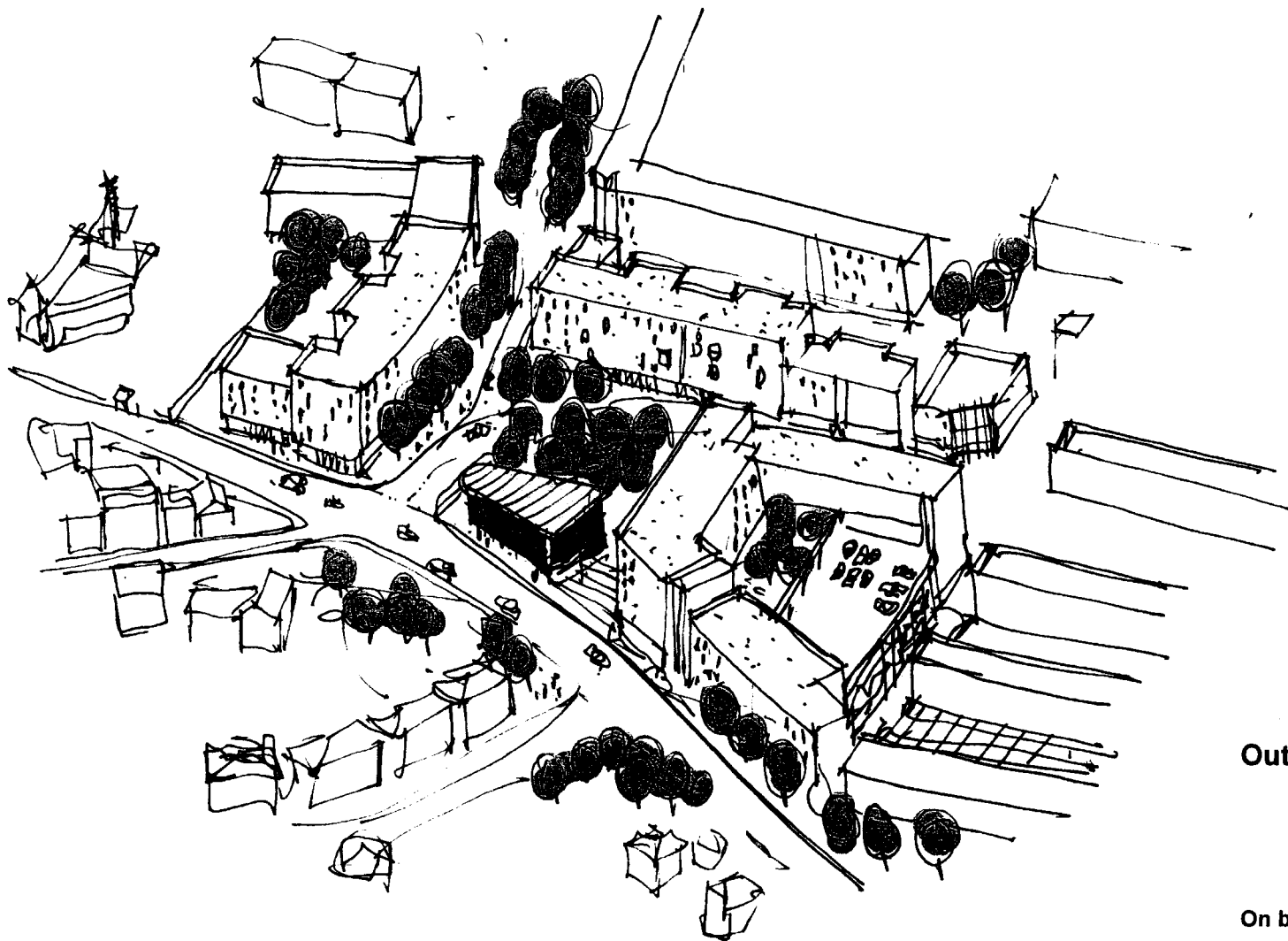


Roehampton Regeneration



TECHNICAL SERVICES
REC'D 18 FEB 2009 A.M.

Outline Energy Statement

On behalf of Wandsworth Borough Council

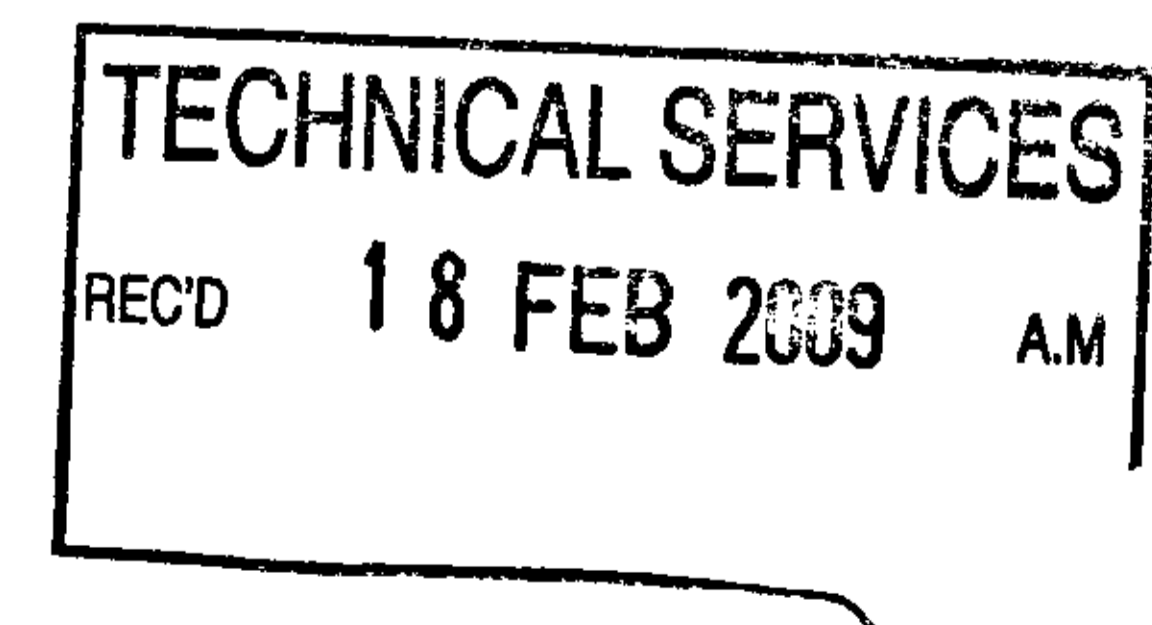
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CONTENTS

1.	INTRODUCTION	4
1.1	OVERVIEW OF THE GLA ENERGY STRATEGY.....	5
1.2	THE MAYOR'S ENERGY HIERARCHY.....	5
1.3	OUTLINE DESCRIPTION OF BUILDING	6
1.4	OUTLINE DESCRIPTION OF BUILDING SERVICES PROVISION.....	6
2.	ESTIMATED ANNUAL CO₂ EMISSIONS.....	7
2.1	PASSIVE DESIGN.....	7
2.2	ENERGY EFFICIENT SYSTEMS & APPLIANCES.....	9
2.3	DESIGN ENERGY CONSUMPTION RATES - RESIDENTIAL.....	11
2.4	DESIGN ENERGY CONSUMPTION RATES –COMMERCIAL OFFICE AND COMMUNITY SPACE.....	12
2.5	DESIGN ENERGY CONSUMPTION RATES – SUPERMARKET & RETAIL	13
2.6	DESIGN ENERGY CONSUMPTION RATES - LIBRARY.....	14
2.7	ENERGY CONSUMPTION BENCHMARKS & ANNUAL CO ₂ EMISSIONS	15
2.8	COMBINED HEAT & POWER (CHP) ASSESSMENT	16
3.	RENEWABLE ENERGY SOURCES ASSESSMENT	17
3.1	ANNUAL RENEWABLES TARGET	17
3.2	WIND TURBINES	18
3.3	SOLAR THERMAL COLLECTORS.....	19
3.4	PHOTOVOLTAICS	20
3.5	BIOMASS HEATING.....	21
3.6	GROUND SOURCE HEAT PUMPS – CLOSED LOOP	22
4.	CONCLUSION.....	24



1. INTRODUCTION

This Outline Energy Statement was prepared by Genesys Environmental the Environmental section of Cundall, as a response to the planning consultations relating to the proposed Regeneration of Roehampton, in South-west London.

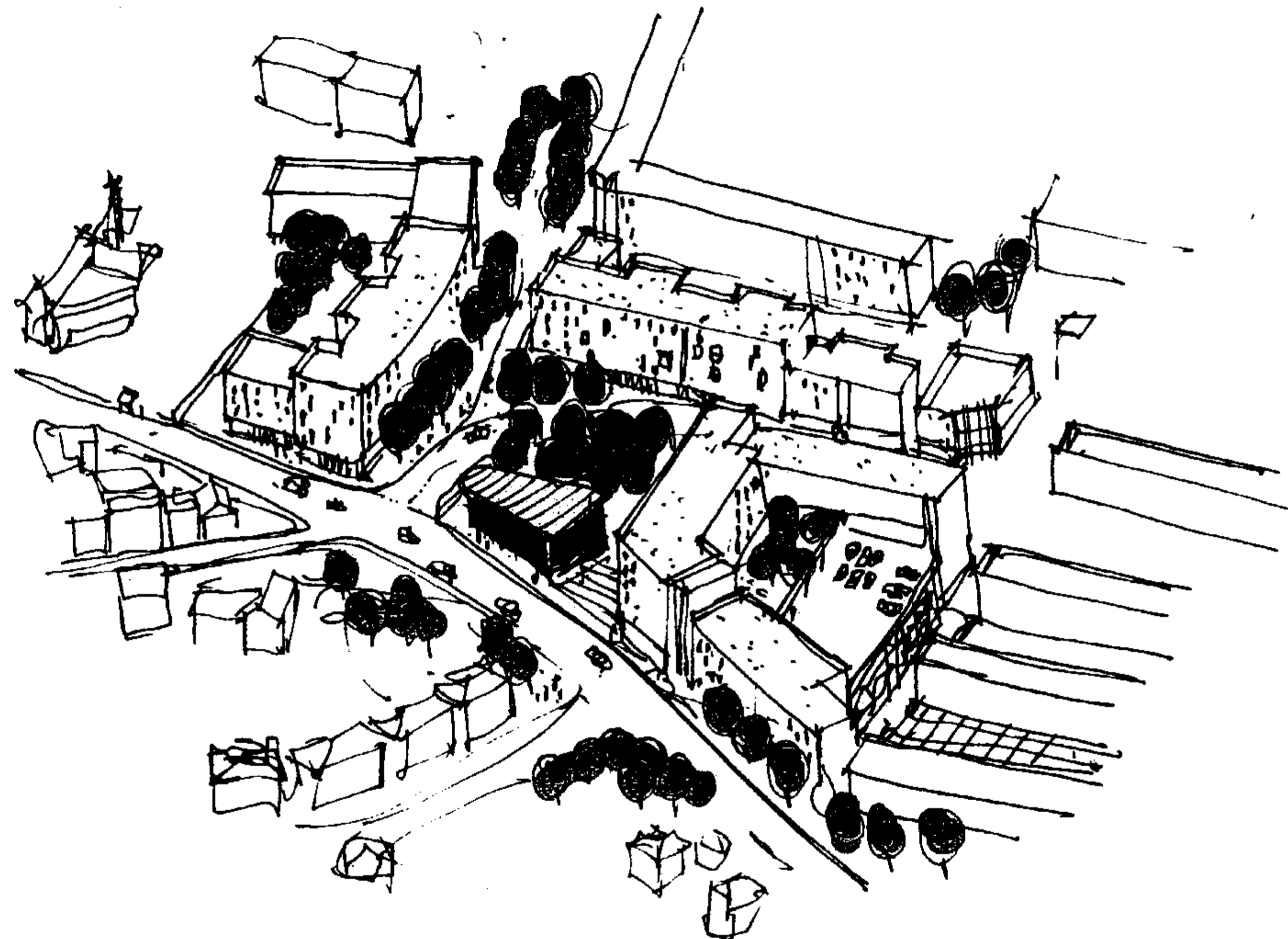
The format of the statement is intended to reflect and respond to the issues raised in the GLA's 'Spatial Development Strategy for Greater London' known as the 'London Plan' as published by the Mayor of London's office in 2004 and revised in February 2008. Policy 4A.1 Tackling Climate Change states that the following hierarchy should be used to assess applications:

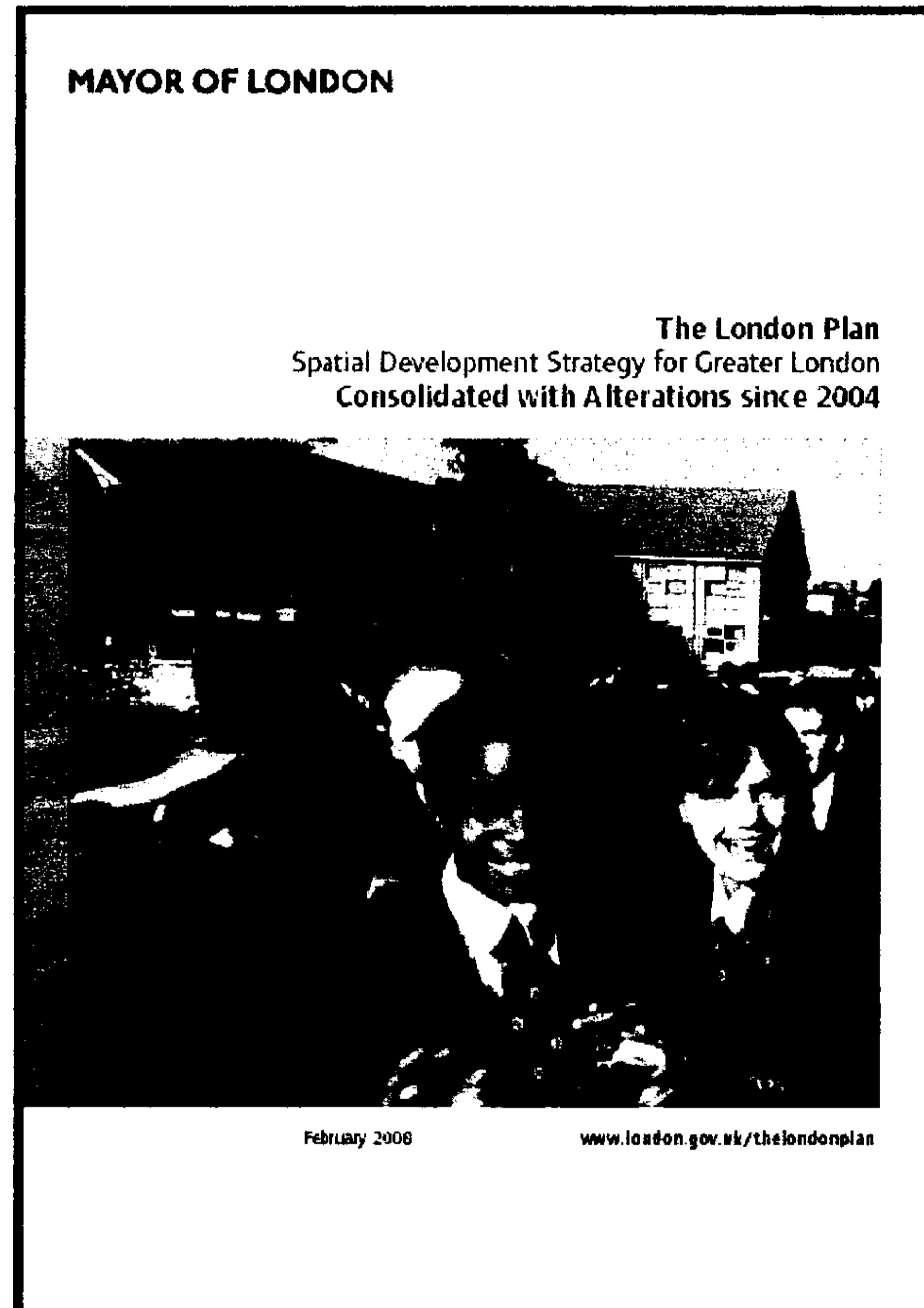
- using less energy, in particular by adopting sustainable design and construction measures (Policy 4A.3 and 4A.4)
- supplying energy efficiently, in particular by prioritising decentralised energy generation (Policy 4A.5 and 4A.6), and
- using renewable energy (Policy 4A.7).

The Mayor's Energy Hierarchy was used to structure the energy assessment as follows:

- Incorporate energy efficiency measures such as building envelope improvements, facades optimisation, energy efficient light fitting etc, into the proposed design of the development
- Calculate the design energy consumption rates and associated annual carbon dioxide emissions for the development in line with Part L of the Building Regulations
- Add into the overall site emissions the associated annual carbon dioxide emissions for catering and small power equipment (not considered as part of the Part L emissions calculation)
- Assess the viability of incorporating a combined heat and power (CHP) system into the proposed development, further reducing the site's annual carbon dioxide emissions
- Generate a renewables reduction target of 20% of the development's annual CO₂ emissions based on the Part L figures, including the equipment, catering and CHP emissions
- Assess the viability of various renewable energy technologies with the aim of exceeding an additional 20% emissions reduction above the Building Regulations requirements

All of the above issues are addressed within this report and discussed in detail in order to arrive at a practical and economically feasible energy strategy for the proposed development.





1.1 OVERVIEW OF THE GLA ENERGY STRATEGY

The plan encourages planning officers to require renewable energy and energy efficiency in new developments. In brief the London Plan states:

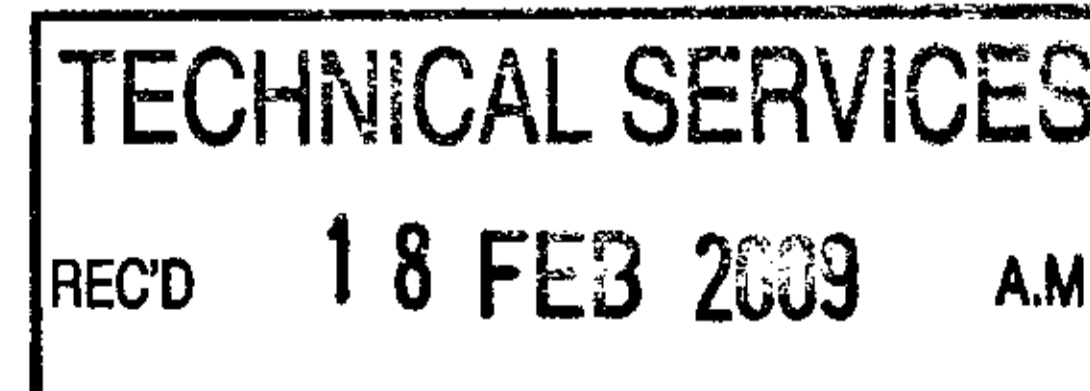
- Policy 4A.4 states that The Mayor will, and boroughs should, require an assessment of the energy demand and carbon dioxide emissions from proposed major developments, which should demonstrate the expected energy and carbon dioxide emission savings from the energy efficiency and renewable energy measures incorporated in the development, including the feasibility of CHP/CCHP and community heating systems. The assessment should include:
 - calculation of baseline energy demand and carbon dioxide emissions
 - proposals for the reduction of energy demand and carbon dioxide emissions from heating, cooling and electrical power (Policy 4A.6) proposals for meeting residual energy demands through sustainable energy measures (Policies 4A.7 and 4A.8)
 - calculation of the remaining energy demand and carbon dioxide emissions
 - Part L of the current Building Regulations to be used as the minimum benchmark and the starting point for the assessment.
- Policy 4A.7 Renewable Energy suggests that developments should achieve a reduction in carbon dioxide emissions of 20% from on site renewable energy generation unless it can be demonstrated that such provision is not feasible. This will support the Mayor's Climate Change Mitigation and Energy Strategy and its objectives of increasing the proportion of energy used generated from renewable sources by:
 - requiring the inclusion of renewable energy technology and design including: biomass fuelled heating, cooling and electricity generating plant, biomass heating, renewable energy from waste (Policy 4A.21) 2006 Mayor of London The London Plan
 - photovoltaics, solar water heating, wind, hydrogen fuel cells, and ground coupled heating and cooling in new developments wherever feasible
 - facilitating and encouraging the use of all forms of renewable energy where appropriate, and giving consideration to the impact of new development on existing renewable energy schemes.

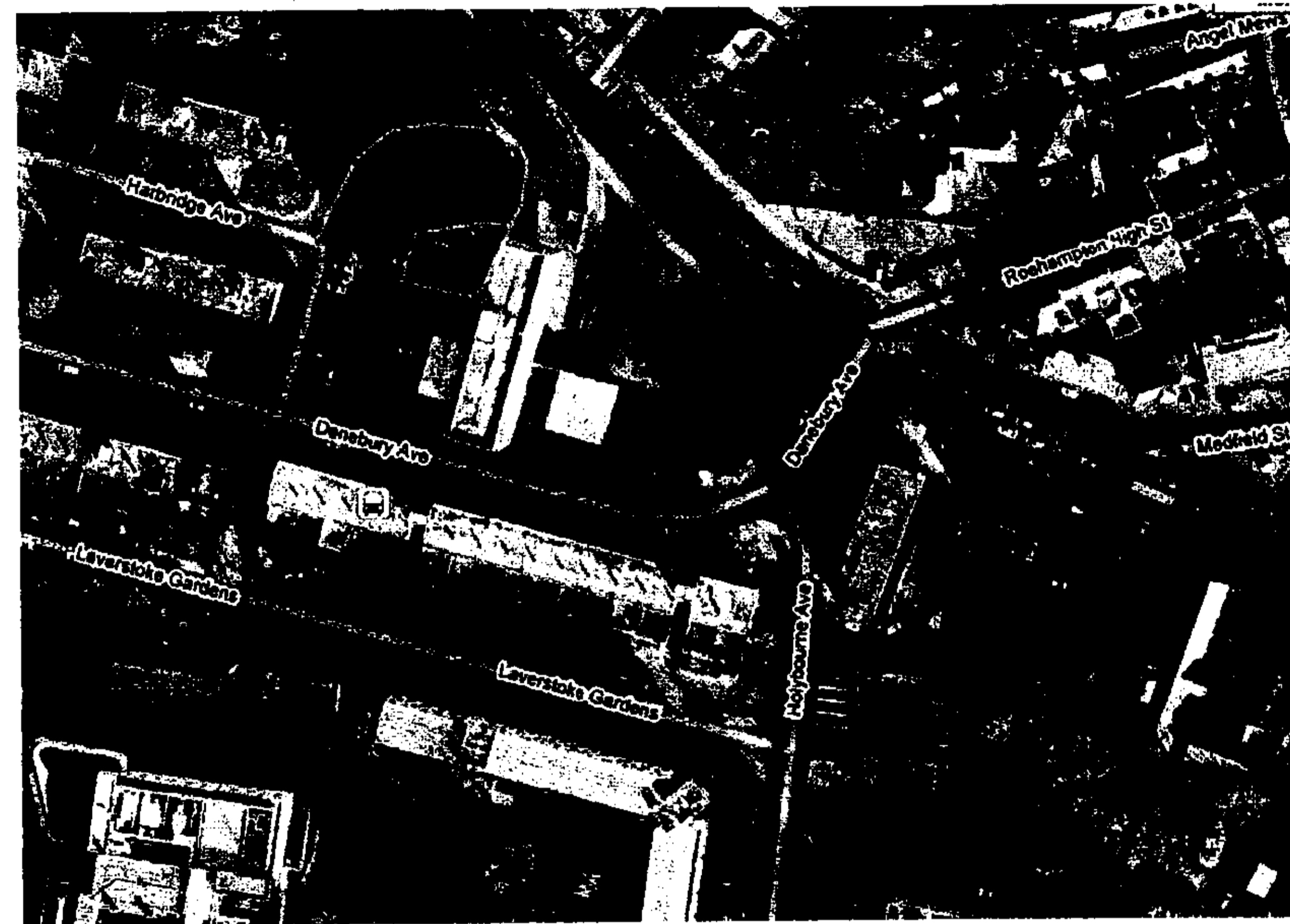
1.2 THE MAYOR'S ENERGY HIERARCHY

The Energy Strategy also has defined the 'Mayor's Energy Hierarchy' to help guide decisions concerning energy measures and systems, the hierarchy is as follows:

1. Be Lean - Reducing energy consumption through passive design means
2. Be Clean - Supply energy cleanly and efficiently
3. Be Green - Use of low emission energy sources

This hierarchy has been applied to the design and development of the proposed project, by means of a number of assessments which are evaluated in the following sections.



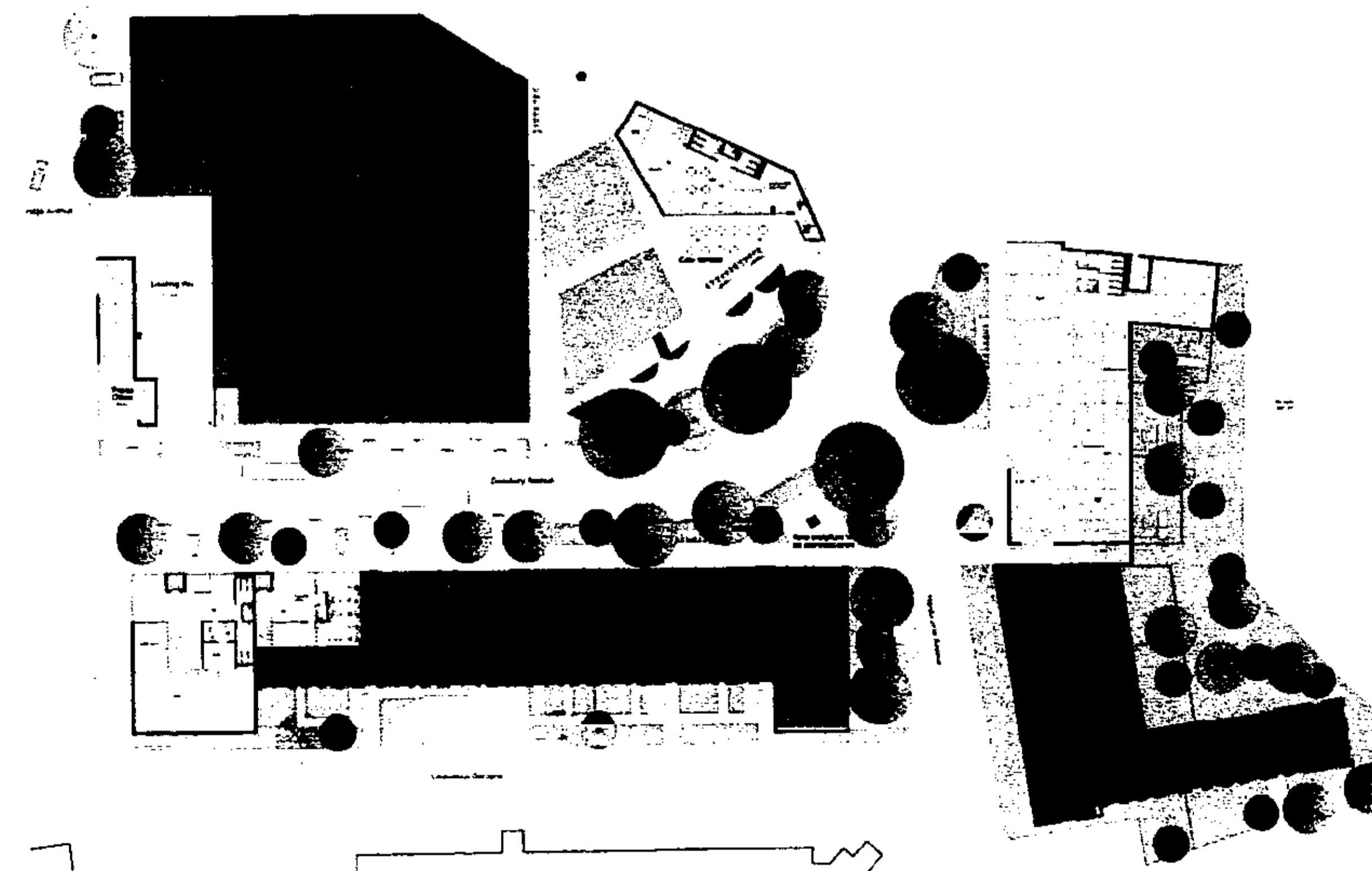


1.3 OUTLINE DESCRIPTION OF BUILDING

The proposed Roehampton Regeneration development relates to the commercial centre of the Alton Estate which is located on Danebury Avenue at the junctions with Roehampton Lane and Holybourne Avenue in Wandsworth, South-West London. The scheme comprises of 4 mixed use stand alone buildings with basement car parking and plant spaces.

The following internal areas have been used as the basis for the energy assessment;

Activity Type	Area (m ²)
Residential 281 units	17205
Supermarket	2623
Office, Commercial and Community Space	780
Retail units	911
Police office	130
Boys' Club / Housing office	1150
Public Library	862
Total	23661



1.4 OUTLINE DESCRIPTION OF BUILDING SERVICES PROVISION

Residential & Library

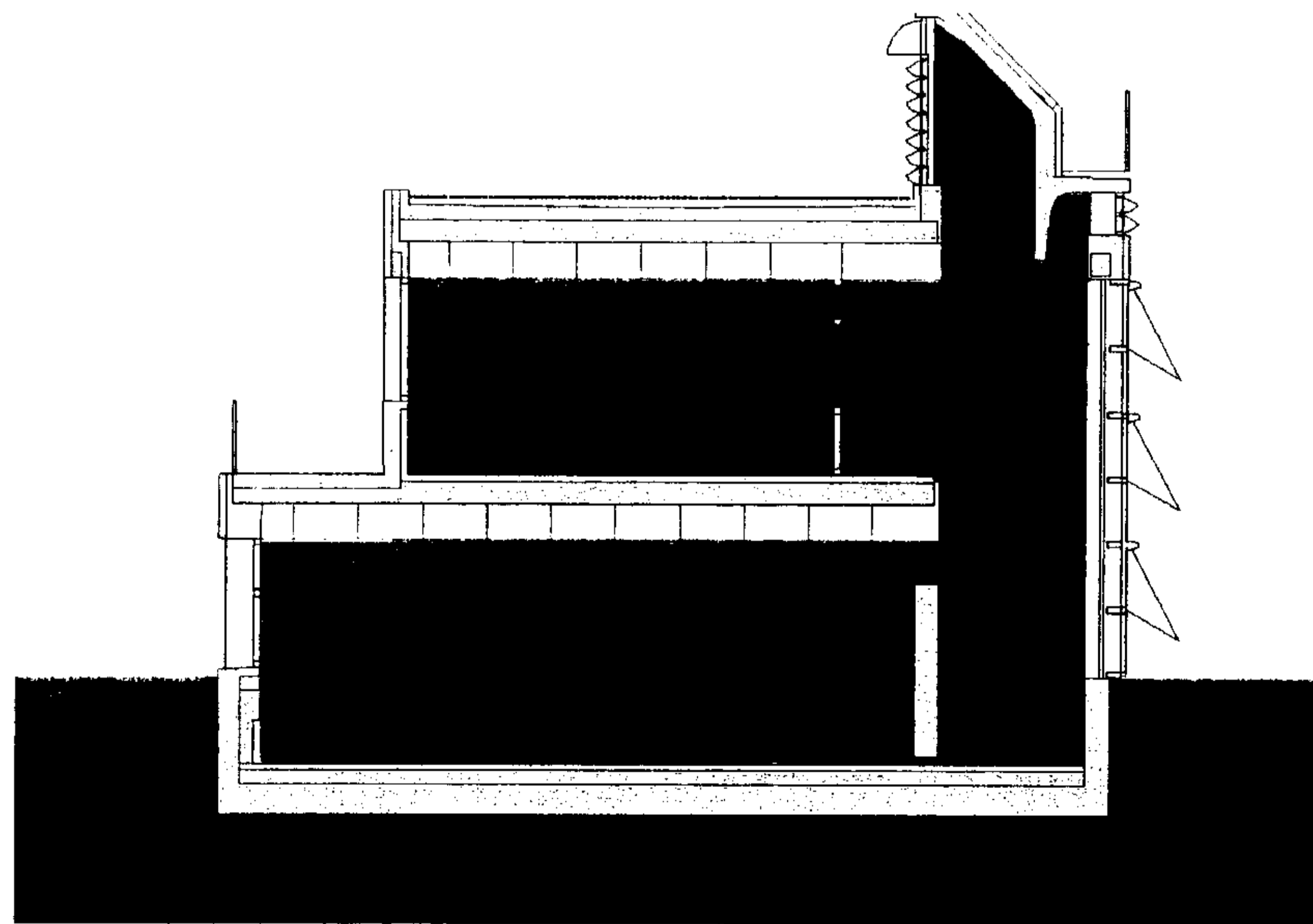
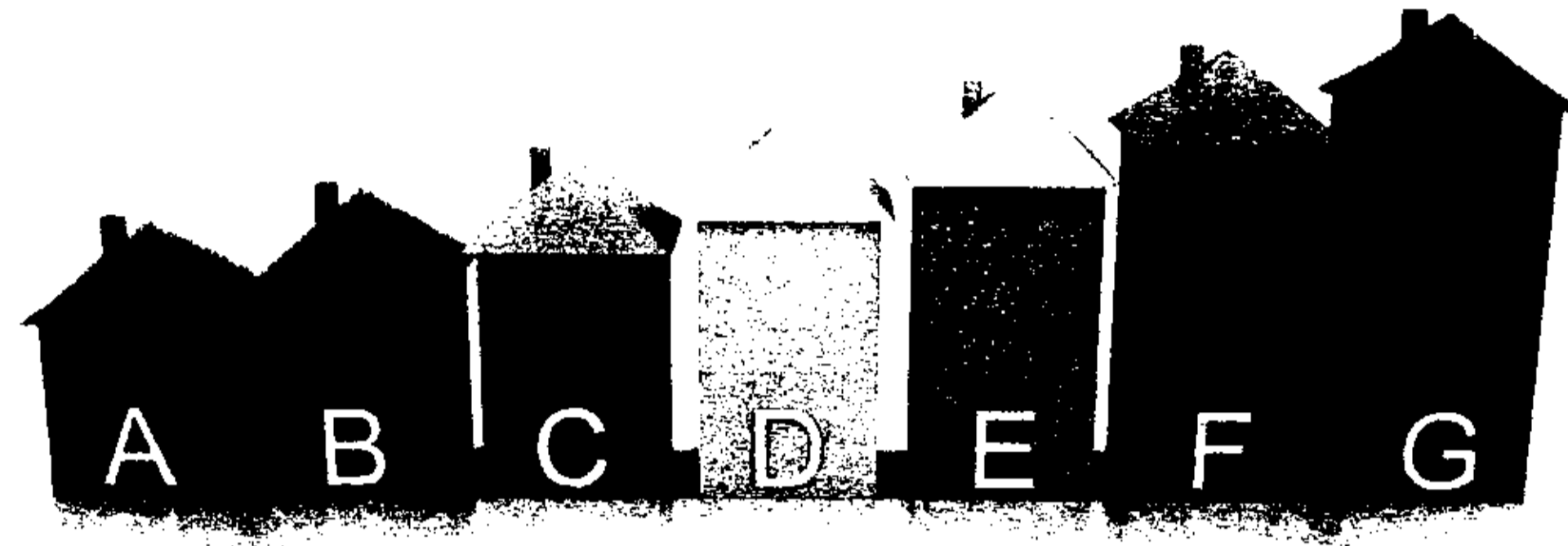
All areas will be naturally ventilated via external window openings with minimum fresh air requirements being met by the opening windows and trickle vents. Heating will be generated centrally by a CHP engine and high efficiency gas fired boilers, serving local heat emitters via a site wide district heating scheme. All bathroom and toilet areas will be provided with extract ventilation. Domestic hot water will be stored locally and feed of the district heating scheme.

Office, Commercial and Community Space

The Office, Commercial and Community Space areas have been assumed to be air conditioned spaces. Primary mechanical ventilation plant will incorporate heat recovery systems. Cooling will be generated centrally by roof mounted air cooled chillers. Heating and hot water will be provided by the district heating scheme. All toilet areas will be provided with extract ventilation. The on-floor air conditioning solution will be either fan coil units, or chilled beams.

Supermarket & Retail units

The Retail Units will be completed to a shell and core standard, for fitting-out by the tenants. It has been assumed that all heating, heating and domestic hot water requirements will be served off the district heating system via capped service connections.



TECHNICAL SERVICES
REC'D 18 FEB 2009 A.M.

2. ESTIMATED ANNUAL CO₂ EMISSIONS

In accordance with the Mayor's Energy Hierarchy the estimated energy consumption for the development has been calculated in line with the National Calculation Methodology (NCM). The proposed design incorporates a number of energy efficient measures and system operations in order to demonstrate improvements over the Building Regulations, (refer to sections 2.3-2.6 for details).

2.1 PASSIVE DESIGN

Substantial reductions in energy usage for the scheme will be achieved through consideration of the passive elements of the design, together with improved occupancy comfort. The aim for the design of the proposed development is to optimise the passive building elements where possible and hence reduce the energy consumption associated with the mechanical systems, whilst maintaining a balance between a range of requirements and accounting for factors such as site restrictions and orientation.

The scheme will be as energy-efficient as possible with low emissions and running costs, enabling the development to substantially exceed the requirements of the Building Regulations. The key design elements that have been considered are:

- Occupant comfort -parameters affecting comfort
- Natural ventilation - ratio of plan depth to ceiling height, night purge and thermal mass, ventilation openings, glazing types, internal gains
- Solar Control - orientation & overshadowing, façade treatment
- Daylight - sufficient level of daylight, uniformity of daylight distribution, minimise glare

The functionality of the occupied spaces must take precedence over any of the individual key elements listed above. As such, the sections that follow identify the design approach adopted. The one element that could not be compromised was occupancy comfort, which was considered first.

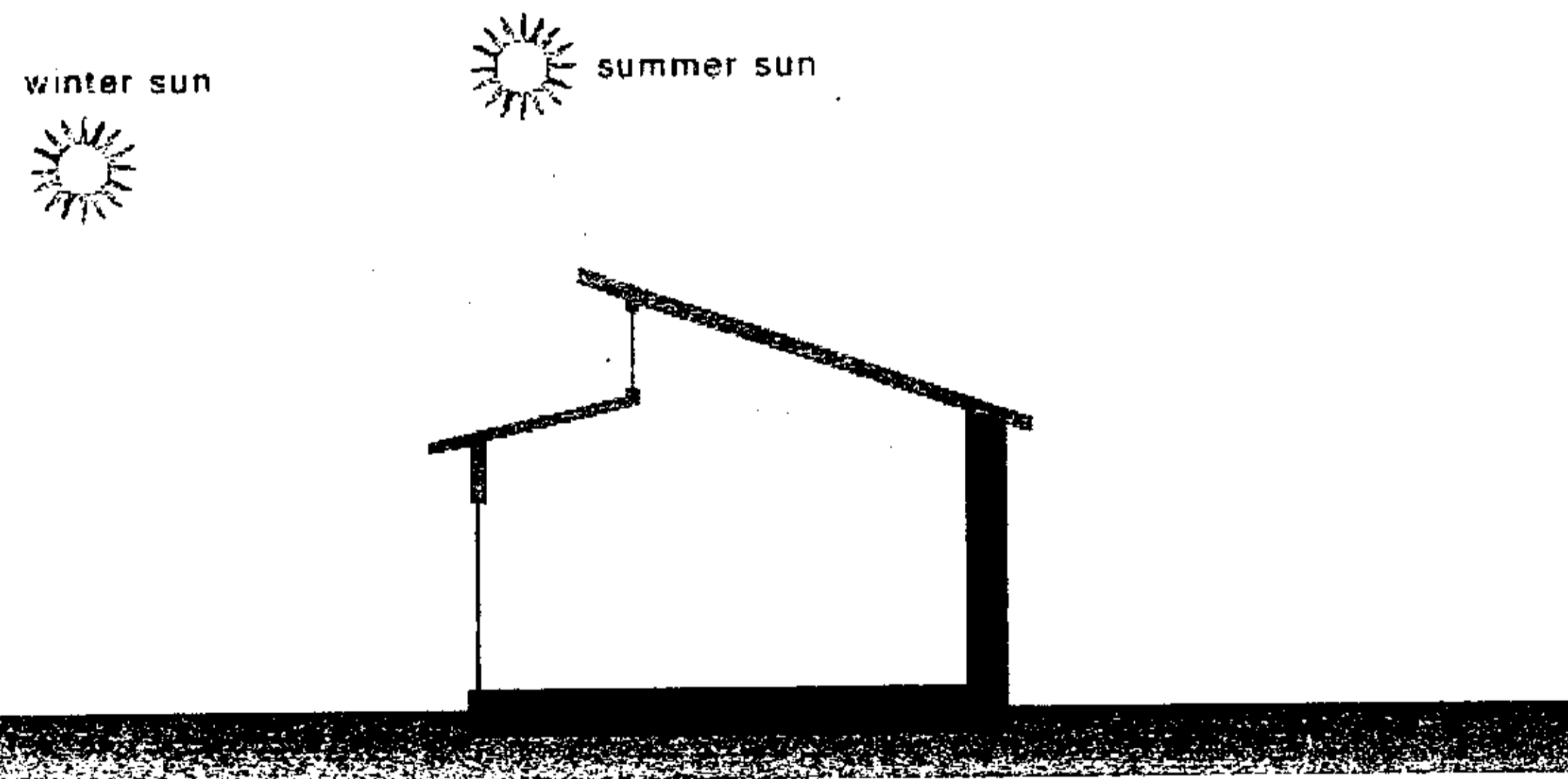
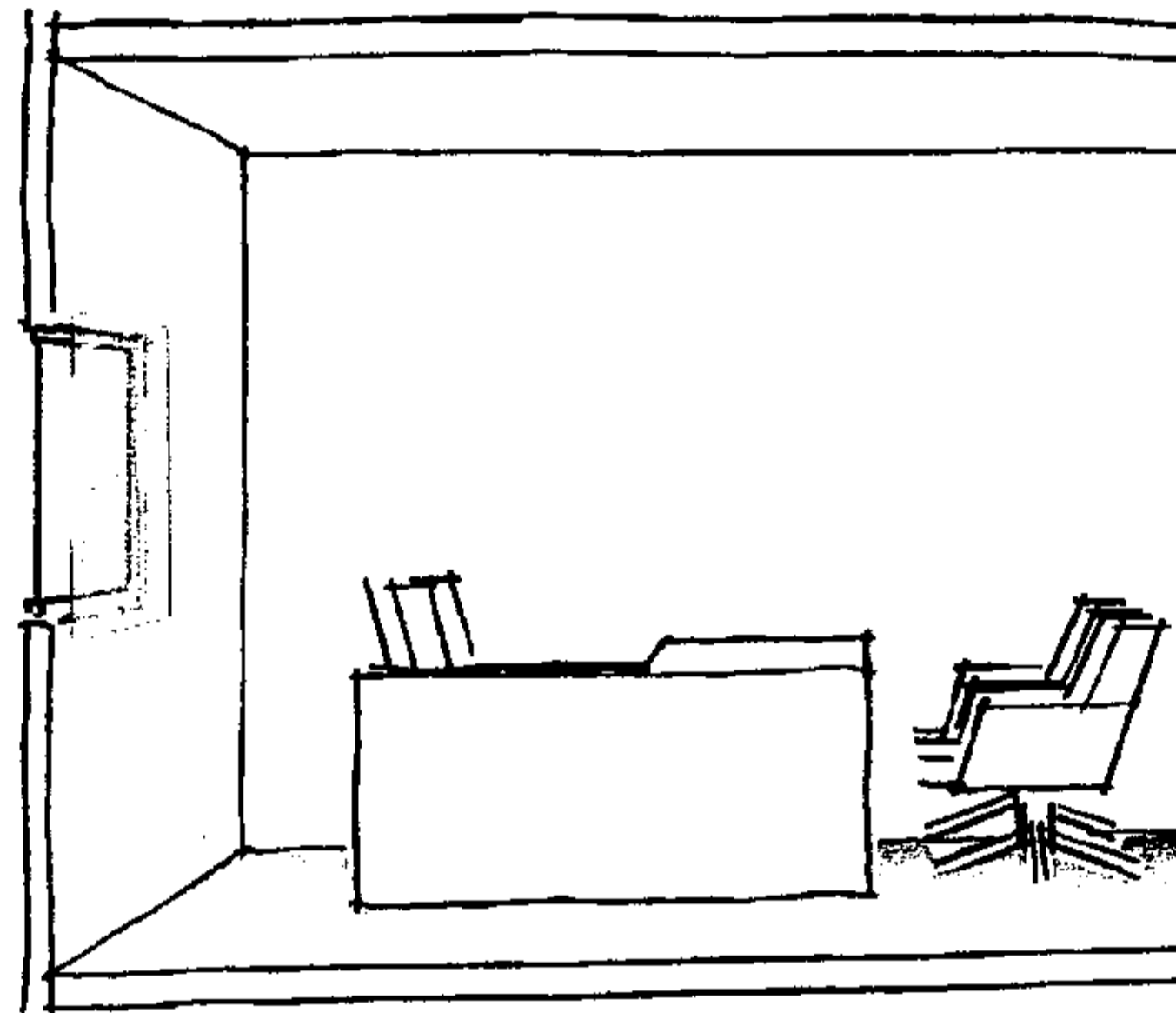
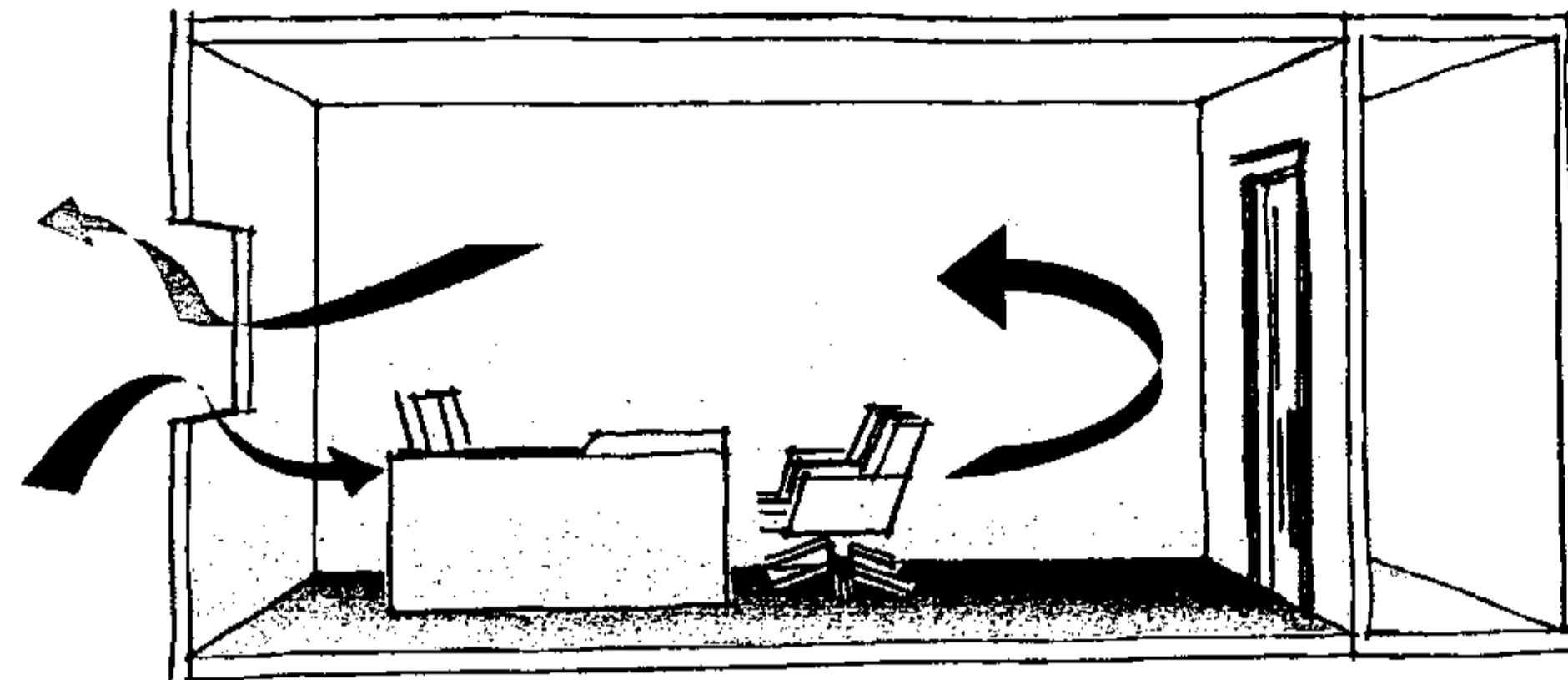
Occupant comfort

Research has established that improved occupant comfort in a working environment, reduces absenteeism and increases productivity (Osland BRE Report). The degree of occupant comfort within a space, however, will depend upon a number of factors, including:

- Adaptive Opportunity
- Contact with the external environment, views to outside.
- Control over air flows with, for example, openable windows
- Air temperature
- Radiant temperature
- Air Velocity / local air movement
- Humidity (Relative and absolute)
- Air quality

Traditionally comfort has only been measured in terms of air temperature and air movement whilst the radiant temperature of the surfaces of the surrounding fabric of the building, was ignored. Instead of this simplistic approach, the operative temperature within the space, which is a combined measure of air and radiant temperatures, is preferred as this allows the benefits of the thermal mass of the surrounding building fabric to be considered.

The following principles were therefore adopted throughout the proposed development in order to achieve the required comfort conditions whilst reducing primary energy consumption where possible:



Passive Solar Design

Where possible the position of windows and building layouts will be designed to maximise the use of passive design principles, hence reducing the amount of energy required from other sources. This will be achieved via the use of carefully considered glazing types and window locations, so that low angle winter solar gains are able to enter the space providing 'free' heating in winter, but are limited in summer so as to reduce the risk of 'overheating'.

Natural Daylighting

Daylighting is the controlled entry of natural light into a building through windows, skylights, atria, and other building envelope components. A properly designed daylighting system should achieve good daylighting factors by distributing it evenly and by avoiding glare and overheating. Not only does this significantly reduce overall energy consumption by 10-30% but natural light also offers occupants a pleasant living and working environment.

For the proposed scheme the quantities of natural light entering the occupied spaces will be maximised by the choice of glazing types and areas, coupled with shallow floor plans where possible.

Perimeter daylight sensors will be linked to digitally dimmable light fittings, which will be able to maintain the required internal lighting levels whilst using the minimal energy consumption required.

Solar Control

In all the air conditioned areas improving the total solar transmission performance of the building's glazing elements will reduce the annual CO₂ emissions associated with the cooling systems, whilst also improving occupancy comfort by limiting solar gains entering the building.

In the natural ventilated areas improving the total solar transmission performance of the building's glazing elements will improve occupancy comfort by reducing the risk of overheating.

Natural Ventilation

Where possible areas will be naturally ventilated, providing fresh air and removing heat gains in summer, they saving energy related to fans and pumps that would otherwise be required and the associated annual CO₂ emissions. It is currently assumed that the residential and library areas will be naturally ventilated, during the detailed design stage natural ventilation analysis will be carried out for all of the proposed buildings and incorporated where possible.

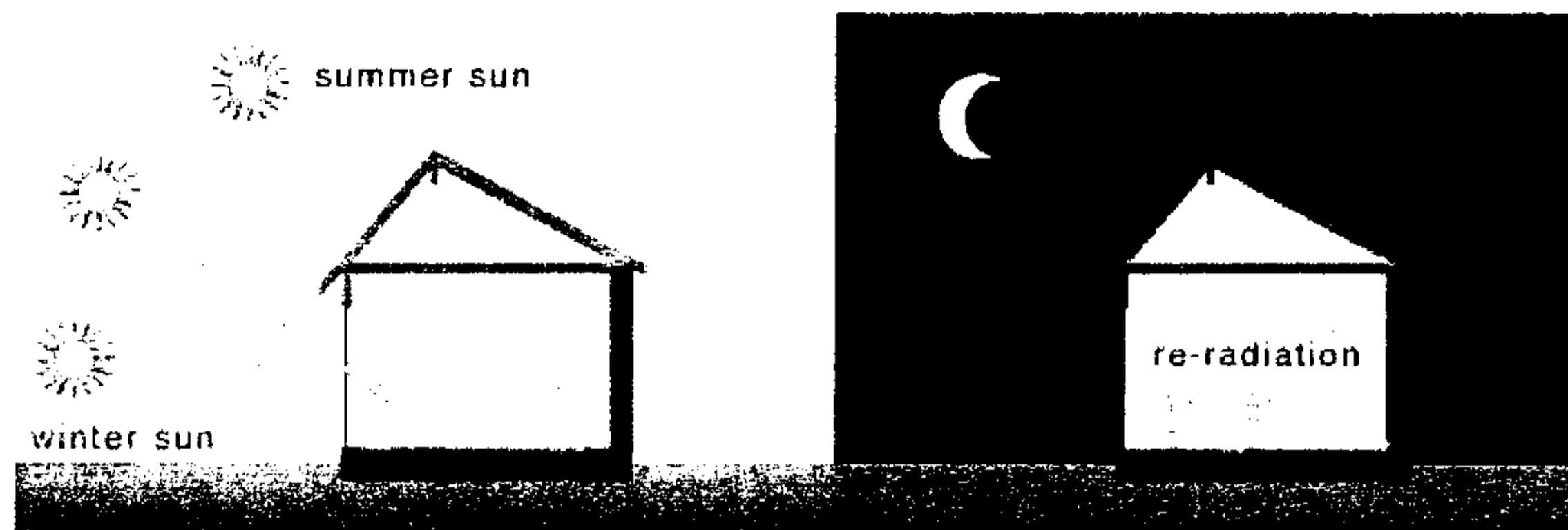
Where areas definitely require mechanical ventilation, efficient heat recovery systems have been incorporated into the design to limit the development's fresh air heating and cooling requirements, hence reducing its associated annual CO₂ emissions.

Thermal mass

The thermal mass of a building is the measure of its capacity to store and release internal heat. Buildings with a high thermal mass take a long time to heat up but also take a long time to cool down. As a result, they have a very steady internal temperature. Buildings with a low thermal mass are very responsive to changes in internal temperature- they heat up very quickly but they also cool down quickly. They are often subject to wide variables in internal temperature.

Detailed 'overheating' analysis will be carried out on all of the proposed buildings during the detailed design phase to ensure that they were compliant with the recommendations outlined in the CIBSE Guides.

ESTIMATED ANNUAL CO₂ EMISSIONS



The results of these assessments will be used to help select the construction materials. i.e. to ensure that the required amount of thermal mass are achieved in the design of the building so as to reduce the potential risk of 'overheating'. Conversely, in areas that require fast responses like the residential living spaces a lightweight approach will be adopted, so that the occupants can quickly purge the space in order to take full advantage of the cooling evening air.

Building Envelope

Improving the thermal insulation standards beyond the minimum Building Regulation standards can help to reduce the annual CO₂ emissions associated with all of the building's heating and cooling systems, by limiting the heat loss through the building's fabric, (refer to sections 2.3-2.6 for details).

Air Permeability

By specifying improved building air leakage rates of 5m³/hr/m² at 50Pa over the Building Regulation standards of 10m³/hr/m² at 50Pa in the residential elements of the development infiltration losses and gains will be substantially reduced in a number of buildings.

This will be achieved by prefabrication of a number of key building components under factory conditions, robust detailing of junctions and good building practices on site.

2.2 ENERGY EFFICIENT SYSTEMS & APPLIANCES

After maximising the contribution of the passive elements to the overall energy balance, the aim is to further reduce CO₂ emissions by selecting efficient mechanical and electrical systems and efficient controls to manage the energy used during operation.

EcoLabelled Goods

Lights and appliances account for about a third of the CO₂ emissions in buildings. To further reduce carbon emissions, where domestic appliances are installed energy efficient unit will be incorporated where possible. Fridges, freezers, fridge-freezers will have an A+ rating under the EU Energy Efficiency Labelling Scheme; and dishwashers should have a minimum A rating.

Low-Energy Lighting

Installing efficient low energy light fittings internally and externally can significantly reduce a building's overall lighting load hence lowering its annual CO₂ emissions. The proposed scheme will enhance natural lighting, with a view to providing a pleasant environment for the occupants, as well as reducing the energy consumption associated with artificial lighting by installing low energy and high frequency ballasts on all luminaries coupled with daylight dimming systems where possible. Where spaces require artificial lighting high efficient fixtures and fittings will be specified throughout.

HVAC Plant Efficiencies

Efficiency of the HVAC systems will go beyond the minimum standards in the Non-domestic Heating, Cooling and Ventilation Compliance Guide and hence substantially reduce the annual CO₂ emissions associated with the development's heating/cooling systems.

The Non-domestic HVAC guide provides guidance on the means of complying with the requirements of Part L for conventional space heating systems, hot water systems, cooling and ventilation systems in non-domestic buildings.

