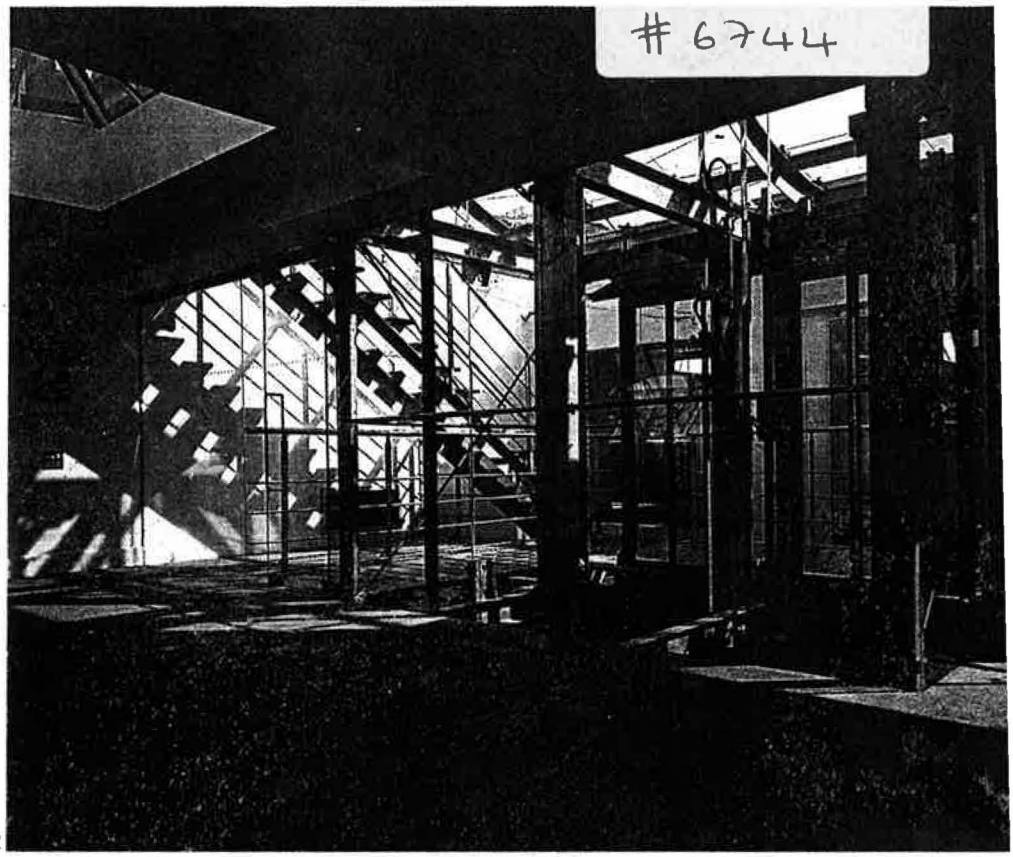
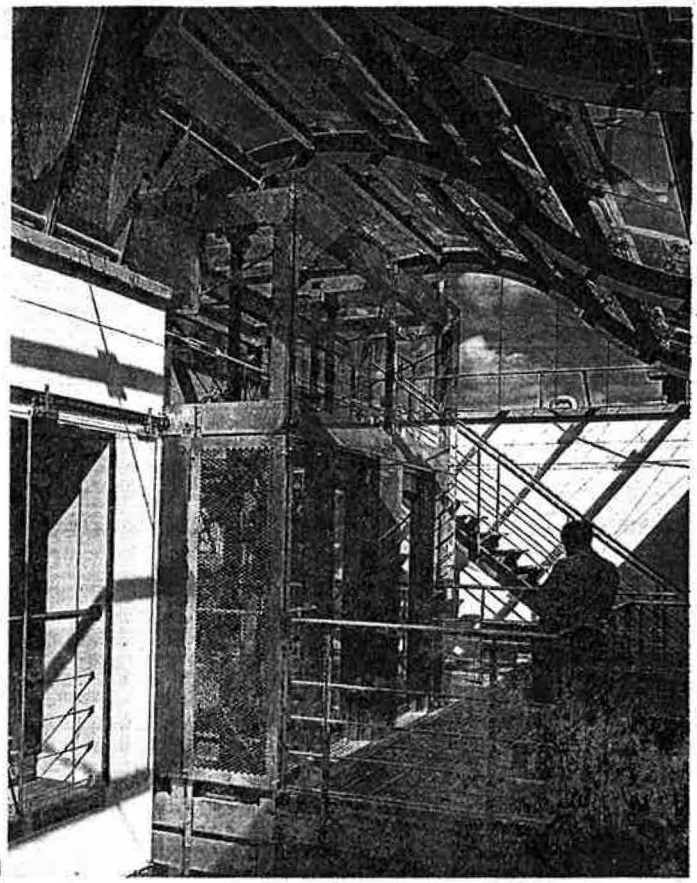


2

Roof and windows
Office

Jestico + Whiles designed the new atrium in this warehouse to maximise the entry of natural light and ventilation.



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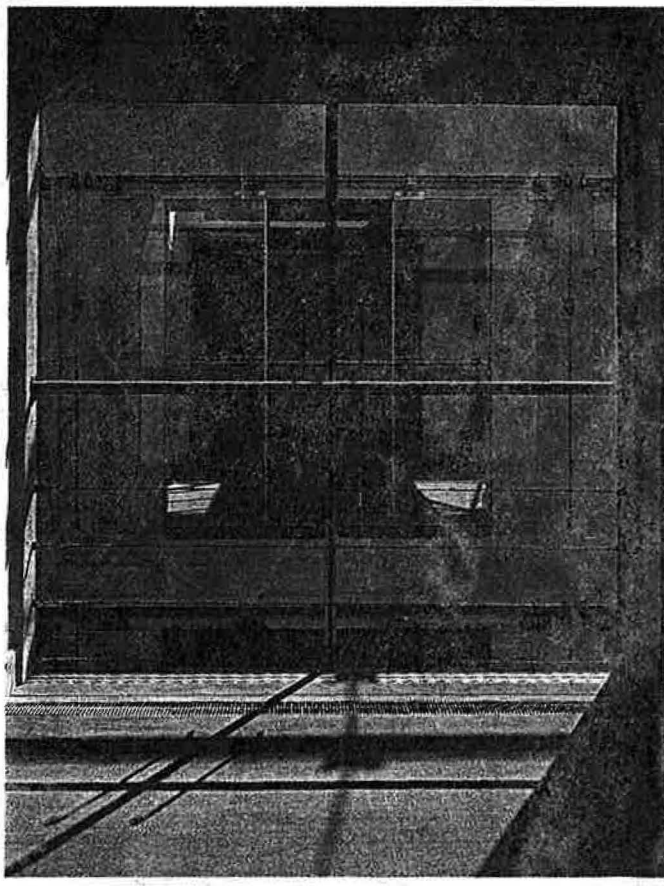
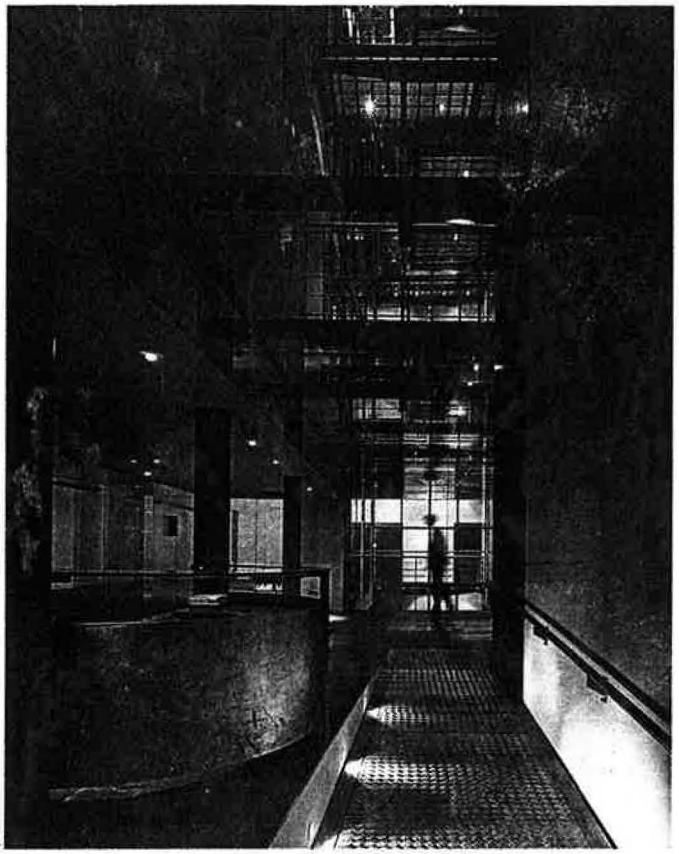




No 20-22 Stukeley Street was an Edwardian warehouse built on a corner site in London's Covent Garden. The building was divided by a small, dingy lightwell. The brief was to convert the building into office units within a budget of approximately £1.2 million (about £60 per sq ft).

The key to the architect's approach was to give the building's users a high degree of control over their environment by using natural light, natural ventilation and by the provision of self-contained, gas-fired heating systems on each floor.

An atrium has been created with circulation and sanitary accommodation on either side of a vertical shaft — all covered with an undulating glazed roof and open along both sides. The offices are open plan and can be partitioned by tenants.

Glass casings to the lifts and specially made glass lenses on the balconies allow light to filter down through the atrium, and stainless steel wire mesh screens along the internal parapet are used to bounce sunlight down the walls — mesh was used because air has to pass through the screens. To make maximum use of the daylight, window sills in each office are taken down almost to floor level and thin cable balustrades act as safety barriers.

To create an environment relying on natural air circulation, the atrium is used as a ventilation shaft in which hot air rises thereby drawing air from the offices. For this to work, the windows onto the atrium and street have to be open with few restrictions between. It is intended that when air flows across the top of the roof from the lower side to the higher, negative air pressure will be created at the mouth of the wider opening, drawing air from the atrium. During winter, windows are unlikely to be open and the air in the atrium will remain static. In practice this set-up would be better if it did not rely on the vagaries of human nature to keep windows open, particularly given that there will be draughts. Further complications would arise if the floors were partitioned.

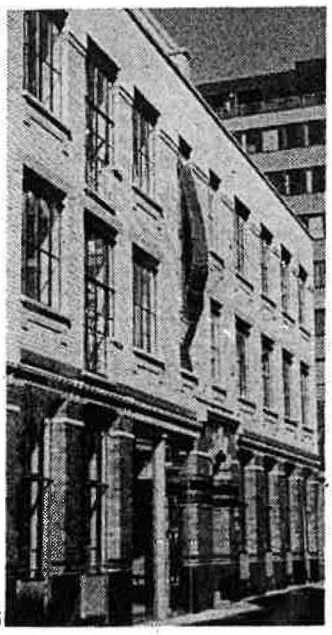
Being an open atrium, only one smoke detector was required to operate electro-magnetic closing devices on the glass windows to the offices. When a window is opened an electro-magnet keeps the vertical spring in tension. If the current is switched off the spring is released so closing the door.

The roof to the atrium is made up from a Greenberg's Thermospan glazing system on a galvanised mild steel structure of undulating T-beams with T-purlins bolted on to them. The web of each purlin is gripped by cleats welded to the web of the beam, so the flanges of the purlins and beams remain flush. Welded to the top of the purlins are flat plates to which are bolted 170 x 170mm T-plates for the glazing. Horizontal slots allow for tolerance when bolting on the plates. The glazing system is made up of 1500 x 1200 x 10mm toughened glass sheets, gripped in each corner by a bolting system and sealed along the joints by silicone sealant. The beams are supported by circular hollow sections anchored down to concrete beams.

The structure is stabilised to prevent movement — the end bay braced diagonally with steel cables, and the two central vertical supports also braced diagonally to stop the beams toppling over like dominoes. The stub columns at the low end of the beams are stiffened to prevent the structure from tilting from front to back.

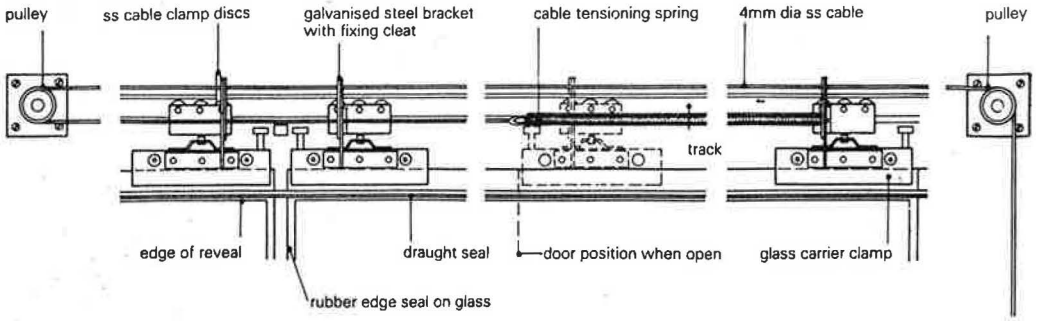
Uplift is a problem that occurs in all roofs — here the roof has been designed to create the effect. To counteract this, the beams that support the glass are considerably larger than normal.□

1 The atrium at fourth-floor level, with the roof access stair behind.
2 A rear view of the lifts, from the fourth-floor office.
3 The windows between the offices and the atrium.
4 The entrance area. The reception desk is galvanised mild steel.
5 The atrium at night. The end bay of the roof had to be braced.

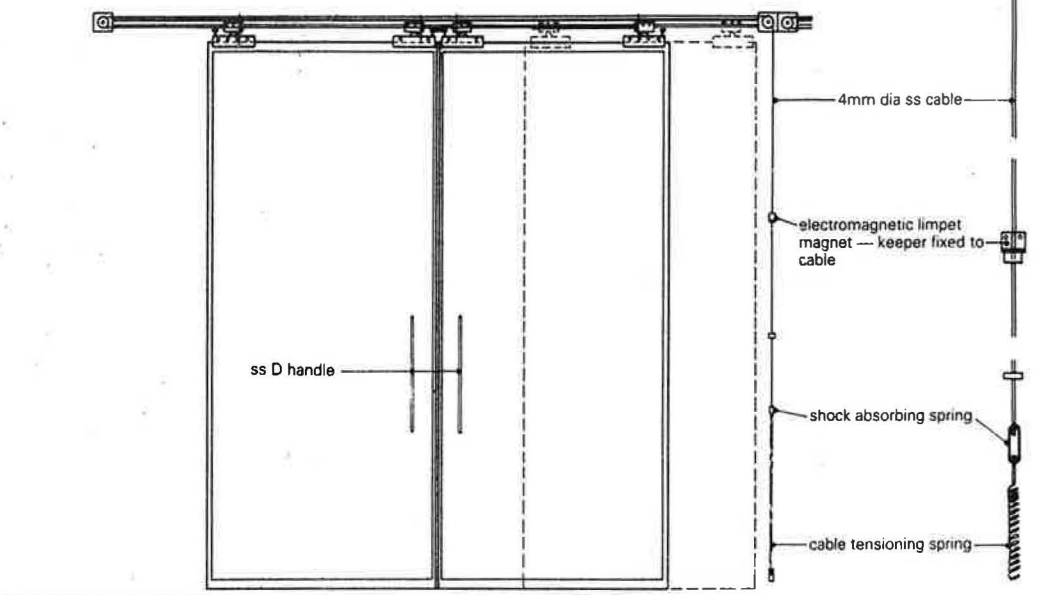


6

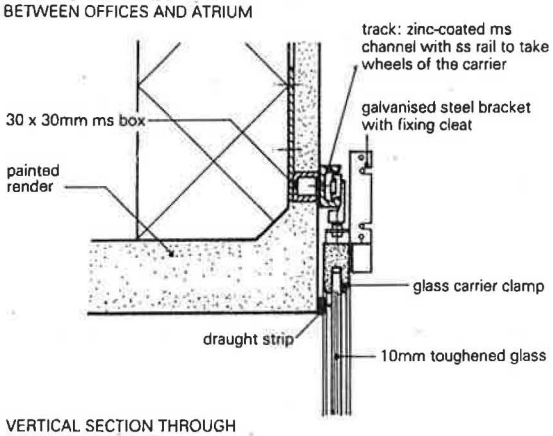
6 Exterior of the refurbished building.
7 Window elevation and details, and, below, a typical floor plan and section. The plan and section show anticipated air movement. Air is drawn out of the atrium because of the negative pressure created by the shape of the roof, to be replaced by air entering through the window openings in the outside walls.
8 Section through the top of the atrium showing the stair and roof, and above, roof details.



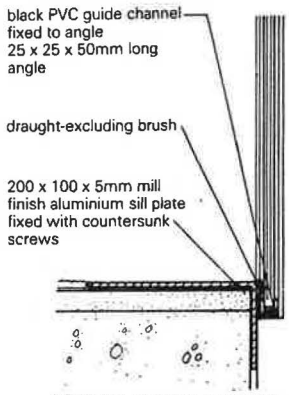
DETAIL OF WINDOW OPENING MECHANISM



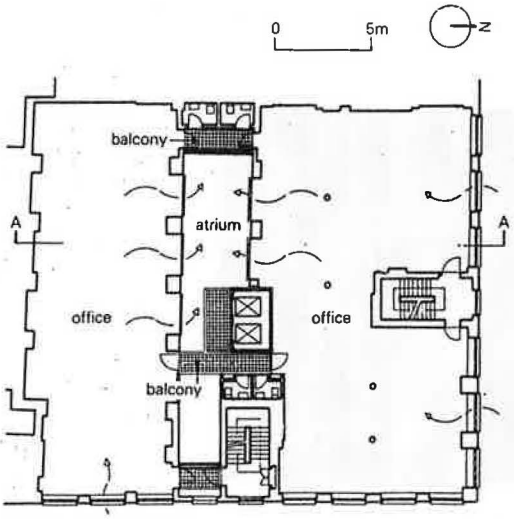
ELEVATION OF GLASS WINDOW BETWEEN OFFICES AND ATRIUM



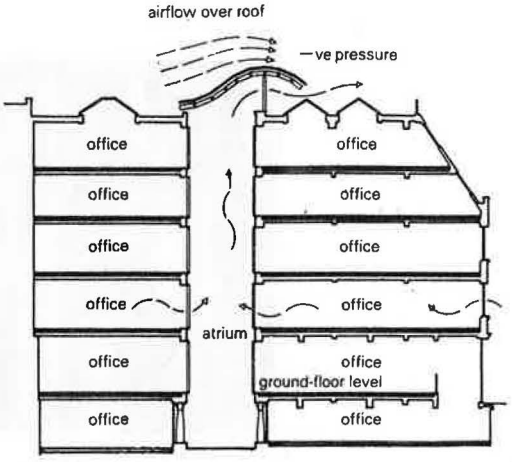
VERTICAL SECTION THROUGH HEAD OF WINDOW



VERTICAL SECTION THROUGH BASE OF WINDOW



TYPICAL FLOOR PLAN

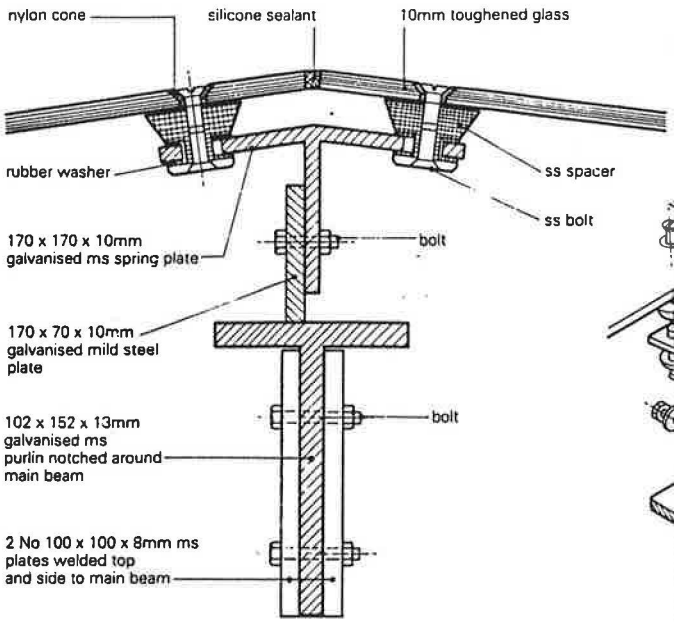


SECTION AA

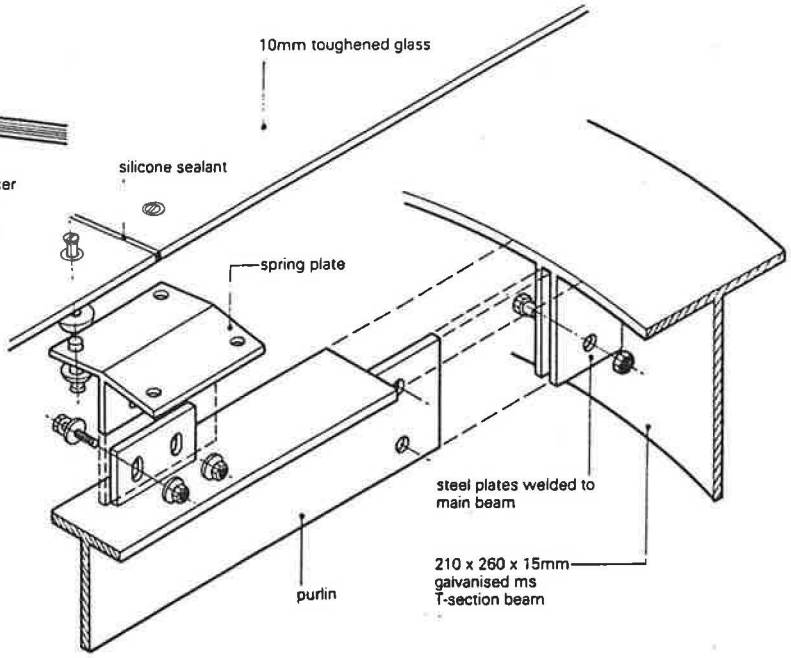
Acknowledgment
The editors acknowledge the assistance of Lionel Friedland of Pentarch in the preparation of this article.

Credits
location No 20-22 Stukeley Street, London
client Burswood BV
architect Jestico + Whiles: Alan Cardwell, Tony Ingram, Eoin Keating, Tony Ling, Jane Ostler, Anne Rowall, Martin Williams
structural engineer Price + Myers: Nick Hanika
services engineer HGS Engineers
quantity surveyor Michael Gregory Associates
project surveyors Watts and Partners
contractor Mansells

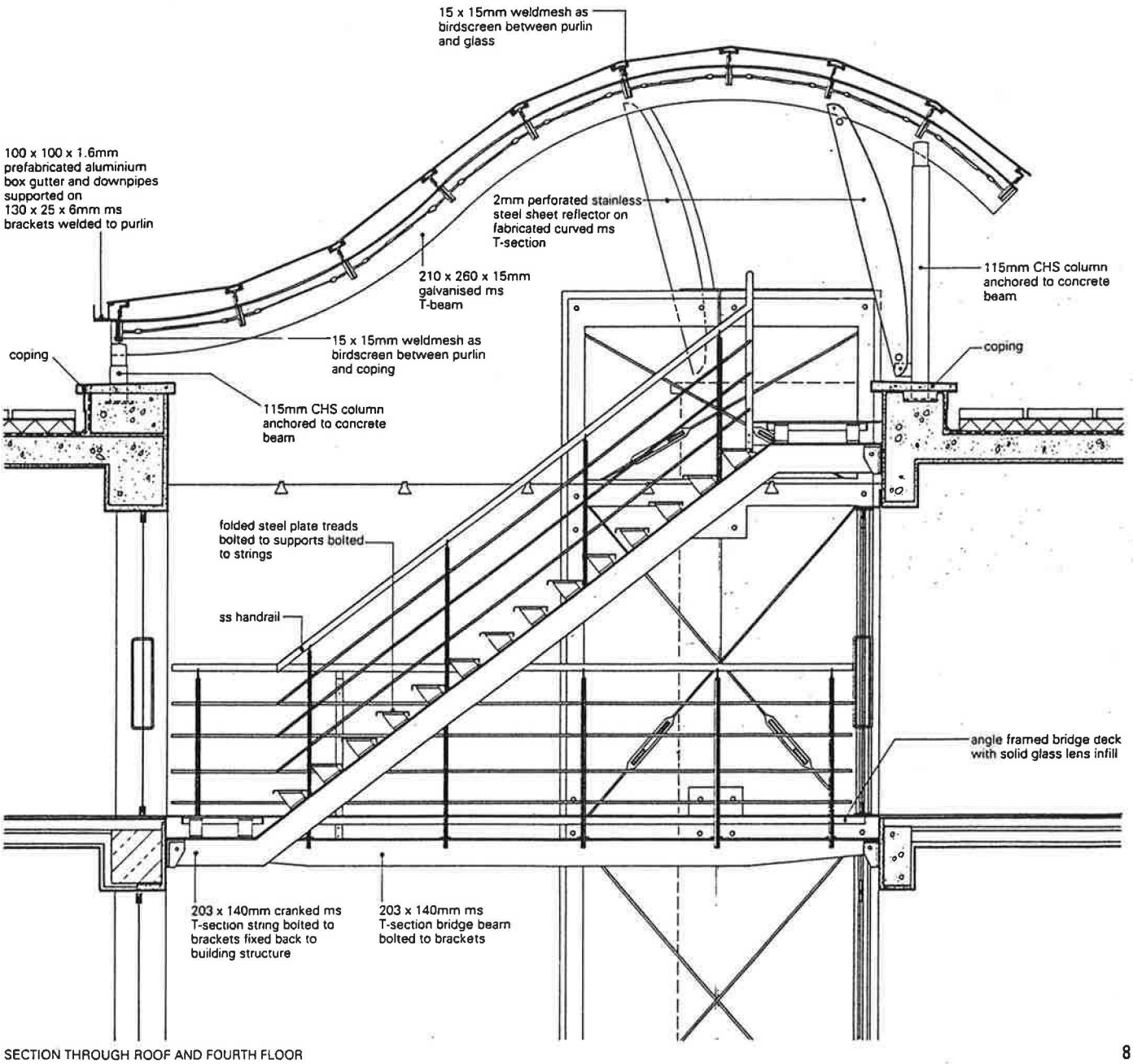
Project data
Contract JCT Management Contract
site start date May 1990
completion date February 1991



DETAIL THROUGH ROOF GLAZING SYSTEM



ISOMETRIC OF GLAZING AND STEELWORK JUNCTIONS



SECTION THROUGH ROOF AND FOURTH FLOOR