Buro Happold

025901 Camden BSF - Adelaide Road

Feasibility Study for future decentralised energy connection

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Contents

1 Executive Summary

To satisfy planning condition 23 regarding the feasibility of implementing a future decentralised energy connection, the following Items are to be addressed in this document:

1. Assessment of space required in the energy centre for future necessary plant and the changes shown to existing plant shown on plan.
2. Details of the route for an appropriately sized and accessible pipe to be installed from the energy centre to the eastern boundary of the site to enable the site to receive a decentralised heat source
3. Space shown on plan at the property boundary to accommodate an indicative heat exchanger.

2 CHP Outline Analysis

2.1 Mitigating remnant carbon emissions associated with fossil fuel by combined heat and power plant (CHP)

Requirements set out in the CHPQA Standard2 as issued by Government sets out efficiency requirements for CHP plants to be eligible, for example, for exemptions from the Climate Change Levy (CCL) and for Enhanced Capital Allowances (ECA). The CHPQA Standard requires that two key parameters be met:

- Power (electrical) efficiency of 20% (CHP models available in market to meet this criterion).
- 'Quality index' exceeds a benchmark of 105. Quality index takes into account both heat and power efficiencies, generally 'state of the art CHP installations that put all their heat output to beneficial use will meet the 'quality index'.

2.2 The Influence of Load Duration/Running Hours on the Viability of CHP

The adoption of CHP incurs additional capital cost which needs to be repaid over an acceptable period, from the financial benefits accrued.

A CHP on site requires a significant amount of plant in addition to conventional boiler and power systems and this additional plant installation and its maintenance possesses a significant amount of embodied energy which requires offsetting through the operating life of the CHP, to ensure environmental benefit.

The rate at which a CHP plant is able to repay its capital cost (and embodied energy) is directly dependant on load duration/running hours per year – the longer the CHP plant operates for the more quickly its capital cost will be repaid.

It is generally accepted that annual running hours of around 4,500 hours per year are required for large scale

(>1,000kW(e)) CHP plants to be economically viable. Small scale CHP (<1,000kW(e)) suffers higher cost per unit capacity compare to large scale, and efficiencies are generally lower. As a result small scale CHP generally requires between 4,500 and 8,760 hours running per year to be viable – or in excess of around 14 hours per day, seven days a week.

Our outline analysis assumes that the CHP will operate for approximately 7000hours per year and be in export mode should the need arise in absence of sufficient local site loads.

2.3 Beneficial Use and Suitable Load Types

Beneficial use is themed as making use of the CHP plant's heat without 'dumping' any of it to the environment or the ground.

Historically, typical projects where CHP has been successfully adopted are those with significant year round loads for heat, typically from heating loads, hot water loads, or requirements for process heat. Hospital, swimming pools process facilities and large mixed use developments therefore remain the most common CHP applications. However with the advent of district heating networks catalysed by potential export tariff structures such as the Renewable Heat Incentive, give rise to a beneficial use in the form of a district heating network as a heat sink for period of invariable spatial heat demands. Therefore, whilst there is strongly invariable (and sometimes no spatial heating or hot water demand) summer time space heating and/or hot water demand for the Camden BSF schools.

To mitigate the overall annual remnant carbon dioxide emissions associated with spatial heating and hot water would best be done via CHP plant that feeds excessive heat generation onto the local district heating network. This option will need to be explored with the local district heating network operator as to whether their existing infrastructure is capable of supporting the proposed additional heat generated onto it for wider / local community use in period of low school occupancy or low/zero heat demand.

Should the local district heating operator refuse the connection of this load onto the heating network, this would nullify the presence of beneficial use in accordance with CHPQA Standard 2. This also concurs with the guidance set out in section 4 of the London Renewables Toolkit (the toolkit refers to Biomass CHP and recommends CHP is not used where a significant year round demand is not available).

Proposed CHP plant for Adelaide Road site:

55kW, 33kWe (Shortfall of 7 tons of CO2/annum to be mitigated by Green Grid Power)

3 CHP Energy Centre Space Requirements

3.1 Energy Centre Space requirements

To accommodate a future CHP system the 8 no HTG modular boilers would be removed from the energy centre and a suitably sized plate would then be installed in place of the HTG boilers. The existing pipework and valve arrangements would need to be altered to suit the new installation.

Entry and exit to the energy centre will be via the double door access into and from the podium car park.

Space allowances would be needed as detailed in the following documents, listed below.

- BSIRA 9/92 - Space and weight allowances for building services plant - inception stage design
- BSRIA 10/92 - Space allowances for building services distribution systems - detail design stage

3.2 Decentralised heat source Pipe Route and Sizing

To accommodate decentralised heating a route through the energy centre is required from the eastern boundary. We would propose to install all pipe work at high level within the podium car park running into the energy centre. This proposed route would depend on how many pipes would be needed and the external diameter of the pipe work including for insulation. If this option would not be viable then the pipe work would need to run externally in a trench.

Please refer to appendix A drawing:

- PL_ADE_ME_7650 – Adelaide Road Site – Energy Centre – Building Permission

Appendix A

PL_ADE_ME_7650 – Adelaide Road Site – Energy Centre – Building Permission