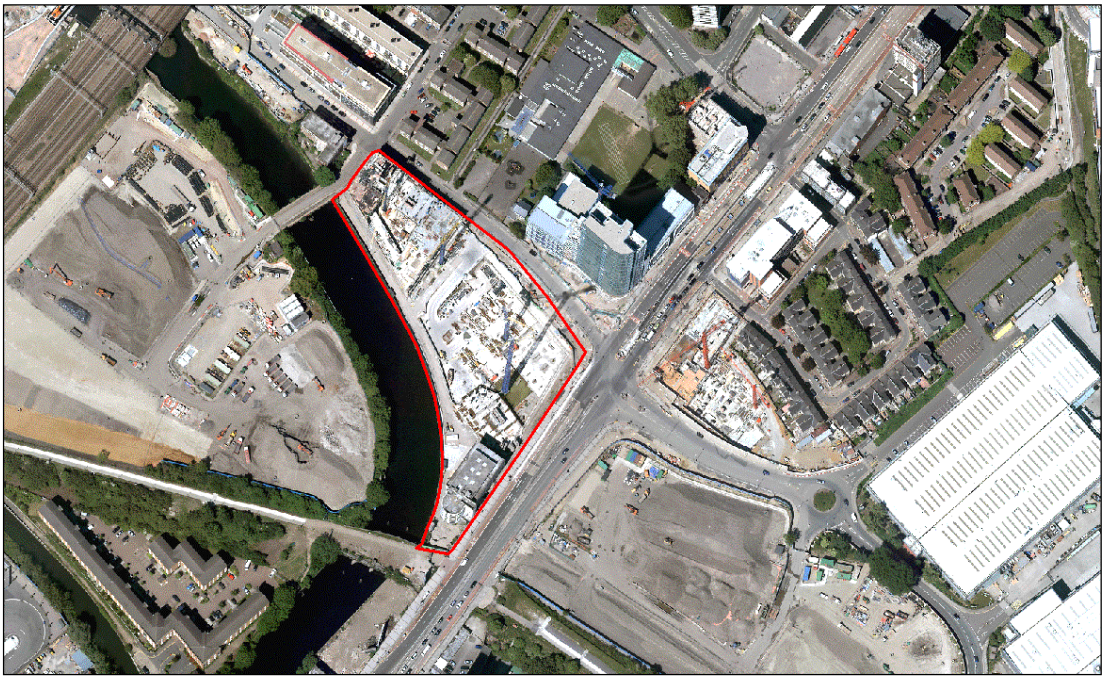

Figure 1.2 : Aerial view of site boundary

The site is bounded by a busy high street to the south east, a river to the west and a residential road, also a through road to a neighbouring shopping centre. There is a school to the north-east of the site.

Noise levels recorded as part of the Environmental Statement were recorded at 70 dB $L_{Aeq,10hr}$ along the High Street and 67 dB $L_{Aeq,16hr}$ along the residential road.

Construction is to take place during normal daytime hours and includes the breaking out of hard surface across the site, prior to a two-storey basement excavation and the construction of a 43 storey building with an extension to the existing building at the south of the site.

Risk Assessment A – Locality / Site information (Example 1)

		Low	Medium	High
Locality / Site information	Programme Duration			
	<6 months			
	6 months to 12 months			
	> 12 months			✓
	Proximity of nearest sensitive receptors			
	>50m from the site boundary			
	Between 25m and 50m			
	<25m			✓
	Ambient Noise Level			
	High ambient noise level	✓		
	Medium ambient noise level			
	Low ambient noise level			
	Working hours			
	Normal working hours only^	✓		
	Normal working hours + extended evening or weekend working			
	Normal working hours + extended evening or weekend working + night-time working			
	SUBTOTAL A Add up the number of ticks in each column	2	0	2

^ Normal working hours: Monday to Friday, 08:00 – 18:00 hrs; Saturday, 08:00 – 13:00 hrs

Risk Assessment B – Works information (Example 1)

		Low	Medium	High
Works information	Location of works			
	Majority within existing complete building façade			
	Majority of works external			✓
	External demolition			
	Limited to 2 weeks[21]			
	External demolition between 2 weeks and 3 months[21]			
	External demolition greater than 3 months[21]			✓
	Ground works			
	Limited to non-percussive methods (i.e. hand tools / small excavator / small backhoe)			
	Percussive methods[22] less than 3 months[21]		✓	
	Percussive methods greater than 3 months[21]			
	Piling			
	Limited to 1 week [21, 23]			
	Bored piling only. No impact or vibratory piling.		✓	
	Impact or vibratory piling.			
	Vibration generating activities			
	Limited to less than 1 week	✓		
	Between 1 week and 1 month			
	Greater than 1 month			
	Street management			
	Required for less than 1 week / or not at all	✓		
	Required for less than 1 month			
	Required for greater than 1 month			
	SUBTOTAL B Add up the number of ticks in each column	2	2	2

Total - Risk Assessment

	Low	Medium	High
Risk Assessment A – Locality / Site Information Carry over SUBTOTAL A	2	0	2
Risk Assessment B - Works information For the highest number of ticks in SUBTOTAL B add 1 tick to the equivalent risk column	✓	✓	✓
TOTAL	3	1	3

The site is assessed as a High risk site overall.

[21] Total across entire programme.
[22] For example, breaking out using hydraulic or pneumatic breakers
[23] Hydraulic jacking is considered to be acceptable for longer periods

Example 2

Application for full planning permission for the demolition of the existing building occupying the site and redevelopment to provide two buildings of between four and five storeys providing 161 sqm retail floorspace (A1, A2 and/or A3 uses), and 44 x no. one, two and three bedroom residential units (C3), plus associated car and cycle parking, and landscaped amenity space.

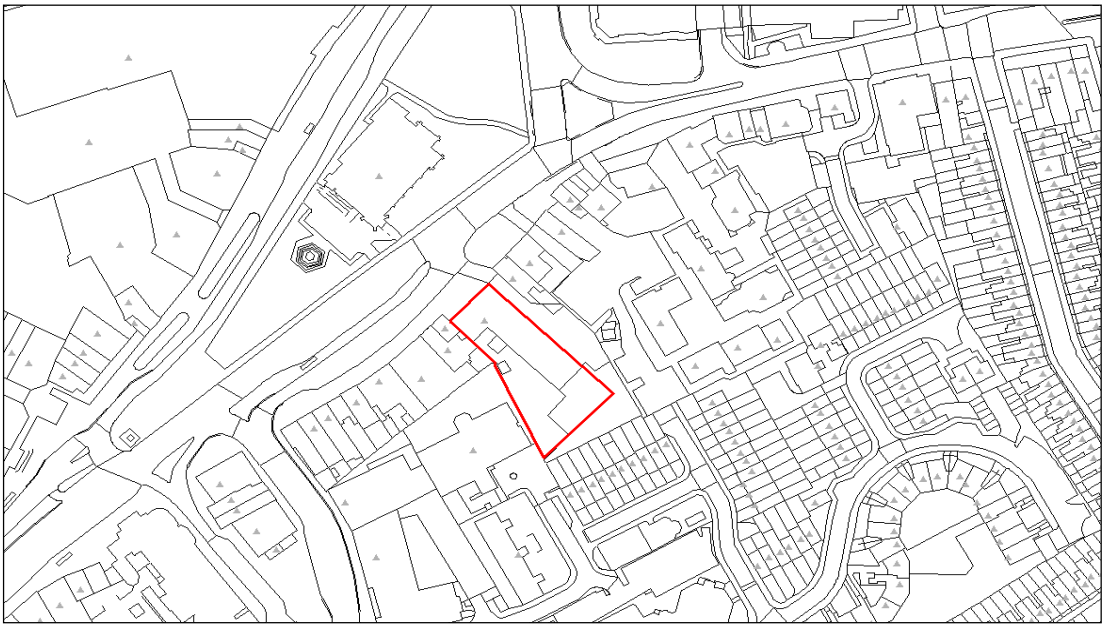

Figure 2.1 : Planning application site boundary

Figure 2.2 : Aerial view of site boundary

Site is bounded by a busy road and bus slip-road to the north, commercial properties to the east and west and residential properties to the south.

Noise monitoring undertaken to assess sound insulation requirements recorded levels of 71 dB $L_{Aeq,16hr}$ at the front of the site (facing road) and 54 dB $L_{Aeq,16hr}$ at the rear of the site.

Risk Assessment A – Locality / Site information (Example 2)

		Low	Medium	High
Locality / Site information	Programme Duration			
	<6 months			
	6 months to 12 months			
	> 12 months			✓
	Proximity of nearest sensitive receptors			
	>50m from the site boundary			
	Between 25m and 50m			
	<25m			✓
	Ambient Noise Level			
	High ambient noise level	✓		
	Medium ambient noise level			
	Low ambient noise level			
	Working hours			
	Normal working hours only^	✓		
	Normal working hours + extended evening or weekend working			
	Normal working hours + extended evening or weekend working + night-time working			
	SUBTOTAL A Add up the number of ticks in each column	2	0	2

^ Normal working hours: Monday to Friday, 08:00 – 18:00 hrs; Saturday, 08:00 – 13:00 hrs

Risk Assessment B – Works information (Example 2)

		Low	Medium	High
Works information	Location of works			
	Majority within existing complete building façade			
	Majority of works external			✓
	External demolition			
	Limited to 2 weeks[24]			
	External demolition between 2 weeks and 3 months[24]		✓	
	External demolition greater than 3 months[24]			
	Ground works			
	Limited to non-percussive methods (i.e. hand tools / small excavator / small backhoe)			
	Percussive methods[25] less than 3 months[24]		✓	
	Percussive methods greater than 3 months[24]			
	Piling			
	Limited to 1 week [24, 26]			
	Bored piling only. No impact or vibratory piling.		✓	
	Impact or vibratory piling.			
	Vibration generating activities			
	Limited to less than 1 week	✓		
	Between 1 week and 1 month			
	Greater than 1 month			
	Street management			
	Required for less than 1 week / or not at all	✓		
	Required for less than 1 month			
	Required for greater than 1 month			
	SUBTOTAL B Add up the number of ticks in each column	2	3	1

Total - Risk Assessment

	Low	Medium	High
Risk Assessment A – Locality / Site Information Carry over SUBTOTAL A	2	0	2
Risk Assessment B - Works information For the highest number of ticks in SUBTOTAL B add 1 tick to the equivalent risk column		✓	
TOTAL	2	1	2

Site is assessed as High risk overall.

[24] Total across entire programme.
[25] For example, breaking out using hydraulic or pneumatic breakers
[26] Hydraulic jacking is considered to be acceptable for longer periods

Example 3

One of four tunnelling sites across a London Borough needed to construct a flood alleviation scheme. Project in total provides a 3km length of transfer/storage tunnel and over 3km of microtunnels to intercept flows from local sewerage system and transfer to transfer tunnel. This shaft will act as a reception and drive shaft for the tunnel boring machine (TBM) during the project.

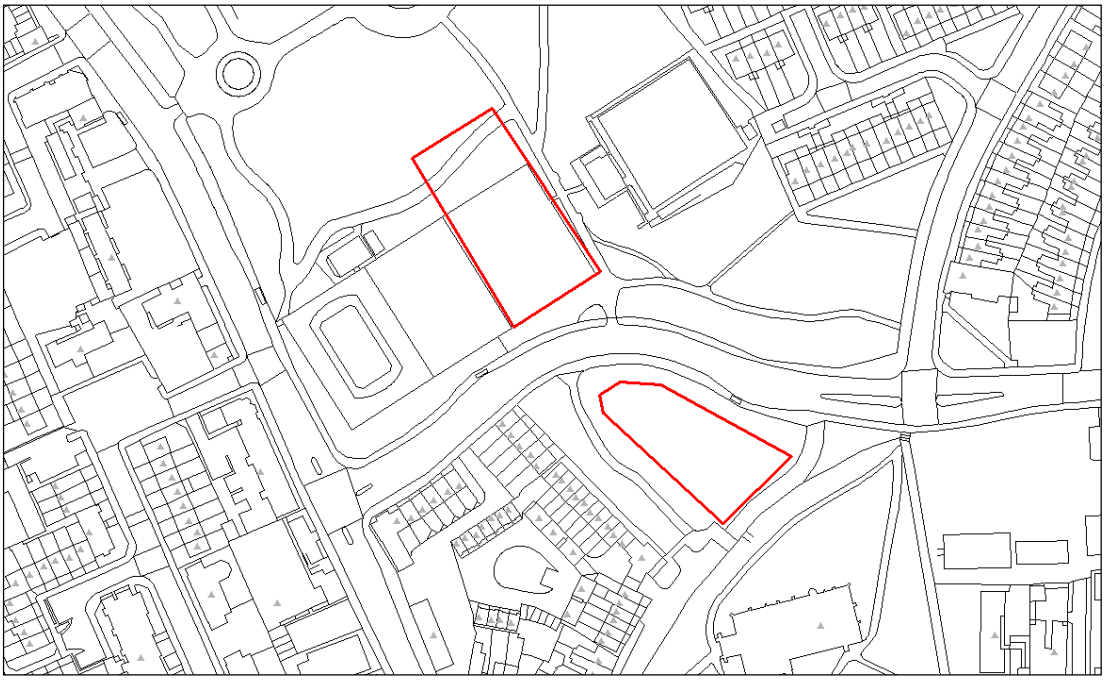

Figure 3.1 : Tunnelling site boundary

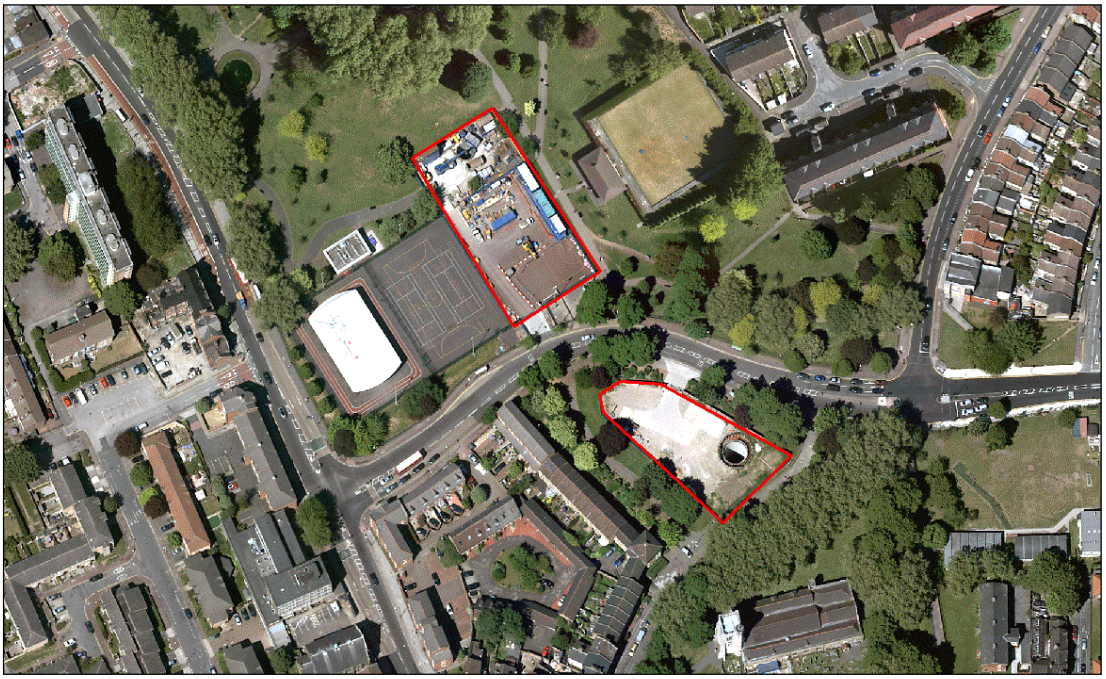

Figure 3.2 : Aerial view of tunnelling site

The site preparations and shaft sinking will be undertaken using an excavator, electric compressor, pneumatic and electric tools, diesel hydraulic power pack, track mounted crane (3-5t), electric submersible pump, hydraulic jacks, grout plant and HGVs (grout, muck, segments and plant transport). Works will be undertaken during normal working hours (Monday to Saturday).

Upon reception of the TBM and following the subsequent relaunch of the TBM, site activity will be 24/7. The dominant noise source at the site is from the road running through the middle of the two sites.

Risk Assessment A – Locality / Site information (Example 3)

		Low	Medium	High
Locality / Site information	Programme Duration			
	<6 months			
	6 months to 12 months			
	> 12 months			✓
	Proximity of nearest sensitive receptors			
	>50m from the site boundary			
	Between 25m and 50m		✓	
	<25m			
	Ambient Noise Level			
	High ambient noise level			
	Medium ambient noise level		✓	
	Low ambient noise level			
	Working hours			
	Normal working hours only^			
	Normal working hours + extended evening or weekend working			
	Normal working hours + extended evening or weekend working + night-time working			✓
	SUBTOTAL A Add up the number of ticks in each column	0	2	2

^ Normal working hours: Monday to Friday, 08:00 – 18:00 hrs; Saturday, 08:00 – 13:00 hrs

Risk Assessment B – Works information (Example 3)

		Low	Medium	High
Works information	Location of works			
	Majority within existing complete building façade			
	Majority of works external			✓
	External demolition			
	Limited to 2 weeks[27]	✓		
	External demolition between 2 weeks and 3 months[27]			
	External demolition greater than 3 months[27]			
	Ground works			
	Limited to non-percussive methods (i.e. hand tools / small excavator / small backhoe)			
	Percussive methods[28] less than 3 months[27]		✓	
	Percussive methods greater than 3 months[27]			
	Piling			
	Limited to 1 week [27, 29]			
	Bored piling only. No impact or vibratory piling		✓	
	Impact or vibratory piling			
	Vibration generating activities			
	Limited to less than 1 week			
	Between 1 week and 1 month.		✓	
	Greater than 1 month.			
	Street management			
	Required for less than 1 week / or not at all	✓		
	Required for less than 1 month			
	Required for greater than 1 month			
	SUBTOTAL B Add up the number of ticks in each column	2	3	1

Total - Risk Assessment

	Low	Medium	High
Risk Assessment A – Locality / Site Information Carry over SUBTOTAL A	0	2	2
Risk Assessment B - Works information For the highest number of ticks in SUBTOTAL B add 1 tick to the equivalent risk column		✓	
TOTAL	0	3	2

Site is assessed as Medium risk overall.

[27] Total across entire programme.
[28] For example, breaking out using hydraulic or pneumatic breakers
[29] Hydraulic jacking is considered to be acceptable for longer periods

Example 4

Demolition of existing public house and redevelopment with a ground floor pub (A4) and a part 3, part 4 and part 5 storey building and a part 3 storey building comprising 39 self-contained flats and a terrace of 3 houses (3 storey) (42 units in total) with associated car, motorcycle parking and landscaping.

Figure 4.1: Planning application site boundary

Figure 4.2: Aerial view of site boundary

The site is bounded by busy streets to the north and west that form part of numerous bus routes and an underground line to the south.

Noise levels on the north façade of the development were measured at 69 dB $L_{Aeq,10hr}$, while those on the western façade were measured at 67 dB $L_{Aeq,10hr}$.

Demolition involves the removal of the Public House currently on-site that is predicted to take one week and the ground works will involve the removal of the hard standing with an excavator.

Risk Assessment A – Locality / Site information (Example 4)

		Low	Medium	High
Locality / Site information	Programme Duration			
	<6 months			
	6 months to 12 months			
	> 12 months			✓
	Proximity of nearest sensitive receptors			
	>50m from the site boundary			
	Between 25m and 50m			
	<25m			✓
	Ambient Noise Level			
	High ambient noise level	✓		
	Medium ambient noise level			
	Low ambient noise level			
	Working hours			
	Normal working hours only^	✓		
	Normal working hours + extended evening or weekend working			
	Normal working hours + extended evening or weekend working + night-time working			
	SUBTOTAL A Add up the number of ticks in each column	2	0	2

^ Normal working hours: Monday to Friday, 08:00 – 18:00 hrs; Saturday, 08:00 – 13:00 hrs

Risk Assessment B – Works information (Example 4)

		Low	Medium	High
Works information	Location of works			
	Majority within existing complete building façade			
	Majority of works external			✓
	External demolition			
	Limited to 2 weeks[30]	✓		
	External demolition between 2 weeks and 3 months[30]			
	External demolition greater than 3 months[30]			
	Ground works			
	Limited to non-percussive methods (i.e. hand tools / small excavator / small backhoe)			
	Percussive methods[31] less than 3 months[30]		✓	
	Percussive methods greater than 3 months[30]			
	Piling			
	Limited to 1 week [30, 32]			
	Bored piling only. No impact or vibratory piling.		✓	
	Impact or vibratory piling.			
	Vibration generating activities			
	Limited to less than 1 week	✓		
	Between 1 week and 1 month			
	Greater than 1 month			
	Street management			
	Required for less than 1 week / or not at all	✓		
	Required for less than 1 month			
	Required for greater than 1 month			
	SUBTOTAL B Add up the number of ticks in each column	3	2	1

Total - Risk Assessment

	Low	Medium	High
Risk Assessment A – Locality / Site Information Carry over SUBTOTAL A	2	0	2
Risk Assessment B - Works information For the highest number of ticks in SUBTOTAL B add 1 tick to the equivalent risk column	✓		
TOTAL	3	0	2

The site is assessed as a Low risk site overall.

[30] Total across entire programme.
[31] For example, breaking out using hydraulic or pneumatic breakers
[32] Hydraulic jacking is considered to be acceptable for longer periods

Appendix 6 - Considerate contractors scheme

The Considerate Constructors Scheme (CCS) is the national initiative set up in 1997 by the construction industry and recognised by Government. It seeks to improve the image of the construction industry by striving to promote and achieve best practice under the Code of Considerate Practice.

The Code outlines the Scheme's expectations and describes those areas that are considered fundamental for registration with the Scheme.

Construction sites and companies may consider to register with the Scheme and to be monitored against the Code of Considerate Practice, designed to encourage best practice beyond statutory requirements.

The Scheme is concerned about any area of construction activity that may have a direct or indirect impact on the image of the industry as a whole. The main areas of concern fall into three categories: the general public, the workforce and the environment.

The Code of Considerate Practice applies to all registered sites, companies and suppliers, regardless of size, type or location.

There are 5 parts to the code:

- Care about Appearance
- Respect the Community
- Protect the Environment
- Secure everyone’s Safety
- Care for the Workforce

Appendix 7 - Complaint procedure

All staff on site will understand the chain-of-command when a complaint is made and any complaint received in relation to noise and vibration will be investigated by the appropriate worksite personnel.

Records of any complaints about noise and/or vibration received by and relating to the site should be recorded and retained. For medium and high sensitivity sites details of any complaints or incidents should be sent to the local authority in a pre-agreed timeframe by telephone and email.

Details of the complaint should include:

- Name of complainant
- Address of affected property
- Contact phone number
- Date and time of complaint
- Method of notification (i.e. complaint line, email, letter)
- Type of complaint (i.e. noise or vibration)
- Details of complaint
- Any previous or related complaints

Note: this information shall be provided in accordance with the Data Protection Act 1998.

All complaints should be investigated and where appropriate noise and/or vibration measurements taken. Mitigation methods should be implemented or work practices modified to reduce noise and vibration levels where it is reasonably practicable to do so.

The results of the investigation, including details of any mitigation methods implemented, work practices that have been modified and how complainants have been kept informed should be recorded and sent to the LA.

Preliminary and final reports should be submitted in a standardised format as agreed by the local authority and include:

- Person responsible, position title
- Details of investigation including any relevant monitoring data
- Action taken i.e. mitigation or modifications to work practices implemented
- Details of response provided to complainant, including a copy of any correspondence sent, if applicable.
- Action taken to prevent a recurrence of the complaint
- Details of any further action required

Regular reports of all complaints will be provided to the local authority within a specified pre-agreed timeframe.

Appendix 8 - Abbreviations, definitions and references

Abbreviations:

CIEH - Chartered Institute for Environmental Health
CoPA - Control of Pollution Act 1974
DEFRA - Department for Environment, Food & Rural Affairs
TfL - Transport for London.

Definitions:

Best Practicable Means (BPM) - refers to the efficient and realistic approach to the control of emissions from scheduled processes and is defined in statute within Section 72 of the Control of Pollution Act 1974 and Section 79 of the Environmental Protection Act 1990. BPM is defined by reference to the following provisions in Section 72 of Control of Pollution Act 1974:

1) In that expression "practicable" means reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications.

2) The means to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and acoustic structures.

3) The test of best practicable means is to apply only so far as compatible with any duty imposed by law, and in particular is to apply to statutory undertakers only so far as compatible with the duties imposed on them in their capacity of statutory undertakers.

4) The said test is to apply only so far as compatible with safety and safe working conditions, and with the exigencies of any emergency or unforseeable circumstances.

Construction - in this document includes the following (as defined in Section 60(1) of the Control of Pollution Act 1974:

a) the erection, construction, alteration, repair or maintenance of buildings, structures or roads;
b) breaking up, opening or boring under any road or adjacent land in connection with the construction, inspection, maintenance or removal of works;
c) demolition or dredging work; and,
d) (whether or not also comprised in paragraph (a), (b) or (c) above) any work of engineering construction.

Sensitive Receptors - Include residential premises, schools and hospitals

Noise Level units used

dB(A) – Noise is measured in Decibel (dB) units (A-weighted).

A-weighted - The human ear does not have a flat frequency response, so noise levels are often frequency weighted so that the measured level is more representative of the perceived level. A-weighting attempts to match the response of the human ear to noise.

$L_{Aeq,T}$ - The equivalent continuous sound level (A-weighted). It is defined as the level of notional steady sound which, at a location and over a defined period of time, would have the same A-weighted acoustic energy as the fluctuating noise.

References:

British Standard BS5288, 'Code of practice for noise and vibration control on construction and open sites`

European Commission Directive 2000/14/EC on the approximation of the laws of the Member States relating to the noise emission in the environment by equipment for use outdoors

The Noise Emission in the Environment by Equipment for Use Outdoors Regulations SI 2001/1701

Noise Policy Statement for England (NPSE), DEFRA, March 2010