Addendum to support an update to the previously discharged condition No.4 of planning application 2013/0884/P

1. Introduction

This addendum is being submitted to update Condition 4 of planning consent 2013/0884/P. The condition was initially discharged in 2014 under application 2013/8198/P on the basis of outline design proposals. The addendum reflects the final design arrangements and considers that the air quality impacts remain within acceptable limits.

2. Background

Planning consent was granted under reference 2013/0884/P on 25 April 2013 for:

Installation of flue from basement to the roof level at the east elevation, installation of gas fired boilers and 1 CHP engine to the basement level associated change of use from office (Class B1) to plant (Sui Generis).

Condition 4 required that:

Prior to the installation of the CHP plant hereby approved, a full Air Quality Assessment and scheme of mitigation shall be submitted to and approved, in writing, by the local planning authority. The development shall thereafter not proceed other than in complete accordance with such scheme that has been approved.

On 30 January 2014, Condition 4 was discharged under application 2013/8198/P. The application provided a full Air Quality Assessment described as "URS Air Quality Assessment Report ref: 47068322 dated December 2013". The air quality assessment was based on the project engineer's (Arup and Partners) best estimate of the gas boiler and CHP plant sizing at Phoenix Court. This included spare capacity in the boiler plant to allow for potential future heat connections in Somers Town (notably Edith Neville School and proposed and existing housing in the area). However, it was understood that the final CHP sizing would be dependent on final electricity demand profile of the Francis Crick Institute, which would be supplied electricity by the CHP.

In summary the plant configuration informing the URS Air Quality report of December 2013 comprised:

- two operational gas-fired boilers of 1.8 MW with a NOx emission factor of 80 mg/kWh and a gross seasonal efficiency of 95% or better; and
- one 1 MWe gas-fired CHP unit with a NOx emission limit of 250 mg/Nm3 in dry flue at 5% oxygen (O2) by volume and a net electricity generation efficiency of 38% or better.

In November 2014, Vital Energi was appointed to design, build, operate and maintain the plant at Phoenix Court. The design and build contract was phased, with Phase 1 triggered immediately and comprising boilers only (smaller modular 1.3MW boilers with a NOx emission factor of below 39mg/kWh were installed as opposed to the 1.8MW boilers with a NOx emission factor of 80mg/kWh modelled by URS). Phase 2 trigger

was programmed to take place in 2017/18 when the full Crick electrical demands would be known.

3. Revised model assumptions

The final CHP size has now been determined and this addendum presents updated results from a new dispersion model based on the following actual plant configuration at Phoenix Court.

The model assumes that the CHP and boilers operate to meet 100% of the heat demand across the four estates currently supplied heat under Phase 1 (Monica Shaw Court, Oakshott Court, Clyde Court, and Chenies and Cecil Rhodes) and the future connections noted above which include:

- Phoenix Court housing (currently electrically heated) and offices
- The Mayford Estate
- The proposed Edith Neville School
- The proposed community hub and housing overbuild

The plant configuration comprises:

- Three operational 1.3MW (modular to 650kW) Hoval boilers with NOx emission factor of 39mg/kWh
- 1No. GE Energy type Jenbacher JMS412GS-N.L (Version B02) generating set producing: an electrical output of 901kWe and a thermal output of 957kWth and a net electricity generation efficiency of 41.5%.

To ensure that negative air quality impacts have been minimised the following additional adjustments to the plant have been made:

1. A reduction in the approved CHP NOx rate from 250 mg/Nm3 to 230 mg/Nm3
2. An increase in CHP efflux velocity from 15m/s to 24 m/s

In addition to the updated plant configuration, the new model also uses an updated background concentration of 36.2 µg/m3 to mirror that developed to support the Central Somers Town application. This background level was determined by using the Defra predicted background concentration for 2014, with the contribution from half the A roads removed using the sector removal tool given the location. This background level is considered to provide greater accuracy than the 50µg/m3 background level used in the original discharge application. This higher level was based on data from the Brill Place diffusion tube site, which suffers from poorer air quality because of the proximity to St Pancras station and the Midland Road taxi rank.

4. Model outputs

URS (now AECOM) have been engaged to update the original model based on the new plant configuration in section 3 above. The updated results were issued in the form of a memo which can be seen in Appendix 1. The tabulated results within the memo provides the output of the updated model and replaces table 10 in the URS assessment of 2013. Appendix 2 shows the location of the various receptors.

In summary the updated dispersion model demonstrates that exceedances of NO2 objectives are not reached at any of the receptors and the magnitude of impact is small at worst.

Appendix 1 – Modelling results

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Somers Town Energy (Phase 2)

Project ref:
60540042

From:
Chuansen Ren

Date:
27 November 2017

Memo

Subject: Updated Air Quality Modelling Results

Model Run 1: 901kWe CHP & 3 operational boilers, CHP emission limit at 230 mg/Nm^3, stack height of 26.6 m, internal diameter of 0.293 m

Table 1. Run 1: Modelled Annual Mean NO_2 Concentration at Selected Receptors, 2010 Meteorological data

Receptor	PC	AC*	PEC	Objective	% PC of objective	% PEC of objective	Magnitude of impact	Significance
R1	1.8	36.2	38.0	40	4.6%	95.1%	Small	Moderate
R2	1.8	36.2	38.0	40	4.5%	95.0%	Small	Moderate
R3	1.8	36.2	38.0	40	4.6%	95.1%	Small	Moderate
R4	1.8	36.2	38.0	40	4.4%	94.9%	Small	Moderate
R5	0.3	36.2	36.5	40	0.8%	91.3%	Very small	Negligible
R6	0.1	36.2	36.3	40	0.4%	90.9%	Imperceptible	Negligible
R7	0.3	36.2	36.5	40	0.8%	91.3%	Very small	Negligible
R8	0.6	36.2	36.8	40	1.5%	92.0%	Small	Slight
R9	1.8	36.2	38.0	40	4.4%	94.9%	Small	Moderate
R10	0.2	36.2	36.4	40	0.6%	91.1%	Very small	Negligible
R11	0.4	36.2	36.6	40	1.0%	91.5%	Very small	Negligible
R12	0.4	36.2	36.6	40	1.0%	91.5%	Very small	Negligible
R13	0.8	36.2	37.0	40	2.1%	92.6%	Small	Slight

**Ambient NO_2 concentration provided by LB Camden*

Table 2. Run 2: Modelled 99.79th Percentile Hourly NO_2 Concentration at Selected Receptors, 2010 Meteorological Data

Receptor	PC	AC*	PEC	Objective	% PC of objective	% PEC of objective	Magnitude of impact	Significance
R1	4.8	72.4	77.2	200	2.4%	38.6%	Imperceptible	Negligible
R2	4.8	72.4	77.2	200	2.4%	38.6%	Imperceptible	Negligible
R3	4.8	72.4	77.2	200	2.4%	38.6%	Imperceptible	Negligible
R4	4.8	72.4	77.2	200	2.4%	38.6%	Imperceptible	Negligible
R5	3.9	72.4	76.3	200	1.9%	38.1%	Imperceptible	Negligible
R6	3.3	72.4	75.7	200	1.7%	37.9%	Imperceptible	Negligible
R7	3.8	72.4	76.2	200	1.9%	38.1%	Imperceptible	Negligible
R8	4.2	72.4	76.6	200	2.1%	38.3%	Imperceptible	Negligible
R9	4.8	72.4	77.2	200	2.4%	38.6%	Imperceptible	Negligible
R10	4.1	72.4	76.5	200	2.0%	38.2%	Imperceptible	Negligible
R11	4.4	72.4	76.8	200	2.2%	38.4%	Imperceptible	Negligible
R12	4.1	72.4	76.5	200	2.1%	38.3%	Imperceptible	Negligible
R13	4.4	72.4	76.8	200	2.2%	38.4%	Imperceptible	Negligible

**Ambient NO_2 concentration provided by LB Camden*

Appendix 2 – Receptor locations