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Toronto's Underground Pedestrian System

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Résumé: -

Remarks: -

Toronto's Underground Pedestrian System

Michael B. Barker

Abstract—*This paper describes the large underground pedestrian network that serves Toronto's metropolitan area of 3.5 million people. The network, which is approximately four blocks wide and nine blocks long, links 17 major developments. The article describes the three stages of the systems development, which began at the turn of the twentieth century. The present subsurface space contains about 1000 retail shops, many restaurants, and several movie theaters. Two main building types employed in the city's subsurface development—the atrium and the galleria—are discussed. Such structures have permitted the developers to exploit the potential of all available levels: above-, below-, and on-grade.*

Résumé—*Cet article décrit le résau de voies piétonnières souterraines qui dessert l'agglomération urbaine de Toronto, englobant 3.5 millions d'habitants. Le réseau dont la largeur et la longueur sont respectivement d'environ 4 et 9 patés de maisons relie 17 centres principaux. L'espace souterrain actuel contient environ 1000 magasins, de nombreux restaurants et plusieurs cinémas. Deux de principaux types de construction utilisés dans le développement de l'espace souterrain, l'atrium et la galerie, sont décrits. De tels développements ont permis aux urbanistes d'exploiter le potentiel de tous les niveaux: au dessous, ou au même niveau que la surface du sol.*

Introduction

The U.S. National Committee on Tunneling Technology's subcommittee on planning and evaluation of urban subsurface systems is undertaking a series of case studies in which the subsurface has been used successfully in North American cities. Eventually, these case studies will be published by the U.S. National Academy of Sciences Press.

The first case study examined the new underground light rail loop in the "golden triangle" of downtown Pittsburgh, Pennsylvania (U.S.A.) The second case study addressed the large and complex underground pedestrian network in the urban core of Toronto, Canada. This report is a brief descriptive summary of the Toronto case study.

Description of the System

Toronto's underground pedestrian network is a labyrinth of tunnels, basements, escalators, mails and fountains. The system, which serves a Toronto-area metropolitan population of 3.5 million, has grown to be the largest system of its kind in North America and, perhaps, the world.

Toronto's long, cold winters are certainly one important factor encouraging new developments to connect into the underground network. Another factor is the unprecedented growth of the city's financial district in the 1960s and 1970s. This economic growth provided the opportunity to separate pedestrian circulation from automobile circulation, with obvious advantages to each.

The heart of the system is Union Station, the regional rail center. The perimeter is the U-shaped subway route (see Fig. 1). The network is approximately four blocks wide and nine blocks long—a 1.5-mile walk from one end to the other. Seventeen major developments are linked into five subway stations, 10 under-street tunnels, and five basement connections. The underground network provides internal access to 30 office towers, where about 82 000 employees work in 30 million ft^2 of office space.

A smaller pedestrian concourse about four blocks long runs along Bloor Street approximately 2 miles further north of the main underground network. The Bloor Street underground system also links two subway stations with underground shopping concourses.

Development Phase I (1900–1930)

Toronto's underground pedestrian network began at the turn of the twentieth century, when the T. Eaton Company, Canada's largest department store complex, connected its main store, catalogue store, bargain annex and stable with tunnels. By 1917, five under-street tunnels had been constructed.

This development was followed in 1924 by the construction of Union Station, which used an advanced plan form (developed in the design of New York's Grand Central Station) featuring grade-separated arrival and departure areas for passengers. The plan featured sets of stairs and subtle, often skylit ramps that provided visually interconnected spaces above and below grade. In 1929, the station was connected by a tunnel to the Canadian Pacific Railway Company's Royal York Hotel.

The underground pedestrian system saw no further development until after World War II.

Development Phase II (1954–1974)

The single most important contribution to the system resulted from the construction of the city's subway loop in 1954.

The coming of the subway provided mezzanine connections under the street, offering numerous opportunities for subsurface continuity in the financial district. The late 1960s and early 1970s saw major redevelopment of the financial district, as four of the five Canadian banks built their head offices, with each bank agreeing to build underground concourses. The model for these developments were the successful Place Ville Marie and the Place Bonaventure, both of which were constructed in Montreal in the 1960s (see Figs 1 and 2).

In the early 1970s, Toronto experienced unprecedented growth, resulting in many new office tower and plaza developments. The tower and plaza projects focused on the buildings' significance as a landmark; the large surface plaza contributed to city life. These developments included subsurface retail malls that were connected eventually, forming about half of the complete system. In some notable cases, landowners redeveloped their original sites and incorporated the idea of subsurface space into the new developments.

Development Phase III (1974–1984)

With the adoption of Toronto's 1975 official City Plan, the powerful new "Development Review" process witnessed a new "city" view of its streets, open spaces and building configurations. If street-related shopping was not provided, developers of commercial projects would lose development density. Hence, a strong bias was created for street-related—as opposed to underground—commercial activity.

The planners and politicians at the time were particularly influenced by Jane Jacob's *Life and Death of American*

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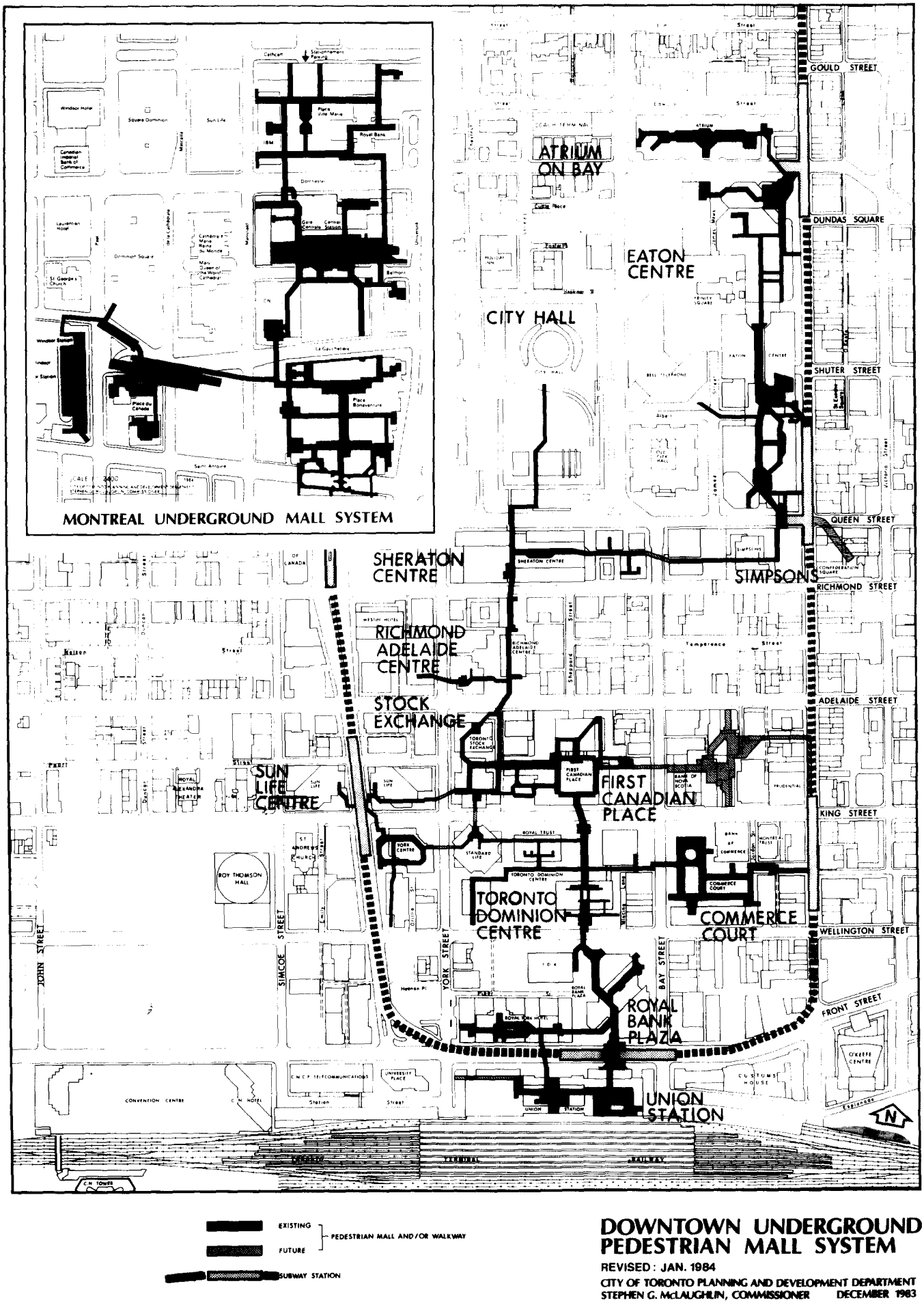

Figure 1. Toronto's underground pedestrian system, showing the metro, connecting tunnels, and major developments.

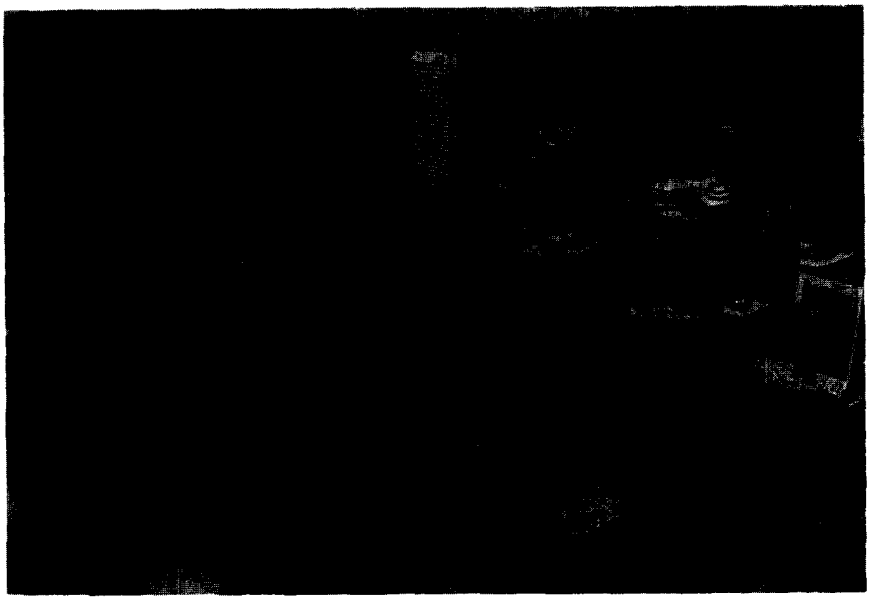

Figure 2. This photograph of downtown Toronto's urban core shows the results of the city's tremendous growth in the 1970s.

cities, a book which focused, among other things, on the glories of street life.

At the time that the 1980 Official Plan was adopted, the underground network was half-built, although only partialy connected. The 1980 plan maintained a bias toward street-commercial, and was neutral on the underground pedestrian system. Today's system is depicted in Fig. 1.

The present subsurface system supports 30 office towers, City Hall, Union Station, two department stores, 20 parking garages, three hotels, and the Stock Exchange. The subsurface space contains about 1000 retail shops, numerous restaurants, two cinemas and a cineplex, and nine fountains with gardens. Street-level entrances number over a hundred.

Operation of the System

Two Networks

The downtown Toronto system comprises two separate but connected networks. The northern network operates in a typical shopping center fashion, with a department store at each end and a retail mall in between. The northern anchor is the Toronto Eaton Centre Galleria (Fig. 3), Canada's most successful shopping complex and the city's main tourist attraction (50 000 tourists visit the complex daily). The southern anchor is Simpson's Department store.

The mall is open to the public during the hours of subway operation—i.e. 6.00 a.m. to 2.00 a.m. The Galleria stores are open late, while the department stores have more limited hours. The bulk of the Centre's retail business is conducted on Saturday.

The southern network interconnects the major bank towers of the financial district. The shops and stores serve the weekday office population essentially between the hours of 10.00 a.m. and 2.00 p.m. It now has become important for new projects in the financial district to offer their prospective tenants access to the amenities of the underground network.

Security

The network is privately owned and is subject to the control of private police. Although the mall and arcade are open to the public and seem to be public, in reality they are private property. The spaces and tunnels in the system are treated as a private utility. The responsibility for security rests with the property owners. The private security system makes extensive use of video monitoring and radio communication.

Orientation

Because the system is complex and can be confusing to the occasional visitor, efforts are underway to improve directional graphics. Daily users get to know the system and seem to find their way around quite easily. Figures 4 and 5 show a typical understreet connection tunnel and surface entrance.

The northerly network, particularly Eaton Centre, regularly programs fashion shows, concerts and even golf demonstrations to create a lively atmosphere and sense of "place" in the underground network. In the southerly part of the system, which lacks such promotional events, orientation is more difficult for visitors.

A multi-disciplinary team has been assembled to work on maps that will appear in publications aimed at tourists and hotel clientele, on kiosks at street level, and on markers throughout the network. A wordmark or logo, now being developed, would appear on kiosks, entrances, intersections and landmarks within the system as part of the identification program.

At present, access and egress for the handicapped are poor. Apart from being uninviting, access and egress points may be dangerous.

Building Typology

In Toronto, the arcade galleria has evolved to emphasize the subsurface level, celebrated in gardens and fountains. Essentially, the Toronto arcade and atrium buildings respond creatively to two pressures—one public, the other private.

First, buildings were required by the city's official plan to line the streets with retail establishments.

Second, the private developer's interest in maximizing commercial space provided the impetus to expand accessible shops to the subsurface level. In contrast, earlier developments featured office towers in open plazas where street retail and subsurface links were difficult at best.

The two building types that have emerged have been repeated and modified in combination with the traditional office tower: (1) the atrium building, with its square plan and high glazed volume (see Fig. 6); and (2) the galleria building, with its long, parallel walls and vaulted glass roof (see Fig. 3).

These two buildings types not only satisfied the requirement of the development review process for street-related retail, but also opened the lower concourse to the interior street level. Modifications to the building code with a special chapter on atrium structures, and a new understanding of the dynamics of fire, allowed for more experimental architectural solutions.

Clearly, the visual interconnectedness found in the late nineteenth-century gallerias in Rome, Paris, Milan and Brussels were precedents for the new structures. In Toronto, however, the street level is a mezzanine overlooking the concourse a floor below.

The collaborative efforts of engineers and architects have created interior and below-grade environments with trees, waterfalls, sunlight, fountains and garden as landmarks.

The financial district's five galleria and atrium structures are hybrid office towers with glass roofs. Characteristic of these complexes is a lavish commitment to subsurface retail, street-related retail and above-grade retail establishments. Developers of these structures, determined to create landmark projects, attempted to exploit all available connections—above-, below- and on-grade. Although the city has tried to redress the balance in favor of street-related retail through legislation, the balance at present clearly favors subsurface retail.

Future Links

Continuity problems occur at the junctions of the two networks at

Figure 3. Toronto's Eaton Centre Galleria, visited by 50 000 tourists daily, features a large central space and lower subsurface concourse level. (Photo courtesy of Bregman & Hamann and Zeidler Roberts Partnership/Architects.

Eaton's and Simpson's department stores, both of which have limited hours of operation. Another separate tunnel is the strategic link needed to connect the two systems to form one larger system. Such a linkage could provide a whole new dynamic to the underground concourse, broadening the array of experience and interest in its development.

As the underground system matures, the single circuitous route, with branches extending from it, will develop into a network as additional north-south and east-west routes are completed.

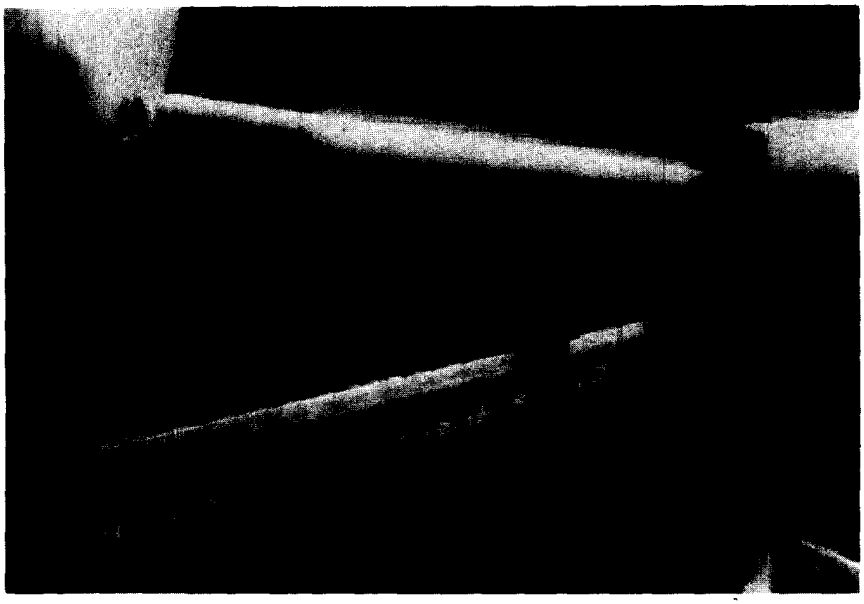

Figure 4. A typical understreet tunnel connecting portions of the Toronto underground pedestrian system.

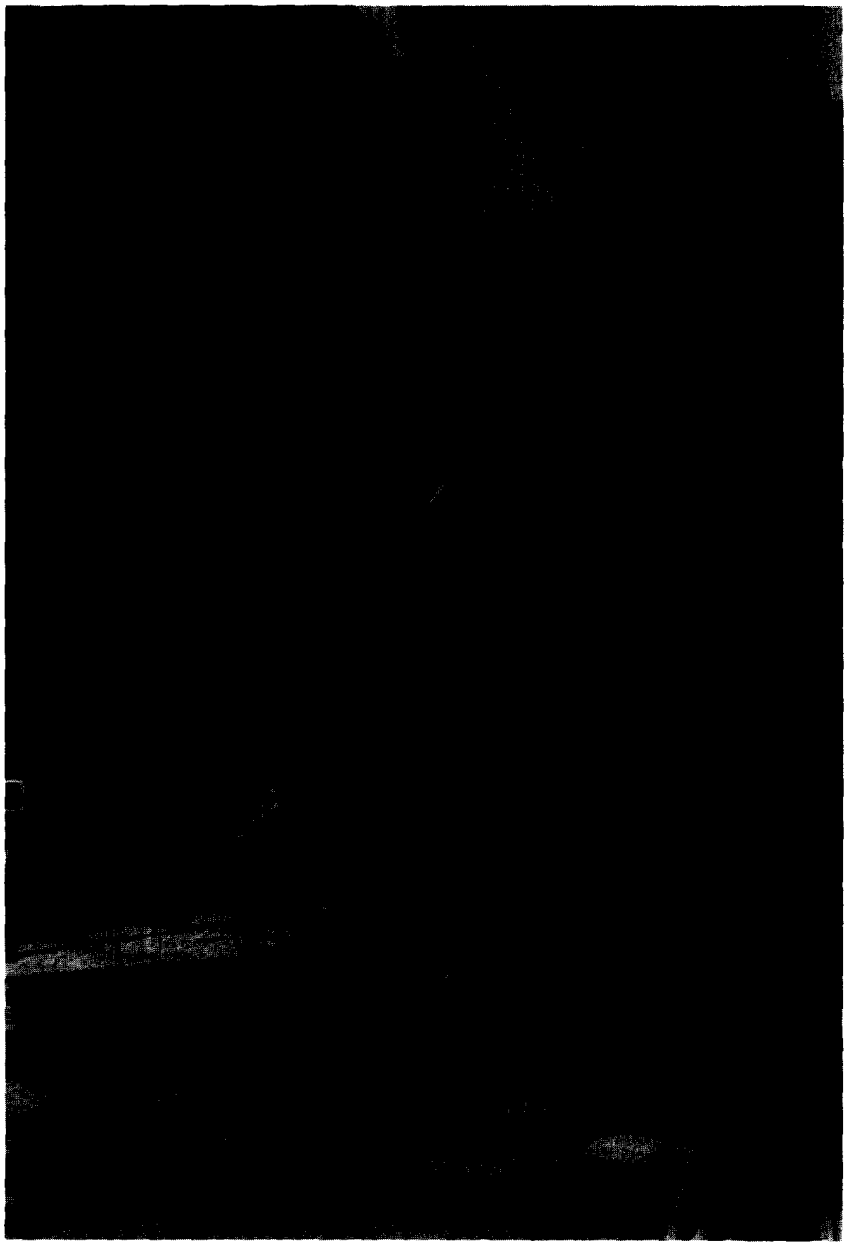

Figure 5. This typical entrance to the underground pedestrian system is located at the Eaton Centre.

Figure 6. Atrium-type building in the Toronto underground pedestrian system.

Conclusions

Toronto's underground pedestrian system is one of the best anywhere, and it is constantly being improved. Although other cities also have underground pedestrian systems, few are as comprehensive and well-developed as Toronto's.

While the Toronto system is not without flaws, there are, nonetheless, substantial lessons to be learned from the Toronto experience.

The underground network in Toronto has secured economic and environmental benefits, including:

(1) Increases in property values and land utilization.
(2) The separation of pedestrian and automobile traffic.
(3) The linking of transportation modes.
(4) The reduction of surface congestion.

(5) The protection of pedestrians from inclement weather.
(6) The coordination of the infrastructure.
(7) An improved atmosphere for pedestrians.

Each urban area has its own unique circumstances that will influence the potential application of the Toronto idea. These include: urban density; local geology; building configuration; development policies; and environmental standards. A thorough analysis of local needs and capabilities is essential to sound planning for subsurface use.