THE FUR DISTRICT: CONVERSION OF UNDER-USED INDUSTRIAL BUILDINGS TO AFFORDABLE HOUSING

AVI FRIEDMAN, DEREK DRUMMOND, ADRIAN SHEPPARD
McGill University

BACKGROUND

A number of recent socio-demographic changes have contributed to a shift in housing accommodation away from the traditional North American single-family detached home. Smaller households (down from an average of 4.2 persons in 1961 to 2.7 in 1986), the proliferation of the non-traditional family type (traditional families of working father and stay-at-home mother represented only 17% of all families in 1989 as opposed to 27% in 1980), and an increase in the population of citizens over 65 years old (from 8% of the population in 1976 to a projected 17% by 2011) have created the demand for a housing unit that in many cases is no larger than 1,000 square feet (Poitras and Duff 1988; CMHC 1990). Diminished expectations as well as decreased practical requirements have not altogether eradicated the need for the type of large house that many middle-class North Americans took for granted in their youths, but now these new social conditions have certainly led to a concentration of attention on the part of policy-makers, developers and architects on a type of housing that reflects the changed requirements for a unit that is both smaller and more efficient.

The restructuring of the North American economy away from resource-based activities and labor-intensive manufacturing industries has resulted not only in a greater population concentration around urban centers whose economies are primarily service- and information-based but in the collapse of a crucial segment of commercial power (CMHC 1990). The shrinking prices of the commercial real estate market are projected to continue falling due to an over-supply of urban office space. Property taxes in industrial areas of municipalities on the periphery of large cities are sometimes half the amount as those in major downtown centers, which further exacerbates the situation of industry abandoning the cores of big cities (Fromstein 1994). Not only are new buildings remaining empty, but buildings constructed before 1960 are imperilled since they are becoming increasingly inefficient and expensive to operative as they age and deteriorate. The higher the proportion of unleased space in older buildings, the greater is the likelihood that they will remain unrenovated, which results in a linked pattern of neglect and abandonment which further accelerates the downward spiral of degradation and disuse. With the present economy in stagnation, this dismal state of events seems unlikely to improve over the coming few years.

The ramifications of the current economic situation are experienced in the residential as well as in the commercial realm. Vulnerable purchasing groups such as low- to moderate-income families and first-time home buyers are subject to an affordability gap, a phenomenon whereby the rate of increase of median new house prices has surpassed the rate of increase of median family incomes. Land and infrastructure costs alone had increased to 24% of the total price of a new home in 1982 from 11% in 1949 (U.S. League 1983). Affordability is a major problem for most people considering their first purchase of a house, especially in times of economic uncertainty when lack of job security forces earners to regard their personal financial situations as precarious at best.

Another feature of the changed economic landscape involves the work-at-home phenomenon where mounting numbers of people have opted to transform their homes into working environments and themselves into home-office telecommuters. It is estimated that eleven million Americans already work out of their homes and that one in five major firms participate in such a scheme. The availability, affordability and accessibility of personal computers, software, fax machines and modems have, for many people, outweighed the expense of rented office space; by working from home, a person economizes on office costs which can be channeled directly into business-related resources (Friedman 1994). The benefits of such a manner of working have effects not only on the design of the home environment but on the demand for office space in the already-depressed urban core.

With the relocation of a substantial portion of the residential population to the suburbs, many North American cities have succumbed to urban depression following the exodus from the central residential neighborhoods. With greater numbers of inhabitants on the fringes of cities and fewer numbers actually living within the cities themselves, the downtown areas experience reduced retail activity, increased crime levels, and a general diminishment in the vibrancy and quality of city life. A strong residential presence downtown is also important in maintaining tax-base requirements. In order to support the essential services of a large city, a solid base of property tax-paying citizens is crucial. When the population drops and the tax base follows, civic upkeep and maintenance suffer, and when the civic quality suffers, even more people are inclined to depart: such a cycle is to be avoided by the active encouragement of sound and affordable neighborhoods in the city centre. When older buildings are reclaimed for residential purposes, not only are people housed satisfactorily in desirable parts of town, but the city's architectural heritage is conserved. Old buildings may be torn down and their sites used for new construction, but the buildings themselves are never truly replaced; once a viable and potentially useful portion of the city's history is demolished, it is gone forever.

As society becomes more aware of the depletion of the earth's natural resources, building practices which use resources

efficiently both in the construction and operational phases and which respond favorably to basic design principles to create pleasant and environmentally-sound living spaces can become an essential strategy at all phases of design and planning. If the environmental cycle is viewed in a comprehensive manner which takes into consideration more than simply the energy that a building consumes, and the waste and consumption involved in the demolition of old buildings and the construction of new ones is acknowledged, then one can begin to appreciate the savings to be achieved in energy and resources when older buildings are renovated for extended use and the construction of a new building is avoided altogether. Additionally, savings in infrastructure costs are to be gained by mixing industrial and residential use within the same existing building. A single structure which utilizes sewers and roads for primarily industrial purposes by day and for residential purposes by evening is a building which makes maximum use of available infrastructure. Rather than construct, at added expense, an entirely separate infrastructure to accommodate a solely residential new community, by creating a mixed-use complex in a building which was formerly exclusively industrial, we take advantage of services and amenities already in place and eliminate the need to erect new and otherwise avoidable infrastructure systems.

The idea of renovating and reusing existing older buildings and adapting them for mixed residential and commercial use is not a new one, although most conversions of this type have so far been made in the development of condominiums: a decidedly expensive housing option. This paper, which is based on a report researching the conversion to mixed use of an underused eleven-story building in the Fur District of downtown Montreal, takes a new and different approach. The authors suggest that two crucial objectives can be combined in this strategy: 1) the reuse of the current oversupply of industrial/commercial buildings in the downtown areas of large cities, and 2) the accommodation of increasing numbers of potential buyers eager to enter the housing market and who want to live close to the urban center. The distinguishing features of such a strategy are the concepts of affordability and of mixed industrial and residential use.

THE MAYOR BUILDING: DESIGN PROPOSAL

We have selected one of the buildings in the Montreal Fur District on which we demonstrated how the conversion process can take place. The building was chosen with the owner's willingness to take part in the study, and because of the building's vacancy rate and its physical characteristics. The structure's dimensions and location make it a prime candidate for such a process. The concrete structure, the large windows, the bay size, the character and material of the facade should require less investment and will attract buyers. The authors' objective was to draw attention to the potential of such buildings in accommodating diverse uses and as affordable housing.

The Mayor Building is one of the prototypical industrial buildings which make up the Montreal Fur District (Fig. 1). It is situated on the corner of St. Alexandre and Mayor Streets with its main facade and entrance on St. Alexandre, and it is owner by Rosdev Development of Montreal. Over the years, the main occupants have been manufacturers in the fur industry and therefore the building has supported light industrial activities. Today the Mayor Building has a vacancy rate of over 70%. Some

Figure 1: Mayor Street Facade

Number of Floors	Ground Floor Area (sq. ft.)	Typical Floor Area (sq. ft.)	Total Area (sq. ft.)	Structural System	Bay Size
11	17800	14000	157800	Concrete Post and Beam	18'x16'8" to 23'6"x17'8"

Floor to Floor height (ft.)	Total Height (ft.)	Windows	Facade Material	No. of Elevator Shafts	No. of Stair Wells
12	150	Single pane metal frame	Stone and Brick	4	2

Table 1: The Mayor Building—Technical Information

of the floors are completely empty and run down. The names on the doors of the many abandoned offices and work spaces are witness to a time when the fur industry was booming. The Mayor Building serves as an example of the state and condition of most of the buildings in the Fur District (Fig. 2).

The Mayor Building has four entrances, two on each street. Two major entrances serve the entire building by providing access to the main stairwells and elevator shafts. Both of these entrances have lobbies on the first floor and act independently of the other. The two secondary entrances serve only to access the first floor and increase its accessibility. The facade material of the first tow floors are stone whereas the rest is brick. The building also has a vehicle entrance which serves as a loading dock. This access may prove to be useful in the introduction of future below-grade commercial/industrial activities. Circulation in the building varies between the ground floor and the upper floors. The upper floors are comprised of a double-loaded corridor which links the two stairwells and elevator shafts; the ground floor does

	Height in floors	Structure	Facade Material	Vacancy (%)
1	3	Steel	Brick	0
2	4	Concrete	Stone	0
3	3	Concrete	Stone	20
4*	10	Steel	Brick Stone	30
5*	6	Steel	Brick	50
6	7	Steel	Steel	30
7	3	Concrete	Brick	20
8	3	Concrete	Brick	20
9	3	Concrete	Brick	0
10	3	Concrete	Brick Stone	0
11	3	Concrete	Stone	0
12	3	Concrete	Brick	20
13*	10	Steel	Brick	50
14	3-5	Steel	Steel	0
15	5	Steel	Stone	20
16	4	Concrete	Brick	20
17*	10	Concrete	Brick	60
18*	12-13	Steel	Brick	40
19	12	Steel	Brick Stone	30
20	6	Concrete	Brick Stone	20
21	3	Concrete	Stone	50
22*	12	Concrete	Stone	30
23*	11	Concrete	Brick Stone	50

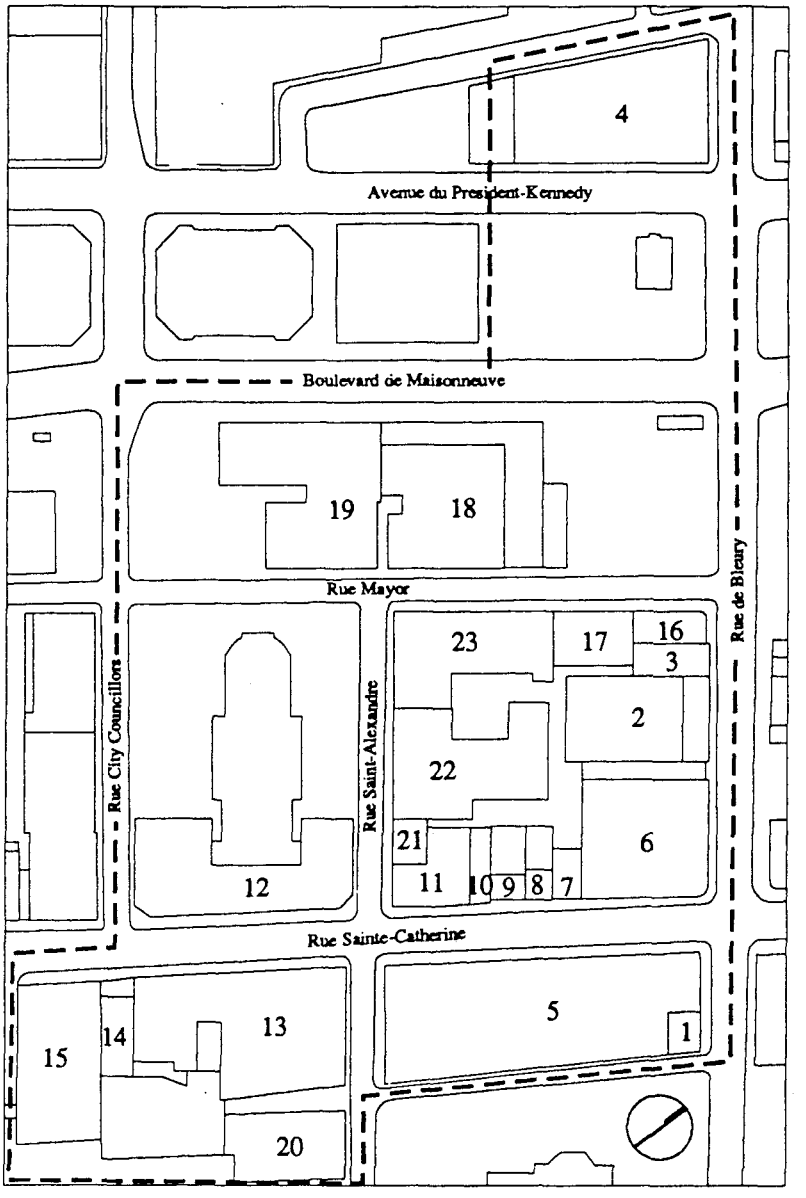

Figure 2: Site Plan of the Fur District (The dotted line indicates the designated study area)

not follow this configuration since the vehicle access/loading dock divides the building, and a secondary structure is also present on the ground floor. The building has two components which make up its volume. The eleven-story structure which faces both St. Alexandre and Mayor is the main volume of the building. However, a secondary two-story structure lies behind the building and creates a small 600-square-foot open court between the structures. The rooftop of the secondary structure provides almost 4,000 square feet of potential usable space. The circulation on the ground floor is therefore not linear as on the other floors. From the main entrance on St. Alexandre one can ascend to the other floors or enter either the main or the secondary structures. The main entrance on Mayor permits ascent to the upper floors and access to the loading dock (Table 1).

In accordance with the objective of converting the Mayor Building to mixed use, the authors suggest that the lower three floors remain commercial/industrial and the upper eight floors be designed for residential use. It is also proposed that since the building has two circulation shafts, the St. Alexandre Street entrance will serve the housing component and the entrance to the commercial/industrial part will be through Mayor Street.

LOWER LEVEL

The windows at the lower (basement) level of the Mayor Building have been boarded, and the space is currently under-used (Fig. 3). The bay size, unfortunately, does not permit the introduction of parking (with a service entrance from the building next door). A parking solution for the building's users will be to allow permit-parking zones on adjacent streets or to rent parking spaces in adjacent lots or office garages with interior garages. In the proposed plan, the lower level would be turned into rented commercial spaces in order to encourage street-level activities. These spaces can either have their own

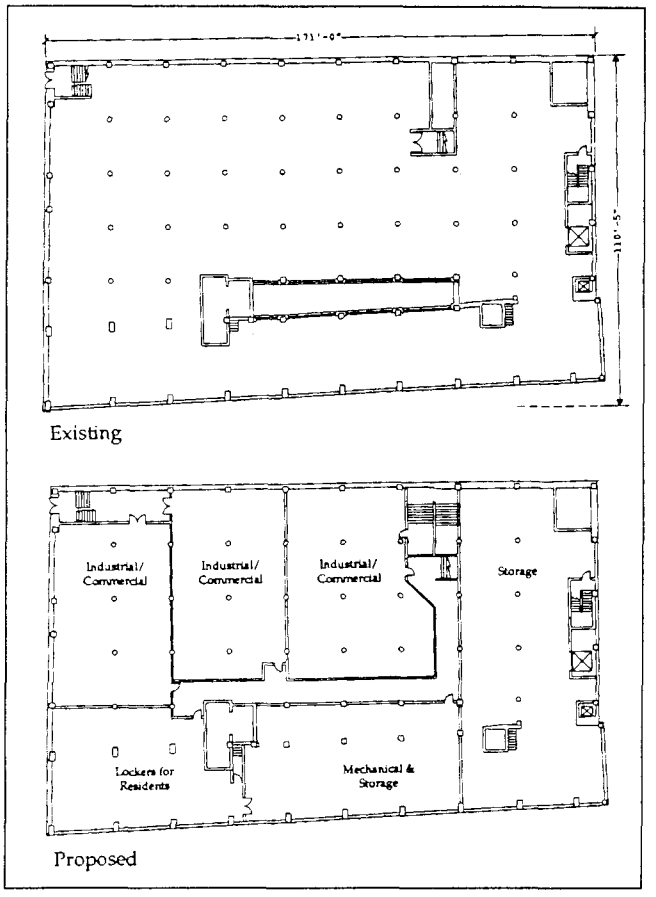

Fig. 3: Lower Level of Mayor Building—Existing (Top) and Proposed (Bottom) Plans

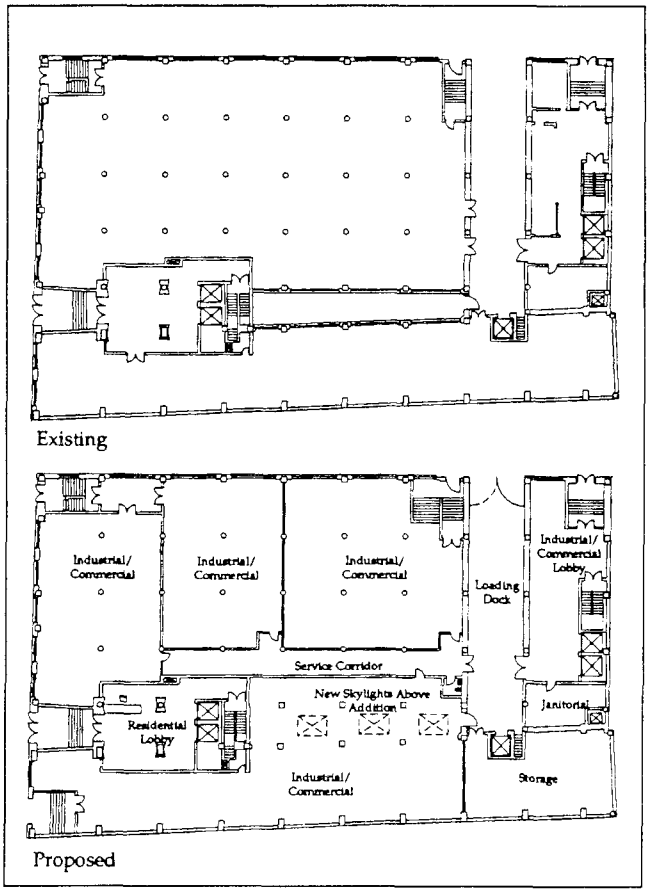

Figure 4: Ground Floor of Mayor Building—Existing (Top) and Proposed (Bottom) Plans

direct street entrances or be part of a large ground floor space function. Once the boarded windows are opened, these places can attract service stores or industry. The loading dock will be kept for benefit of the industrial users.

GROUND FLOOR

At present the Mayor Street lobby serves as the prime entry way. The lobby is made of terrazzo flooring and granite-clad columns and walls. There is a two-story independent structure in the rear, and a loading dock and service elevator on the St. Alexandre Street side. In order to separate between residential and industrial activities, two distinct entrances are proposed (Fig. 4). The access on St. Alexandre Street will serve the residents and the Mayor one will be the entry way for the industrial/commercial activities. The two-story structure on the south side of the building will become part of the ground floor by closing the void between them (i.e., demolishing two walls and building a new roof with skylights). The elevated ground floor will have a private direct access from street level and will be connected, if necessary, to space on the lower level as well.

UPPER FLOORS

A typical upper floor is currently served by the two elevator shafts near the two entrances to the building (Fig. 5). Both entrances are linked by a corridor. The bay sizes vary between 18' x 16'8" and 23'6" x 17'8", and the structure seems to be in good condition. When designing a typical floor, a cost-effective strategy is to offer potential buyers a choice of unit sizes (i.e., subject to a pre-determined price scale by the developer). The number of choices must be coordinated and limited in order to better manage the marketing process. Buyers can also be offered a choice of interior service units (e.g., bathrooms and kitchens) and they may decide to leave their spaces open or partitioned according to their means and lifestyle.

The design of living units can be undertaken in several stages. First, the developer must determine the socio-demographic composition of the potential buyers. The number of units and price range are decided in order to satisfy the economic demands of the buyers and developer; the sizes of the units to be built are identified in accordance with these variables. Unit sizes must balance the potential needs of buyers with the potential profitability of the project. Creating a greater number of smaller units may seem to make more economic sense but may not reflect the needs of buyers as determined in a market study. Flexibility of choice is provided by creating open spaces with pre-determined wet walls in which service units can be placed and adapted o the specific social and economic profile of potential buyers. The design process becomes one of adapting a generic volume to particular spatial and economic specifications. In a typical situation, potential clients are met and their household type and socio-economic characteristics are identified. Architect and client may undertake the process of selecting service units from a menu of choices and then planning them out in the pre-selected space. Finishes are also chosen, and then a cost estimate

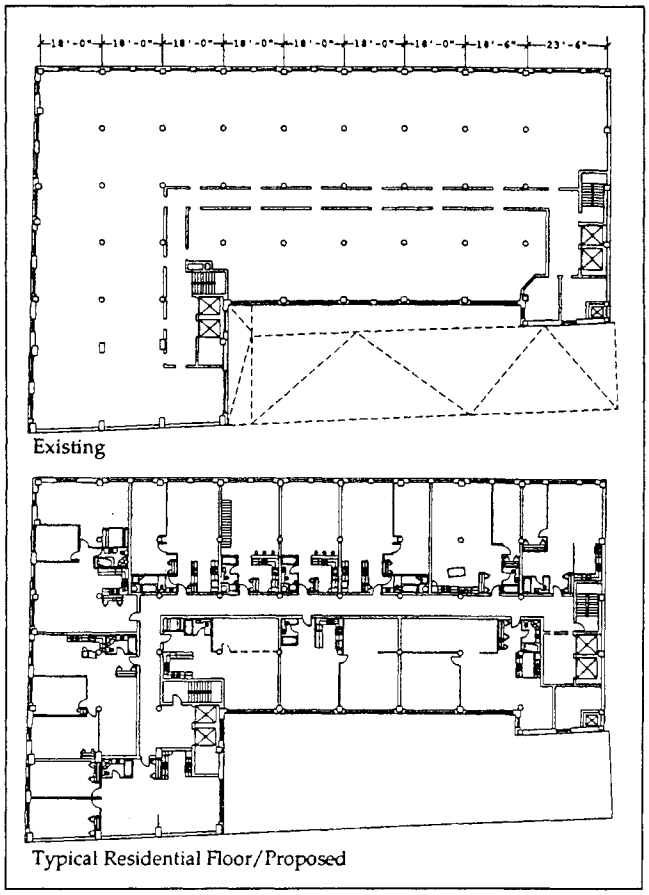

Figure 5: Upper Floor of Mayor Building–Existing (Top) and Proposed (Bottom) Plans for Typical Residential Floor

based on the user's decisions and subsequent modifications can be made to satisfy the pre-determined budget. The result is a housing unit which meets the needs and means of the buyer.

The service units are components designed to serve the principal activities in the living unit (Fig. 6). The authors suggest that as a cost-reduction strategy these units can be offered to potential clients as options to choose from, according to their means and needs. All of them have been designed to respond to the changing and diversified needs of the home buying market. Residential units in converted industrial buildings in the urban core of Montreal would appeal almost exclusively to the growing non-traditional segment of the home buying market (e.g. singles, single parents, couples without children, and same-sex couples); they are young, educated and urban with lifestyles and needs that are not only non-traditional but diversified. Therefore, to provide flexibility and be functional, the units can be custom designed using standard components which respond to the different needs of this market. The authors suggest a selection of kitchen, bathroom and storage units which offer a wide variety of choices.

DEMONSTRATION

To demonstrate the principles involved in the design of units for a mixed-use conversion project, two units have been designed for the Mayor Building in the Montreal Fur District (Fig. 7). Scenarios were proposed for hypothetical users, and the designs were elaborated to answer their needs. The assumed user of the 600-square-foot unit is a single person who works outside the house but needs to do part-time work at home. The apartment is designed to be comfortable, open, informal, and the buyer puts a very high priority on having enough space to work. The dining table is used as part of the area. There is no formal living room. The front of the apartment is a combination bedroom and living room, with a space to read and watch television. No spaces except the bathroom are partitioned. The storage service units are used to define the spaces and provide visual privacy. The assumed users of the 900-square-foot unit are a single mother with a university-age daughter who visits occasionally. This is a case where both occupants require a certain amount of privacy. Some partitioning is necessary to define rooms. The parent wants an apartment with generous living spaces in which to entertain; the daughter needs a private space in which to study (a room the mother otherwise uses as a den). The partitioned bathroom service unit was chosen to make the morning schedule easier to manage. Much of the partitioning was eliminated by using storage units to separate the living areas from the sleeping areas. The den is an example of a living space removed from the exterior wall; this is made possible by using partitions with a glazed upper section, which admit light from other spaces in the unit.

COST ANALYSIS

Most of the prices used for the elemental cost estimate were obtained from *Yardsticks for Costing* (Hanscomb 1993). The prices for finishes were obtained from consultations with representatives of the building's owner, who provided the price-per-square-foot for finishes based on their quality objectives; the same sources also provided the figures for costs of electrical services for residential and commercial, as well as the cost of air conditioning costs for the commercial spaces.

In renovation and conversion projects, the costs of construction are distributed differently between the building elements as compared with new construction. Typically, the structure and the exterior envelope are largely conserved, and therefore the cost of those elements tends to represent a smaller proportion of the construction costs. Windows, however, are an important investment. In the case of the Mayor Building, the windows alone would require an investment of $460,750 or 6.6% of the total construction cost. The total expenditure on the refurbishment of the exterior enclosure would be $749,156. The structure of the building, which is in very sound condition, would require no expenditure towards repairs, and a small sum would be needed to create new floors and a roof over a demolished light well. The cost of the building shell is an average of $4.25/square foot; compared with the national average for new construction of about $33, the renovation costs represent a substantial saving as an alternative to new construction. The cost of the interiors accounts for the largest proportion of the expenses, at 56.7% of the total construction costs. At an average of $19.64/square foot, the interiors are apparently more expensive than the national average. The cost of services, however, at $8.28/square foot, is much lower than the national average. This discrepancy can be accounted for partly by the fact that the cost of lighting fixtures was included with the cost of finishes and therefore not included in the lighting costs of the services. As well, substantial savings on mechanical services are accomplished by not installing air conditioning in the residential part

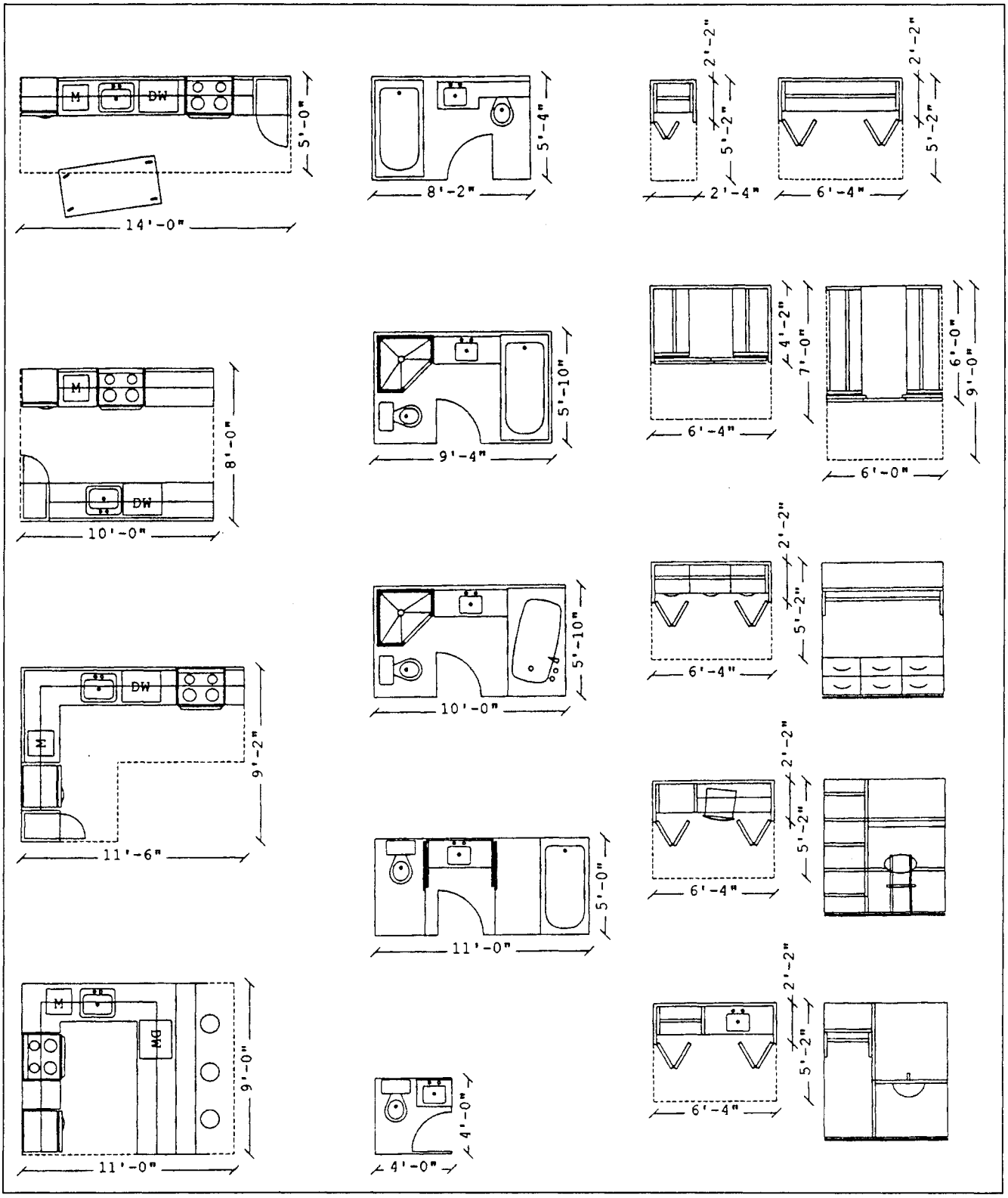

Figure 6: Kitchen, Bathroom and Storage Design Options

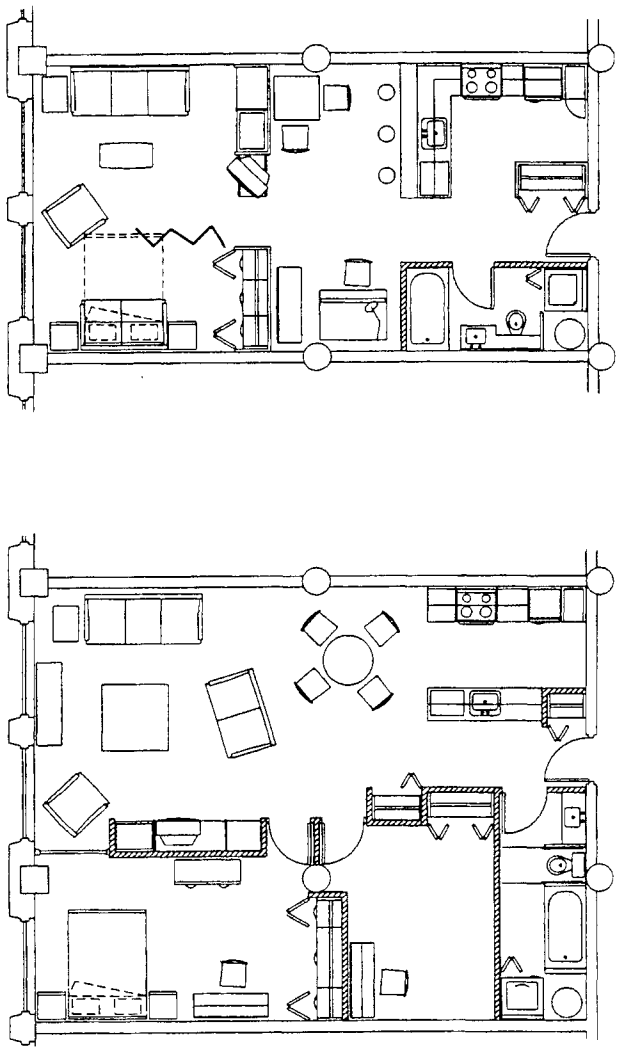

Figure 7: A 600-square-foot Unit (Top) and a 900-square-foot Unit (Bottom)

of the building and providing only a central ventilation system with baseboard heaters rather than a central HVAC system.

The project construction costs account solely for the actual expenses required by the conversion. They do not consider the cost, value or mortgage on the building, since this remains constant for all development strategies. It is therefore necessary to account for the financial impact of the building's worth on the project to evaluate the conversion project on a comparative basis with other development strategies. The project construction costs total $8,645,039, for a gross cost per square foot of $47.62. Based on discussions with owner's representatives, the anticipated retail cost (based on conversion cost, value of land and building, marketing, overhead and profit) was determined as $84/square foot; at this rate, the 600, 900 and 1200-square-foot units would sell, respectively, for $50,400, $75,600 and $100,800. These retail prices fall well within the benchmark affordability guideline of a centrally-located housing unit of approximately 1,000 square feet in size and in the price range of $100,000.

CONCLUSIONS

As in other major North American centers, urban sprawl in the metropolitan area of Montreal has contributed to the threat against the very fabric of the city. The central core of Montreal has lost 25% of its population over a recent 15-year period while the surrounding suburban communities have grown by 50%. Manufacturing has declined in the urban core, leaving behind a multitude of abandoned buildings in the downtown area. Socio-demographic changes (e.g. the increase in the numbers of single-headed families and the elderly), combined with the growing cost of housing, high unemployment, and the lack of job security have contributed to an urgent need for affordable housing in the city center. The city has a functioning but under-used infrastructure; the need to recycle and extend the life of existing infrastructure will have a direct impact on reducing urban sprawl and contributing to a sustainable environment. Montreal used to be a place where residential and commercial activities were well balanced, but the exodus of people to the suburbs has created an urban void and the city center has lost the vitality and activity which used to characterize it so positively in the past. All these factors indicate a strong need to make use of existing, under-used commercial or industrial downtown buildings for affordable residential purposes.

Large industrial buildings facilitate the mix of residential and commercial/industrial activities. Recent changes in the job market have given rise to home employment and telecommuting; industrial buildings with high ceilings are well suited to the accommodation of living and work spaces within the same unit. By selecting an appropriate design strategy, conversion costs represent a reduction of 40% over new construction: when a suitable building is found and a systematic methodology followed, construction costs can be reduced to less than $48 per square foot, to generate a 600-square-foot dwelling unit with a retail cost of $50,400, a 900-square-foot unit for $75,600, and a 1200-square-foot unit for $100,800 in downtown Montreal. The creation of a shell within a multi-level structure enables users to purchase interior components which they need and can afford. As part of the suggested methodology of this conversion process, a choice of infill components, or service units (kitchen, bathroom, closets) is to be made available to suit a wide range of users and their income levels.

The realization of a successful conversion project is also largely dependent on an active collaboration from the outset between a housing authority, a municipality, and a developer: the magnitude and range of relevant considerations (i.e., urban, market, permits, financial) require the formation of a team that will confront and solve the interrelated web of conversion factors. Only when the crucial issues of livability and design, urban context and residential activity are integrated within the conversion process can the transformation from under-used downtown buildings to mixed use successfully take place.

REFERENCES

Austin, Richard. *Adaptive Reuse: Case Studies in Building Preservation.* New York: Rheinhold Co., 1988.

Boileau, Monique. *Architecture Résidentielle Québecoise: Projets Primés de 1980 à 1988.* Québec: Publications du Québec, 1990.

Canada Mortgage and Housing Corporation. *Strategic Plan: 1992–1996.* Ottawa: CMHC, 1990.

Cantacuzino, Sherbon. *New Uses for Old Buildings.* London: Architectural Press, 1980.

Friedman, A. *Planning Housing for Change.* Montreal: A report prepared for the Société d'habitation du Québec by McGill University Affordable Homes Program, April 1995.

Fromstein, Suzen. "Industrial Elder Care." *Building.* February 1994.
Hanscomb Consultants Inc. *Yardsticks for Costing.* Toronto: Southam Business Communications Inc., 1993.
Holliday, John. *City Centre Redevelopment.* New York: John Wiley & Sons Inc., 1973.
Jacobs, Jane. *The Death and Life of Great American Cities.* Toronto: Random House, 1961.
Johnson, Alan. *Converting Old Buildings.* London: David and Charles, 1988.
Kidney, Walter. *Working Places: The Adaptive Use of Industrial Buildings.* Pittsburgh: Ober Park Associates, 1976.
Marsh, P. *The Refurbishment of Commercial & Industrial Buildings.* London: Construction Press, 1983.
Poitras, André and Jocelyn Duff. *Les innovations technologiques en matière d'habitation et la production de logements en dehors des modes traditionels.* Montreal: Direction de l'analyse et de la recherche, Société d'habitation du Québec, Décembre 1988.
Reiner, L.E. *How to Recycle Buildings.* The Book Press, McGraw-Hill Publishers, 1979.
Senécal, Paul, Carole Tremblay and Dominique Teufel. *Gentrification or Urban Sprawl? Central Montreal and Surrounding Area.* Montreal: Direction de l'analyse et de la recherche, Société d'habitation du Québec, November 1990.
Shopsin, William. *Restoring Old Buildings for Contemporary Uses.* New York: Watson, Guptill, 1986.
Statistics Canada. *Vanier Institute of the Family: Canadian Families.* Ottawa: 1990.
U.S. League of Savings Institutions. *The Challenge to Homeownership in the 1980s.* Discussion Paper 1 Chicago: 1983.
Ville de Montréal. "Profil: Ville-Marie." Montreal: 1994.
Ville de Montréal. "Master Plan for the Ville-Marie District." Montreal: 1992.