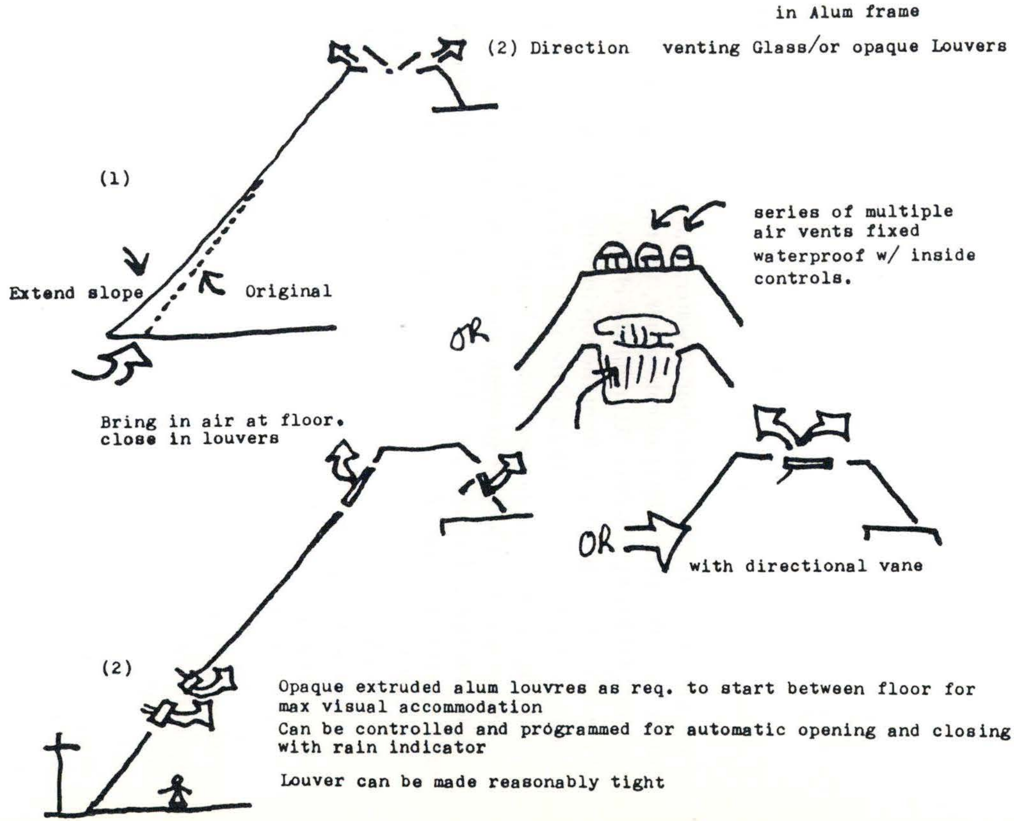
Other Technical Aspects

Although the glass roof is fully enclosed, according to documents prepared by Erickson's office, it was to be considered as "exterior in character." By this the firm meant that, because the roof formed an interface with the exterior and partook of the weather and heat conditions without, the regulation of its warmth and coolness would be at variance with levels maintained in other wall-enclosed portions of the building. The design team foresaw that the vast interior space of the gallery would be "ventilated by making use of the natural stack action" in the air enclosed within.

AEA's manner of dealing with the special problems concerning the regulation of comfort levels within the diaphanous structure is evident in the sketch reproduced here. They chose to capitalize upon and promote effects caused by the natural circulation of air. They were probably assisted in this conclusion by precedents outlined in a very sophisticated article on heat systems for space frame structures, by B. Etkin and P. L. E. Goering, entitled "Future Possibilities and Challenges: Air-curtain Walls," which was part of the design team's research materials. When an overall heating system was worked out with Reid, Crowther and Partners Limited of Vancouver, Erickson's firm committed itself to one that used stored water, warmed during off-peak hours (overnight), to heat the complex during the day. This system required the construction of an 840,000 gallon storage tank (greater than the volume of water contained within the Vancouver Aquatic Centre's pool). Its effectiveness would depend upon "a uniquely sophisticated computerized control system," but the idea itself depended upon a

EXTERIOR WALL VENTILATION PROPOSALS

B.C. LAW COURTS 7/17/74



Opaque extruded alum louvres as req. to start between floor for max visual accommodation

Can be controlled and programmed for automatic opening and closing with rain indicator

Louver can be made reasonably tight

basic law of the physical behaviour of water; that is, when a layer of warm water lies over a layer of cold water, the two will not mix because of differing densities. At night the chilled water in the tank is regulated by piping water from the top into the chillers, and slipping it back into the bottom of the tank. Hot water, on the other hand, is the basis of the heating system. Water, 150,000 gallons of it, is contained within Block 71 to create the waterfalls for Block 61.

The falls themselves are created by the water circulated from the tank up over the roofs of the Government Buildings as one important fireproofing measure. There are also automatic sprinklers that will release water to contain fire and smoke. These are placed especially in the underground areas where combustibles are found in considerable quantities.

This work of contemporary architecture strives to achieve the integration of all systems and material means. Hence the water that is necessary for the falls flowing from the roofs of Block 61 is also useful for heating and cooling systems and for fireproofing. Schematics 1974 contains many statements that allude to interchangeability of spaces and flexibility of planning. It could be demonstrated that Block 71's form emerged in part from a consideration of the movement patterns among the secure and non-secure, public and limited access areas required in the New Law Courts. In the case of the open area offices, for example, the design, as well as the design process, is as open-ended and open planned as that of the Old Courthouse was fixed and closed-doored. However, the major courtrooms and some other facilities were fixed at the beginning of the design process.

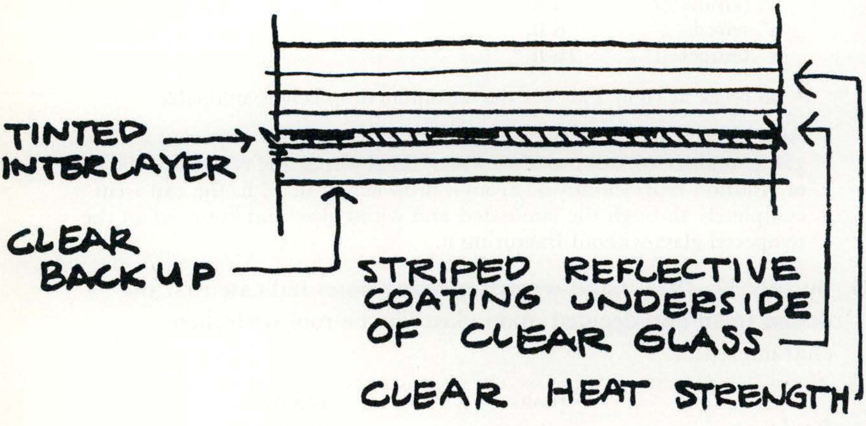
Finally, the glass for the space frame was not ordered in the way Dalton & Everleigh requested, as an already manufactured type of wired glass. Instead, it was specially designed to suit the purpose. A wide range of opinion was scrutinized before the final orders for glass could be made. It is interesting to read the preserved correspondence that led to the choice of the system we see. It contains information that was intended to help Erickson's firm decide among several available types of glass as they moved towards the preparation to Schematics 1974. Here is an excerpt from a letter from T. J. Winzler of the Libby-Owens Ford Company to D. J. Christ of AEA:

> You enquired if any testing had been conducted that indicated that tempered glass had more resistance to impact than conventionally used types of glass.
>
> Impact test for skylights have been conducted in Houston with safety glass . . .
>
> Impact with a 2-lb. steel ball showed fracture of single samples (36″ x 48″) at the following drop heights:
>
> ¼″ laminated 5 ft.
> ¼″ wired 6 ft.
> ¼″ tempered 16 ft.*
>
> * no break at 16 ft. This was the maximum drop height attainable
>
> As a more practical demonstration, the glass was also impacted with a 5 gal. container containing 6″ of water. This was at the request of the City of Houston representatives. From a drop height of 12 ft. the can went completely through the laminated and wired glass and bounced off the tempered glass without fracturing it.

By July 17, 1974, hand-written meeting notes indicate that the design team had decided upon glass for the roof with these characteristics:

Roof type	positive attributes	negative attributes
½″ tempered tinted and reflective	High strength resistant to thermal stress. Can be walked on. If it breaks will not fall full height of slope wall.	will fracture but can drop in large fractured chunks. replacement. extra lights should be kept in storage

By August 22, 1974, the architectural firm knew that the specifications in the chart reproduced here had to be taken into consideration. Even after the Law Courts entered into its redesign phase, the covering for the glass gallery was still unresolved and a member of the team was thinking of this special order:



By August 20, 1979, the glass for the skylight roof of the court finally had been decided upon. It was recorded in a memo of that date that a "Laminated glass assembly consisting of 12mm (½″) clear annealed glass; .060 polyvinyl butyl interlayer; 6mm (¼″) green heat absorbing/heat strengthened glass" had been chosen. The glazing consultant was Eugene O. Tofflemire & Associates. The skylight contractor was Central Glass Products Limited, Vancouver.

Subject	Notes	Action by
1. DEFINITION OF FORCES	In order to provide design data for glass manufacturers and for sub-consultants, the forces were roughly defined as follows: Wind forces: 25 lbs/ft^2/perpendicular to vertical glass walls Snow and Ice loads = 20 lbs/ft^2. The combined wind, snow and ice loads of 45 lbs/ft^2 would be sufficient to account for high velocity winds, wind would remove the snow and ice from the roof. Negative suction forces are anticipated to be higher than ordinary wind forces but would not exceed 45 lbs/ft^2. Uplift forces at the cantilevered overhangs might cause some glazing problems and have to be studied in detail. Since the spaceframe is a light weight structure, seismic forces would be easily accommodated. The seismic impact on the independent glazing system, however, might be severe. Thus the glass and mullion connections require special attention. Expansion forces would require at least one expansion joint. The two smaller space frames of 170' x 170' would each expand approx. 3". In order to accommodate the expansion forces top and bottom supports would have to be of moveable nature, whereas the connections to the concrete frames would be rigid. Turning moments at the top of the suspended glass walls at either end of the public space (assuming weight of 7 lbs/ft^2 for suspended glass wall) will stay within the overall space frame deflection limitations.	

IMAGES

PAGE

59 Arthur Erickson Architects.

62 Arthur Erickson Architects.

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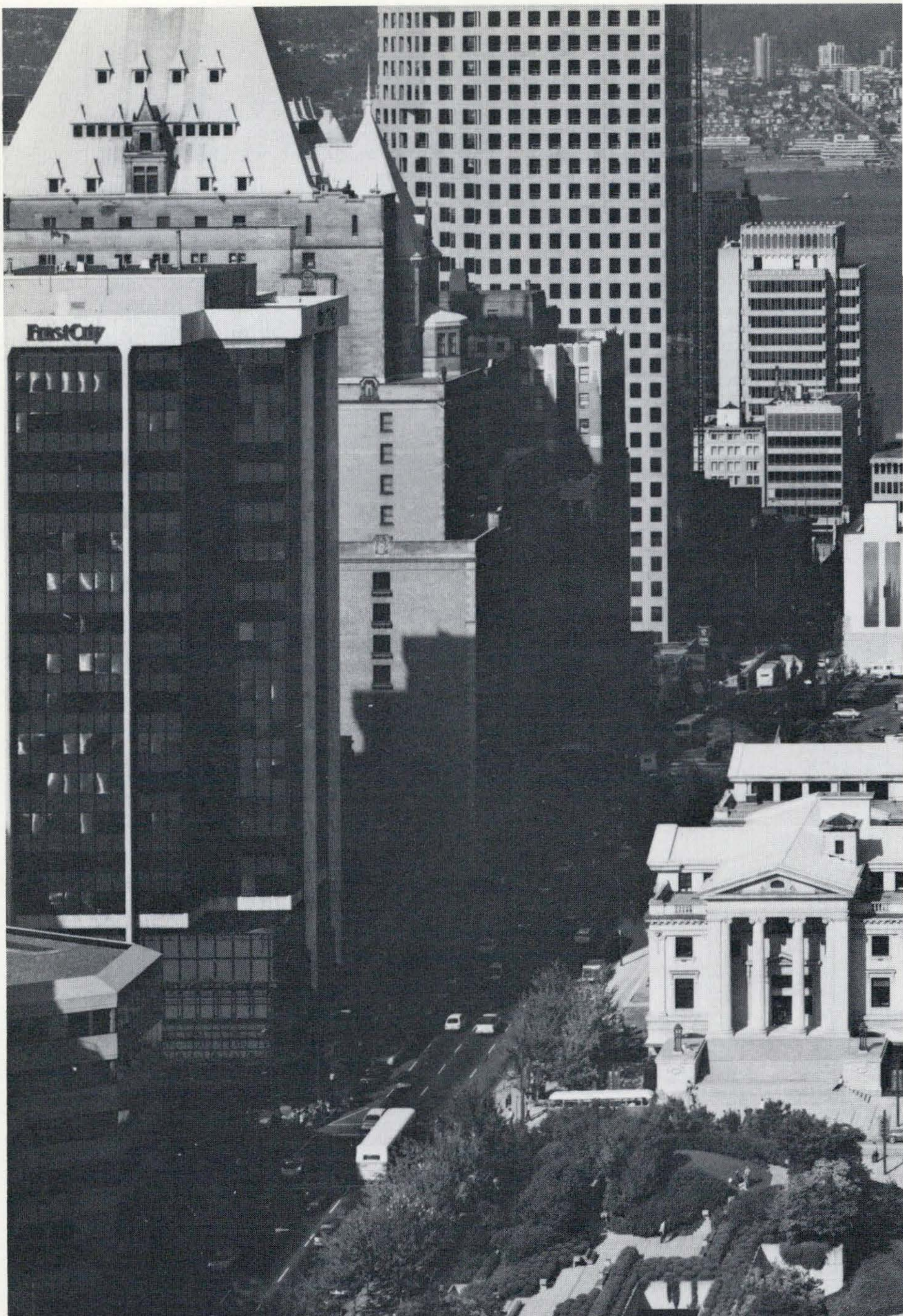
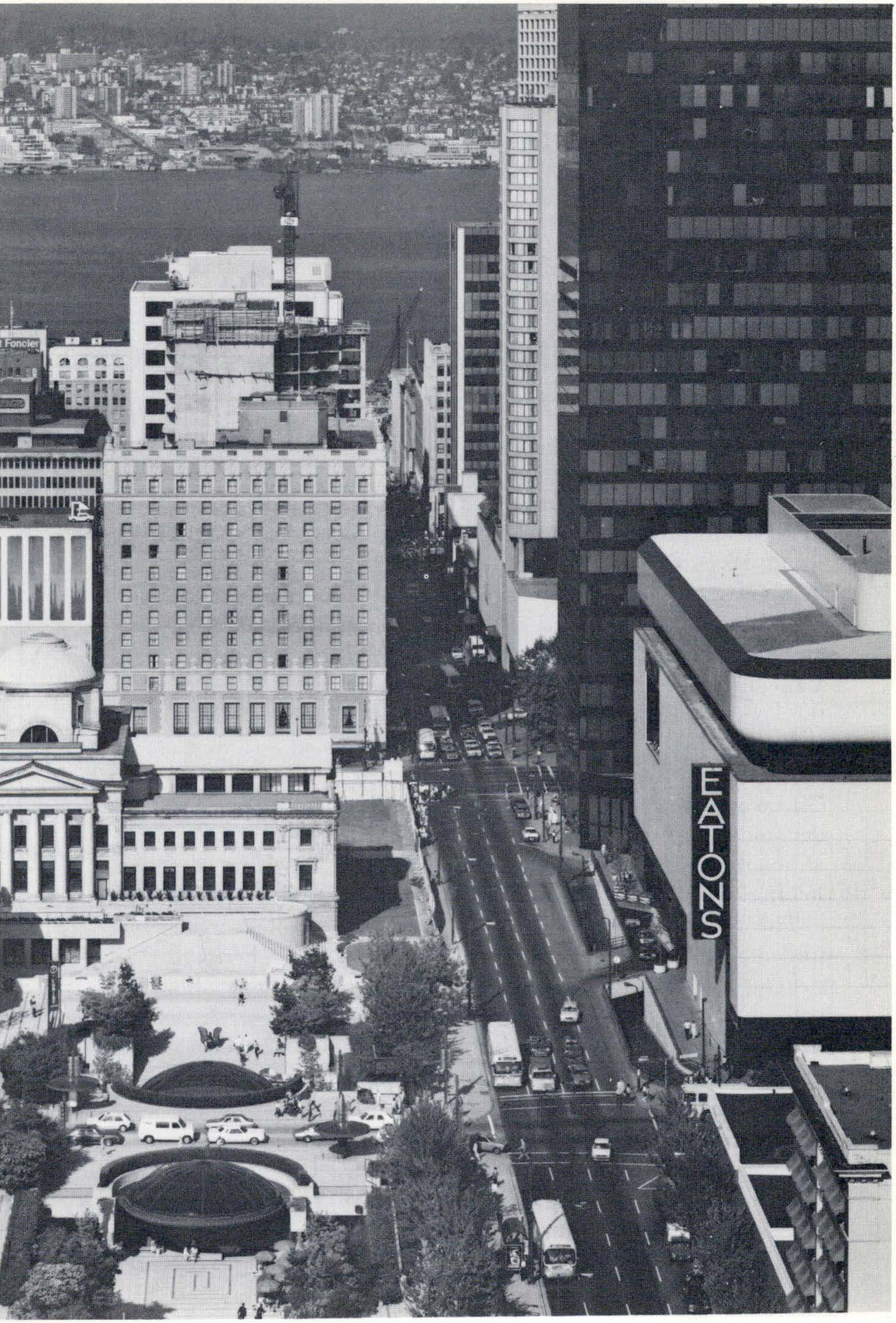

FirstCity


EATONS