Sarah Ballantyne-Way
London Borough of Camden
Town Hall Extension
Argylle Street
London
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25th November 2014

Dear Sarah,

This letter has been prepared in response to comments regarding the air quality assessment carried out by Air Quality Consultants Ltd and submitted in support of the planning application for the Centre for Research into Rare Disease in Children (CRRDC) at the Great Ormond Street Hospital (report ref: J2086/1/F1, dated 5th September 2014). Specifically, this letter relates to the calculation of building emissions as part of the Air Quality Neutral assessment. In addition, a completed copy of the Camden Air Quality Checklist, which was not submitted with the application, is appended to this letter.

Building Emissions Calculation

The calculation of the NOx building emissions benchmark (BEB) for the proposed development is presented in Table 10 of the air quality assessment report. The NOx BEB for the proposed development is 560.9 kg/yr.

In terms of the total building NOx emission for the proposed development, this has been calculated as being 237.0 kg/yr and is therefore below the BEB. The calculation of the total building NOx emission is set out below.

CHP

The development will include a 40kWe CHP utilising 1,226,400 kWh of fuel input per annum and meeting the GLA band B NOx emission rating of 95 mg/Nm^3. Although it can be guaranteed that this emission rate will be met, no specific CHP unit has yet been chosen, and therefore the Air Quality Neutral total building emissions calculations are based on a similar size CHP unit with a NOx emission of 125 mg/Nm^3. In terms of the Air Quality Neutral assessment, this is conservative in order to demonstrate compliance with the BEB. Based on continuous CHP operation, the total annual NOx emission is calculated as follows:

A = B x C x D x E

A = 188.2 x 125 x 24 x 365

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A = 206.1 x 10^6 mg/yr => 206.1 kg/yr

Where:

A = Annual NOx emission (mg/yr)
B = Exhaust gas volume (Nm^3/hr)[1]
C = NOx emission concentration (mg/Nm^3)[1]
D = 24 (hours in 1 day)
E = 365 (days in 1 year)

Gas Boilers

In addition to the CHP unit, the development will also utilise gas boiler heating plant which must also be considered in the Air Quality Neutral total building emissions calculations. The gas boiler plant to be installed at the CRRDC will be designed to supply the remainder of the heat demand for the development which is not supplied by the CHP; equivalent to an annual fuel input of 773,600 kWh. The gas boiler plant will conform to a NOx emission rate of <40 mg/kWh. The contribution of the gas boiler plant to the total building NOx emission is therefore calculated as follows:

A = B x C

A = 773600 x 40

A = 30.9 x10^6 mg/yr => 30.9 kg/yr

Where:

A = Annual NOx emission (mg/yr)
B = Annual fuel input (kWh)
C = NOx emission rate (kWh)

The final step of the calculation of the total annual building emission is to combine the contribution of the CHP and gas boilers:

A = B + C

A = 206.1 + 30.9

[1] The exhaust gas volume and NOx emission concentration used in the calculation was obtained from the technical datasheet for the Energimizer 48NG gas-fired CHP. This unit is a 48 kWe unit, whereas the unit required for the CRRDC development is a smaller 40 kWe unit. The use of this Energimizer unit is thus considered to be an appropriate and conservative surrogate for the unit that will be installed at the CRRDC development, in terms of the Air Quality Neutral assessment.

A = 237.0 kg/yr

Where:

A = Total annual building NOx emission (kg/yr)
B = CHP contribution (kg/yr)
C = Gas boiler contribution (kg/yr)

Summary

The BEB for the proposed CRRDC development is 560.9 kg/yr. The total annual building NOx emission for the proposed development has been calculated as being 237.0 kg/yr. The total annual building NOx emission is well below the BEB and as such, the development is considered to be 'air quality neutral' with respect to building emissions.

Kind Regards,

Laurence Caird
Principal Consultant
Air Quality Consultants Ltd