PLANNING STATEMENT
ENERGY AND PART L COMPLIANCE STRATEGY

81 Belsize Park Gardens, London

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1.0 Executive Summary

This document details the preliminary intended energy strategy for the proposed refurbishment of 81 Belsize Park Gardens, London.

The report has been prepared to demonstrate to the planning authorities the proposed energy usage of the facility once completed as a nursery, from its current usage as a gym facility.

The building was modelled in both its current state and servicing as well as proposed, to demonstrate significant energy reductions and CO2 reductions in the order of 75%. This is assisted in no small part by the removal of the swimming pool, but the report demonstrates the benefit and effects of the high efficiency fixed building services that will be installed in the building moving forward.

2.0 Introduction

This document details the preliminary intended energy strategy for the proposed refurbishment of 81 Belsize Park Gardens, London. The report has been prepared to demonstrate to the planning authorities the proposed energy usage of the facility once completed as a nursery, from its current usage as a gym facility.

The report has been prepared to support the planning application, and provide details of the intended route to compliance with Part L2B 2013 for the completed development, as well as compliance with the local authority requirements to demonstrate a 20% CO2 reduction as part of the works. .

Further work will be required at later stages in the “design and build” process to ensure that the requirement to comply with the relevant targets and that all statutory guidelines or local planning enforcement requirements are met.

This document explores the proposed route to compliance in line with the project specification and requirements.

3.0 Description of the Development

The development currently consists of a gym and fitness complex, incorporating various exercise and changing facilities as well as a swimming pool. Due to the age of the building and the fixed building services, the energy usage for the current building is demonstrably high.

It is proposed to re-purpose the facility to be used as a nursery building. The current ground and first floors will be refurbished, with the second and third floors addressed at a later date as required. The swimming pool will be removed and re-purposed as a garden area, with the relevant walls etc. made good to suit.

4.0 Energy Use in the Built Environment

In line with hierarchy of intervention (Be lean, Be Green, Be Clean) it is essential to ensure that efficient buildings and building services systems have been designed and proposed prior to the consideration of LZC technologies. Design measures that should be considered include, but are not limited to:

- Good insulation of walls, roofs and floors to reduce heat losses (but not at the expense of summertime overheating). For this development the fabric improvements have been limited to those areas made good, which have been modelled in line with current Building Regulations and good practice.
- Maximisation of potential for natural ventilation (where ambient noise levels and room function permit). This is not an option for this development due to limited openings, therefore much of the building is mechanically ventilated, and this will remain the case for the refurbishment. The revised installation will however incorporate all new plant which will exceed the minimum

requirements of current Building Regulations in terms of heat recovery efficiencies and specific fan powers.

- Minimisation of requirements for mechanical cooling, by the application of good ventilation techniques. Much of the building is currently mechanically cooled, and this will remain the case for the refurbishment. The revised installation however will incorporate a modern variable refrigerant volume (VRV) system which is very energy efficient and exceeds the minimum requirements of current Building Regulations in terms of efficiency.
- Reduction in electrical power usage via specification of efficient lighting controls, high efficiency luminaires and optimisation of daylighting through careful façade and building design. The lighting installation shall be replaced throughout with high-efficiency LED luminaires, with PIR presence detection incorporated wherever practicable to minimise future energy use.
- Specification of high efficiency plant/equipment. Areas not served by the VRV system shall be heated by modern high-efficiency boiler plant.

To this end, the proposed design should promote significantly reduced CO_2 emissions from delivered energy consumption by minimising operational energy demand through passive and best-practice measures.

The energy usage figures within this report have been based on reasonable but not unrealistic assumptions in line with good industry custom and practice at the present time, and the specified equipment wherever possible to give an accurate assessment of the energy usage going forward against the current building as it stands.

5.0 Methodology

To demonstrate compliance with the planning policy requirements, the building was modelled as it stands using dynamic thermal simulation software (EDSL Tas version 9.5.0) by an accredited Level 5 Low Carbon Energy Assessor (LCEA) to validate the energy usage of the building as it currently stands with its previous use. The initial run utilised NCM profiles associated with a D2 building usage class (indoor or outdoor sports or recreations), as well as the plant and equipment information based upon our survey of the installations as currently installed. The resultant carbon emissions due to the energy usage of the pool and hot water loads associated with the shower/change areas was demonstrably high.

To undertake a fair comparison based on comparable use, the existing building was remodelled using the same profiles for the refurbished building, i.e. class D1 building usage (non-residential education institutions). These still utilised the existing plant and equipment, but give a more representative comparison of the energy usage if the building were simply re-purposed as a nursery in its current state.

The building model was then modified in line with the proposed layouts, including removal of the pool and incorporation of new walls/glazing elements, full replacement of the fixed building services such as heating, cooling, ventilation, hot water and lighting. Again the NCM profiles for the D1 usage class were used as these would be applicable to the refurbished building.

The NCM profiles were fully considered and assessed and in our opinion reflect an accurate basis for the energy usage and carbon emissions for all the above cases.

The refurbished building services shall be designed with energy efficiency at the forefront, with plant and systems selected to have efficiencies in excess of those required by legislation to maximise carbon reduction. A summary of the preliminary servicing strategy is provided below. This has been based on our extensive experience of similar buildings which have informed the specification for the building as currently proposed, although further work will be required at later stages in the design once the detailed servicing strategy and final client requirements have been determined.

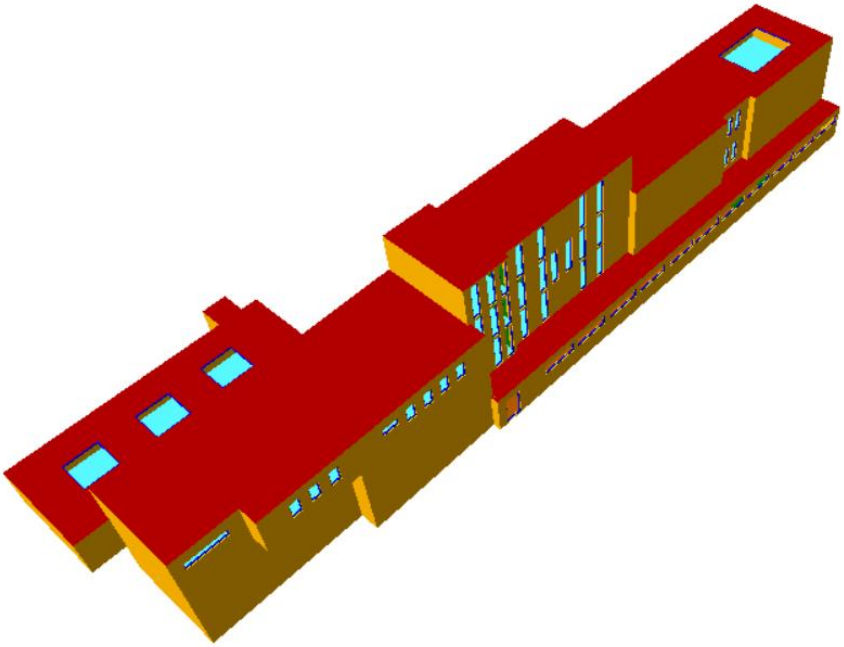

Figure 1 – Model screenshot, existing building including pool

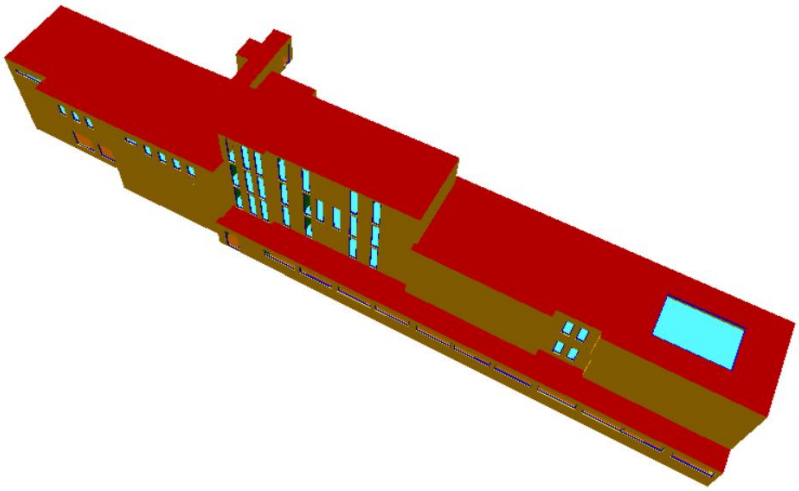

Figure 2 – Model screenshot, proposed building, pool removed

6.0 Description of Services

The main teaching areas shall be provided with heating and cooling via a high efficiency variable refrigerant volume system. Ancillary areas (i.e. corridors, WCs etc.) shall generally be heated via high efficiency gas fired boilers, generally serving low surface temperature (LST) radiators throughout the building, as well as the hot water load. The boilers shall be sized to satisfy the peak heating and hot water demand of the building simultaneously.

Ventilation shall be provided to occupied areas by air handling equipment incorporating heat recovery ventilation units. The air handling plant shall have both high efficiency heat recovery and low specific fan powers which exceed current Building Regulation requirements. Extract only systems shall be provided to WCs and similar areas wherever practicable.

High efficiency/LED lighting has been assumed throughout. PIR on/off devices have been provided to corridors, WC areas etc. in line with the project specification and design intent.

The building fabric was modelled on our assessment of the current constructions and the age of the building. For the minimal areas where new walls and windows are provided, these have been assumed as follows:

- External Walls 0.22 W/m²K
- Windows/Doors/Rooflights 1.40 W/m²K, 0.6 g value

Equally, uncontrolled ventilation losses should be minimised, however given the age of the building it would not be practicable to air test the building, therefore an air permeability rate of 15m³/m²/hr at 50Pa has been assumed for both the current and refurbished building.

7.0 Summary of Key Input Data

As well as the u-values and design air permeability previously indicated, the following information summarises the key input information assumed for this analysis:

Weather File
The NCM London TRY weather file has been utilised for this analysis and is considered to accurately represent the weather for the proposed location based on the BRE SBEM Weather Locations Lookup tool.

HVAC Systems

Wet Radiator System:

Heat Source:	LTHW boiler
Fuel Type:	Natural gas
Seasonal Efficiency:	95 % new / 90% existing
Circulation pump:	Variable Speed, pressure control across pump (new), / fixed speed (existing)
New System Controls:	Central time control, Weather compensation control

Heat Pump Systems:

Heat source:	Heat pump (electric): air source
Fuel type:	Electricity
Heating CoP	4.39 new / 4.0 existing
Cooling CoP:	4.0 new / 3.6 existing

Mechanical extract is provided to en-suites, bathrooms, WCs etc.

Mechanical extract:	SFP: 0.5 W/l/s
Supply and extract to teaching spaces etc:	SFP 1.3W/l/s, 80% heat recovery (new) 1.8W/l/s, 70& heat recovery (existing)

Hot Water Services:
Hot water services are to be provided via the same heating system as is utilised for the wet radiator space heating system.

Lighting
Lighting based on the design undertaken and issued as part of the design intent, with high efficiency luminaires with efficacies between 95 and 125 lumens per circuit Watt, with PIR control incorporated where proposed. Existing luminaires modelled on an optimistic 55 lumens per circuit Watt based on our assessment of the currently installed lighting.

8.0 Results and Commentary

The baseline figures using the above existing input figures and a D2 usage class were calculated as follows:

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	24.78	11.42
Cooling	3.07	7.54
Auxiliary	20.37	10.65
Lighting	22.75	14.94
Hot water	597.59	584.75
Equipment*	27.8	27.8
TOTAL**	**668.56**	**629.31**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

The baseline figures using the above existing input figures and a D1 usage class for fairer comparison were calculated as follows:

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	15.78	7.57
Cooling	1.77	3.85
Auxiliary	7.94	3.52
Lighting	21.98	14.22
Hot water	218.11	213.25
Equipment*	19.99	19.99
TOTAL**	**265.59**	**242.41**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

The figures for the proposed refurbished building utilising the revised layouts, updates to the fixed building services etc. and a D1 usage class were calculated as follows:

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	7.99	3.81
Cooling	2.51	6.02
Auxiliary	6.3	4.28
Lighting	12.3	11.66
Hot water	16.38	16.57
Equipment*	16.39	16.39
TOTAL**	**45.47**	**42.33**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Equipment loads shall be ignored in the commentary below as these are not part of the fixed building services, however the nursery building will have a very minimal small power and equipment load based on our experience with the client and their similar facilities.

A summary of the energy use by fuel and the associated CO2 production and savings is provided in the table below. Carbon factors of 0.216kg.CO2/kWh and 0.519kg.CO2/kWh have been utilised for gas and electricity respectively.

Scenario	Gas Energy Consumption (kWh)	Gas CO2 emissions (kg.C02/ annum)	Electrical Energy Consumption (kWh)	Electrical CO2 emissions (kg.C02/ annum)	Total CO2 emissions (kg.C02/ annum)
Case 1 - D2 usage as existing	888744	191968.704	65959	34232.72	226201.425
Case 2 - D1 usage as existing for fair comparison of use against proposed	333994	72142.704	45253	23486.31	95629.011
Case 3 - D1 usage as proposed	34800	7516.8	30145	15645.26	23162.055
Energy usage reduction from case 1 to case 3 (%)	96.1		54.3		
Energy usage reduction from case 2 to case 3 (%)	89.6		33.4		
CO2 reduction from case 1 to case 3 (%)		96.1		54.3	89.8
CO2 reduction from case 2 to case 3 (%)		89.6		33.4	75.8

As can be seen from the above, the energy usage reduction of the refurbished building is significantly reduced, and the overall CO2 production from the building has reduced in the order of 75% based on comparable use.

This is naturally helped in no small part from the removal of the pool areas, which is a significant energy user, however it can also be seen that the fixed building services as proposed contribute a significant reduction in energy use and CO2 production, i.e. lighting loads have reduced from 21.98kWh/m² to 12.3kWh/m², a reduction of 45%. All new plant exceeds Building Regulation minimum requirements, with significant improvements on the existing efficiencies, specific fan powers etc. as demonstrated by the input data provided.