Contribution of planned built environments to city transformation: urban design in Montreal, 1956-2015

François Racine
Department of Urban Studies and Tourism, Université du Québec à Montréal,
École des sciences de la gestion, Montréal, Québec, Canada
E-mail: racine.francois.2@uqam.ca

Abstract. *Research on Canadian urbanism and, in particular, Canadian urban design, despite some notable exceptions, are relatively limited. This paper explains from an urban form perspective the practice of urban design in Montreal from the mid-twentieth century onwards. The paper seeks to interpret the development of urban design practice by studying three representative urban projects built over the past 6 decades. These projects are used to illustrate the different design strategies adopted, to understand how urban design ideology/ ideas have evolved over time and how they have influenced the spatial organization, form, and aesthetic of the city. The principal theoretical and methodological contributions aim to develop a typomorphological framework to study and understand the physical-spatial mode of organization of planned built environments and to study their relationship to urban form. Although the political, economical and design frameworks in Montreal and Canada may be different, these are valid cases to define an approach appliable to other contexts. The main objective is to develop tools to help designers and local autorities establish a dialog between new built environments and the historical fabric of the city, to increase the resilience of new urban areas and its spatial and social integration in the contextual urban fabric.*

Keywords: Urban morphology, urban design, planned fabric, schools of thought, Montreal

Introduction

The urban design projects carried out in the last sixty years on the Island of Montreal can be understood as laboratories of Quebec and Canadian urbanism. Since 1956, i.e. when the concept of urban design was first introduced in North America (Krieger and Saunders, 2009), design practices on the city scale have progressively replaced the traditional typological evolution process and its central role in urban form formation and transformation. In this context, we wish to identify how the product of urban design practice, what we refer to as "planned built environments", has structured the urban form of Montreal throughout time. The first objective of the research is to contribute to the advancement of knowledge on the planning experiences that enabled the emergence of the practice of urban design in Quebec and Canada during the 1950s. The second is to develop cognitive tools to understand how planned built environments are structured and how they contribute to the urban form. The intention of this article is to bridge the gap between research in urban morphology and practice in urban design (Whitehand, 2017).

Theoretical framework

Typomorphology consists on the study of the formation and transformation processes of traditionnal urban fabric using diachronic analysis and the notion of the persistance of

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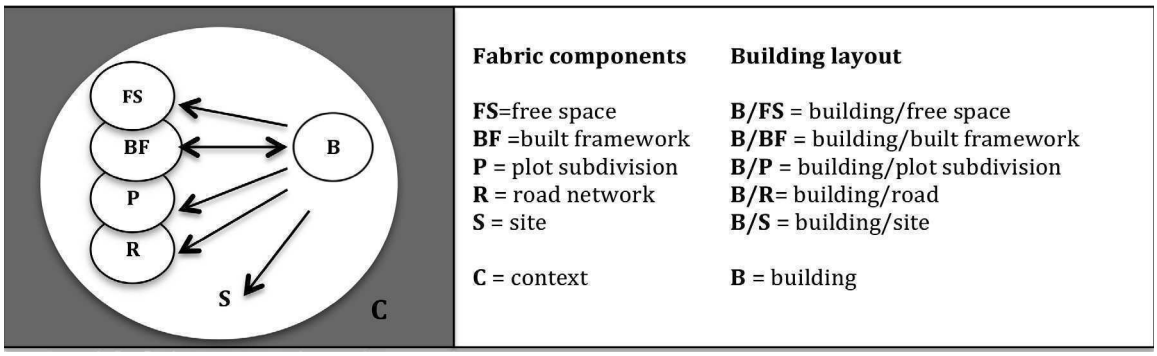


Figure 1. Organization of planned built environments in relation to the context (Racine, 2016)

built types through time (Cannigia and Maffei, 2001). As a researcher specialized in this discipline, our aim is to develop a theoretical framework to study the organization of planned built environments and to examine how these environments relate to traditional urban forms. To study non traditional urban forms, we must define what is meant by "planned built environments" in order to establish a common basis for our analysis. Figure 1 is a schematic representation using a morphological approach revealing how planned built environments are generally designed. On the city scale, the planned fabric components installed in a specific site consists usually of a road network, a plot or land subdivision system, a built framework, and a network of free spaces. The specific interrelations among these various components, understood as morphological units, define and characterize a particular type of urban ensemble (Conzen, 1969). Figure 1 shows also that besides the components, there is, on the scale of the planned fabric, a building layout, i.e. a way of installing the buildings on the site (relationship between buildings and the site); of dealing with the relationship with roads (relationship between buildings and roads); of adapting them to the shape of the plots (relationship between buildings and plots); and of arranging them in order to define the shape of free spaces (relationship between buildings and free spaces) (Lévy in Merlin et al., 1988). Lastly, there is a specific building type (Devillers, 1974) constitutive of the general building framework of a planned built environment. Usually planned built environments fall within a context whereby it is, by its very nature, one of the components of an element on a larger scale, i.e. the form of the urban fabric and of the city as a globality. The hypothesis guiding this research is that the organizational concept of these elements evolves according to the influences of schools of thought and theories that affect specially the relationship of the planned built environments to city form.

Methodology

The qualitative method used to evaluate the contribution of urban design projects to urban form, consists of analyzing in a synchronic manner the general organization of the fabric components, the typical building layout and the characteristics of the building types forming the built framework of the project. Diachronic analysis is used to compare the state of the sector before and after construction of the project. This step helps to determine how the fabric components and building layout and the buildings themselves relate to the morphology of the context of the bordering urban fabric. Plans emphasizing each component, research based on 'figure-ground' to examine interplay between built form and free space (Törmä, Griffin and Vaughan, 2017), field visits and photographic surveys are used to understand the morphology of planned built environments and of the immediate context.

A literature review of the professional report found in the archives of the Planning Department of the City of Montreal (Centre de documentation Marie-Morin) reveals three phases that suggest a periodization of the major theoretical schools of thought in urban design: a modernist phase rejecting the traditional city (Le Corbusier, 1957), from 1956 to 1980; a

Figure 2. Localization plan: A. Habitations Jeanne-Mance (1957-1959); B. Quartier Angus (1994-1998); C. Faubourg Québec (2001-2015)
(Source: Centre de documentation Marie-Morin, Ville de Montréal)

postmodernist phase based on a recognition and reuse of the traditional forms of the city (Ellin, 1999), from 1980 to 2000; and a contemporary movement of reconstruction of the city based on a more rigorous approach of urban analysis related to the discipline of urban morphology (Panerai et al., 1999), from 2000 to today. Montreal provides significant examples of each approach during the periods specified: Habitations Jeanne-Mance (1957-59) (Figure 2A); Quartier Angus (1994-1998) (Figure 2B); and Faubourg Québec (2001-15) (Figure 2C). The next segment examines each project in detail with an introduction to the background of the urban design command and presents the main actors involved in these projects.

The modernist approach: Habitations Jeanne-Mance (1957-1959)

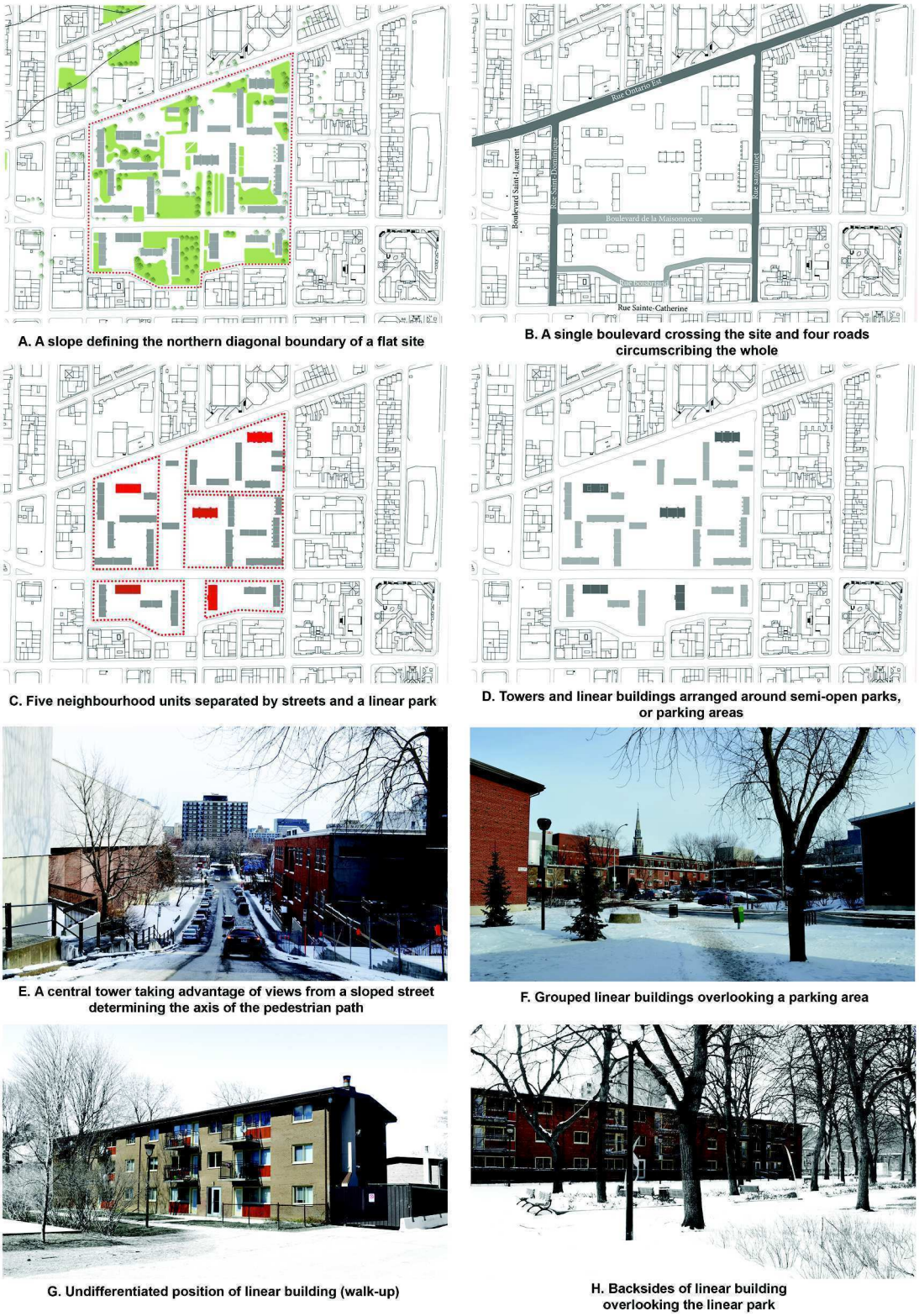


Figure 3. Components of the planned fabric and building implantation mode: Habitations Jeanne-Mance (from the updated cartographic database, Ville de Montréal, 2002; drawings and photographs by Simon Wuilmart).

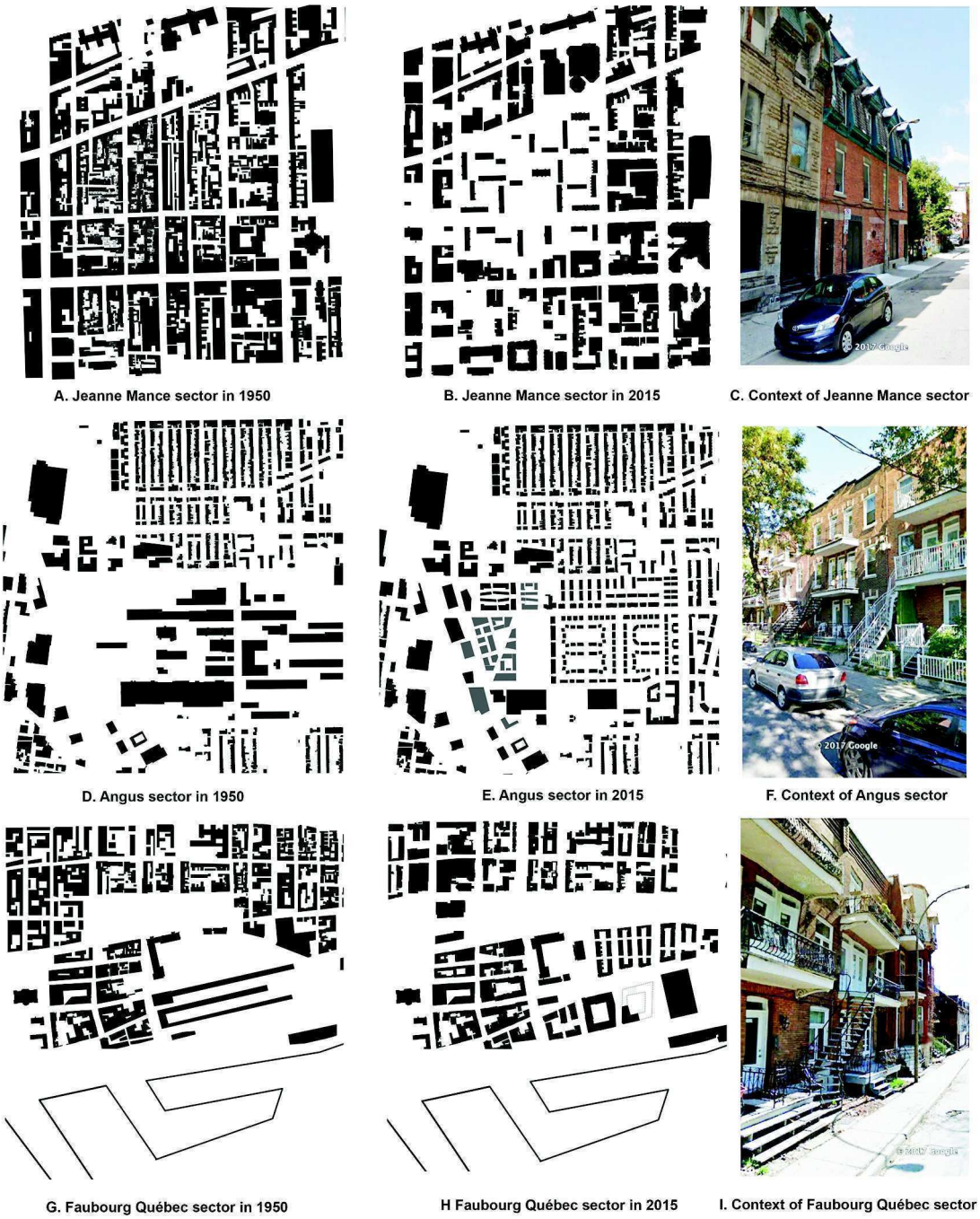


Figure 4. Diachronic analysis of the relationship of the project to the boundary context. Jeanne-Mance sector: A. 1950, B. 2015; Angus sector: C. 1950, D. 2015; Faubourg Québec sector: E, 1950, F. 2015 (Source: historical plans from Bibliothèque et Archives nationales du Québec, drawings Simon Wuilmart and photos Google Earth 2017).

The Habitations Jeanne-Mance is a social housing project intiated by the City of Montreal and financed by the federal government of Canada. As many North American cities (Boston, Toronto, etc.), the functionalist model prevailed as the tool that the public autorities preferred for solving social and living condition problems in central areas of the city. The thinkers of the era, imbued with hygienist theories, established a link between the physical deterioration of the urban fabric and social disintegration, delinquency, and

Figure 5. Components of the planned fabric and building implantation mode: Quartier Angus (from the updated cartographic database, Ville de Montréal, 2002; drawings and photographs by Simon Wuilmart and Google Earth, 2017).

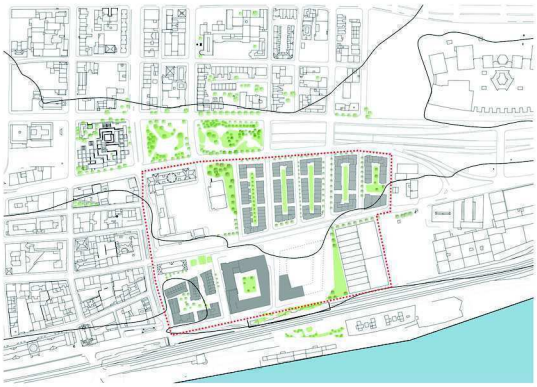
prostitution (Choko, 1995). Taking action on the historic city was for them a way to treat the social and the health problems encountered by the inhabitants living in one of the poorest neighbourhoods of Montreal. The operation planned by the City presented the opportunity for proponents of the functionalist approach to show the potential of their urban solutions, i.e. replacing part of the district fabric by a project stemming from the reflections of progressive urban planners (Choay, 1979). Rother, Bland and Trudeau, and an architecture firm, Greenspoon, Freedlander, Dunne and Morin designed the social housing project endorsed by the City in 1959 (Ville de Montréal, 1959). The masterplan is established in a "randomly organized" manner according to Le Corbusier's notion of the free plan (Figure 2A).

To implant the concept a total of eight city blocks located on a plateau, delimited to the north by a diagonal slope, are demolished (Figure 3A). Only one boulevard oriented from east to west still passes through the site and four roads circumscribe the whole (Figure 3B). A green space entirely set aside for pedestrians is created, in which circulation is completely isolated from the surrounding street network. Five isolated neighbourhood units (Figure 3C) are regrouped around vertical towers arranged in order to visually highlight these signal buildings, while ensuring maximal exposure to sunlight (Figure 3D). The major public spaces of the project are arranged in the extension of an existing north-south street defining a pedestrian path, punctuated by a passageway under the highest tower (Figure 3E). Here the notion of the carriage gate (porte cochère), an element taken from residential district typology, replaces that of modernist piles. The opening has been walled recently reinforcing the privacy of the path and its low openness to outside residents. A secondary network of semi-open spaces determines the grouping of linear buildings formed of walk-up units and townhouses to host larger families. The townhouses with their enclosed backyards and walk-up linear buildings are arranged around either semi-open spaces or parking areas permitting very few social interactions. The linear buildings can be entered by way of parking lots or by public spaces and the front or the back face have an undifferentiated position (Figure 3G,H). The undetermined status of the free spaces (private, semi-private or public) explains their low level of appropriation by residents and infrequent use by people living outside (Jacobs, 1961).

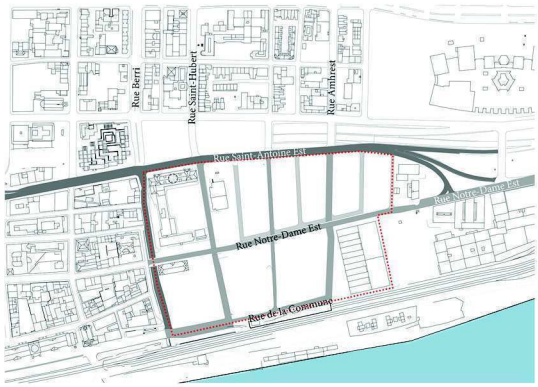
Ornamentation has been banned and the facades are homogeneous, with a succession of uniformly sized openings. The crowning termination of the façade is undifferentiated and the gaps between some of the balconies in the high-rise towers are the only elements that enliven the facades and offer more light. The lower buildings are organized in perpendicular built alignments with simple rectangular volumes with low-slope roofs that tie together the whole (Figure 3G). The facades are also devoid of major signs to distinguish the front or rear of the housing units. The difference between housing types is marked by the tint of the facing bricks: the more the house is individualized, the more the brick goes from brown to red.

A comparison of the components of the sector before and after incorporation of the planned fabric (Figures 4A,B) shows that the demolitions have transformed drastically the site. Three north-south streets have completely disappeared and only one road divides the site in two distinct parts. The plot subdivisions have also disappeared and have been replaced by a grouping of buildings around introverted semi-open spaces. The city block system has been replaced by isolated buildings according to a free plan where the limits and the status of the free spaces are blurred when usually they are defined in the adjacent fabric.

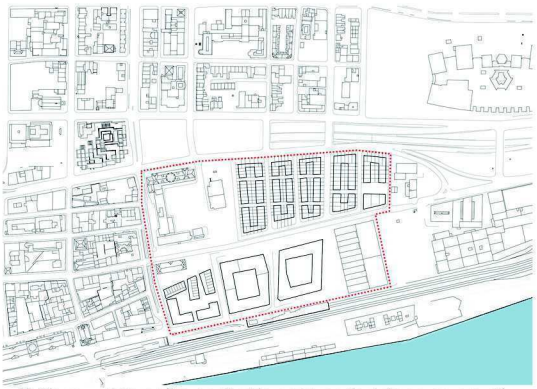
The new buildings no longer follow the built environment rule in regard adaptation to the diagonal warping because of the presence of the slope in the north. The road network is no longer the structuring element of the fabric since the implementation mode of the built environment is generally independent from the streets making the movements through the project complex and the buildings difficult to reach. As for the relation of buildings to a subdivision system, the built environment of the context is made of adjoining buildings on 7,5 metre plots (Figure 4C). Usually the facades are overlooking a road in front



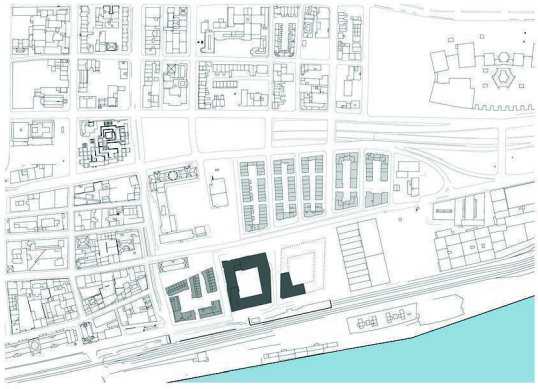
A. Site located east of Old Montreal, above the St. Lawrence River



B. Extension of the structuring north-to-south and east-to-west axes



C. Narrow plots on the north side and broader lots on square city blocks on the south side



D. Row houses in the north and multi-unit residential buildings in the south defining public spaces

E. Buildings giving form to the riverfront

F. Front façades facing the street and back façades opening onto private courtyards

G. Narrow plots for row houses and fragmented blocks enabling the incorporation of higher residential buildings

H. Row houses giving form to Dalhousie square

Figure 6. Components of the planned fabric and building implantation mode: Faubourg Québec (from the updated cartographic database, Ville de Montréal, 2002; drawings and photographs by Simon Wuilmart).

and a private courtyard in the back but not here, the buildings have undifferentiated alignments disengaged from the boundaries of plot structure and the road hierarchy. Two organizational methods are opposed in space, one with an emphasis on identifiable empty spaces (streets, squares, etc.) and the other on fullness (towers and linear buildings). Open spaces are no longer emerging figures (Arnheim, 1986); rather the buildings are the emerging elements that creates a separation from the old neighbourhood, compromising the possibility of physical and social integration of the social housing ensemble to the city (Kostourou, Karimi, 2017). As for architecture, the hierarchical composition of the context with base, main bodies and crowning termination (Figure 4C) has been replaced by an undifferentiated system. This is representative of the modernist ideology and its will to erase social class division by proposing a uniform and homogeneous architectural language. Only the material, i.e. the clay brick, unites the traditional and planned architectural composition systems, which are discontinuously juxtaposed in urban space.

The postmodern approach: Quartier Angus (1994-1998)

In the Montreal borough of Rosemount, the Quartier Angus is a residential development located on a large industrial site. The site was occupied from 1904 to 1992 by railway equipment manufacturing and repair workshops (locomotives, wagons, etc.) of the Canadian Pacific (CP) company that spearheaded the development of Rosemont. The industrial ensemble has been included in a historic inventory in 1982 (CUM, 1982). Béïque and Associates Architects and the urban planning firm Pluram hired by CP conducted the studies required to draw up the master plan in 1994 (Pluram-Béique, 1994). To justify a zoning modification from industrial to residential, their economic studies demonstrated the non-viability of maintaining the industrial zoning on the entire site. A compromise was reached between Canadian Pacific and the borough to attribute the land close to the railway to a para-public organization named Société de développement Angus for the creation of a business pole. The objective of public authorities was to provide jobs for a local population affected by the disappearance of a major employer. The design concept is marked by the adoption of a historical archetype, the close (Figure 2B), popular with the proponents of postmodernism rediscovering the work of Unwin (Unwin, 1909). In their view, neighbourhood spaces enable the emergence of a community life that is lacking in North American suburbs (Katz, 1994). This organization aims to counter the flight of middle-class families towards low-density housing in the suburbs.

The master plan is put in place on an abandoned industrial site with a railway limiting the site to the west (Figure 5A). Two main axes are traced from east to west and north-south streets are traced in the extension of existing streets and connect to looped alleys circumscribing the closes (Figure 5B). The north-south street extensions are interrupted though, decreasing the continuity of movements through the housing scheme (Hillier and Hanson, 1984). The plot width tends to adapt to the hierarchy of major and more local streets (Figure 5C), wider on major streets and narrower on the looped alleys. The public spaces are organized in a hierarchical network ranging from a major public park, a square and neighborhood spaces (Figure 5D).

The public park is located between the areas with residential and tertiary vocations according to an approach challenging the typical segregation of functionalist urbanism. Because of their heritage value, three buildings are integrated into the masterplan: the Locoshop, the largest industrial building of the entire complex (Figure 5E); the administration building; and a fire station located at the southern entrance of the site. Almost half a kilometre long, the Locoshop building is divided into sections and facades maintained to make it more suitable for commercial or tertiary use and to enable connections to the southern part of the site. To the north, the residential section is modeled according to built alignments along the roads and neighbourhood spaces (Figure

5F). The plot subdivision system is adapted to host the buildings that occupy the entire width of each plot (Figure 5G). This system is interrupted to give access to lateral or backside garages, thus adapting the built environment to the presence of the car without affecting the role of buildings shaping the figure of the streets. The buildings delimit the form of urban spaces that organize the whole project (Figures 5H) with a standardization of elements based on different models of semi-detached houses. Unified plexes are organized around major roads and walk-up buildings border the large park.

The facades are homogeneous with vertical divisions underlining the span of the living rooms. The buildings generally have a base to enable a liveable basement section and to include lateral or back garages accessible via passageways. Private terraces are located above the back garages and give access to enclosed private courts. The red-brick gable-crowned facades is a reference to Victorian architecture.

The transformations before and after the project (Figures 4D,E) show that traces of the prior industrial occupation remains in the south. Midway, the main axis serving the disused factories is integrated into the road network. In the north, an east-west street is traced to continue avenue de Mont-Royal, although it is interrupted by the railway but this allows the persistence of major urban axes of the grid of Montreal. The northern part of the planned fabric maintains the division-into-blocks method typical of the context (Figure 4E), while the southern section is organized according to a system of closes. The typical width of plots in the setting is 7.5 metres (Figure 4F), while the planned fabric is organized according to a module varying from 4.5 to 8.5 metres to adapt to the different sizes of row houses typologies and multifamily housing. A new type of closed space appears at the scale of the urban fabric of Rosemont giving a distinctive morphological identity to the planned fabric. This has favoured an appropriation by a homogenous upper middle class regrouped around the neighbourhood closes. Because of the compact form of the organisation, these spaces play their role as they stimulate the community interactions between neighbors while assuring a level of privacy by the backyard courts of the townhouses. The larger park of the project attracts people from outside of Quartier Angus because it is incorporated to the network of the public spaces of the borough.

Standardization and repetition characterize the architecture of the planned fabric. With their exterior stairs and balconies, the collective buildings reinterpret the template of the duplex and triplex, typical of the context (Figure 4F), but crownings tend to consist of sloping gable roofs and not flat roofs typical of the context. The tint of the bricks and variations in the form of the crowning termination are the only touches of diversity in a somewhat standardized built environment where quality emanates rather from the landscaped urban spaces.

The contemporary approach: Faubourg Québec (2001–2015)

The Faubourg Québec is promoted by a public organism, Société d'habitation et de développement de Montréal (SHDM) in association with the private sector. The SHDM established a project office that provided an opportunity to initiate a collective debate involving professionals, experts, thinkers, and practitioners and approached different committees to assist it, including community associations and business representatives. The project was subject to public consultations and an open approach in the form of an urban design and public space development. Because of its open process and the financial problems that occured, the morphology of the project has evolved through time. This has permitted the finalization of the planning guidelines in 2001 (Arbour & Associés, 2001). The main idea is to incorporate the site into the urban grid of Montreal. The traditional city blocks are the structuring elements of the whole project (Figure 2C). The public organism has encouraged a mix of typologies to accommodate cooperative housing and more luxurious apartments on different city blocks composing the master plan. The construction is not completed in the moment.

Located along the St. Lawrence River, at

the eastern end of Old Montreal, the site began as a residential sector in the 19th century and it became an industrial zone a century later, thanks to the establishment of two railway stations, which are now abandoned. The level of the northern part of the site is situated below the level of the old city (Figure 6A). Rue de la Commune was extended to continue the built waterfront of the Old Montreal, and rue Notre-Dame was pursued to the east while north axes continued to the south (Figure 6B). The fabric has narrow plots on rectangular city blocks in the north. In the southern part of the project, the scale of the city blocks, and no longer that of the plot, determined the incorporation of new types of buildings in response to increased downtown land value (Figure 6C). The designers worked on the size of the city blocks to organize the built framework. They regulate the structure of major urban spaces to provide more private inner urban island areas. A triangular public square is built on the site of the enhanced fortified gateway, the former Dalhousie railway station, converted into a circus arts school (Figure 6D).

Through the construction of a viaduct pursuing Notre-Dame Street, the presence of two levels on the site was exploited by a play on the buildings' volumes, some of them connect both on the higher and the lower sides. New buildings pursue to the east the waterfront (Figure 6E). The buildings' front façades face the street (Figure 6F), while their backs open onto private spaces. The narrow plot pattern enabled the construction of adjoined superposed dwellings typology in the north, and the grouping of two city blocks in the south allowed the implementation of larger and higher apartments building (Figure 6G). Even if the viaduct tends to separate the site in two, the project can accommodate different household types, a factor encouraging the social mix planned by the SHDM. The buildings delimit the site's structuring spaces that favour social interactions, such as the Dalhousie Square (Figure 6H), and define the more private character of the backyard spaces. To connect with the context, two different architectural expressions are used. In the northern part, the three-storey scale is typical of the contextual fabric (Figure 4I and 6F). The buildings in the southern part are representative of a modernistic language but the concrete masonry fits with the visually dominating stone in Old Montreal (Figure 6G). Townhouses form the pedestal of higher structures incorporating flat apartments on the upper levels. A diversity of loggia openings, some single, some double or even triple, liven up the facades.

The transformations before and after incorporation of Faubourg Québec (Figures 4G,H) shows that the project took advantage of the site's characteristics, such as its topography and the presence of the river. The orthogonal network was extended with streets of similar scale from north to south and with the primary routes of Old Montreal. In the north, the city blocks are subdivided into small plots, comparable with the context and larger lots subdivide square blocks situated in the south. The buildings are organized in L-shaped volumes to define the more closed city blocks. Open linear or triangular spaces serve as a continuation of existing public spaces in the centre and at the periphery of the site.

The scale of the built environment is generally comparable to that of the bordering fabric (Figure 4I). Buildings directly face the street, are adapted to its layout, and are adjusted to the structure of the street network. They take up the entire breadth of the plot structure, narrow and deep on narrow plots, and more imposing and L-shaped on square city blocks. The block structures the shape of open spaces by extending the waterfront of rue de la Commune and the larger frontage along Notre-Dame Street and along linear public spaces in the northern part. Facade composition utilizes vertical elements (loggias, balconies) and the size of the openings matches the vertical proportions of the facades. The project represents a dialog with the scale of the clay brick architecture of Montreal, while stone masonry use as material for the more imposing buildings is related to the cut stone expression of the ancient fortified city.

Conclusion

We can see the influence of schools of thought that affected the relationship between the three

planned built environments and the urban morphology of Montreal. Habitations Jeanne-Mance applies the premises of functionalist urbanism and provides a good idea of the disintegration effect of a free plan on the morphology of the city (Figure 2A). Quartier Angus reveals an inspiration drawn freely from the theories of cultural urbanism (Choay, 1979). By retaining the organizing figure of the close of English garden cities (Figure 2B), designers sought an antidote to the typical individualism of low-density housing of North American suburbs. The incorporation of this reference in the urban fabric creates a distinctive environment attractive for families. We also wish to mention the emergence of heritage considerations in terms of architectural forms and layout as structuring elements of planned fabric. The reuse of the Locoshop for commercial and office purposes clearly demonstrates that Rossi's lesson was retained: forms do not follow function; they can be reused and reappropriated throughout history (Rossi, 1980). Finally, the more open planning of Faubourg Québec, involving a multitude of actors and its implementation over a long period enable the integration, in the design process, of a rigorous knowledge of the form of the city itself. The need to densify the city and adapt it to contemporary construction techniques gave way to the emergence of the figure of the city block. As such, the city is structured on basis of a joint effort on the part of architects and builders to define an emerging figure, the built block closed onto itself. This emerging form represents a cross between the form of rectangular district blocks typically formed of 7.5 metre district plots and the closed blocks of Old Montreal whose centre is accessible by way of large carriage gates (portes-cochères). This shows a process of typological evolution and an adaptation related to the typical urban form of Montreal. Here the context and its latent spatial potential for physical integration is use by the designers to assure the sustainability of the new urban ensemble (Kostourou, Karimi, 2017).

Finally, an analysis of the evolution of urban design practices shows the development of expertise over a period of 60 years, where the issue of morphological and spatial continuity between planned built environments and urban fabric has proven to be very important indeed. The analysis reveals that the phenomenon of morphological discontinuity associated to modernistic theories tends to subside with time because the planned built environment is increasingly designed on the premise of a "dialogue" with the morphology of the inherited city. This is explained by an increasingly rigorous interpretation of the morphological and typological characteristics of the host environment when designing urban projects. The task of urban designers during this period has been to reconcile modern architecture and its achievements with the morphology of the city. This knowledge is being used to create today's integrated built environments, and to protect, with the help of morphological research, the gains derived from this long learning process. Thus the role of the architects, urban planners and designers will be to pursue the aim of reconnecting planned urban environments to the evolution of the urban form, by promptly addressing the major issue of contemporary urban design, i.e. sustainable development.

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