Cole Jarman

Mr T Croft
Thomas Croft Architect
9 Ivebury Court
325 Latimer Road
London W10 6RA

2nd March 2016
Ref: 16-0692 L04-0

Dear Thomas

Application Reference - 11 Rosslyn Hill
Civil Engineering Dynamics Ltd report ref AKS/3400/R1/iL dated 1st February 2016
"Structural and Ground Dynamics"

I refer to the above report. You have asked that we comment with respect to two matters raised in the report not covered in our earlier correspondence. These are:

a) The potential effect of use of the new TV room upon recording at the studio

b) The effects of underground train noise upon the studios.

Previously noise and vibration matters have been commented upon by Vanguardia on behalf of the studio. It should be noted that they did not raise these matters in their reports, from which one might reasonably conclude they did not consider them matters of merit worth raising as reasons for objection to the application. That is a conclusion I would concur with, my reasons outlined below:

The Potential Effect of use of the New TV Room upon Recording at the Studio

In paragraph 8.32 of the report it is stated:

"Depending upon the type of sound system used in the Home Cinema Basement room and were they to mounted on the adjacent new interface basement wall (see fig 8.10), it may be necessary to mount any powerful loudspeaker (an electrodynamic shaker), in such a way to minimise structure-borne noise transmission of very loud events that exist in some movie tracks. Otherwise this has the potential to affect the un-isolated main Hall, particularly given the 24/7 nature of the studio usage. It may be used late at night at a time coincident with typical use of a home cinema. And when background levels are lower."

I note that that the concern relates only to structureborne noise, that arising from direct connection to the building structure. There is no concern with airborne noise, the sound as actually heard in the TV room. This is fairly obvious as the TV room would be separated from the recording studio by the lining constructions within the basement shell, the 300mm concrete inner wall, the secant piled wall and the studios own constructions which would offer very high levels of airborne sound insulation. The airborne sound levels themselves within the TV room would be at domestic levels.

Civil Engineering Dynamics speculate as to loudspeakers being directly fixed to the concrete shell walls. However, very clearly this cannot and will not happen. Under Camden Development Policy DP22 the scheme needs to achieve Level 4 Code for Sustainable Homes rating with 50% of the energy, Water and Material Credits. Consultants Price and Myers have undertaken a pre assessment demonstrating this will be achieved. To achieve level 4 as a minimum the thermal performance of the building has to be at least 19% above Building Regulations Part L requirements. In their Energy Strategy Report they state that the walls and floor of the building are to have U values of not more than 0.11 w/m^2K. This means that within the concrete shell of the basement there will be extensive thermal insulation of the walls, floor and ceiling, between the concrete shell and the internal finishes. As a consequence the loudspeaker supports can (and will) only be on to the internal finishes, as any direct connection to the concrete structure would cause "cold bridging" to the shell. Therefore the speculation on loudspeaker mounting will not apply. I would again reiterate that this would be a TV room with domestic sound levels, not those which would be made in a nightclub (or recording studio).

The Effects of Underground Train Noise upon the Studios

It is noted from the Civil Engineering Dynamics report that underground train noise is audible within the main studio. The noise levels recorded at ground level of 28.7dBA, apparently from the closer tunnel and 25.8dBA from the further tunnel represent noise levels above the criteria Vanguardia had proposed (25dBA) applicable to noise intrusion from construction works at 11 Rosslyn Hill.

They speculate that the new constructions at 11 Rosslyn Hill will increase the underground train noise in the main recording studio due to the piled foundations and connection between the studio building and the new constructions at 11 Rosslyn Hill.

The argument is however flawed. The primary mechanism of sound transfer dissipation is distance attenuation. The main recording studio is actually closer to the tube lines than the proposed TV room basement extension. Therefore the dominant sound transmission path to the main studio is through ground which will not be affected by the construction. That will remain unchanged.

As Alan Baxter make clear the studio buildings and the proposed TV room basement extension will remain structurally separate. The effect of the basement extension rather than amplifying train vibration will be to act as a partial vibration screen to the studio, as a consequence of the discontinuity in ground conditions it will create. This effect is covered in some detail in the attached page from "Transportation Noise Reference book" (Editor Paul Nelson), paragraph 16.6.4.

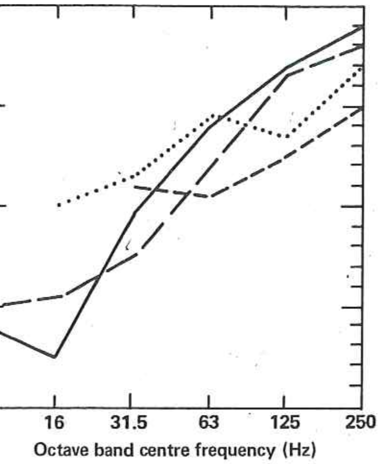
In this case however the screening benefit to main studio would not be perceived by the main studio because the dominant sound path from the train tunnels would continue to be the nearer direct path. With the other smaller studios they are on isolated bearings and so there is currently no noise impact. That will continue to be the case with the TV room basement constructions present.

The effects of this screening I refer to can actually be seen in the readings by Civil Engineering Dynamics, the noise levels from the further northern line tunnel being around 3dBA less than the nearer tunnel.   That 3dB attenuation can expected to be mostly due to the closer tunnel acting as a noise screen to the second tunnel, the differences in distance between the two being unsubstantial, (and hence the additional distance attenuation).

Civil Engineering Dynamics also speculate as to the impact of other train lines. The nearest of those are some 100m to the north. The others are over 150m away to the south. They do not identify any impact of these upon the studios currently and so this would continue to be the case for the reasons identified above.

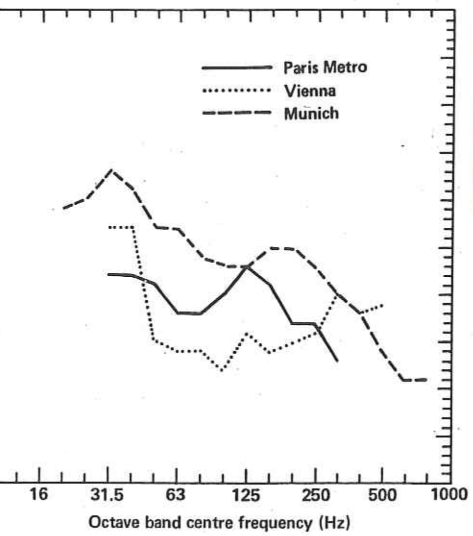
Yours sincerely

Neil Jarman



6.20 Difference in tunnel vibration levels between
nal track and floating slab track (level without floating
with floating slab). ——, New York (NYCTA) continuous
slab, support frequency $f_0 \approx 16$ Hz;[65] — —, Washington, DC
) continuous concrete slab, f_0=16 Hz[33] ------, Cologne
us concrete trough containing a conventional tie/ballast
10 Hz;[66] ....., Frankfurt discontinuous precast concrete
$f_0 \approx 10$ Hz[67]

tunnels. However, below about 31.5 Hz the levels from
lar tunnel are 0–10 dB lower.
ported reductions in groundborne noise and vibration
from changes in the average tunnel wall thickness
rom 5 to 18 dB per doubling of the wall thick-
[9,70,71]
r research is needed to provide better estimates of the
tunnel wall thickness and of tunnel/soil interaction.
increased tunnel wall thicknesses imply increased
tion costs, greater thickness designs may provide the
oise reduction more inexpensively, more reliably, and
maintenance requirements than, say, floated slab track
ner walled tunnel.



21 Measured change in vibration with ballast mats[33]
mat–level without mat).

16.6.4 Screening

Trenches (either open or backfilled with light-weight waterproof filler) or solid barriers (such as concrete-filled trenches) have seen only limited use as a method for controlling groundborne noise and vibration from rail systems. Both screening approaches provide an impedance mismatch in the soil so as to interrupt the wave propagation path.

In order to alleviate a groundborne noise problem at a TV studio in a building located about 2.5 m (8.2 ft) from the wall of a rapid transit tunnel, a trench was installed between the tunnel and the building. Measurements were taken before the work began, after excavation of all the soil between the tunnel and the building, to the depth of the bottom of the tunnel and after backfilling the trench to its final width of 20 cm (7.9 in). The basement floor of the building was about 2.3 m (7.5 ft) below the bottom of the tunnel (and trench). Noise reductions in the studio of 8 and 4 dB(A) were obtained before and after the trench was backfilled.[72] The dominant octave band in all cases was 63 Hz.

The results of a test conducted with steel sheet piles (9 m [30 ft] deep and 50 m [165 ft] long) driven in two rows near a Shinkansen aerial structure[73] yielded about 15 dB of reduction in the ground surface vertical acceleration level at 12 m (39 ft), about 4 dB at 20 m (66 ft) and 0 dB at 50 m (164 ft). The reduced effectiveness at larger distances may be due in part to flanking around the ends of the sheet piles.

In another test on the Shinkansen[73] concrete piles (40 cm [16 in] in diameter) were driven in a continuous line about 4 m (13 ft) from an existing (apparently at-grade) track. When driven to a depth of 5 m (16 ft), these piles resulted in a vibration reduction of about 10 dB at 7 m (23 ft). For piles driven to a depth of 3 m (10 ft), the reduction was only about 2 dB.

The Toronto Transit Commission[74] built a 'U'-shaped trench, whose side parallel to the track was 24 m (80 ft) long and whose ends (perpendicular to the track) were 10 m (34 ft) long. The trench was 4.3 m (14 ft) deep and filled with 10 cm (4 in) thick styrofoam. The side parallel to the track was 8 m (26 ft) from the at-grade track centreline. The typical reduction in the ground acceleration level at 9.8 m (32 ft) was 5 dB with reductions at some locations of up to 10 dB.

Some general guidelines for trench and soil barrier design are given by Barkan,[29] Richard *et al.*,[75] Haupt[76] and Dolling.[77] The primary concern is to provide a trench of sufficient depth to attenuate the primary wave type causing the vibration at the receiver location. Thus, for Rayleigh (surface) waves, the trench depth should be in the order of the Rayleigh wavelength at the dominant frequency. In typical soils, the Rayleigh wavespeed is in the order of 200 m/s (660 ft/s) and the dominant frequency from train vibrations is about 50 Hz. Thus, the Rayleigh wavelength is about 4 m (13 ft).

16.6.5 Building isolation

Insertion of isolation pads in buildings under foundation piles, at column bases or crowns, and at other structural connections can assist in protecting selected buildings or areas within buildings from noise and vibrations. Lead–asbestos pads have found considerable use in isolating large buildings from railroad and subway-induced noise and vibration in New York City since about 1915. More recently (in the 1960s) these pads were used in the construction of Montreal's Queen Elizabeth Hotel and New York's Avery Fisher Hall (formerly the Philharmonic Hall) and appear to result in significant vibration isolation, in the order of 10 dB.[78]

Elastomeric bearing pads have been used in building foundations in the United Kingdom for the purpose of noise and vibration isolation from rail systems since 1964.[79] The general

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