



NOISE EMISSION FROM THE PULROSS ROAD MID TUNNEL VENTILATION SHAFT

A Report by Local Residents

© November 2019

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1. EXECUTIVE SUMMARY: Key Findings and Recommendations

1.1 The Pulross Road Mid-tunnel Ventilation Shaft (MTVS) is a shaft into the Victoria Line. Apart from when it is down for maintenance it operates 24/7, 365 days a year.

1.2 The MTVS was upgraded in 2010. At that time London Underground Limited (LUL) said it was already the “dominant”¹ noise in a quiet neighbourhood.

1.3 The upgrade of the shaft was part of the *Cooling of the Tube Project* (LUL/TfL). It was agreed by LUL and Lambeth Council that it would not add to existing background noise of 37 dB. However, TfL’s own figures show it is operating at 53.8 dB and neighbours regularly measure it between 55 and 65 dB.

1.4 For those (eg in Pulross Road) unfortunate enough to live above the underground tunnels these levels rise by a further 6dB when underground trains pass below the shaft. For much of the day this is near-continuous, and with the Night Tube trains now run through Friday and Saturday nights.

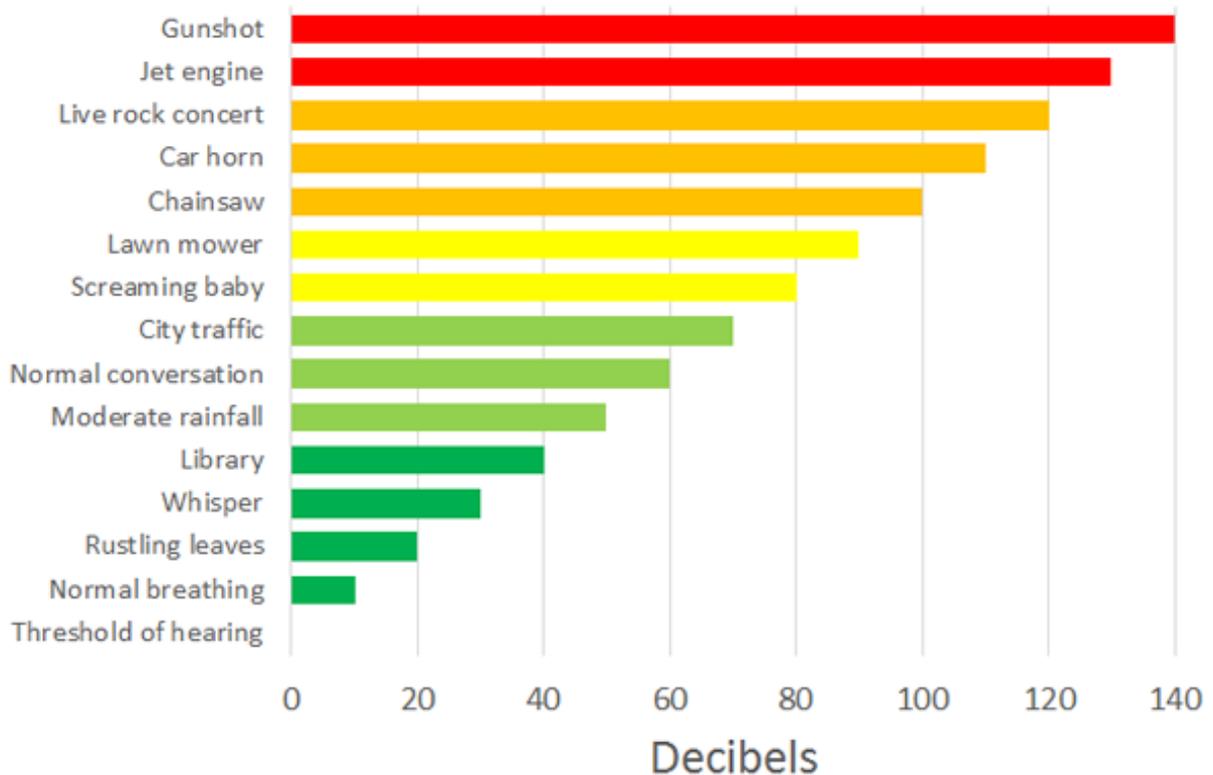
1.5 The sound quality of the MTVS is one of a constant loud roar; with modulation. The Scott Wilson Report notes in Paragraph 3.3.3 that a further 5 dB should be added by way of upward correction to data if a sound is: “a distinguishable, discrete, continuous note”. No such addition has been made to the measurement data supplied by TfL or by local residents in this report; but such an upward correction would properly reflect the wearing impact of the constant rushing sound emitted by the shaft.

1.6 This level of noise – 60-70 db - is three times as loud as the background sound without the shaft running and far exceeds the operating limit that was agreed between Lambeth Council and LUL/TfL when the MTVS was commissioned.

1.7 60-70 db is equivalent to someone boiling a kettle a metre away or vacuuming three metres away. It prevents sleep, is bad for health – does not conform to Government or WHO recommendations – and it is wearing and intrusive in our otherwise peaceful locality.

¹ Pulross Road MTVS (mid-tunnel ventilation shaft) Baseline Report (Scott Wilson Ltd) March 2009, 4.2.3

Decibel levels of common sounds

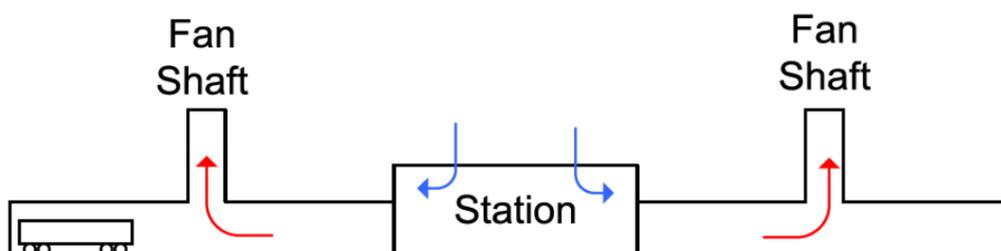


1.8 Local residents, living near the shaft, call on TfL to monitor the MTVS regularly, and at appropriate points in surrounding streets; to publish this data; and to ensure that the MTVS operates within its original agreed design specification in regard to noise.

1.9 We call on Lambeth Council, as the responsible statutory authority, to ensure that they do so.

2. BACKGROUND: The Baseline is Set

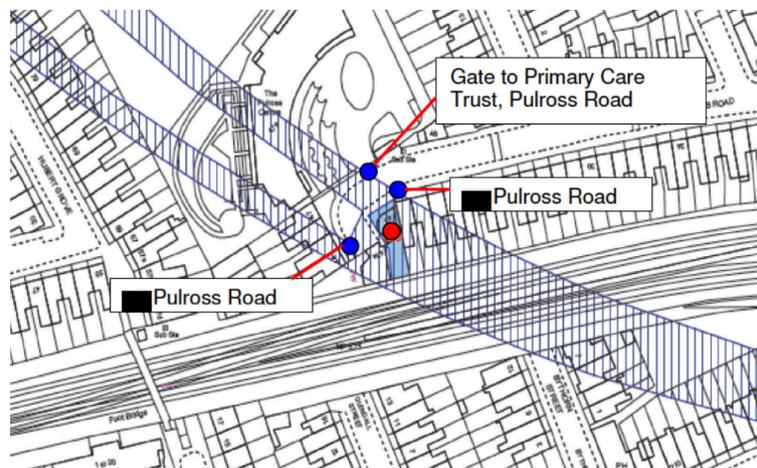
Mid tunnel ventilation shafts extract warm air from the tunnels. Cool air drawn in through the stations.



2.1 In 2008 London Underground decided to upgrade the Pulross Road MTVS as part of the *Cooling of the Tube Project* and commissioned a report from Scott Wilson Ltd - a design and engineering consultancy with a specialism in railways (now part of the AECOM²) - in order to plan how to do so.³

2.2 Scott Wilson Ltd took baseline readings from adjacent locations, referred to as receptors. These were 42 Pulross Road (4 metres away from the MTVS ground doors), 44 Pulross Road and the Primary Care Trust, 14 metres away. They did not take any readings further afield eg across the railway line in Glendall Street, Bythorn Street or Ferndale Road.

2.3 Of these locations the background sound level at 44 Pulross Road was measured at 37 dB (this was the quietest spot, 10 metres away).



Cooling the Tube Programme
Victoria Line
Mid Tunnel Vent Shaft Upgrades
Noise Assessment
For London Underground Ltd



Pulross Road MTVS
Baseline Report

LUL CTP REF: CTP-V058-1710-SW2-M21-RPT-4-Z1-X-00001-000
SWR REPORT NUMBER: A019065-PRD-SWR-NOL-NSV-001-2
SWL REPORT NUMBER: D120970-PULR-R1_03

March 2009
Scott Wilson Ltd

² https://en.wikipedia.org/wiki/Scott_Wilson_Group

³ Pulross Road MTVS (mid-tunnel ventilation shaft) Baseline Report (Scott Wilson Ltd) March 2009:

2.4 Even at this time it was noted that “Noise from the MTVS was the dominant noise source”.

2.5 The *Scott Wilson Ltd Report* explains that the plan to upgrade the shaft – installing a new fan into it – was a permitted development in terms of planning, because the building itself was to be little altered: “However the statutory noise provision will apply to the MTVS”⁴. The responsible authority was (and is) Lambeth Council who are required to enforce the *Environmental Protection Act 1990* and can issue noise abatement orders in the case of infringement.

2.6 On 26th March 2009 Lambeth Council Officers met with London Underground officials at the Lambeth Council Environmental Health Office. Lambeth Council stated that: “the new fan noise output should be no louder at the receptor points than the existing” and that they would “positively welcome any noise reductions that could be achieved”⁵.

2.7 It was confirmed by all parties that baseline sound level was 37 dB at the nearest receptor (44 Pulross Road) and agreed that this figure should not be exceeded. “Lambeth would accept the new fan design at current La90 level...LUL’s noise monitoring showed background noise level to be 37 dB at the nearest receptor”.

2.8 LUL proposed:

- To keep the existing structure (so avoiding the need for planning permission)
- To attenuate the fan - ie fit silencers - in order to meet the 37 dB figure
- To minimise cost

Their preferred option is to “match existing background” noise, and operate within WHO guidelines.

⁴ Pulross Road MTVS (mid-tunnel ventilation shaft) Baseline Report (Scott Wilson Ltd) March 2009

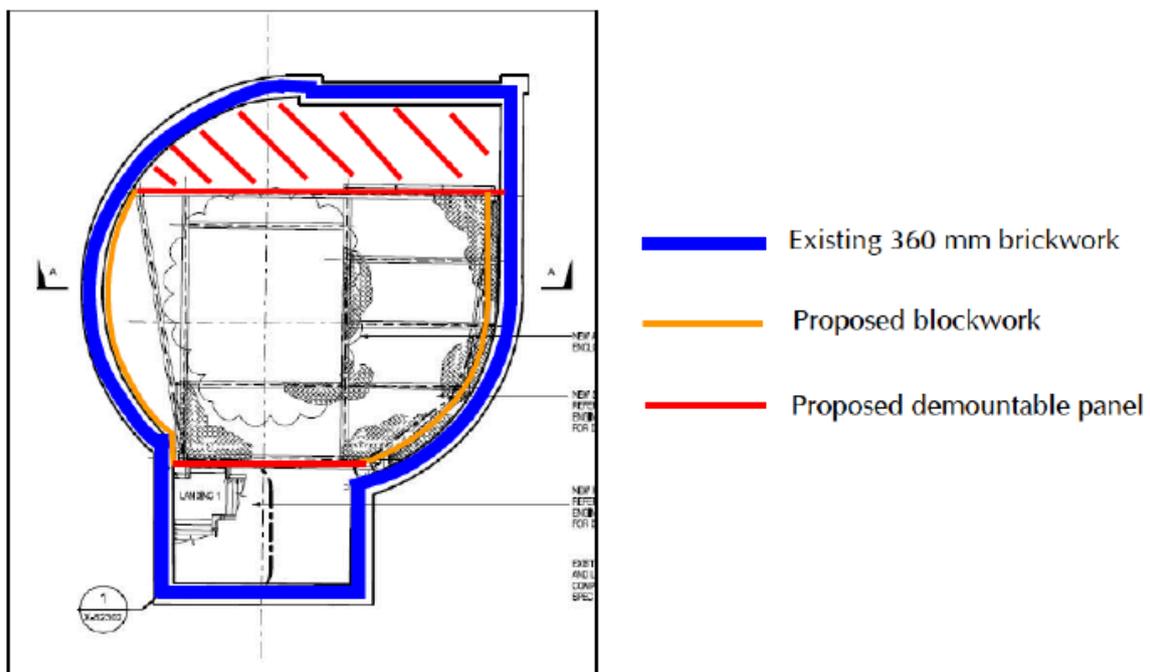
⁵ Pulross Rd MTVS Noise Level Meeting Minutes at Lambeth Council Environmental Health Office 26th March 2009

3. DESIGN: What was the Plan?

3.1 *Sandy Brown Associates*⁶ - consultants in acoustics, noise and vibration - advised on the actual fit-out.⁷ They stated that: “the total level of fan noise shall be limited to achieve 2dB below the background noise level at the nearest residential receptor”. To achieve this treatments to the head house (‘mitigation’) will need to “achieve a noise limit of 12 dB below the existing background level”.

3.2 They note that: “It was previously recommended” - in a memo of 17th August 2009 - “that the fan should be housed in an acoustic enclosure” ie effectively a sound-proofed box in the head house “However, it is understood that this is not considered to be practicable due to space constraints etc”. Instead they propose: “to line the head house with block work where feasible and with demountable acoustic panels in other areas”.

Figure 2 First floor plan indicating existing constructions and proposed measures



3.3 SBA reckoned that the block work and panelling would: “generally be capable of meeting the external criteria”. However, they also draw attention to

⁶ <https://www.sandybrown.com/>

⁷ Cooling the Tube Programme MTVS Tranche 2 Pulross Road (8th February 2010) SBA

the roof. “The exception is that there is potential noise break out via the roof which needs to be considered”.

It should be noted here that there is a hatch in the roof which local residents observe to be often open. SBA include a caveat to their report: “SBA are only considering noise break out through the building structure, as noise transfer through the air outlet itself is the responsibility of others”. It is far from clear that LUL included the rather obvious impact of an open hatch in their calculations.⁸

3.4 In July 2010 Scott Wilson Ltd produced another report predicting the effect of the proposed mitigation via the attenuators. This was the *Mitigation Design Audio – Specialist Acoustic Attenuation Report Pulross Road* (26th July 2010) (SAAR).

Morgan Professional Services Ltd (MPS) – design and engineering specialists (now part of Baker Hicks⁹) and *London Underground Ltd* (LUL) set out to design the plant so that the total level of fan noise was limited to 2dB below the background noise level at the nearest residential property ie 35 dB. This would mean, effectively, that the fan would not be heard; it would be ‘underneath’ the background sound level (37dB).

3.5 This *SAAR Report* used the RIBA D model in order to calculate the likely impact of the attenuator under various options. It concluded: “The results from the audit model show that the target noise levels at surrounding residential receptors are met when employing the fan data.”¹⁰

3.6 It further stated that: “Given the relatively low background noise levels at this location, the proximity of sensitive receptors” ie local houses “and the requirement to achieve 12 dB(A) below background noise level, the proposed treatments in the detailed design are considered robust”.¹¹

The various modelling calculations indicate that breakout noise would be “negligible”. Para 9.1.5 states that target noise levels “at all receptors should be met”.

3.7 All these figures are guesstimates based on modelling alone.

⁸ **Cooling the Tube Programme MTVS Tranche 2 Pulross Road** (8th February 2010) SBA Conclusions

⁹ <https://bakerhicks.com/about>

¹⁰ **Mitigation Design Audio – Specialist Acoustic Attenuation Report Pulross Road** (26th July 2010) para 6.3.3

¹¹ **Mitigation Design Audio – Specialist Acoustic Attenuation Report Pulross Road** (26th July 2010) para 8.1.4

4 NOISE IN PRACTICE: Did the Mitigation Work?

4.1 Subsequent to the new fan being installed, along with the 'mitigation' structures in 2010, various noise measurements were taken by LUL to see if the shaft was actually meeting its target of being below the previous baseline background level of 37 dB.

4.2 The first LUL sound level data sheet from *Burgess*, dated 15th November 2010, shows the La90 figure at 44 Pulross Road to be 41.1dB. It will be seen from this data sheet that the target of 37 dBa had not been met and *Burgess* recorded this outcome as not acceptable.

MEASUREMENT LOCATION	MEASURED dB A	TARGET dB A	ACCEPTABLE Y/N	CLIENT SIGN OFF
Background at 44 Pulross Road	Leq =36.4 LA90 = 35.0	N/A	N/A	
44 Pulross Road Fan 100% (AMB + Fan)	Leq =42.7 LA90 = 42.1	N/A	N	
44 Pulross Road Fan Only	Leq =41.53 LA90 = 41.1	37.0	N	

That is to say that the revamped Pulross Road MTVS did not meet the agreed noise limits, set by LUL and Lambeth Council at the outset.

4.3 Over time the sound levels emitted have gone from bad to worse. The TfL data sheet *Pulross Road Fan Noise 110914* shows the following sound levels at 44 Pulross Road:

	A	B	C	D	E
1	Pulross Road Fan Noise				
2	Summary - September 2011 to March 2016				
3					
4	Measurement location	Target noise level - LA90 - dB(A)	Date / Time of measurement	L90 - dB(A)	Notes
5	Pavement outside 44 Pulross Road	37.0	15/11/2010	41.1	Measurements by
6			14/09/11 - 09:08	54.0	Water running in gutter nearby
7			29/09/11 - 23:52	52.0	
8			04/11/11 - 10:54	43.4	Fan not operating
9			11/11/11 - 08:55	51.0	
10			23/11/11 - 23:44	51.9	
11			24/11/11 - 00:20	38.3	Fan not operating
12			24/11/11 - 00:56	52.3	
13			28/05/12 - 14:40	45.1	Post clean 25th May 2012
14			18/07/12 - 11:37	51.7	
15			10/02/15 - 10:42	53.8	
16			10/03/16 - 10:49	53.8	
17					

4.4 From this data it is clear that the level of sound nuisance coming from the fan has not only never been met but is getting considerably worse.

By 29/09/11 the La90 figure with the fan operating was already 52 dBA, meaning a level of sound three times as loud as the background sound level ie highly intrusive. These levels have continued to increase. The most recent ¹²reading from TfL on 10/03/16 was 53.8 dBA.

4.5 It should also be noted that the clean of the MTVS which took place in 2012 reduced the sound level from 52.3 dBA to 45.1 dBA but within two months – by 18/07/12 - the noise was back up to an unacceptable 51.7 dBA ie the effect of cleaning the fan was only temporary.

4.6 It is clear from the data that the design of the MTVS itself is at fault and that measures taken by TfL to respond to residents' complaints via a clean will provide only temporary relief.

4.7 TfL's figures with regard to background sound levels when the fan is not operational are broadly aligned to figures taken by local residents. TfL readings are in a range of 38.3 to 43.4 dBA. Recent readings at night (31/10/19) taken from outside the bedroom window of 8 Glendall Street record:

¹² Using NIOSH (National Institute for Occupational Safety and Health) Sound Level Meter App

- Fan Off 40.5 dB
- Fan On 56.6 dB

Readings taken from outside 43a Pulross Road are as follows:

- Fan Off 39dB
- Fan On 65dB
- Fan On, train passing below shaft 70dB

4.8 It is the case that residents are impacted by the noise from the shaft over a much wider area than that which has been measured by LUL/TfL. Indeed lines of sight across to the head shaft and comparative readings taken show the sound in, for example, Glendall Street to be worse than at 44 Pulross Road (the adjacent receptor).



4.9 Measurements taken between 10.52 and 10.50 on 24rd October 2019 with the fan operational are:

- Pavement MTVS Doors 63.6 dBa
- Pavement 44 Pulross Road 65.3 dBa
- Pavement 8 Glendall Street – some 100 metres away across the railway line - 66 dBa

5. LIVING BESIDE THE MTVS: The Voice of Local Residents

5.1 At intervals since 2016 (October 2016, February 2017, May 2019) local residents have complained to TfL about the noise from the MTVS. This has resulted in TfL bringing forward cleaning schedules but any reduction in noise has been short-lived. Now residents feel they have had enough with short term fixes.

5.3 Comments include:

“I have lived in Glendall Street for over 35 years. It was a quiet neighbourhood and the trains have never bothered me. The sound level from the MTVS is much worse than in the past. It is like a plane taking off all the time. The noise is now keeping me awake at night and the lack of sleep is affecting my job as a teacher. The noise is constant and exhausting. It is bliss whenever the fan is turned off.” – Nigel, Teacher, Glendall Street

“We have lived next door to the vent shaft for over twenty years. Before the 2010 shaft works, there was no discernible fan noise due to the shaft, and underground trains passing below could only be perceived as a very faint rumbling, if all else was quiet. Since the 2010 works, fan noise has been a constant and worsening problem, and the roar of trains passing below the shaft dominates the area, and within our house, including in our bedroom. In my work as an architect I am used to Planning Authorities requiring that mechanical plant should emit no more than 10dB below background. Here at home we are subject almost 24/7 to an increase in background of around 25dB - that’s over five times as loud as it was before the works.” – Tony, Architect, Pulross Road

“I am a musician; my wife and I moved to Glendall Street in September 2012, not long after the new fan was installed. I noticed it straight away even though our house is the furthest away at the end of the street, but it has grown significantly louder in recent years. Because my ears are attuned to sound I find it very intrusive, more so than I used to. We have a toddler and a new baby and can hardly use the front bedroom of our house which faces the MTVS.” – Frank, Saxophonist, Glendall Street

“The noise from the shaft has genuinely been a source of real stress for the last three years (since I have lived here). It has a very definite impact on my and my

husband's quality of life, and specifically on our quality of sleep." – Rebecca, Ferndale Road

"The noise from the shaft is constant and irritating." – Bethany, Glendall Street

6 RECOMMENDATIONS: What Residents want TfL and Lambeth Council to do

6.1 TfL have stated: "We do not have a regular noise monitoring schedule" with regard to the Pulross Road MTVS. This is entirely unacceptable. We call upon them to immediately set up regular noise monitoring of the shaft and to take measurements, not only adjacent to the shaft, but at other nearby residential locations. These measurements to be published.

6.2 We demand that TfL face up to the fact that the Pulross Road MTVS is getting noisier and act now to reduce noise emission to the agreed operational level of 37 dBA.

6.3 We look to Lambeth Council to respond to all nuisance complaints in regard to noise from the Pulross Road MTVS, to undertake their own monitoring (publishing their findings), and to enforce the *Environmental Protection Act 1990*, with abatement notices applied to TfL where appropriate and prosecution where breached.