

**TRANSPORT AND WORKS ACT 1992
TOWN AND COUNTRY PLANNING ACT 1990**

PLANNING (LISTED BUILDINGS AND CONSERVATION AREAS) ACT 1990

**PROPOSED LONDON UNDERGROUND
(NORTHERN LINE EXTENSION) ORDER**

TRANSPORT FOR LONDON'S REBUTTAL

OF

**THE EVIDENCE OF ERIC GUIBERT AND ROBIN PEMBROOKE, THE
KENNINGTON & WALWORTH NEIGHBOURHOOD ACTION GROUP,
THE NORTHERN LINE EXTENSION COMMUNITY ACTION AND
CLAYLANDS ROAD NLE ACTION GROUP**

ON

NOISE AND VIBRATION

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1. INTRODUCTION

- 1.1.1 This rebuttal proof of evidence has been prepared on behalf of Transport for London to address particular aspects relating to noise and vibration in the proofs of evidence submitted by Eric Guibert and Robin Pembroke (OBJ 27), the Kennington and Walworth Neighbourhood Action Group (OBJ 60/KWNAG4), the NLE Community Action Group (OBJ 190/1) and the Claylands Road NLE Action Group (OBJ 254/GBN). This rebuttal does not address issues specific to the Kennington Green and Kennington Park worksites which will be the subject of other rebuttal proofs of evidence.
- 1.1.2 Dr. Lentell for Kennington and Walworth Neighbourhood Action Group (OBJ 60) has raised new points in paragraphs 2.5, 2.9, 5.1, 4.1, 6.1, 7.1 and 8.1. Mr. Petchey for Claylands Road NLE Action Group (OBJ 254) has raised new points in paragraphs 6.7, 6.10 and 6.11. These points were not previously addressed in the proofs of evidence prepared by TfL's witnesses, which were submitted to the Inspector and each objector on 18 October 2013.
- 1.1.3 It is not intended that this rebuttal should address further points that witnesses for TfL have previously covered in their evidence; however, cross-references to relevant paragraphs of those witnesses' proofs of evidence will be made where appropriate.
- 1.1.4 It is intended that this rebuttal should be a composite response to those issues raised by the objectors and set out above. In this respect, for cross-examination purposes the name of the TfL witness who is responsible for each aspect of this rebuttal proof will be given at the beginning of each section below.

2. DEFINED TERMS

The following defined terms are referred to throughout this rebuttal proof:

<i>CoCP</i>	<i>Code of Construction Practice</i>
<i>ES</i>	<i>Environmental Statement</i>
<i>KWNAG</i>	<i>Kennington and Walworth Neighbourhood Action Group</i>
<i>NPPF</i>	<i>National Planning Policy Framework</i>
<i>SPJ</i>	<i>step plate junction</i>
<i>TBM</i>	<i>tunnel boring machine</i>

3. OBJ254 - CLAYLANDS GREEN ACTION GROUP – Mr PETCHEY

3.1 *Precedent set by Crossrail “special cases”*

3.1.1 Mr Petchey considers (paragraph 5.10.3) the step plate junction should be treated as a special case, as per the precedent set by Crossrail, "... Without regard to any numerical noise level".

Expert witness: Rupert Thornely-Taylor

3.1.2 **The track form in the vicinity of the step plate junctions will be a “special case”. It is likely that a special resilient track support system will be required to achieve the noise level in the draft planning condition of 35 dB L_{AFmax} . I explain in section 5 of my Proof of Evidence [TFL3/A] why this noise level is sufficient to prevent adverse impacts on amenity and how it complies with relevant policy and guidance. To be clear this design level would be the lowest ever adopted in any underground railway in the UK.**

3.1.3 **Because this means that the designer has to achieve the design level at “pinch points”, i.e. the locations likely to experience the highest levels of groundborne noise, the consequence is likely to be that levels of ground borne noise actually experienced in the vast majority of cases will be considerably below the design level.**

3.1.4 **Indeed, the JLE was designed to a design level of 40 L_{ASmax} but the outturn has been that ground borne noise levels actually experienced are significantly below that level, i.e. 28 to 30 L_{AFmax} (see my Proof of Evidence [TFL3/A] page 17 paragraph 5.2.5). This demonstrates that the approach proposed to be adopted is effective in practice.**

3.2 *Ground borne noise from the temporary construction railway*

3.2.1 In paragraph 6.7 Mr Petchey states that he does not consider that the construction railway is temporary.

3.2.2 Mr Petchey considers (paragraph 6.13) that levels of ground borne noise arising from the construction railway should not exceed the levels of mitigated ground borne noise estimated by TfL for the NLE in its operational phase (as shown in ES Table 9-28). In order to achieve this appropriate mitigation measures (such as a level of resilience in the track) should be installed. Failing this, operation of the construction railway should be suspended outside of normal working hours.

Expert witness: Jonathan Gammon

- 3.2.3 It has to be understood that the track used on the temporary railway is not the same as that used for the final trackform. It is a temporary railway in the sense that the temporary track is replaced by the final trackform after the tunnels have been completed. To permit full flexibility regarding the gauge of the temporary tunnelling works railway, and to accommodate temporary installations including invert drainage as well as to avoid accidental damage, it is not possible to place the permanent way trackform for use by the temporary railway.
- 3.2.4 The temporary railway design and operation is subject to the commitment in the CoCP to adopt Best Practicable Means to mitigate noise impacts. This is defined in section 72 of the Control of Pollution Act 1972 so that the best means that is reasonably practicable to mitigate noise will be adopted having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications.
- 3.2.5 Paragraph 17.79, points iv and v in my Proof of Evidence [TFL2/A] explains that measures will be taken to minimise the transmission of vibration and ground borne noise from rail vehicles. Any diesel locomotives will be fitted with efficient exhaust silencers.
- 3.2.6 The temporary railway is required to support the TBM operations. The TBMs are required to operate continuously once they commence tunnelling. It follows that the construction railway has to be able to operate at all times as well. To restrict the operational hours of the construction railway in the way that Mr Petchey suggests would result in the need to stop the TBMs, which is not practicable.
- 3.2.7 The length of time that the temporary railway will be operating depends upon the point along the tunnel drive that is considered. As it is constructed behind the TBMs the temporary construction railway will pass under properties to the west of the route for a longer period than those living to the east. It will take approximately 9 weeks for the TBMs to travel to Nine Elms and then a further 12 to 14 weeks to the shaft sites. The construction of the permanent way and systems installation is programmed to take 28 weeks. The temporary construction railway will be removed during this period.

3.3 *Tunnelling work and application of the Code of Construction Practice*

3.3.1 Mr. Petchey is aware (paragraph 6.10 and 6.11) that the TBM will be in operation continuously. He considers this will be a clear contravention of the Code of Construction Practice (CoCP).

Expert witness: Rupert Thornely-Taylor and Jonathan Gammon

3.3.2 Paragraph 3.2.8 of the CoCP (TFL13) states, ***“Tunnelling works together with directly associated activities will normally be carried out on a 24 hours per day, 7 days per week basis.”***

3.3.3 The CoCP thus makes it clear that the TBM will operate continuously. Such operation does not breach the CoCP. Further, the project has been assessed on the basis of continuous operation in the Environmental Statement (ES) [NLE/A19/1].

3.3.4 As explained above, it is essential that the TBM does not stop in order to allow for proper management of ground settlement risks and health and safety risks. All recent tunnel drives in London have involved 24-hour tunnelling.

3.3.5 Recent experience in relation to the Crossrail tunnelling suggests that the levels of impact identified in the Environmental Statement are likely to be an overestimate of the likely ground borne noise impact.

3.4 *Comparison of noise levels from Crossrail temporary construction railways*

3.4.1 Mr Petchey considers (paragraph 6.16) that the mitigation measures that are proposed for the construction railway compare unfavourably with the equivalent provisions made for Crossrail (Crossrail Information Paper D10).

Expert witness: Rupert Thornely-Taylor

3.4.2 The Crossrail CoCP imposed precisely the same obligation upon the undertaker to adopt Best Practicable Means as is included in the NLE CoCP. Thus the temporary construction railway for the NLE will be designed and operated such that it will be similar to that used on Crossrail, which has performed well with regard to ground borne noise levels. There is no reason to believe that the design and operation of the NLE temporary construction railway will be any less effective at mitigating ground borne noise than the Crossrail temporary railway.

4. OBJ60 – KWNAG – Dr LENTELL

4.1 Operational noise limits around SPJs

4.1.1 Train movements across the step-plates should not be permitted to emit more ground borne noise than elsewhere along the NLE. We see no reason why a lower commitment of lower than 30dB L_{AFmax} should not be imposed (paragraph 2.9).

Expert witness: Rupert Thornely-Taylor

4.1.2 **The planning condition proposed to control the levels of ground borne noise arising from the operation of trains across the step plate junction applies the same approach and design level as is applied to the rest of the railway, namely a design level of 35 L_{AFmax} .**

4.1.3 **I explain in section 5 of my Proof of Evidence [TFL3/A] why this noise level is sufficient to prevent adverse impacts on amenity and how it complies with relevant policy and guidance. To be clear this design level would be the lowest ever adopted in any underground railway in the UK.**

4.2 Works to trackform of Kennington Loop

4.2.1 Dr. Lentell states that the trackform of Kennington Loop should be upgraded to improve its performance as a result of the NLE.

Witness: Rupert Thornely-Taylor

4.2.2 **The NLE results in less use of the Kennington Loop than occurs at present. It thus delivers a noise improvement for those occupying buildings above the loop. As the NLE delivers improvement already it is not necessary in order to mitigate the impacts of the NLE scheme to require works to the trackform of the loop.**

4.3 Noise impacts of water management measures

4.3.1 Dr Lentell states that no information has been made available on the noise impacts of possible water management measures (paragraph 5.1)

Expert witness: Jonathan Gammon

4.3.2 **The ES [NLE/A19/1] notes at paragraph 4.92 that groundwater control is likely to be required. Where the removal of groundwater from excavations is found to be necessary, this is likely to be effected by the**

use of electric-powered submersible pumps placed in sumps (i.e. a localised deepening at the base of the excavation).

- 4.3.3 The CoCP applies Best Practicable Means to all plant and equipment used during construction. Further, paragraph 5.3.3 of the Code of Construction Practice, controlled by draft planning condition 6, requires that all plant and equipment liable to create noise whilst in operation to be located away from sensitive receptors, as far as reasonably possible. It also goes on to state that barriers to absorb noise will be used to protect sensitive areas wherever required and reasonably practicably.
- 4.3.4 The position of the pumps reduces further their noise during operation, which is likely to be intermittent as the sump fills and is emptied. In addition, a noise shroud can be placed over the pump installation without hindering its operation.
- 4.3.5 This provision of the CoCP has been assumed as part of the assessment of the scheme and would ensure that no significant effects would arise from these activities.

4.4 Hours of Construction

- 4.4.1 In paragraph 4.1, Dr Lentell states that working hours should not be extended in order to keep the Northern line/Kennington station operating.

Expert witness: Jonathan Gammon

- 4.4.2 Construction activity in the vicinity of Kennington Station will include:
 - a) construction of the cross-passages at platform level;
 - b) the construction of the gallery tunnels;
 - c) the construction using the SCL technique of the running tunnels from the two shafts to connect with the Kennington Loop; and
 - d) the construction of the step-plate junction.
- 4.4.3 The working hours for the construction of the cross-passages will be consistent with the standard working hours for the NLE. However, the material to be taken away by train cannot occur when the station is being used for passenger operations and so will occur outside passenger operating hours, between the hours of 01:30 and 05:00. As with all sub-surface works, best practicable means will be used to control noise and no significant effects are expected.

- 4.4.4 The construction of the gallery tunnels and the running tunnels will occur on a 24 hour basis, seven days a week. Continuous working is necessary to minimise risks to health and safety and risks of ground movement. The cessation of services on the Northern line would not affect the need to work at night for this construction operation.
- 4.4.5 The working hours for the construction of the step-plate junction will be on a 24 hour basis seven days a week. Continuous working is necessary to minimise risks to health and safety and risks of ground movement. The cessation of services on the Northern line would not affect the need to work at night for this construction operation. Even if an alternative tunnelling technique were used to create the step-plate junctions which resulted in cessation of services on the Northern line, 24 hour operations would still be necessary to minimise risks to health and safety and risks of ground movement.
- 4.4.6 It is thus not the case that 24 hour working is required in order to maintain services on the Northern line. It is necessary for other reasons.

4.5 *Assessment of in-combination effects is insufficient as lacks information about utilities*

- 4.5.1 In paragraph 6.1 Dr Lentell states, “We have not been provided with information about what works to utilities would be required in consequence. At a TfL meeting with NLECA we were told that discussions with utility companies were still in progress. Unless a late report is brought to the Inquiry, it will not be able to ascertain the impact of these on noise and to scrutinise mitigation plans. We note that if utilities works were to be required then section 17 of the ES (In-combination effects) would need to be rewritten.”

Expert witness: John Rhodes

- 4.5.2 These matters are addressed in section 4.5 (Utilities Damage Assessment) of the Settlement Report and further details regarding the enabling and utilities works are presented at paragraphs 4.7A to 4.7D of the Environmental Statement Addendum Report [NLE/A19/8]. The potential significant effects are then reported in the ES.
- 4.5.3 Whilst the precise details of some of the utilities works are not currently defined, they would be of a minor nature. In the context of the comprehensive controls set out in the CoCP, they are not likely to give rise to significant environmental effects. It should be noted that this would have no bearing on the validity of Chapter 17 of the ES [NLE/A19/1].

4.6 *Excavated material from Kennington station*

4.6.1 In paragraph 7.1 Dr Lentell indicates his opposition to removal of tunnel spoil and transport of materials by lorry from Kennington station.

Expert witness: Jonathan Gammon

4.6.2 **No spoil will be removed from Kennington station via the surface entrance at the station. Works trains will be utilised – see paragraph 15.6 of my proof of evidence [TFL2/A].**

4.7 *Disapplication of powers*

4.7.1 In paragraph 8.1 Dr Lentell opposes the disapplication of legislation that enables the London Borough of Southwark to control noise and vibration detectable at the surface. Dr Lentell also requests a locally based (Kennington/Walworth) point of contact and a 24 hour/ 7 day phone contact throughout the construction period. The objector also asks for a person who acts as an external intervention akin to a ward councillor.

Expert witness: John Rhodes and Jonathan Gammon

4.7.2 **Article 44 of the draft Order provides a defence to action taken by a local authority or third party pursuant to section 82 of the Environmental Protection Act 1990 if:**

a) the nuisance arises out of NLE works carried out in accordance with a notice served under section 60 or a consent given under section 61 (prior consent for work on construction sites) of the Control of Pollution Act 1974(c); or

(b) the nuisance is a consequence of the operation of the authorised works and that it cannot reasonably be avoided.

4.7.3 **This does not materially alter the ability of the London Borough of Southwark to control noise and vibration detectable at the surface. None of the three relevant local authorities has raised any concerns in this regard.**

4.7.4 **Section 2.5 of the CoCP [TfL/13] sets out the approach to community liaison. It includes a commitment to a 24 hour/7day telephone helpline (see TFL13, paragraph 2.5.3). Appropriate contacts and response times will be the subject of a detailed procedure to be agreed prior to the commencement of construction. Potentially affected occupiers will be notified of the helpline number and it will be widely advertised and**

displayed on site signboards.

4.8 Comparison of the TfL Noise and Vibration Asset Design Guidance with international examples

4.8.1 Below paragraph 4 Mr Guibert and Mr Pembroke (OBJ 27) set out a chart which compares operational noise design levels for rail/metro projects in other countries with that proposed for the NLE. The objectors argue that the NLE/TfL Noise and Vibration Asset Design Guidance is the worst of all the examples selected by the objector. The objectors also state (below the chart), “the readings being Fast might be up to 5 dB L_{amax} better than a Slow one but does not give a precise number for the NLE which can be used. The TfL noise policy would still be the worse in the range even if we included a 2 dB, especially as many of the other are also given as Fast L_{amax} readings and the WHO data does not stipulate.”

Expert witness: Rupert Thornely-Taylor

4.8.2 **This chart is selective, omitting Italy (35 dB L_{ASmax}), Austria (35-40 dB L_{ASmax}), Dublin Metro North (35 dB L_{ASmax}) and DART Underground (35 dB L_{ASmax}), and shows Jubilee Line Extension measured levels and not the design aim of 40 L_{ASmax} .**

4.9 Sleep Disturbance

4.9.1 Mr Guibert and Mr Pembroke (OBJ 27) allege that the proposed design level of 35 dB L_{AFmax} will result in sleep disturbance

Witness: Rupert Thornely-Taylor

4.9.2 **In my Proof of Evidence I set out in section 5.4 a comparison of the proposed design level with national and international guidance. I demonstrate that the proposed design level of 35 dB L_{AFmax} is lower than the “No Observed Effect Level” for transportation noise in general and the L_{night} level identified at the NOEL threshold within the Night Noise Guidelines for Europe. I do not accept that the adoption of the design level proposed would result in sleep disturbance.**

4.10 Additional Cost of Different Trackform

4.10.1 Mr. Guibert and Mr. Pembroke (OBJ 27) seek information regarding the difference in cost that achieving 30 dB L_{AFmax} .

Witness: Rupert Thornely-Taylor

4.10.2 TfL has not identified any particular track form to be used with the NLE. That is a matter for the contractor within the framework provided by the planning condition proposed. To select and specify a particular trackform to be used now would require a level of detailed design which cannot be carried out at this stage, would tie the project to a particular manufacturer with obvious implications for the costs of procurement and would also give rise to difficulties in terms of the legality of the procurement process. It follows that there is no specific trackform associated with the NLE that can be costed. It follows that a comparison between the cost of an NLE trackform and any other trackform cannot be undertaken in any reliable way. What can be said, however, is that it is likely that a trackform to meet a more stringent criterion would be more expensive.

5. OBJ190 – NLE COMMUNITY ACTION – Ms ANDREWS

5.1 Proposed changes to draft planning condition on operational noise and vibration

5.1.1 Section 2.3 of Ms Andrews's evidence for the NLE Community Action (OBJ 190) proposes an alternative draft planning condition relating to operational noise and vibration.

Expert witness: Rupert Thornely-Taylor

5.1.2 **The draft planning condition relating to ground borne noise has been agreed with the local planning authorities who do not appear to share Ms Andrew's concerns.**

5.1.3 **The condition proposed by Ms Andrews seeks to require that the noise levels set out at Table 9.31 of the ES [NLE/A19/1] are not exceeded when measured near the centre of any habitable room within a residential property (including basements).**

5.1.4 **This is unworkable and unenforceable. The Table sets out a number of noise levels at different properties. It is thus impossible to identify what noise level would apply to any particular property along the route. There is no good reason why noise should be limited on a basis that applies a different design limit as between different properties. Further and in any event, the noise levels set out in the Table are well below the level at which any material effect upon amenity might be experienced. It is not necessary to require the project to meet such noise levels in order to mitigate to acceptable levels of ground borne noise. The draft condition agreed with the local planning authorities is clear and enforceable.**

5.1.5 **The condition also does not allow for verification monitoring in locations other than those assessed in the ES. If access were refused at all of these locations there would be no means of verifying the ground borne noise performance of the railway. The better approach is that proposed in the draft condition agreed with the local planning authorities of allowing for agreement to be reached on the appropriate representative properties to use for the verification process.**

5.1.6 **Paragraph (e) is unenforceable as it does not specify the properties to which it relates with any precision. Further the adoption of a 30 dB L_{AFmax} design level is not justifiable. I have explained in section 5 of my Proof of Evidence why the 35dB L_{AFmax} is appropriate. Further the reference to two trains is unnecessary for reasons I explain in my Proof of Evidence [TFL3/A] in paragraph 7.2.9 and following.**