Guidance

# G1374 Management of site noise from construction and maintenance work activities

| Applies to all TfL | | | | |
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| Issue no.: | A1 | | Issue date: | March 2014 |
| | | | Review date: | March 2017 |

Contents

# 1 Purpose

This purpose of this guidance is to provide advice to managers responsible for managing work activities that may create noise to neighbours, customers and contractors.

Details of the specific responsibilities of managers are provided on the Noise Management content page of HSE element of the TfL Management System.

The guidance can be used to aid the completion of noise assessment form F5410.

# 2 Scope

This guidance applies to construction and maintenance activities carried out across the London Underground and London Rail.

# 3 Guidance

## 3.1 Introduction

TfL has a legal obligation under the Control of Pollution Act 1974 and the Environment Protection Act 1990 to ensure that noise from its work activities that may affect neighbours, customers or contractors is minimised using the best practical means (BPM). This means applying all practicable mitigation to reduce noise and vibration produced to as low as possible. Failure to do so may result in the Local Authority imposing regulatory notices of work activities that may result in being restricted or stopped altogether.

## 3.2 Assessment of Noise and Vibration Risks

It is important to identify works which may generate high noise and/or vibration levels early when planning works, so there is a greater opportunity to determine whether quieter methods can be adopted, to avoid noise and vibration at night and to implement controls that are as cost effective as possible.

An assessment of noise and vibration should be carried out before the works commence, using form F5410. Consider the following when deciding what controls to use to reduce noise and vibration:

- Site location
- Type of receptors (i.e. residential, theatre, school etc.) and their attitude to works
- Distance between source of noise and/or vibration and receptor
- Existing ambient noise and vibration levels
- Length of work
- Periods of operation of plant and equipment
- Any noise screens between sources and receptor
- Whether the receptor is in front of a reflecting surface e.g. building
  For vehicles and mobile plant, traffic volume and speed

## 3.3 Section 61 Consents and Regulatory Notices

### 3.3.1 Section 61 Consents

For large-scale construction work, discussing plans and agreeing BPM noise and vibration controls with local councils is necessary. This agreement usually takes the form of Section 61 consent and these offer some protection from regulatory notices. It can take several months to agree consent depending on the size and nature of the works. If consent is needed, you cannot start work until it is in place. It is a criminal offence not to comply with the conditions of the consent once set. Further information on the time-table for completing consents is provided in Appendix 1.

The Pathway, section 61 Consent Application Template, should be used when completing section 61 consents.

### 3.3.2 Regulatory Notices

Carefully planned works, involving using best practicable means to identify appropriate noise and vibration controls reduce the risk of a Local Authority serving a regulatory notice on work activities. This is important because the serving of a notice may restrict work conditions e.g. prevent certain types of equipment being used, or stop all work activity, resulting in work delays and increased costs.

## 3.4 Eliminate and reduce noise

Much of our work takes place at night when our neighbours expect and have the right to sleep. So, wherever possible, schedule work during the day when the noise is less likely to cause a nuisance.

Other ways to eliminate noise include:

### 3.4.1 Selection of Plant

- Where possible use electrical power supply (e.g. from stations) rather than having a standalone power source e.g. diesel generators
- Opt for hydraulic or electrically-controlled units rather than pneumatically-powered units
- Select super-silenced compressors, silenced jackhammers
- Ensure all vehicles, plant and equipment are fitted with effective exhaust silencers where appropriate.
- When purchasing or hiring, request low-noise equipment. Enquire about adding more effective mufflers, enclosures, low-noise tool bits and blades.

### 3.4.2 Work Programming

- Where space, access and safety considerations permit, seek permission to store materials, equipment, fencing and scaffolding within the station's storage areas or platforms so as to minimise night time noise outside station entrances.
- Seek to establish segregated work areas within stations so as to open the possibility of working (even if on a reduced scale) through day and evening periods.
- Consolidate noisy works to occur on the same nights such that the total number of noisy nights is minimised.
- Program the construction of acoustic hoardings, shrouds and enclosures for the earliest stages of the works program.
- Pre-fabricate scaffolding, fencing and other material off-site during day shifts

### 3.4.3 Traffic Planning

- Ensuring deliveries of equipment and materials and waste removals occur during the day.
- Assign a specific loading / unloading location for the site and times which these activities will be carried out. Assign staff to police parking and loading / unloading activities for high sensitivity locations.
- Traffic flow and routes to the site should be designed so that no reversing is required. Truck reversing beacons at night are a major source of annoyance.
- Consider alternatives to conventional truck reversing beacons such as fitting "smart alarms" that adjust their volume according to the level of ambient noise, low-frequency quacker alarms, CCTV-equipped trucks or alternatively, using spotters.

### 3.4.4 Site Behaviour

- Avoid allowing staff and contractors to congregate, shout, curse, use loud radios/stereos or slam vehicle doors in areas near residences. (These issues are a primary – but generally manageable - cause of complaints from the public).
- In the case of night works, consider transporting staff to and from the site from an external meeting point using a staff shuttle service. Encourage staff to car-pool so as to minimise night time vehicle movements.
- Staff should be regularly reminded to avoid excessively revving engines and to gently close rather than slam vehicle doors. Drivers should be reminded regularly of the approved designated parking areas.
- Avoid the use of PA systems for broadcasting calls during night periods.
- Instruct staff that they are to gently set-down rather than drop materials and scaffolding. Ensure that any accidental, loud noise is not left to be repeated.

- Use rubber mats or old carpet in delivery vans and on hard pavements to minimise noise during loading and unloading.

- Avoid metal-to-metal contact on equipment. Scaffolding should be bound with ties when being moved within the site or transported and carpet attached to the metal corners of harass fencing where applicable.

- Display and regularly update a one-page summary of approved work practices in a central area to remind staff of all noise minimisation responsibilities (e.g. receiving times for materials, details of truck waiting areas, approved vehicle-routes etc).

### 3.4.5 Site Layout and Set-up

- Locate site offices and welfare facilities as far from residences as possible and orientate doors and access routes away from residences.

- Take advantage of existing barriers (e.g. walls, buildings etc).

- Consolidate noisy equipment in one area such that it may be possible to enclose them all within an acoustically-treated shed or storage area.

- Install noise hoardings, barriers, shrouds and/or enclosures (with no gaps or defects). See Appendix 2 for information on acoustic noise barriers.

### 3.4.6 Use of Plant and Equipment

- Maintain all plant and equipment in good condition to manufacturer's instructions and shut down when not in use.

- Ensure equipment covers are closed.

- Return or have replaced any hired equipment causing noise not typical to its operation. The increased noise may indicate the need for repair

In extreme cases, where noise levels are expected to adversely affect residents for a long period e.g. during a project, it may be appropriate to consider secondary glazing or temporary re-housing. Always take advice from HSE Adviser, Environment Team, External Relations, and the Noise and Vibration Team before pursuing this route.

## 3.5 Eliminate and reduce vibration

Typical sources of vibration from LU construction work activity include:

- Piling
- Tunnelling
- Excavation

- Demolition

Vibration can be a source of disturbance and concern to sensitive receptors e.g. residents, hospitals, theatres.

### 3.5.1 People

Vibration can be a source of disturbance and concern to sensitive receptors, e.g. residents, hospitals, theatres. People can perceive vibration of relatively low levels; the threshold of perception ranges from 0.14 – 0.3 mm/s PPV.
Vibration can cause disturbance at levels just above the threshold of perception, especially if there is no existing measurable ambient vibration. At 1mm/s PPV vibration would generally cause complaint if sensitive receptors have not received prior warning and/or the exposure is prolonged. Complaints will depend on the activity being carried out in or near the sensitive receptors property, for example people will be more sensitive to vibration when sleeping and when carrying out delicate tasks.

### 3.5.2 Buildings

Building damage, which can be a major concern for sensitive receptors, occurs at very high vibration levels; greater than 12.5mm/s PPV. Works that will generate high vibration levels and are in close proximity to sensitive receptors – a 100m or less - must be assessed by a competent person to determine whether structural damage is a concern.

### 3.5.3 Reducing Impact

There are not many ways to reduce the vibration experienced by a sensitive receptor once it has been established that works are required. It is generally better to carry out vibration works during the daytime if residential receptors are near by, and it can be better to carry out works at night when offices only occupied during the daytime are empty.

To ensure compliance with BPM, all possible working methods must be assessed; generally alternatives exist which generate less vibration, e.g. auger piling typically generates less vibration than impact piling. However, if the alternative method will significantly prolong the works this may be undesirable.

Any plant which may transmit vibration to the fabric of a nearby residence or commercial premises is to be mounted on rubber mounts or pads.

Advice on vibration control measures is available from the Noise and Vibration Team in Technical Services as well as from your HSE Adviser.

## 3.6 Contractors

Ensure noise and vibration management requirements are included in procurement of contractors and document obligations within their contract.

## 3.7 Training

Employees and contractors should be made aware of their role in reducing noise and vibration disturbance. This may be achieved using:

- local inductions
- environmental risk assessments, methods statements and HSE Plans
- tool box talks at the start of shift to brief employees on site specific issues
- specific training in the use of plant and equipment on site, including how to unload and load vehicles

## 3.8 Community Consultation

A good relationship with people living and working near the work site is vital to help reduce complaints and manage cost. Communicate openly with the local authority and neighbours as early as possible when planning works to help manage their expectations. Let them know:

- Why the work is needed;
- How it will affect them;
- When it will be noisy; and
- When there will be high levels of vibration

If works are going on for three or more nights, or will be particularly disruptive to sleep, then you must conduct a letter drop to all affected by the works, at least two weeks in advance. For large projects, more notice is required and you should consider holding a meeting to present the work to neighbours.

Contact the Stakeholder Communications Team for assistance with communicating with residents and business as soon as you have identified works that will generate high levels of noise and/or vibration.

## 3.9 Monitoring

Use audits, Health, Safety and Environment tours and planned general inspections to monitor compliance with controls.

In some circumstance, e.g. highly sensitive residential areas or, as part of a section 61 consent, noise and/or vibration monitoring must be undertaken to establish ambient levels and predicted levels, before works begin on site. Monitoring may also be required to check levels produced throughout the works, using fixed unattended monitors as well as attended monitoring.

The Noise and Vibration Team in Technical Services can undertake noise and vibration monitoring and predictions; otherwise a trained and competent person must be employed.

## 3.10 Complaints and Enquiries

Do not manage enquires or complaints from the public personally. Instead, direct any enquiry or complaint to LU Customer Services Centre.

LU Customer Services Centre: 033 222 2424

**NOTE:** Residents frequently complain about employees and contractors, e.g. talking loudly, slamming doors, and dropping equipment. Remind all employees and contractors of their responsibility to minimise noise and vibration disturbance.

## 3.11 Support and Advice

In the first instance, contact your HSE Adviser for advice and assistance with completing this form and implementing adequate and appropriate control measures. Further technical assistance may be given by:

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|---|---|
| Noise and Vibration Team in Technical Services | 020 7918 6742 or 020 7918 6623 |
| External Relations | 020 3 054 8634 (88634) |
| Environment Team | 020 7918 0520 (40520) |

## 3.12 Appendix 1: Timetable of events for Section 61 application

| Weeks from start date | Activity | Responsible person |
|---|---|---|
| | Noise and/or vibration issue identified in:<br><br>A) Gates Management Plan generated and noise and/or vibration risk recorded on Risk and Impacts Management Product<br>**OR**<br>B) local environmental risk assessment | Client / Manager of works |
| At least -16 | Complete F-10565 Site Noise and Vibration Evaluation and Control Form | Planner / Designer |
| -16 | Contact local council; outline work, programme and reason for work outside social hours.<br><br>Start draft Section 61 application, use F-10564 Section 61 Template | Manager of works / PM |
| -15 | Complete draft Section 61 application. | Manager of works / PM |
| -14 | Use a noise specialist to conduct noise monitoring and noise predictions( and vibration monitoring and prediction where necessary)<br><br>Noise specialist may be from the Noise and Vibration Team in Technical Services or from a competent contractor. | Manager of works / PM |
| -13 | Provide noise (and vibration) predictions to Project team.<br><br>The Noise specialist must review the Section 61 application with regard to BPM. | Manager of works / PM |
| -12 | Begin detailed discussion with local council with support, if required, from HSE Adviser, Stakeholder Communications Team, and Noise Specialist. | Manager of works / PM |
| -11 | - | Manager of works / PM |
| -10 | Submit draft Section 61 application to local council with request to receive comments within two weeks before formal submission date. | Manager of works / PM |
| -9 | Make changes to application to incorporate local council comments. | Manager of works / PM |
| -8 | Submit formal Section 61 application to local council. | Manager of works / PM |
| -7 | - | Manager of works / PM |
| -6 | If required, discuss with modification or additional consent conditions with local council. | Manager of works / PM |
| -5 | - | Manager of works / PM |

| | | |
|---|---|---|
| -4 | Consent granted or refused by local council.<br><br>If refused or granted with unsuitable conditions, discuss with HSE Adviser, Customer Relations Team and Noise Specialist to decide whether to appeal. | Manager of works / PM |
| -3 | - | Manager of works / PM |
| -2 | - | Manager of works / PM |
| -1 | - | Manager of works / PM |
| 0 | Start work on site and monitor compliance with conditions in Section 61 | Manager of works / PM |

## 3.13 Appendix 2: Acoustic Curtains, Screens, Shrouds and Enclosures

Noise curtains, barriers, shrouds and enclosures are generally very simple, easily-constructible and highly portable structures which can be installed and removed at every shift if required – even over station entrances. Further, they may contain simple door openings which themselves can be fitted with an automatic door-closer to ensure that the barrier remains effective.

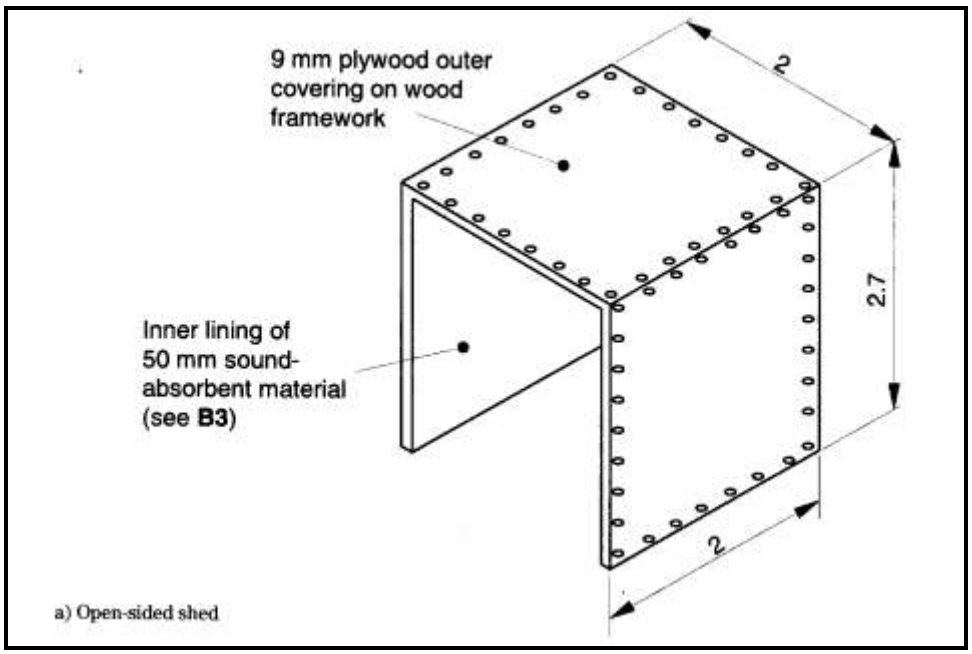
Each site will need to measure the station entrance in order to obtain the correct size of screen. Other curtains, barriers, shrouds or enclosures may be constructed from plywood boards, steel panels, compressed fibre cement board or any other readily available material of comparable mass. Regardless of the material of construction, noise barriers should be erected such that they completely enclose the item of plant from the view of the resident(s) and should be placed as close as possible to the noise source. Where there are several noise sources in one area, barriers may be arranged around the group of loudest sources. (Where possible, the loudest plant / activities should be sited to operate close to one another so as to optimise the benefit of the noise barrier / enclosure).

Noise barriers constructed from multiple panels and/or attached to the fabric of the station should be attached such that there are no gaps as even small openings significantly diminish the acoustic benefit of the barrier. Small strips of wood (or material of similar mass) may be overlapped and nailed over any such gap.

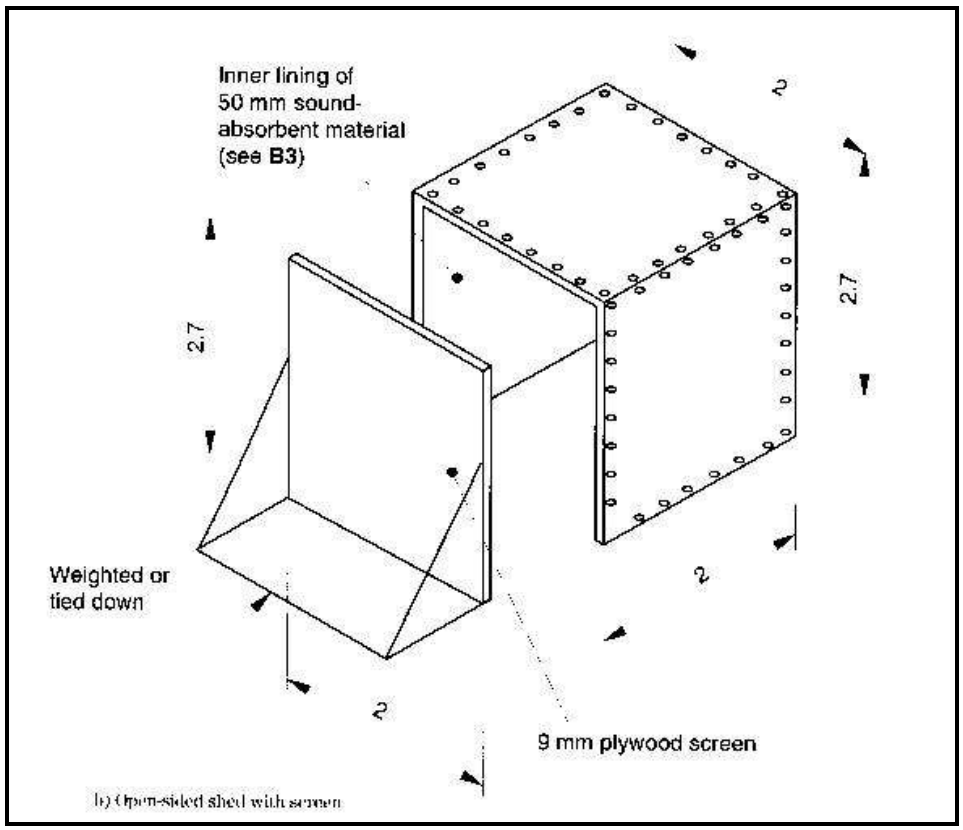
Where multi-storey dwellings adjoin the construction site, the height of a barrier may not be sufficient to effectively shield the upper levels of the residential building from construction noise. In such cases, a combination of measures may be required to control noise impacts (e.g. boundary hoardings to protect the lower-level residences and an undertaking to not work in areas of the site that can be seen by the upper-level residences outside of standard hours).

Take care to note whether any back walls may reflect noise back to a resident. Even where plant is screened on one side, the presence of a reflecting back wall on can negate the benefit of the barrier.

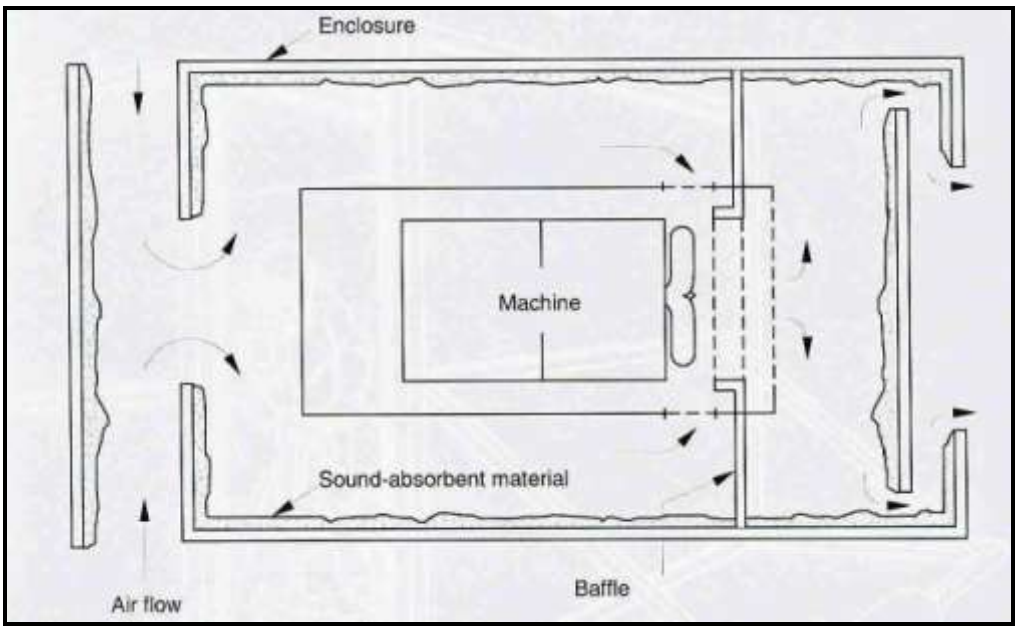
Ensure the structural integrity of the noise barriers remains intact.




*Open-Sided Shed – suitable for any plant. Advantages: Simple, quick to erect, demountable, re-usable.*




*Open-Sided Shed with Baffle – suitable for any plant (i.e. generators, kango breakers). Advantages: Improved noise reduction, simple, quick to erect, demountable, re-usable and easily movable for platform works.*




*Simple Acoustic Enclosure for Stationary Plant –suitable for any plant. Advantages: Best Level of Noise Reduction, simple, re-usable.*

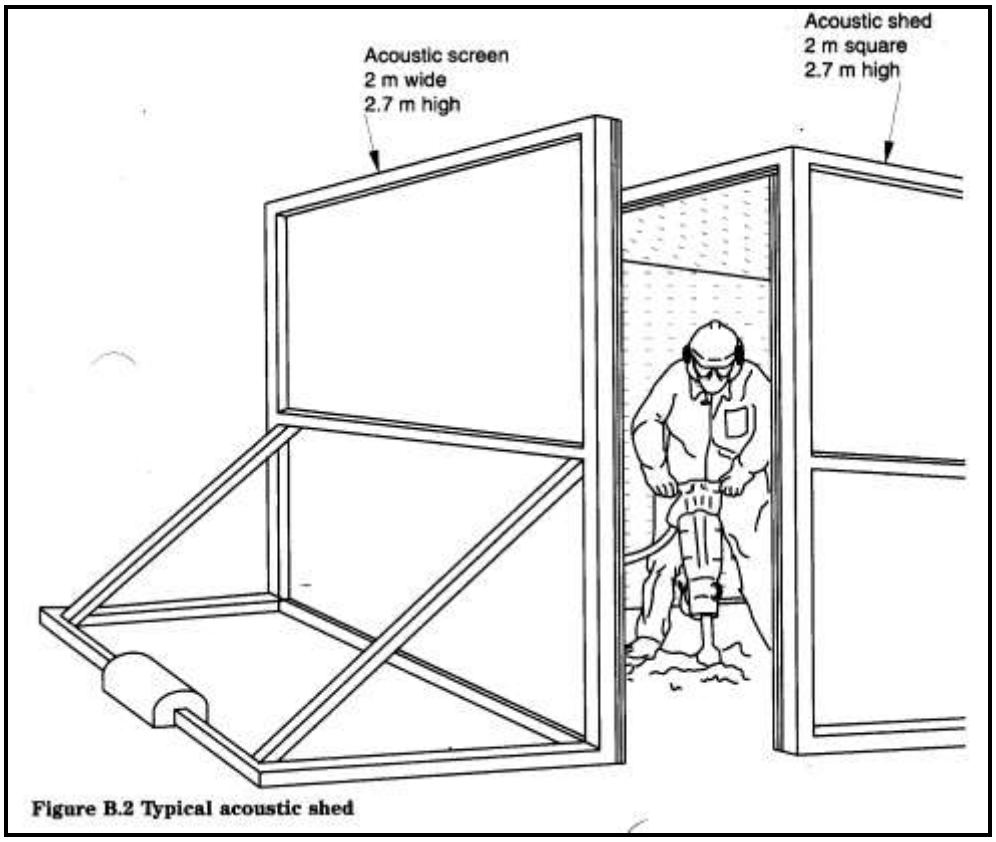



Figure B.2 Typical acoustic shed

*Simple Acoustic Enclosure for Stationary Plant –suitable for any plant. Advantages: Best Level of Noise Reduction, simple, quick to erect, demountable, re-usable.*

## 4 Person accountable for this document

| Name | Job title |
|---|---|
| Steve Judd | HSE Senior Manager - Environment |

## 5 Document History

Any proposed change to this document must go through the TfL Management Change Control process.

| Issue no. | Date | Changes | Author |
|---|---|---|---|
| A1 | 29/03/2014 | New guidance document created as per DRACCT No. 03628 | Cathy Oates |