

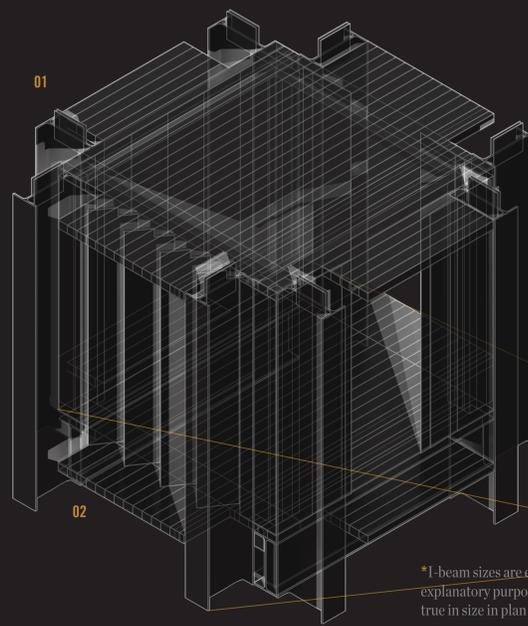
ADAPTABLE LIVING SYSTEMS

The project proposes a building system in which adaptability provides the means to a more durable and effective architecture than that of the traditional type. The building system, explained by general principles, is given specificity in two different applications, each with a distinct function and site: the first seeks to integrate a new development within downtown Toronto's existing urban structure while the second investigates the revitalization of a suburban development in Montreal. Through the analysis of these two hypothetical case studies, in terms of the framecycle and building layers of each, the effectiveness of such a building system can be practically judged. Giving context to the general ideas of a building system, outlined on the right as an introduction, by applying them to two specific scenarios provides a balance between the general and specific/theoretical and practical characteristics of such a proposal.

At its core, the proposal seeks to achieve the key potential benefits that adaptable architecture possesses: increased sustainability (lowered environmental damage and operational costs), longevity (due to the condition of a structure's parts), duration of necessity (due to shifting external conditions such as user preferences), and ease of use that conventional building systems are inherently incapable of achieving. The accepted tendency to "build once and forever leave it from then on" is challenged in an effort to demonstrate how buildings can effectively change over time if they are designed to do so, and the profits that follow. The conservative notion of *valuable* permanence being able to be achieved only by a building that does not change over time is questioned - can a metamorphic structure be more everlasting than its static counterpart in a manner that is effort- and cost-effective for designers, contractors, and builders alike? This premise explicitly outlines the foundations of the proposal.

04 In addition to funneling services and managing sewage and plumbing, the steel I-beams allow for a double-skin, consisting of an exterior curtain wall (hung from the exposed vertical beams) and an interior glass or gypsum wall. This feature would maximize control of cross breezes and stack effect, act as an effective thermal buffer, and create an iconic facade composed of colored shades (manually operated and mechanically deployed) located within the double skin cavity.

Furthermore, this system would have a minimal effect on its existing site. Steel footings, extending from the vertical beams of ground-level units, would raise the entire complex and minimize its site footprint while still directly preserving its structural integrity.



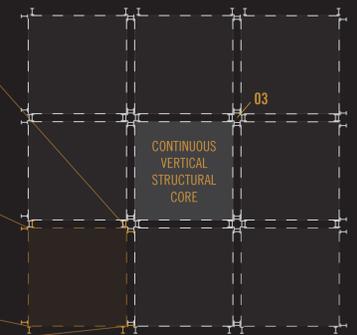
02 The horizontal cavity between stacked units is ideal service space. As well, the tightly sealed steel-grid framework that results from any unit arrangement serves as perfect infrastructure for a sprinkler system that has access to every single unit, no matter the overall configuration of units.

03 Vertical shafts that are created by four interlocking units may serve several purposes, such as a hybridized sewage and fresh water plumbing system or a rainwater disposal system, leading accumulated rooftop rain and snow directly to the ground, but away from footings. This would minimize site destruction by maintaining regular water table levels.

01 Construction is modular - a 27m³ cube unit held by eight vertical I-beams (two on either side) and two horizontal (below the floor) - and allows for interlocking, removable bonds welded on-site between adjacent units. The diagrams to the left illustrate how the I-beams are spaced to allow for interlocking between units.

This method of assembly is ideal for forming 9x9 groupings, where the outer 8 have the potential to cantilever because of the strong vertical core that results from the interlocking I-beams - in a compact structure this core would serve as a route for vertical circulation, with usable units surrounding it, all with direct access to the core and with exterior views.

The malleability of this method of construction allows for configurations that can easily mold to any site conditions - i.e. preserving existing trees, landmarks, or the views of existing developments.



*I-beam sizes are exaggerated for explanatory purposes (left) but are true in size in plan view (right).

BUILDING SYSTEM CONSTRUCTION & ASSEMBLY

01 INTEGRATING NEW DEVELOPMENTS WITHIN EXISTING URBAN STRUCTURES

BRIEF

In scenarios where the exteriors of buildings must remain generally unchanging for the duration of their lives, the building system offers much opportunity for interior adaptability. The more versatile and customizable spaces can be, the better the building can serve a wide variety of purposes. Malleable interiors are a result of a steel framework that does not require floors or walls at all times.

SITE

The South-East corner of Toronto's Yonge & Bloor intersection. The location marks the eastern boundary of the country's most iconic shopping and financial districts, as well as the city's busiest subway interchange station. The site lacks effective street level and below-grade transit connections and provides the means to celebrating a currently undermined and undignified public realm.

PROGRAM

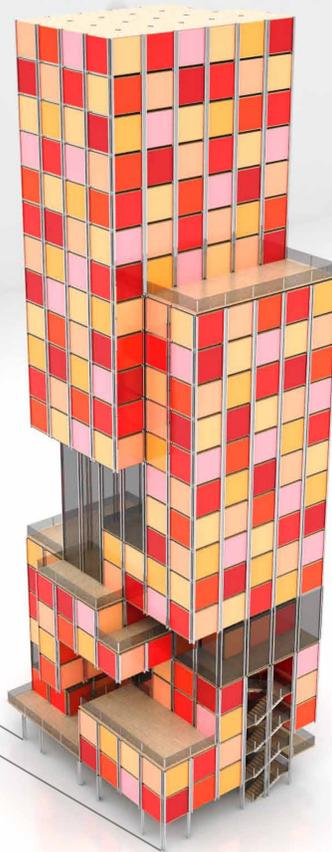
A mixed-use urban complex containing commercial (retail) and public space below-grade and on street level with private (offices) rental space on its upper levels. Vertical growth tendencies are due to the constraints of contextual buildings and airspace restrictions of such an urban site.

COLORED SHADES

Located within the double skin cavity comprise the facade but allow 100% of interiors to be day-lit when (mechanically) retracted.

ADJUSTABLE STEEL FOOTINGS

Can be erected in soft-soil sites and require minimal excavation during construction, preserving ground-level vegetation and artifacts.



INITIAL DEVELOPMENT FACADE



INITIAL DEVELOPMENT SKELETON



ADJUSTABLE INTERIOR PARTITION WALLS

Can be capitalized on by retail stores to create necessary dynamic interiors and maximize usable space while keeping the structural framework.



REMOVABLE FLOOR PLATES

Allow for spaces to be transformed into multi-level performance areas with ample space for entertainment, restaurants, and street vendors.



A NAKED SKELETON

Allows for interiors to be adjusted to serve user desires, such as create an indoor green space, multi-level offices, an atrium, or an installation gallery. Subtractive design can also minimize the complex's cast shadow.



AN UNPREDICTABLE PUBLIC REALM

Dictates malleable ground-level architecture. Units can be added or subtracted to cantilever over trees, sculpt around restaurants, or create other public spaces, such as transparent shop faces and well-lit green spaces.

POSSIBLE TRANSFORMATIONS

02 REVITALIZING SUBURBAN DEVELOPMENTS

BRIEF

The development is a metamorphic structure: always changing, growing, shrinking, and morphing in a way that would translate, in real time, the cultural and social values of the community as they shift and change over time. The exterior can change and mold continuously as trees grow or light voids become necessary, or, on the other hand, as the necessary function of the structure and space changes. The building's non-permanence (ability to be dismantled and reassembled elsewhere) is the highest degree of its adaptable potential.

SITE

Montreal's largest suburban district: Laval. The location is sandwiched between the Bois de l'Équerre forest and a strip of classic North American suburban homes. Such sites rely too heavily on private, automated transportation to sustain self-sufficient communities. As well, a lack of ability to accommodate population growth results from minimal variance amongst constituent properties and program and an inability to alter or renovate existing developments for the purpose of densification.

PROGRAM

An initially dense, single-use residential development featuring much open space on its lower levels. Horizontal growth tendencies are a result of preserving surrounding views and making use of current site characteristics.

●●● BICYCLE FRIENDLY ROADS — BIKE TRAILS ● ELECTRIC TOWERS

CIRCULATION CONTROL

The ability to arrange units in an infinite amount of configurations, and to be able to add or subtract units over time as needed, provides a unique advantage: circulation and congestion can be controlled by distributing occupant density and traffic (paths of circulation) strategically.

SITE DENSITY

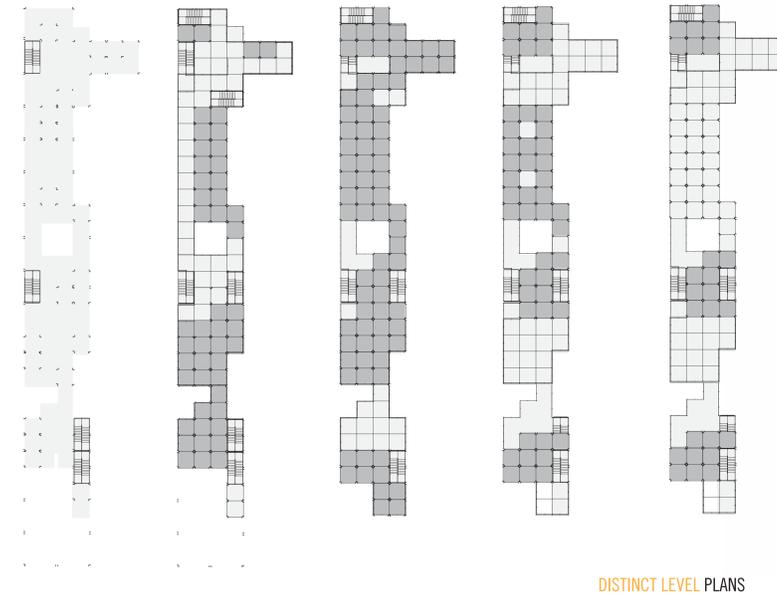
SITE TRAFFIC

UNBUILT AREAS

Can be used as community recreational spaces, such as basketball or soccer courts. The complex's "permanent state of construction" allows its construction to become an integral part of the development altogether, rather than just a precursor or a post-event.

EXPOSED STEEL FRAMEWORK

Can be used to transform outdoor areas into galeria spaces in the winter by serving as anchors for prefabricated glass panels. Alternatively, stretched canvas can be hung in the summer to cool spaces.



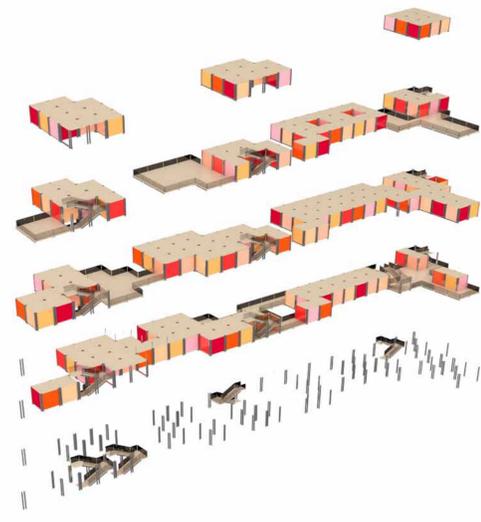
DISTINCT LEVEL PLANS



INITIAL DEVELOPMENT FACADE



INITIAL DEVELOPMENT SKELETON



CUSTOMIZED LEVELS DIVERSIFY PROGRAM



STAGE 01

A dense residential complex with open space on lower levels for recreational, institutional, or commercial use to localize economy and culture.



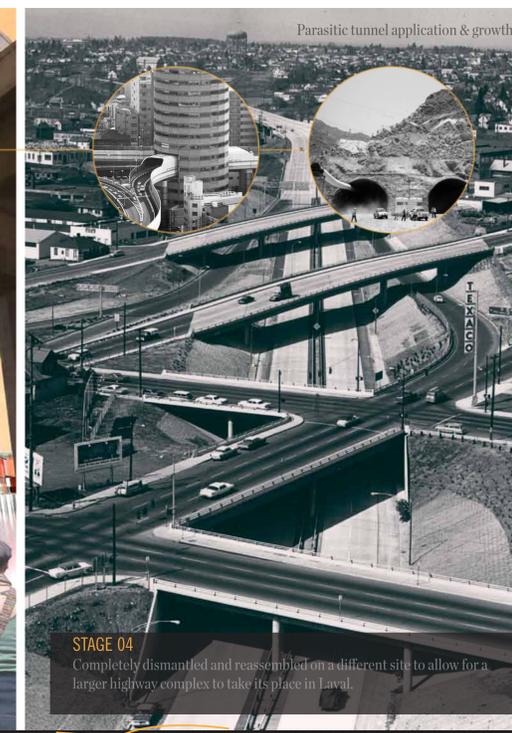
STAGE 02

A dense mixed use urban centre reconfigured to serve a program of higher diversity and create effective links to ground-level transportation.



STAGE 03

A punctured development, continuing to grow around a newly constructed highway route. Spaces have been easily repurposed as parking areas to accommodate increased vehicular volume.



STAGE 04

Completely dismantled and reassembled on a different site to allow for a larger highway complex to take its place in Laval.

POTENTIAL PROGRESSION OF TRANSFORMATION

Source: Vintage Portland

Growth & transformation vector diagrams.