

## City Hall

London, 1998 – 2002

### Architectural Statement

City Hall has been designed as a model of democracy, accessibility and sustainability. It houses the assembly chamber for the 25 elected members of the London Assembly and the offices of the Mayor and 500 staff of the Greater London Authority. It is a highly public building, bringing visitors into close proximity with the workings of the democratic process. The building is set within the new More London development on the south bank of the Thames, bringing a rich mix of office buildings, shops, cafes and landscaped public spaces to a section of the riverside that has remained undeveloped for decades.

More than half of the total site area is given over to public space, including two large piazzas equivalent in size to Leicester Square and Piccadilly Circus. A new streetscape will create dramatic vistas of landmarks such as HMS Belfast and the Tower of London. An underground road, which gives common access to a service infrastructure shared by all the new buildings, has enabled the entire site to be kept completely free of vehicles. This has facilitated the creation of a new, completely pedestrianised public realm along the riverside, which will be accessible 24 hours a day.

The public may enter the building either at the ground level reception or through a large sunken amphitheatre, which leads to a public café at lower ground level. Paved in high-quality blue limestone, the amphitheatre provides a space for outdoor events. Beyond the café is an elliptical exhibition space directly below the assembly chamber, displaying a 1:1250 scale model of the whole of central London from Hyde Park in the west to the Royal Docks in the east. Daylight is reflected into this space by the ceiling's pattern of concentric ellipses of mirror-polished stainless steel. From this space a half-kilometre-long, gently rising public ramp coils through all ten stories to the top of the building. At the level of the assembly chamber is a viewing gallery allowing the public dramatic views over the river to the Tower of London through the triangulated glass facade.

After level 2 the ramp emerges inside the chamber and continues the rest of its rise directly above the heads of the elected politicians. Each step up the ramp offers new and surprising views of London and glimpses into the offices of the GLA staff. The ramp leads past the Mayor's Office to a public space at the top of the building known as 'London's Living Room'. This daylight space can be used for exhibitions or functions for up to 200 guests. Encircling it is an external viewing terrace offering unparalleled views across London. The assembly chamber will also be open to the public, with 250 seats for press and visitors, including provision for wheel chair users.

The building's orientation and form have been designed to save energy. Its shape is derived from a geometrically modified sphere, a form which contains the greatest volume with the least surface area. The glazed facade of the assembly chamber faces north to minimise the amount of direct sunlight falling on it and so minimising solar gain. The building leans back towards the south, where the floor-plates step inwards to provide natural shading for the offices beneath.

The building has a highly integrated system of environmental controls to minimise its energy use. The perimeter office spaces can be naturally ventilated by opening vents positioned below the windows. The building's cooling system utilises cold ground water pumped up via boreholes from the water table and passed through chilled beams in the ceilings, avoiding the need for noisy and unsightly chillers on the roof. Analysis indicates that, as a result of the combination of these energy saving devices, the annual energy consumption for the building's mechanical systems will be approximately a quarter of that of a typical high-specification air-conditioned office building.

Advanced computer modelling techniques and innovative construction techniques have been employed to achieve the geometry. Each of the glazing panels is unique in shape and size. They have been laser-cut with data supplied from the same computer model used to design the building, ensuring a high degree of accuracy. Many of the building elements, including floor tiles and rubber doormats, are made from recycled materials. Designed and built within only 30 months, the building was completed on time and on budget.

## Energy Statement

City Hall is an environmentally responsible building, which meets exceptionally high standards for energy consumption for a building of its type. The energy strategy has been a central part of the design process and wherever viable energy-saving elements have been incorporated. The building's form and geometry has been generated as a result of thorough scientific analysis, aiming to reduce both solar gain and heat loss via the building's skin.

The design of the facade is key to limiting the flow of energy in and out of the building. Triple glazing is used in all areas of the office accommodation achieving a U-value of  $1.3\text{W/m}^2\text{K}$ , twice the insulation of conventional double-glazing. The solid areas – insulated panels covering 75 per cent of the façade – are exceptionally well insulated, with a U-value of  $0.2\text{W/m}^2\text{K}$ .

The glazed surface of the facade – covering only 25 per cent of the building – has ventilated solar control blinds. The ventilation is self-generating and self-regulating by the process of convection and is driven purely by the sun's heat. As the blind and air around it heats up, the air rises drawing in replacement cool air from beneath. These blinds are manually adjustable by the occupants and double as glare control blinds.

The government requires the building to be air conditioned to achieve prescribed internal temperatures. However, the building makes use of a number of energy-saving strategies to achieve an environment that allows the occupants to work in comfort. The perimeter of the building has external ventilation openings, which are under the occupants' control. Opening these allows the offices to be naturally ventilated locally. To avoid energy wastage, operation of the external perimeter vents automatically disables the heating and cooling systems, which are reactivated when the vents are closed.

The mechanical ventilation system supplies fresh air through the floor into the office spaces at just below room temperature. Air is supplied at a generous rate of 12 litres per second per person ensuring that very high air quality is delivered to all occupants. The system is driven by low-powered fans, saving a considerable amount of energy over the course of the year. Heat

exchangers are used to recover heat from the exhaust air and return it to the incoming fresh air thereby reducing the amount of heating required.

Additional cooling is provided by ceiling mounted 'chilled beams'. Cold water is pumped through these devices to cool the surrounding air by convection. Both the cool fresh supply air and the chilled beams are cooled by the use of free cold groundwater. Conventional buildings cool water for use in air conditioning plant by use of electricity to drive large refrigeration machines. City Hall avoids the use of such systems by pumping water from deep below the building through boreholes. This system also avoids the need for fan driven cooling towers on the roof. Once the water has been used for cooling, it is stored to provide 'grey' water for flushing lavatories, saving on the building's use of high quality mains water.

The building has a sophisticated lighting control system, which switches off the lights when it detects that no one is within the office. At the building's perimeter, where natural daylight can provide sufficient lighting for much of the day, the system senses the natural lighting level and if it is sufficient switches the artificial lights off. The energy consumption for lighting the building is 8.9 Watts per m<sup>2</sup>, which is 25% less than that specified by the 'British Council for Offices' BCO Guide 2000 - 'Best Practice in the specification for offices'.

Analysis indicates that, as a result of the combination of these energy saving devices, the annual energy consumption for the building's mechanical systems will be approximately a quarter of that of a typical high-specification air-conditioned office building. Many of the building elements, including floor tiles and rubber doormats, are made from recycled materials.

## Credits

Developer: **More London Development Ltd.**

Architects: **Foster and Partners**

Team:  
Ken Shuttleworth  
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**Arup**

Cost Consultants

**Davis Langdon & Everest**

Planning Consultants

**Montagu Evans**

Services Cost Consultant

**Mott Green & Wall**

Construction Manager

**MACE**

## Facts and Figures

Net Lettable Floor Area:	12,147m <sup>2</sup> 130,749 sq. ft.
Gross Internal Floor Area:	18,734 m <sup>2</sup> 201,652 sq. ft.
Gross External Floor Area:	19,814 m <sup>2</sup>
Useable floor area for each floor:	from 259 to 1282m <sup>2</sup>
Number of floors:	Ten floors above ground
Height:	45m
Structural frame:	Structural steelwork. Reinforced concrete core.
Foundations:	Piles 30m deep
Angle of glass front inclination:	Varies from 81 degrees to 31 degrees from horizontal.
Diameter of circular glass façade:	45m
Concrete quantity:	13,100m <sup>3</sup>
Steel quantity:	Reinforced 1950 tonnes Structural 2100 tonnes
Glass quantity:	7300 m <sup>2</sup> using 3844 unique panels
Bore hole depth:	130m deep
Mirror polished stainless steel ceiling to ground floor entrance:	320 m <sup>2</sup>
Spiral walkway:	28m high 250m in length 130 steps behind a glass façade facing the river Thames. 12 tie rods are necessary to keep the ramp in place. Structure diameter changes from 16m (2 <sup>nd</sup> level) to 7m (9 <sup>th</sup> level).