P626 Clarification Note – Noise

Introduction

A background noise survey was first carried out at the proposed Donich hydroelectric scheme on 6th March 2013 and the results of this survey were presented in Report No. P626/Noise Survey r1.

A further survey was then requested in order to establish the night-time background noise level at the dwellings. This survey was carried on 24th and 25th July 2013 and the results are available in the attached report.

Predicted Noise Levels – no mitigation

The predicted noise level at the nearest dwelling without any specific mitigation measures (60m away from the proposed powerhouse) is 44dBA (please refer to P626/Noise Survey r1).

These predicted figure is higher than the background figures recorded on the day of the survey and is above the WHO recommendation of 35dBA for restorative sleep, hence it was proposed that a number of mitigation measures could be employed to ensure the noise at the dwelling as a result of the scheme would be less than the WHO limit.

The report stated that it was likely that the majority of the mitigation measures listed in Section 5 would be applied to the powerhouse, but it was not made clear, precisely what would be done or what the likely effect would be.

This note considers the effects of the proposed mitigation measures and considers which of these will be used on the Donich powerhouse to ensure that noise at the dwelling is kept to an acceptable level.

Mitigation Measures

Eight possible mitigation measures were listed in Section 5 of the noise report. Of these, three will be applicable at Donich:

1. Acoustic baffles on ventilation intake louvres.
2. Close fitting, acoustic grade doors with weather seals on the main equipment access and the personnel entrance.
3. A louver system that extends to below the water surface to acoustically seal the tailrace.

In order to assess the effect of using these three additional measures, noise readings were taken at a recently constructed powerhouse where these three measures have been incorporated.

The powerhouse in question houses a 750kW Pelton turbine and is finished with grey render and a slate roof. The building is located close to a steep river and is dug down into the landscape but not buried in any way.

Results of mitigation

Readings were taken with and without the turbine running and with the acoustic doors open and closed. The weather conditions on the day were dry and sunny but there had been rain overnight so the turbine was running at medium - low power.

Table 1 below shows the Leq results for the readings taken.

Table 1 – Readings from PH with selected mitigation measures

Reference No.	Location	Turbine on / off	Doors open / closed	Leq (dBA)
Mem 3	1m from turbine	On	Open	87.4
Mem 4	1m from double doors	On	Open	80.9
Mem 5	1m from double doors	On	Closed	54.7
Mem 6	1m from tailrace	On	Closed	61.3
Mem 7	1m from blank wall (riverside)	On	Closed	55.2
Mem 8	1m from blank wall (transformer)	On	Closed	50.5
Mem 9	10m from double doors	On	Closed	50.0
Mem 10	10m from double doors	On	Open	67.2
Mem 11	20m from double doors	On	Open	60.7
Mem 12	20m from double doors	On	Closed	47.8
Mem 13	1m from double doors	Off	Closed	45.6
Mem 14	10m from double doors	Off	Closed	47.6
Mem 15	20m from double doors	Off	Closed	46.6
Mem 16	20m from double doors (repeat)	On	Closed	48.4

The calculations presented in P626/Noise Survey r1 show that the average reduction achieved in a standard powerhouse is approximately 28dBA. Therefore assuming a worst case scenario of a 95dBA turbine and generator noise the average noise outside a standard powerhouse building would be 67dBA.

In order to assess the effect of the selected mitigation measures the average of all the readings from Table 1 with the doors closed should be taken. This figure is 34.8dBA. This therefore suggests that the average effect of the selected mitigation measures is in the order of 7dBA.

Taking into account the 5dBA allowance, this suggests that SPL just outside the powerhouse will be in the order of 65dBA for a powerhouse with the selected mitigation measures as opposed to 72dBA for a standard powerhouse.

Applying this new figure to the attenuation calculations yields the following results for the dwelling:

Attenuation = (20 log 60) – 8 = 28dBA
Predicted SPL at the dwelling = 65 – 28 = **37dBA**

The projected increase at the dwelling is less than 5dBA above the WHO practical level for restorative sleep hence the chances of provoking complaint here are marginal. Moreover it is equal to the night time average recorded in the latest noise survey; hence it is likely that the scheme will be imperceptible from the background noise. Furthermore, the figures assume a generator noise of 95dBA, which is a worst case scenario; hence the predicted noise is likely to be less than stated above.