A New Metropolitan Cultural Ligament:

Toronto Eglinton Crosstown LRT Prototypical Design Proposal

by

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Master of Architecture

AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

This thesis strives to establish a set of design guidelines for the upcoming Eglinton Crosstown Light Rail Transit development in Toronto. The primary design goals are to promote an enjoyable travel experience to commuters, offer positive public spaces in vicinity, and contribute to the greater social and cultural matrices of the city. Under a realistic project setting, the study will meditate upon spatial anthropological theories to identify essential public space qualities and to formulate underground lighting strategies.

The main objective is to complete the development of both underground station and surface stop prototypes that can be flexibly implemented along the entire transit line. The vision is for these stations to not only provide convenient public transit amenities but also function as locale identifiers, showcasing Toronto's culture virtually as unique rooms in a gallery. Three sites are chosen: Mount Pleasant, Dufferin, and Keele stations. These stations will provide interesting conditions to demonstrate the way in which a set of design guidelines can facilitate the positive development of subway stations into the powerful loci envisioned.

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Most especially to my family and friends for their continued support and encouragement.

DEDICATION

To my family, for their endless love and support throughout my years at Waterloo.

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A Station, a Connector, an Identifier

fig. 1.1 Suburban neighbourhood in Scarborough, Ontario

MANIFESTO
A station, a connector, an identifier

When suburbia becomes the destination of urban growth, and individualism becomes the pursuit of its inhabitants, Toronto like many other North American cities, is facing the challenge of social and cultural alienations. The sprawling course of urban development has been hostile to an effective informal public life. Our society has failed to provide sufficient public gathering places that are necessary for informal social and cultural interactions. Zoning ordinances are enforced, prohibiting the intrusion of many communal amenities into residential areas. As a consequence, we no longer know our neighbours, not even their names. We lock ourselves in comfortable, well-stocked homes and we hide behind our workstations all day. In essence, we restrict ourselves from unnecessary human interactions. The consequence is individual estrangement.

> "There is nothing to walk to and no place to gather. The physical staging virtually ensures immunity from community." [1]

> Ray Oldenburg, The Great Good Place

Yet a vibrant public life is essential in all great cultures. Absent from today's society are scenes of neighbours gathering in a courtyard after dinner to gossip and to enjoy the evening breeze as I remember from my childhood in China. It is not because we have cooler climate, but because we do not feel secure talking to people in general. As renowned American historian Lewis Mumford once put it, living in a modern metropolis is "a collective effort to live a private life". This becomes a common phenomenon in many North American cities. Hence, urban sociologist Ray Oldenburg concludes:

> As public life is populated with strangers more than ever before; as strangers frighten us more than ever before; and as communities nonetheless depend upon the successful integration of strangers, […] there is a general consensus that greater citizen involvement is the desideratum. [2]

Examples of traditional third places

fig. 1.2   Skating rink at Nathan Phillips Square, Toronto, Ontario

fig. 1.3   Street chess players on Main Street, Red Deer, Alberta

Instead, we are used to a two-stop daily travel routine – home to work and work to home, which devours most of our time. However, when a social outlet cannot be found at home or at work, a third place is needed. "Third place" is a term defined by Oldenburg as a social surrounding for informal public gathering beyond the realms of home and the workplace. Third places are anchors of community life that facilitate a larger range of creative interactions. To many architects and urban theorists, they are the remedies that balance the increased isolation of modern life and are the key to ensure the quality of city living. It is widely recognized that the social purpose served by public facilities or third places cannot be supplied by any other facilities and agencies in our society.

Within the complexity of the urban fabric, transportation infrastructure has the greatest potential to become an identifier for the city. A transit station possesses all the essential qualities of becoming a great third place as identified by Oldenburg: it gathers a full spectrum of people of different social standings; it provides a neutral mixing ground, in which no one is beholden to take the role of a host or a guest; therefore, everyone is equal; it offers flexibility in association, where people come and go as they please; most importantly, it ensures easy accessibility on a daily basis at little cost. With all these qualities, socialization will naturally occur among its users. To some extent, transit stations have the obligation to serve as third places. For instance, the popular salary men's bars in Japan play exactly the same role as great third places. These bars are often found inside or near a transit station, providing office workers a convenient place to carry out their primary social life after work.

Transportation corridors, in particular the subway system, ought to take on an additional role as places of social and cultural convergence and lend themselves positively to the image of the city. Italian architect and theorist Aldo Rossi writes in his influential book *The Architecture of the City*,

> The city is the locus of the collective memory. This relationship between the locus and the citizenry then becomes the city's predominant image, both of architecture and of landscape, and as certain artifacts become part of its memory, new ones emerge. In this entirely positive sense great ideas flow through the history of the city and give shape to it. [3]

As urban artifacts and primary elements, transit stations participate in the evolution of the city and constitute a significant part of the city's memory:

> "Every citizen has had long associations with some part of his city, and his image is soaked in memories and meanings." [4]
>
> Kevin Lynch, Image of the City

Toronto's TTC subway system has the power to become a stage for such memories and meanings, but is currently underutilizing this potential.

In a typical transit station, thousands of individual itineraries converge for a short moment, unaware of each other. The uncertainty and hesitation found in these spaces are fearsome and charming – full of excitement as ephemeral stopovers and possibilities for continuing adventure. The subway platforms, concourse services and other designated waiting areas possess all the attributes of an ideal public meeting place, where:

> neutral ground provides the place, and leveling sets the stage for the cardinal and sustaining activity of third places everywhere. That activity is conversation. Nothing more clearly indicates a third place than […] that it is lively, scintillating, colorful, and engaging. [5]

<div align="right">Ray Oldenburg, The Great Good Place</div>

But these are not common impressions we associate with subway stations, a relevant question to ask is: *what makes them unattractive?*

According to French anthropologist Marc Augé, an ever-increasing proportion of our lives is spent in non-places which can only be perceived in a partial, temporal, and incoherent manner. They have no identity, no history and no urban relationship. Subways, airports, and hotels are examples of such places. These spaces are characterized by a strong sense of otherness, and often become dispersed and disconnected. As a result, the spatial experience of non-places often becomes excessively informative to assist orientation. Even then, they still lack the elements to satisfy the need of individuals, and thus it is impossible to form a collective identity among its users.

An active social environment can be regenerated only when these non-places are reconnected and a new identity of place is formed. Hence, the key to transform transit non-places into third places is the recreation of an identity of *metro architecture*. To create this new identity, one must think beyond the primary function of a subway system merely as a conveying device that handles passenger flow. They are the monuments that offer themselves as fixed points in the urban dynamic and the urban artifacts where the collective memory of a city is created. In *The Death and Life of Great American Cities*, American urban activist Jane Jacobs claims that all public facilities should serve more than one primary function. A public building becomes efficient only if secondary diversities are provided. Secondary diversities are desirable since they are the enterprises that grow in response to the presence of primary uses, and to serve the people that the primary uses draw. [6] When a station is integrated with other fixed activities and cultural programs, it takes on a more significant value. Jacobs claims that, "to understand cities, we have to deal outright with combinations or mixtures of uses, not separate uses, as the essential phenomena." [7]

A mixed-use building needs to be sufficiently complex in order to sustain city safety, public contact, and cross-use. Otherwise, it will become an economic desert. Transit stations have a higher concentration of people throughout the day than most buildings. This advantage allows a wide range of secondary cultural programs to take place effectively – a café restaurant, a convenience store, a mini gallery, a performance stage, even as trivial as a kiosk or a community message board. These supplementary elements are the catalysts for cultural enrichment. In a larger urban context, the essence of a public building is far beyond its individual architecture. The design of a city must reflect the needs of people and the purpose of public architecture is to heighten the drama of living. Only in such way, richness and variety can be established in the city, and its citizens may build up loyalty to it: [8]

> In a general sense they are those elements capable of accelerating the process of urbanization in a city, and they also characterize the processes of spatial transformation in an area larger than the city. [9]

> Aldo Rossi, The Architecture of the City

fig. 1.4   An example of a non-place: restaurants, duty-free shops and the passenger transit lounges in an airport

For many locals, the TTC subway stations are the places that are traveled through on a daily basis constituting part of the city's identity. For visitors, these stations give the first impression of the city and remain to be a significant part of their memory. The common perception of metro architecture is boring and lifeless. Diversity, originality, and vitality are the missing ingredients in existing stations. By emphasizing the dynamic and hybrid qualities in new station design, these spaces can turn into delightful and inspiring places for daily commuters, as well as attractions for visitors. Additional programs also function as economic generators, which will be beneficial to a transit system that is chronically in need of fund.

Working within the parameters outlined in the Transit City proposal, this thesis seeks to establish a set of design guidelines for the upcoming Eglinton Crosstown Light Rail Transit development that promotes enjoyable travel experience to commuters, offers positive public spaces in the vicinity, and contributes to the greater social and cultural matrices of the city. Five fundamental qualities of public space are identified as follow, that the public space should support user participation, embrace cultural values, promote spatial continuity, integrate mixed-use programs, and encourage social interaction. The intent is to show how such a set of design guidelines can facilitate the positive development of subway stations into the powerful loci envisioned.

Undoubtedly, the intricacy of these underground spaces and the layered, almost labyrinthine quality of the subway system can provide a provocative image for its citizens. The vision is for these stations to not only provide functional, necessary and convenient amenities but to showcase Toronto's culture, allowing them to virtually become different rooms in a gallery – each identifiable and unique in its own right. As such, the subway system can be visualized as a network with distinctive nodes along the way that creates a much more interesting and engaging image of 'a city in transit'.

Swiss painter, Paul Klee's sketch of movement demonstrates the idea of a transit city, in which he sees the city as a complete organism. Tense lines of progression move from one place to another, interwoven into a city fabric. Where these lines intersect, transit stations are created as places for repose and enrichment. These conjunctions of repose are most important; where they should call upon the highest expression of architecture in relation to the movements of arrival and departure.

> "Together these two elements, the architecture of movement and architecture
> of repose, make up the city as a work of art, and this is the people's art." [10]

> Edmund N. Bacon, Design of Cities

If multiculturalism is the spirit of Toronto, and communities form the backbone of the city, we may perceive this new transit line as the ligament that will hold them together.
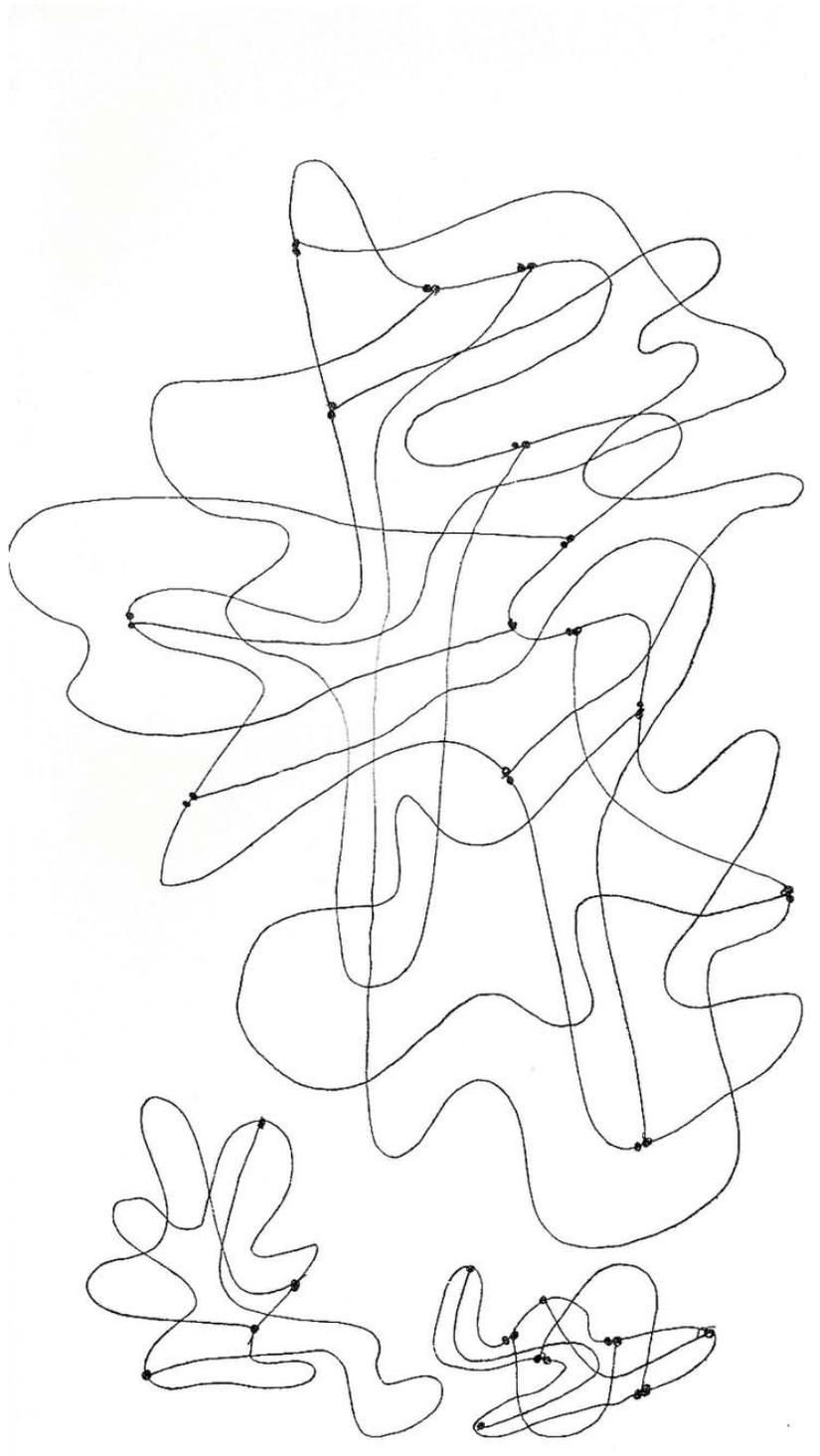
fig. 1.5 Concept of Movement by Paul Klee

a station, a connector, an identifier

2. SPATIAL DISCOURSE

SPATIAL DISCOURSE
Public space as the third place

Definition:

A **public space** *is defined as a gathering place within the public realm that promotes social interaction and helps creating a sense of community.*

The term **third place** *is invented by urban sociologist, Ray Oldenburg to describe social surroundings that are detached from the two most common social environments – home (first) and workplace (second).*

Every community must have a vital social network comprised of third places for creative public interactions. When these social anchors are missing, the community fails. What qualifies a public space as a third place? It is inadequate to identify the third place as a mere haven of escape from home and work. To understand the essence of a third place, we have to understand how it is different from other settings of daily life. Unlike the hierarchical setting at home or at work, a third place must provide a neutral and inclusive environment, upon which people may gather. Given that the character of a third place is determined by the interactions of its regular clientele, a playful and relaxed atmosphere must be created allowing for conversation.

The collective impression of transit architecture is dreary and nondescript. To turn these uninteresting spaces into great third places, architects need to identify what contribute to a good public space, and incorporate these elements in their designs. A series of spatial discourses are included in the following chapters reflecting upon spatial anthropology and its relation to architectural built form. These essays contemplate upon the following good public place characters that help setting a creative social environment:

a   **Inscribed space**: allow inscription through user participation
b   **Embodied space**: generate cultural and communal identities
c   **Transposed space**: conceptualize space in motion rather than confinement
d   **Contested space**: amalgamate diverse programs interactively
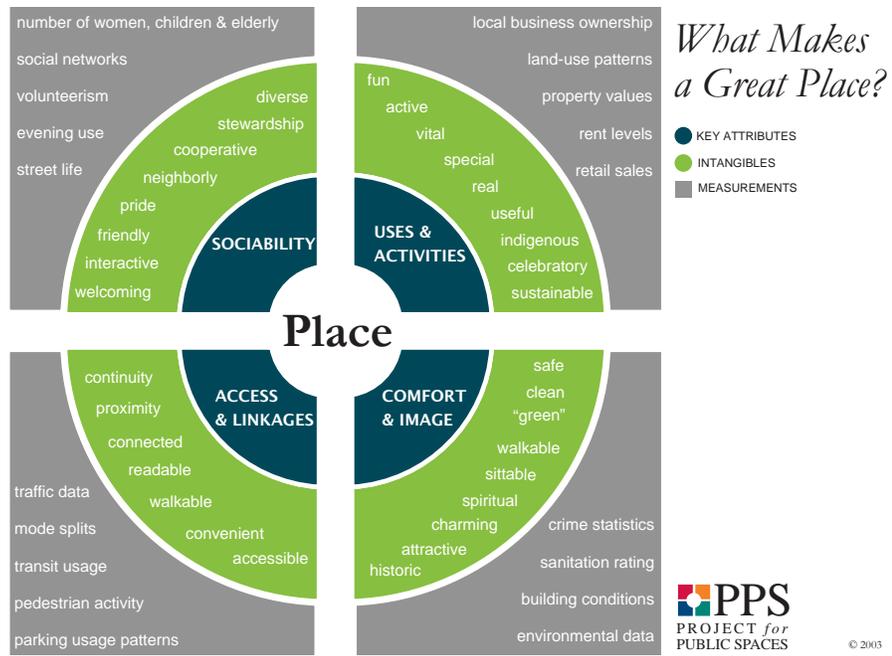
fig. 2.1
What makes a Great Place from online resource Project for Public Spaces

By researching public spaces around the world, Projects of Public Spaces organization has identified four comparable key attributes that make a great public place – sociability, activities, linkages, and image. A second diagram shows how placemaking contributes to local communities. It is evident that successful placemaking promotes social activities, supports local economy, and defines community identity.

fig. 2.2
The Benefits of Place from online resource Project for Public Spaces

The Benefits of Place

public space as the third place

Far Left **fig. 2.3**
Collective Graffiti in Chiado, Lisbon

Left **fig. 2.4**
Graffiti Hall of Fame in Amoreiras, Lisbon

Below **fig. 2.5**
"Designated Graffiti Area" in London, by Banksy

Opposite **fig. 2.6**
A series of perspective art found on the Sheppard
subway line, Toronto

BY ORDER
NATIONAL HIGHWAYS AGENCY
THIS WALL IS A DESIGNATED
GRAFFITI AREA
PLEASE TAKE YOUR LITTER HOME
EC REF. URBA 23/366
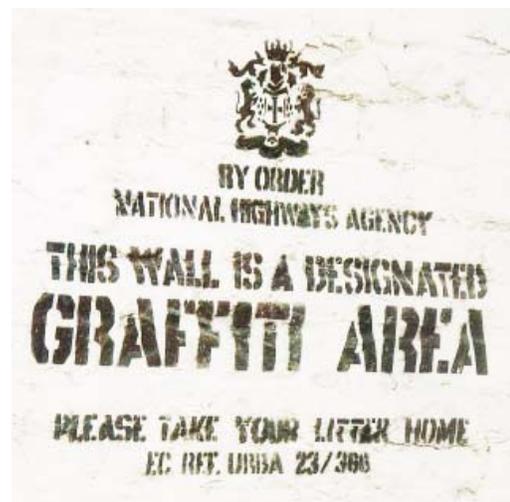
INSCRIBED SPACE
Allow inscription through user participation

> "The relationship between people and their surroundings entails more than attaching meaning to space, but involves the recognition and cultural elaboration of perceived properties of environments in mutually constituting ways through narratives and praxis." [11]
>
> Setha M. Low, The Anthropology of Space and Place

The verbs 'to write' and 'to mark' embedded in the term 'inscribe' imply the action of taking ownership. Similar to writing a name in a book, users may inscribe their presence in an architectural surrounding to declare partial ownership physically and psychologically. It is a natural instinct, that people take pleasure in ownership declaration at any given opportunity, lawfully or illegally. The presence of graffiti walls around the city is the living evidence.

While a totally foreign environment puts pressure upon it users, an inscribable environment makes them feel at ease. To inscribe an architectural space, one must establish meaningful relationship with the locale one occupies. By participating, one may activate unique experience and evoke unusual associations. However, the relationship between people and their environment is reciprocal and mutually constituting. The architectural environment should provide the medium for such personal experience to be generated and for such memory to be embedded. When a mutual relationship is established, a space is transformed into a place. On the contrary, when this sense of attachment, authenticity, and ownership is lacking in a public place, one's presence is constrained and social inactivity often ensues.

> People are influenced by the environment that surrounds them, and take qualities of that environment into themselves, […] they create metaphors in constituting their identity. In taking in these qualities, people also project them into space, creating buildings and settlement plans as part of larger 'architectonic' space. [12]

This kind of user inscription is achieved simply by encouraging user participation in activities that are unique at the site. The design objective of transit architecture should focus on creating quality space that is safe and welcoming for all users, as well as flexible and accommodating to cultural events and social activities.

> "Places are not inert containers. They are politicized, culturally relative, historically specific, local and multiple constructions." [13]
>
> Margaret C. Rodman, The Anthropology of Space and Place

15

EMBODIED SPACE
Generate cultural and communal identities

Transit stations are the primary elements that constitute a city's infrastructure. They always take part in the evolution of the city and often become urban artifacts and locale identifiers. For practical reasons, transit architecture has a tendency to dismiss all unnecessary features that are not contributing in pragmatic terms. However, architecture that only promotes and remains true to functionalism can never produce lasting values. An important role of public architecture is to display local character and embody the vernacular identity. When placed in a large urban context, a transit line that comprises of multiple stops is an ideal vessel; through which vernacular cultures are channeled across the city.

The idea of expressing cultural identity in architecture not only contributes to the image of the city, it also transcends personal experience within an architectural space. American anthropologist Irving Hallowell has suggested that cultural factors are the spatial identifiers that are basic to human orientation. [14] As an effective way-finding and spatial orientation strategy, the built forms, spatial qualities, interior elements of a transit station should preserve and reflect the distinct characters of its locality. When local character and community narratives are embedded into the design of each subway station, it allows users to differentiate one station from another. Even without any reference to the environment above ground, passengers can locate themselves by seeking out the particularities in a given station. The multi-layered, labyrinth-like underground network then can be identified easily within a larger urban context at any given point. American urban planner Kevin Lynch writes in *The Image of the City*,

> It must be granted that there is some value in mystification, labyrinth, or surprise in the environment […] This is so, however, only under two conditions. First, there must be no danger of losing basic form or orientation, of never coming out. The surprise must occur in an overall framework; the confusions must be small regions in a visible whole. Furthermore, the labyrinth or mystery must in itself have some form that can be explored and in time be apprehended. Complete chaos without hint of connection is never pleasurable. [15]

Besides, by expressing the means of transportation as cultural hubs, new transit stations are able to facilitate social reconstruction that benefit to surrounding neighbourhoods and commercial districts. Thus, a new communal identity can be created at both collective and individual levels. This communal identity can be re-established only when the idea of culture is localized.

> "It is time to recognize that places, like voices, are local and multiple. For each inhabitant, a place has a unique reality, one in which meaning is shared with other people and places. The links in these chains of experienced places are forged of culture and history." [16]

> Margaret C. Rodman, The Anthropology of Space and Place

MOSCOW METRO

The construction of the Moscow metro has initiated a new phase of Soviet architecture starting from 1930s, which was intended to glorify socialism and the Stalinist regime. The design theme focuses on the patriotic history and inspiring future of the nation. Such spirit and narratives are embodied in each of the Moscow metro stations.

Top Right **fig. 2.7**
The main concourse of Elektrozavodskaya Station on the Arbatsko-Pokrovskaya Line, which is one of the most spectacular and better-known stations on the Moscow Metro

Right **fig. 2.8**
"Ballroom" interior of Komsomolskaya Station; its historic location and elaborate embellishments made it an icon of Moscow

Top Left **fig. 2.9** & Above **fig. 2.10**
Adornments found in Moscow metro stations

public space as the third place
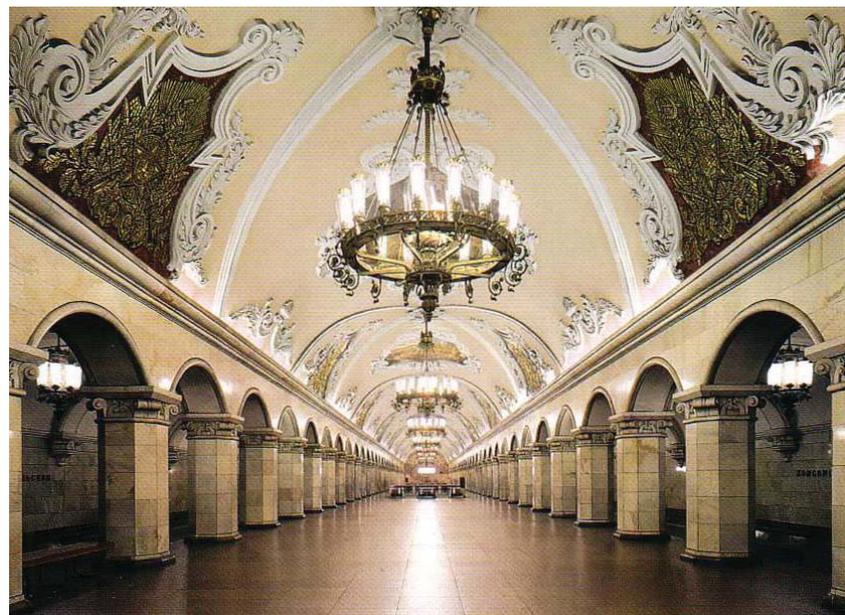
Top Left **fig. 2.11** & Right **2.12**

THE TORONTO EATON CENTRE

Vast multi-storey atriums allow all three shopping levels to be seen at a glance. The openness of the space gives a dynamic appeal to the environment, strengthens the spatial connection between shopping levels, and encourages active user movements that result in creating a lively and varied gathering place that is well integrated with the existing downtown.

Right **fig. 2.13**

THE MUSEUM OF MODERN ART, NEW YORK

With six floors of interconnected galleries and public spaces, the MoMA gives each visitor a unique experience through the building and the sculpture garden. The museum is designed in such way that there is no anticipated visitor circulation pattern. Occasional lookouts and balconies draw attention and lead to other places of interest, making the journey more flexible and intriguing.

TRANSPOSED SPACE
Conceptualize space in motion rather than confinement

We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.

T.S. Eliot, "Little Gidding" No.4 of 'Four Quartets'

American historian and anthropologist James Clifford suggests that frequent travelers have a different perception of spatiality. They are more mentally equipped to read spaces in a mobile and sequential manner based on routes and itineraries. Similarly, commuters generate their own kind of trans-locality as they move from one station setting to another in search of authenticity and destination. [17] Without the dynamism of time and movement, a space will remain static; its architecture is relatively enduring, and it boundaries are always fixed. Using Foucault's critique, the underground environment of the Toronto subway has been treated as "the dead, the fixed, the undialectical, the immobile". [18] A sense of connection, continuity and transposablility is lacking in all stations, especially on subway platforms. These isolated, confined spaces inevitably give commuters an unpleasant and disorienting impression. Yet, a lively public space must animate direct, clear movement patterns that guide its users to places of interest. Without proper control of movement, the underground spaces would be "a labyrinth without a clue, a riddle without an answer".[19]

Any public place that functions merely as a site of coming and going, without generating a sequence of spatial highlights, becomes ineffective and nondescript. Subsequently, its social relations get suspended and the interpersonal distance among users increases. Anthropologist Stuart Rockefeller believes that the vitality of public spaces is generated by individual movements, trips, and digressions of migrants crossing spatial boundaries. These collective movement patterns make up locality and reproduce locality.[20] To stimulate such patterns, spatial transparency must be established within a clearly defined realm, where each public space is physically and visually connected to others, and each person within is allowed to move flexibly from one place to another. The key is to conceptualize spaces in motion rather than in confinement, where each space is a paused frame of a journey.

"The person make space by moving through it." [21]

"Places, […] are not in the landscape, but simultaneously in the land, people's minds, customs, and bodily practices." [22]

Stuart Rockefeller, referenced in The Anthropology of Space and Place

CONTESTED SPACE
Amalgamate diverse programs interactively

> Contested spaces give material expression to and at as loci for creating and promulgating, countering and negotiating dominant cultural themes that find expression in myriad aspects of social life. Spaces are contested precisely because they concretize the fundamental and recurring, but otherwise unexamined, ideological and social frameworks that structure practice. [23]

A contest denotes a meaning of struggle, conflict or race between competitors. Such rivalry is not necessarily unhealthy. If properly monitored and negotiated, a positive environment can be generated that will benefit all participants and act as a spur for improvements. In architecture, a single-use public building is prone to be inefficient because it may struggle to provide a constructive social environment. On the other hand, a hybrid and diversified public building has many social advantages. The contesting environment in these mixed-use buildings allows users to engage in the same place closely for different purposes. A higher concentration of people is generally found in contested spaces. As a result, the viability of individual enterprises, such as shops or eateries is increased. Besides offering convenience and improving personal safety, the juxtaposition of activities also create a more engaging social backdrop for informal social interactions.

> Urban environments provide frequent opportunities for spatial contests because of their complex structures and differentiated social entities that collude and compete for control over material and symbolic resources. [24]

A typical transit station can have a variety of secondary amenities ranging from cafés, bars, beauty parlors, general stores, or galleries, which will bring together the like-minded and similarly-interested group of people in a highly inclusive setting. These neutral and inclusive qualities also make it a great third place for social exchange. As principal public facilities, transit stations are committed to provide convenient amenities to adjacent communities. Hence, the choice of program should reflect the needs of the locals. Due to this site-specific attribute of contested space, the selected subsidiary programs will enhance the social structure and cultural diversity in the area, and through this, collective memory can be constructed and locals may build up loyalty and a sense of identity with the place.

> "To understand cities, we have to deal outright with combinations or mixtures of uses, not separate uses, as the essential phenomena. […] A mixture of uses, if it is to be sufficiently complex to sustain city safety, public contact and cross-use, needs an enormous diversity of ingredients." [25]
>
> Jane Jacobs, Death and Life of Great American Cities

ST. PANCRAS INTERNATIONAL, LONDON

The St Pancras international railway station, a Victorian architecture masterpiece, was built by William Barlow in 1868. The complex was expanded during the 2000s. The restored station houses fifteen platforms, a shopping arcade and a bus station featuring top quality retail stores, Europe's longest champagne bar and a daily fresh farmers' market. These added amenities have made it truly a grand hospitality destination - a great place to meet.

Right **fig. 2.14**   Train platform sits on top of retail stores
Above **fig. 2.15**   des Vins Café & Wine bar
Below **fig. 2.16**   Arcade with eateries, bars, and shops

IMAGE OF THE UNDERGROUND
The psychological and physiological effects

Over the past century we have witnessed a rapid growth of underground development in almost every urban centre. The utilization of subsurface space provides a practical solution to many problems with which modern cities are faced. As cities continue to expand horizontally, agricultural lands are being consumed in city peripherals while green spaces are diminishing in city centres. The overpopulation crisis has led to historically high demands for land; as a result, land prices continue to rise.

Urban development in a vertical sense offers great opportunities that alleviate these trends. While skyscrapers dominate city skylines, the underground domain should also be exploited in a wider range of private and public uses. Storages, cellars, transportation infrastructures, utility distributions, and military defense facilities are some of the conventional examples of such programs. In the past decades, we have seen many other interesting uses of the underground. Most of these modern underground structures have been integrated with surface urban development, thus they have the advantage of being in close proximity to existing facilities on developed sites. Underground shopping centres, underground sports and recreational centres, underground educational facilities, even underground offices now can be found around the world. By relocating suitable facilities below-grade, the surface land then can be used more effectively.

Despite the practical benefits of utilizing underground spaces, when human occupancy is involved, the initial responses are often disapproving and a wide range of concerns are raised. The fundamental question is: *What are the psychological and physiological effects of the underground that create this generally negative impression?* The purpose of this section is to identify the attributes of these underlying environments, and reflect upon historical and cultural influences, as well as the physical experience of occupants.

The image of the underground has always been associated with entrapment, danger, and death throughout human history. It evokes the memory of living in primitive cave shelters, where the space is dark, damp, cold, and poorly ventilated. They are places where many dangerous activities have taken place, such as tunneling and mining. The fear of entrapment and fear of the unknown are some of the powerful connotations. The image of the underground is also closely connected to tombs, catacombs, basements and dungeons, which are the places for enslavement, incarceration, and burial. Numerous stories, poems, and paintings have vividly depicted the horror of descending into the underworld. Historically, it is rare to find underground spaces used with positive meaning. Even in our language, the word *underground* has always been used with negative implications that relate to inferiority, poverty, and criminal activities. As relative height in the physical

Right **fig. 2.17**
Natural underground caves - Grotte di Castellana,
Puglia, Italy

Bottom Right **fig. 2.18**
Tube Shelter Perspective, ink, wax and watercolour
on paper, 1941 by Henry Moore

The drawing depicts the nights people spent shelter-
ing from bombs in the London Underground dur-
ing the Second World War

Below **fig. 2.19**
Coal mine workers in underground tunnel

image of the underground
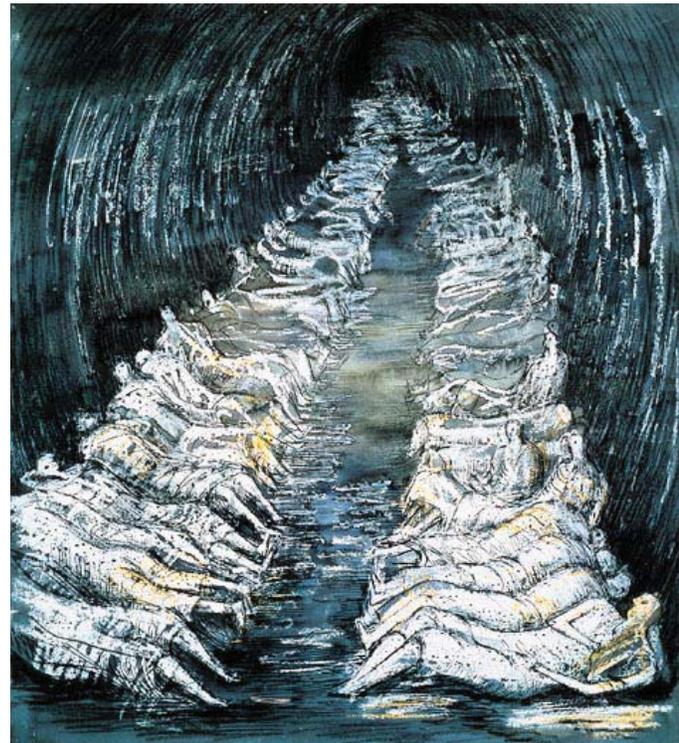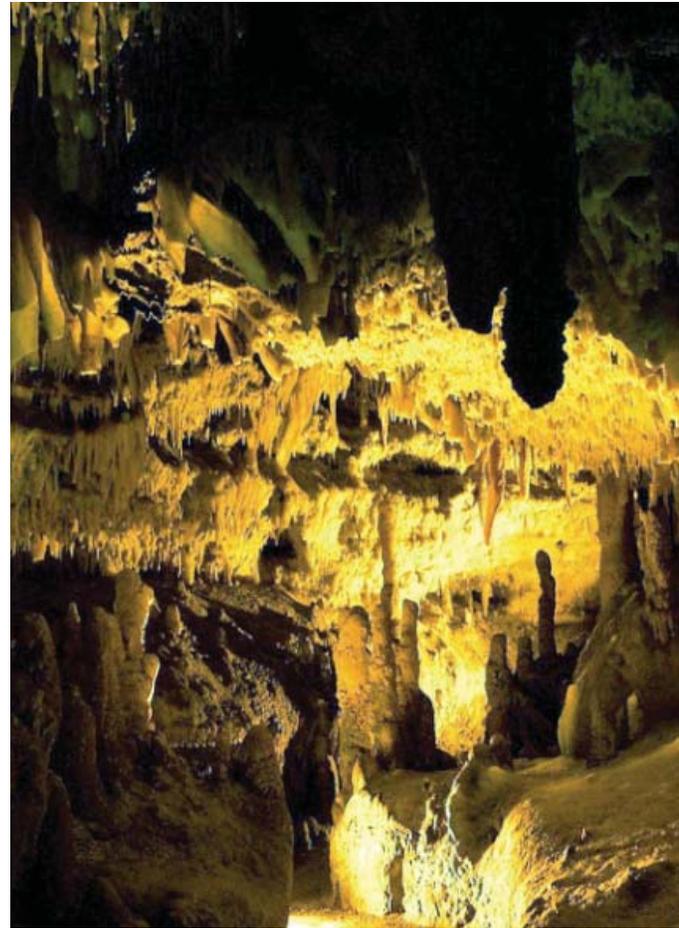
Left **fig. 2.20**
Dante's Inferno, Oil on Canvas, 1846
by Paul Chenavard

Below **fig. 2.21**
Diagram of Dante's Inferno Hierarchy
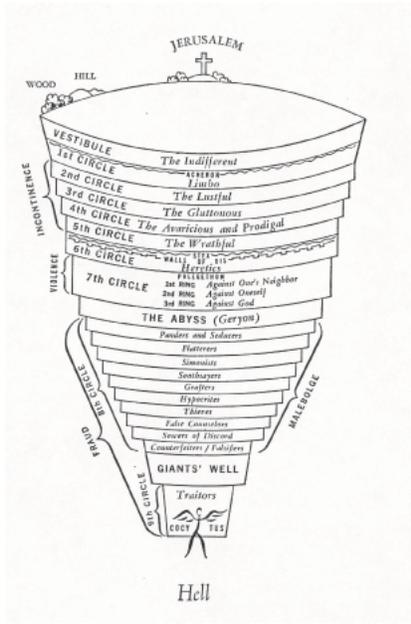
world becomes a strong indication of social status in our society, being underground denotes being substandard and socially unacceptable. These are the common imageries used repetitively in language, literature, and religion. Our response to the underground environments is largely subconscious, and for that reason, these imageries have a profound influence on our perception of the underground.

In addition to cultural and physiological perceptions, underground spaces have a number of physical constraints that are quite challenging to overcome. The lack of windows or skylights creates a sense of confinement and oppression coupled with the sense of weight of the surrounding and overhead mass of earth. Such senses cause mental stress and depression in occupants, and at times lead to claustrophobic reactions. Since reference points to the exterior or the natural world are missing, underground spaces are likely to be disorientating. The downward movement at the entrance may elicit negative associations and fears. Physiologically speaking, underground spaces have insufficient daylight, higher humidity and undesirable air quality. If these indoor environments are improperly controlled, they will have negative health effects. As a result, the involvement of occupants in these spaces is relatively low.

Nowadays, with the aid of modern technology, these underground spaces have been assimilated to above-grade environments – spacious, brightly lighted and well ventilated. Yet the negative impression of the underground persists. It is the absence of organic nature that makes these spaces unappealing. As a fact, natural environments always undergo subtle fluctuations of brightness, wind pressure, temperature, and sound. These periodic changes constantly activate our senses. In contrast, everything becomes constant and static within a completely artificial environment. If one wants to create a better underground environment, one needs to mimic the variables of nature and recreates the natural conditions that people are attracted to rather than avoid.

> In response to environment, people expect all of their senses to be moderately stimulated at all times. This is what happens in nature and it relates not only to colour and changing degrees of brightness, but the variations in temperature and sound. The unnatural condition is one that is static, boring, tedious, and unchanging. Variety is indeed the spice – and needed substance – of life. [26]
>
> Faber Birren, referenced in Underground Space Design

3.   DESIGN GUIDELINE + PRECEDENT

DESIGN GUIDELINES + PRECEDENT
For underground transit facilities

In the previous section, a number of potential psychological and physiological issues that people may have in underground environments are identified. In response, this set of design guidelines is developed with the intention to provide appropriate design solutions that can be used to mitigate and transform negative underground space into positive healthy environment, written specifically for transit facilities. Each section of the guideline is followed by case study projects, offering examples of some of the best and most inspired uses made by architects from around the world. Its function as a set of hypotheses is to be tested.

> It should be emphasized here – and in any guideline document – that guidelines are not immutable recommendations. Every guideline should be thought of as a hypothesis about environment and behavior, to a greater or lesser degree backed up by research. As more research appears, or society changes, guidelines may need to be modified and revised. […] The least we can do is to take the plunge and be willing to present research findings in a form that can be readily used by the user and designer of environmental settings. [27]

Clare Cooper-Marcus, Design Guidelines: A Bridge between Research and Decision-Making

fig. 3.1 - 3.3   'Fosteritos', subway entrances to the Bilbao Metro by Norman Foster

3.1 ENTRANCE AND BUILDING PRESENCE
Design guidelines and precedents

In virtually any building or complex of buildings above or below grade, the entrance has an important role. It gives people a sense of arrival; it can set the mood of a building; it strengthens the orientation on the exterior and interior of the building; and it represents a place of physical and psychological transition between the exterior and interior world. [28]

Therefore, placing the main entrance (or main entrances) is perhaps the single most important step you take during the evolution of a building plan. [29]

> Christopher Alexander et al., A Pattern Language

3.1.1 Articulate exposed architectural elements

- Provide clear, legible entrances that can be recognized from a distance
- Create an aesthetic and distinct overall building image as a landmark
- Allow users to identify the location and extent of the underground structure

3.1.2 Enhance the architectural quality of entrance structures

- Address the approach from various pedestrian paths
- Bring forth an aesthetic sense of arrival with the entrance façade
- Give the entrance a sense of place by creating variety and complexity in entry approach that stimulates curiosity and heightens experience [30]

3.1.3 Alleviate the psychological effects of moving downwards

- Create visual connection between the exterior environment and the building interior
- Offer a gradual and graceful transition to the lower levels by using glass-enclosed elevator to enhance orientation and relieve feelings of confinement, alongside escalators to improve accessibility
- Provide barrier-free access at all major entrances

3.1.4 Integrate with natural and artificial light

- Make sure all vertical circulation elements are well lighted
- Implement glass-roofed structure or skylights over the foyer and circulation area to ease the transition into the facility
- Well-lighted at night to allow easy identification and to take the role as a place marker

CANARY WHARF Station London, England

Foster and Partners, 1999

Canary Wharf by Foster and Partners is the grandest of the 11 new stations on the Jubilee Line Extension – measuring 313m in length. Unlike most other tube stations, plenty of surface space was available. Thus, rather than being hidden deep beneath other buildings, the entire roof of the station is laid out as a landscaped park. The only visible station elements are the three entrances marked by three curved steel and glass canopies. These canopies draw natural light deep into the station concourse by day, and glow with light at night, indicating the entrances to the station. These curvy structures are reminiscent of the famous 'Fosteritos', the name given to the subway entrances to the Bilbao metro[31] (see illustrations on the previous page). Bathed in abundant natural light, banks of escalators carry passengers down to the concourse ticket hall. In an open design, the concourse is lined with ticket machines, offices, and shops at its sides. Main exits are easily identifiable by the magnificent light pouring down the canopies, thus orientation is enhanced and the need for directional signage is minimized.
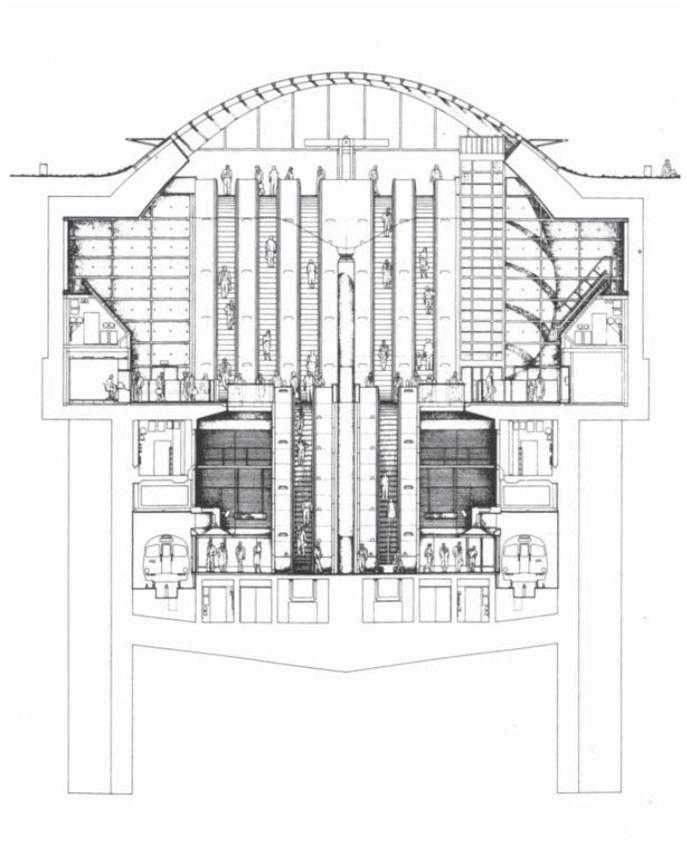
fig. 3.4   Cross Section
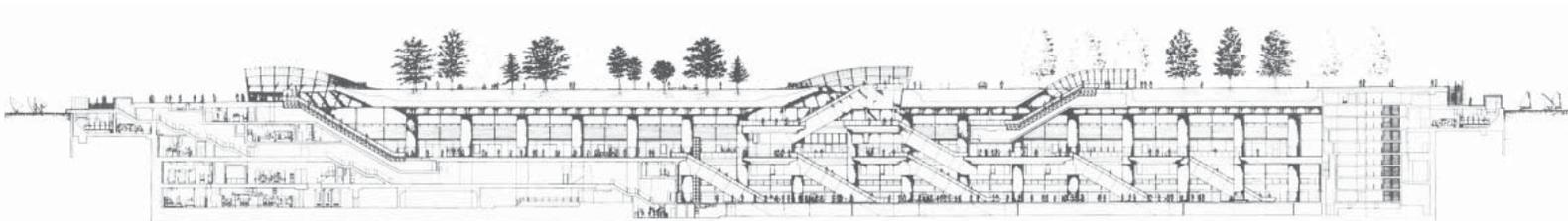
fig. 3.5   Long Section
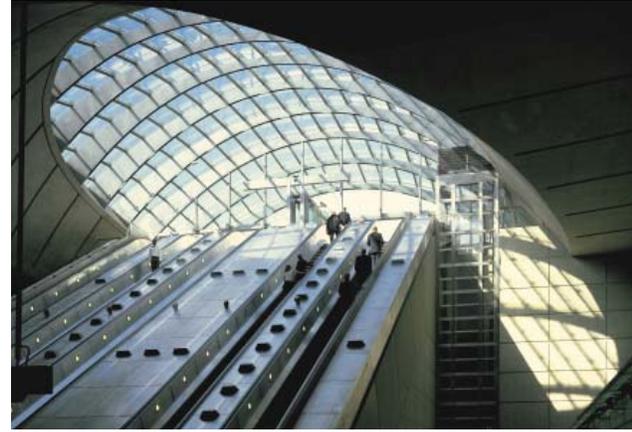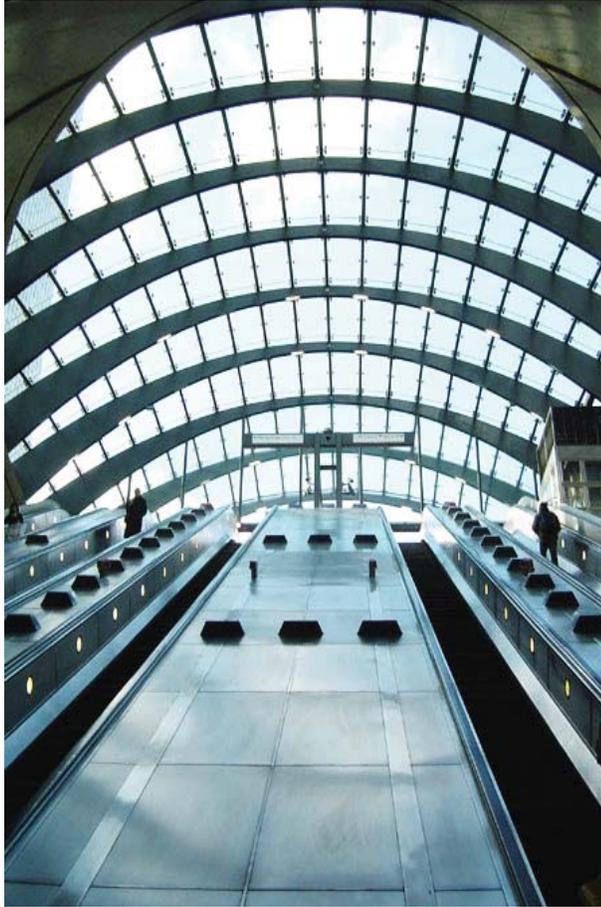
fig. 3.6 - 3.9   Glass canopy at subway entrances

entrance and building presence

3.2 ATRIUM AND SPATIAL CONFIGURATION

Design guidelines and precedents

There are growing instances of public architecture made bright by the placement of an atrium. The effect of the atrium is that the complex interior can be grasped at a glance. Such enormous space provides a volumetric bonus in the oppressive interior, and creates a positive contrast with human scale. It also constitutes a gathering place and circulation space with access to all parts of the building. By exteriorizing an indoor environment with natural light filtering through, an atrium brings forth a delightful public space that can be seen as a retreat from the city.

> "Atria appeal to the mind and the senses. They put people at the centre of things in a way lost in recent architecture. They encourage play: people-watching and promenading, movement through space, enjoyment of nature and social life. They provide a visual antidote to the oppressive interiors and the formless external spaces of today." [32]

Richard Saxon, Atrium Buildings Development and Design

3.2.1   Improve spatial orientation within the facility

- Generate an interior layout that is easy to understand
- Provide visual linkage between spaces
- Create program zones with distinct character to enhance orientation
- Provide a clear and attractive signage and mapping system
- Allow freedom of movement which help offsetting the fear of entrapment

3.2.2   Strengthen the interconnected relationships between spaces

- Generate visual connection from space to space in an open layout
- Provide visual connections between interior and exterior environments whenever possible
- Create extended interior views to mitigate the sense of confinement
- Develop hierarchy of privacy, by arranging spaces so that the most private areas cannot be viewed from public realms
- Use interior windows or glazed walls overlooking adjacent activities
- Arrange spaces so that they are only partially enclosed without being able to see the entire volume at a glance [33]

3.2.3   Enhance the internal environment

- Create a distinct image within the building to compensate for the lack of image outside [34]
- Develop a layout that stimulates various indoor environments
- Provide sufficient places for sitting and social interaction similar to a lively exterior street [35]
- Eliminate long, windowless corridors and passageways between spaces
- Employ uncluttered furniture layout

3.2.4   Provide sufficient spatial volumes

- Use high ceiling (higher than in conventional buildings) to enhance a feeling of spaciousness - experiments found that people needed more personal space when ceiling height was reduced; increased ceiling height reduced feelings of crowding even though floor space remained constant [36]
- Vary ceiling heights to reflect the different function and character of each space within a building and to create a stimulating interior environment
- Create multistory interior atrium spaces within the underground facilities and let them become a focus of activity within the building

"Lay out very large buildings and collections of small buildings so that one reaches a given point inside by passing through a sequence of realms, each marked by a gateway and becoming smaller and smaller, as one passes from each one, through a gateway, to the next. Choose the realms so that each one can be easily named, so that you can tell a person where to go, simply by telling him which realms to go through." [37]

Christopher Alexander et al., A Pattern Language

TGV STATION Lille, France

Office for Metropolitan Architecture, 1994

The Euralille project is based on a masterplan by Rem
Koolhaas. It situates on an empty site adjacent to historic
downtown Lille, centering on a new high-speed TGV station.
The station is straddled by three mixed-use towers and
accompanied by a large shopping centre, an urban park and
the Grand Palais concert hall and exhibition place. Using
'bigness' as the driving scheme, Koolhaas turns the station
centre into a living microcosm of the city, where commercial
and cultural activities are coupled with an extensive transport
system.

This urban project places particular emphasis on the new
TGV station as a multi-modal transportation hub of a
number of inter-urban transit systems – metro, bus, tramway,
and taxi. In the chaos of these existing infrastructures,
Koolhaas' approach was to "increase the complexity so
as to reveal the magic point at which problems are turned
into potentialities". [38] Such magic point is created near the
centre of infrastructure conjunctions – a transferium namely
the 'Piranesian space', which turns the metro station into a
transparent receptacle in the form of a void linking the multi-
storey parking lots, the TGV station, and the multiple railway
lines.

This spatial void is inspired by Piranesi's Carceri series of
prison engravings, which emphasizes on succession of stairs,
ramps, bridges, balconies, and catwalks. These conveying
elements not only become points of visual interest, they also
greatly enhance the flow between interconnected spaces.
With visually endless spatial linkages, Koolhaas' fantasy of
continuous, infinite movement is materialized in this 'enclosed
garden'. In showing the movement flows, the complexity of
the infrastructure and the dynamics of the metropolis are
revealed to the city's population. [39]
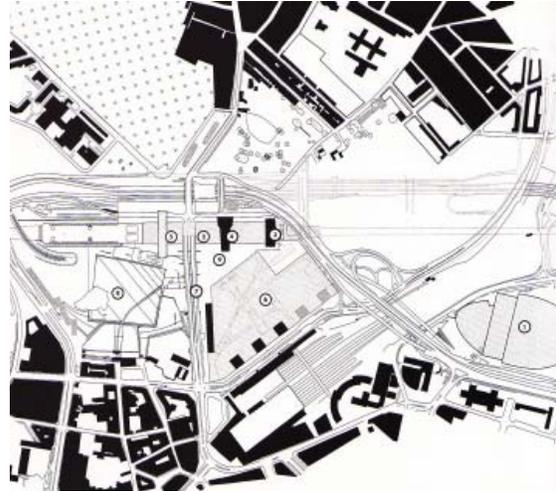
fig. 3.10   Euralille Masterplan

fig. 3.11 & **3.12**   Sketches of the 'Piranesian Space'
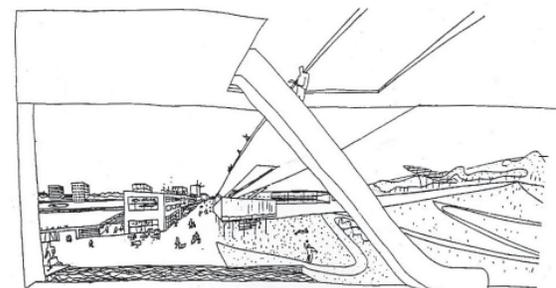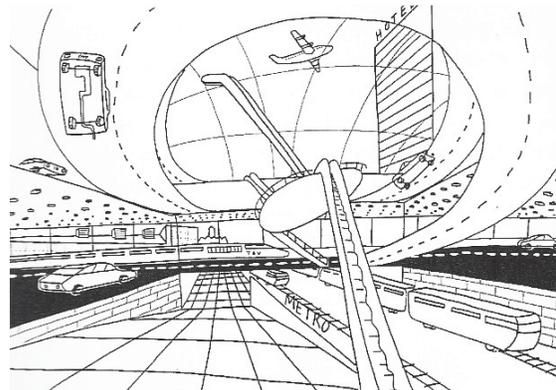
Right **fig. 3.13**
Inside the TGV station, under a cable supported undulating roof

Bottom Right **fig. 3.14**
The Piranesian undercroft of intersecting circulation routes at
Lille-Europe TGV station

Below **fig. 3.15**
The Drawbridge, Etching from "Carceri"
by Giovanni Battista Piranesi, 1745

atrium and spatial configuration
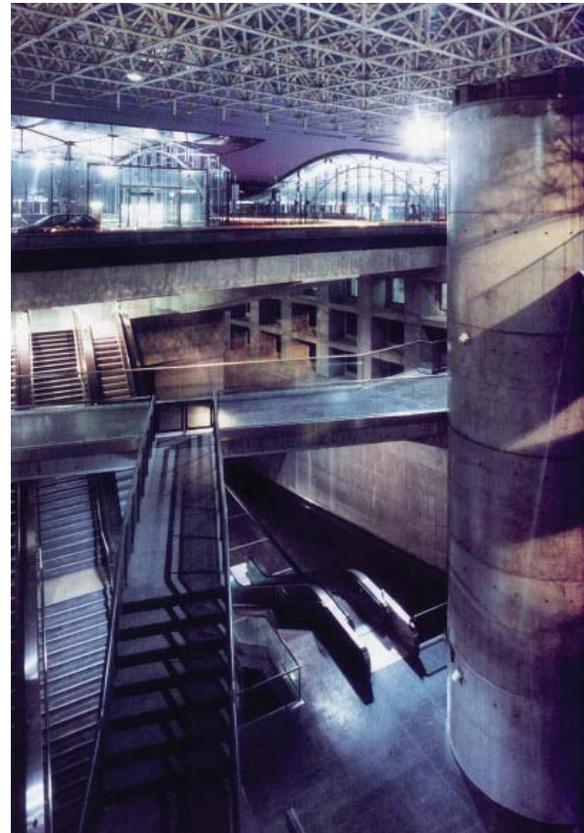
SHIBUYA STATION Tokyo, Japan

Tadao Ando Architect & Associates, 2008

Shibuya station is the terminal station for the Keio Inokashira Line and the Tokyu Toyoko Line, designed by architect, Tadao Ando. It is the third busiest train station in Tokyo, handling over 2.4 million commuters on an average weekday. Ando's design is based on what he calls a 'chichusen' or an underground spaceship, featuring an enormous three-storey atrium at the centre. The architect wanted visitors to feel that they are in a flying saucer hovering over the tracks. Commuters must board the spaceship near the top of the atrium and journey down to reach their subway platforms. Besides being an architectural attraction, the station's unique elliptical shape also allows for smooth flow of human traffic.

The atrium is designed to give visitors an overview of the station at a glance for easy orientation. The atrium opening is wider on the top floor, which enables people to have a glimpse of the platforms down below as they enter the building. Such visual connection is usually absent in traditional windowless, hard-to-navigate subway stations. The openness of the space also gives a dynamic appeal to the interior environment, where hasty commuters and moving trains can be spotted from all levels. In addition, the station incorporates an innovative natural ventilation strategy in its design, which allows stale air to exit and fresh air to circulate via the central atrium.
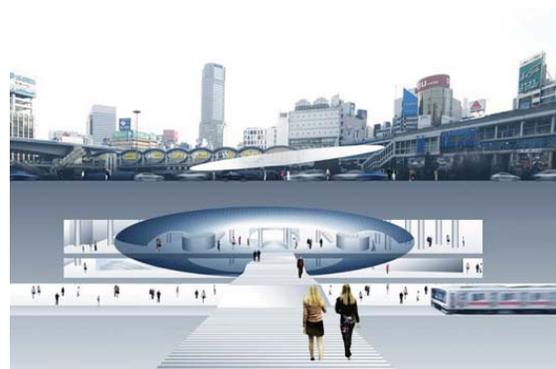
Top to Bottom

fig. 3.16 - 3.18   Shibuya Station atrium, named 'chichusen'
3.19   An subway station in the shape of a spaceship

3.3 ILLUMINATION IN SUBTERRANEAN SPACES
Design guidelines and precedents

Architects of the twentieth century spoke of a newfound importance of natural light in the built environment, which natural light transforms not only the form and space of our buildings, but their atmosphere and mood as well. [40] Subsequently, it has an enormous psychological and emotional impact on the occupants. This awareness of natural light in correlation with the physical well-being of people is increasingly being recognized as a design fundamental.

> "The more we value light, the more securely we will find and keep a worthwhile civilization to set against prevalent abuse and ruin. Because of light, the cave for human dwelling and work, for play and toil, is at last disappearing." [41]
>
> Frank Lloyd Wright

> "Light is the key to well-being… I compose with light." [42]
>
> Le Corbusier

To create a desirable underground space, natural light plays a significant role. Such role cannot be replaced by artificial light. While natural light seems to be regarded universally as an enhancement to most interior space, the lack of windows and natural light are among the most commonly cited drawbacks of below-grade facilities.

3.3.1 General lighting requirements

- Provide appropriate levels of illumination to enhance visual clarity and facilitate all activities through out the day [43]
- Utilize lighting patterns, intensities, and colours to help defining and reinforcing spatial quality
- Use contrast of light and shadow to create visual interest

3.3.2 Natural lighting strategies

- Provide natural light wherever possible, such as glazed entrance structures, skylights, and sidewalk lights
- Use reflective surfaces and other devices to maximize natural light penetration and even distribution

3.3.3   Artificial lighting strategies

- Simulate the characteristics of natural light, such as the colour, flicker, variation in direction and intensity
- Conceal light bulbs in recesses and alcoves; that soft, diffused indirect light is provided and the contrast and glare of visible bulbs is eliminated
- Place artificial lighting above or behind translucent ceiling or wall panels to create the illusion of natural light entering the space; i.e. a glowing wall, or an artificial skylight [44]
- Provide distinct lighting pattern at the ends of tunnel which anticipates the arrival into a station

Rule of Thumb for artificial lighting design

- Fluorescent bulbs can closely replicate the spectrum of natural light; they can replace conventional bulbs of limited or distorted spectrum
- Full spectrum lamp gives off a cooler colour, which creates a more spacious perception of a given space when the illumination levels are high (in the daytime)
- If illumination level is low (in the nighttime), occupants prefer warm-coloured ambient light

In underground spaces, light is the medium for all visual experience and thus is integral to creating perceptions of spaciousness, providing definition and character in spaces, as well as simply providing light to facilitate the performance of activities and tasks. [45]

fig. 3.20
The underground tunnel connects between Terminal 1 & 2 at O'Hare International Airport, where neon tube lighting ripples across the ceiling over the moving walkways.

ST.−QUIRIN−PLATZ Munich, Germany
Hermann + Öttl Architekten BDA, 1997

St.-Quirin-Platz station is one of the most interesting stations of the metro Munich. A shell-shaped steel and glass dome spans above the access spaces, stairways and elevators. Abundant daylight floods in through the wide opening in the ground into the platform hall below. Built on a slope in a small park, its unique site condition was integrated into the design. A lavish roof construction extends down and becomes a glazed sidewall on the southwest side, where passengers can peek into the adjacent park even from the lower platform level.

The rough surface of the external walls stays uncovered and shows impressively the column-like structure of bored piles. As a contrast to this coarse texture, smooth, reflective materials such as polished stainless steel, glass and natural stone were used. The areas alongside the platform hall appear taller through the reflection from its frosted ceiling panels. Aluminum reflectors are suspended above closed ceiling areas to provide even distribution of light.
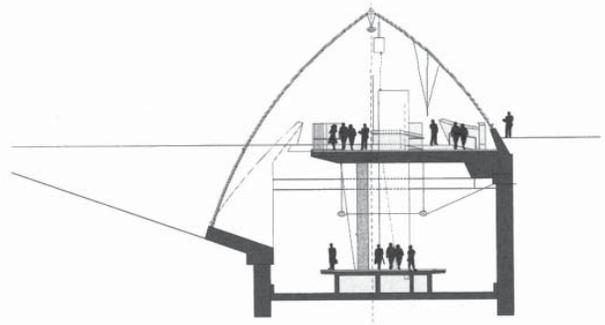
Counterclockwise from top-left

fig. 3.21 Well-lit platform space
    3.22 Aluminum reflectors on ceiling
    3.23 Exterior view from park
    3.24 Cross Section

SOUTHWARK Station London, England
MacCormac Jamieson Prichard Architects, 1999

Southwark is an interchange station for the Jubilee Line Extension and the main line to Charing Cross. It uses rich materials and natural lighting to create inviting and distinct spaces that are easy to navigate. Getting daylight deep into the underground spaces has greatly improved passenger comfort and orientation. Spatial contrast is the main strategy to create an engaging journey through the building. The alternation of natural and artificial light, and the change of form and volume create a remarkable spatial sequence for commuters.

The ticket hall features a circular glass-block skylight at the centre, and a second larger skylight in front of the three escalators leading down to an intermediate concourse. Despite situating 16m below grade, this upper concourse hall receives natural light via a crescent-shaped skylight. The hall is rectilinear in plan, with one long wall straight, the other curved, and five massive concrete beams spanning in between.

The straight wall is made of polished and coursed concrete blocks with three arched openings leading to lower concourse and platforms. As a dynamic contrast, the curved wall is composed of triangular, blue enameled glass panes, which slopes forward as it rises to the skylight. With daylight refracting from it, this glazed wall acts as a beacon for lower levels, where it can be seen as soon as one approaches the escalators from the platforms.
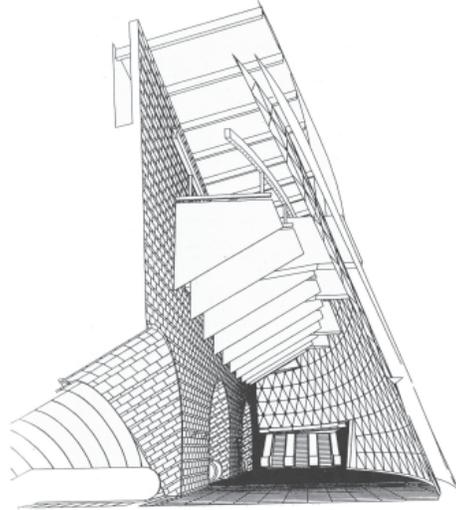
Top to Bottom

fig. 3.25   Sectional perspective of intermediate concourse
    3.26   Upper concourse skylight
    3.27   Glass block skylight above escalators

PADDINGTON Crossrail London, England
Alsop + Störmer Architects, 2010

CrossRail is a new underground railway line in London, which links the eastern and western regions of British Rail from Paddington to Liverpool Street. The Paddington station is one of the five stations within central London, which will be the principal arrival point from the west. The new station will be constructed alongside the existing Victorian station by Isambard Brunel. In addition to the new platform area, project architect Alsop also proposed a complete redesign of the existing underground ticket hall, enhancing the interchange between all rail systems on site. [46]

Bringing natural light deep down into the subterranean station is one of the key design objectives. The architect envisioned all major public areas to be placed in spacious, well-lit volumes to alleviate the gloomy and claustrophobic environment that is usually associated with underground stations. A continuous 'light beam' is cut into the road above, which allows daylight to flood down onto platforms. In addition, a sophisticated glazed structure is placed in the slot to modulate between natural and artificial light. The central 'light beam' also gives a strong presence at street level, especially when it is dramatically lit at night. Combining with a series of glazed canopies, a new urban space is created along the slot at the entrance to the historic Brunel building.
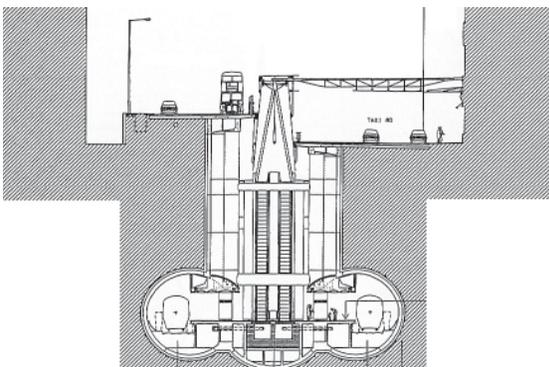
Top to Bottom
fig. 3.28 - 3.30
Two-storey height light shaft cuts across main public spaces

3.4 MATERIALITY AND SPATIAL QUALITY
Design guidelines and precedents

In recent years, many architects have shown a particular interest in surface design – in colour, texture, and tactile properties. Building skins, both interior and exterior have progressively emerged as the most immediately visible and thus most appropriate manifestation of a building's representation. In the past, materials were chosen either pragmatically for their utility and availability or they were chosen formally for their appearance and ornamental qualities. [47] Nowadays, with the incredibly wide selection of building materials, we should think of them as a design palette from which materials can be chosen and applied as compositional and visual surfaces. [48]

Architecture is formed with material, and the character of any given space is based on its materiality. In transit architecture, material details are most important, and they must work. Not only they have to be durable and easy for maintenance, they often are the mediums, through which passengers make contact with the station and where user satisfaction is generated or destroyed.

> "The pleasure to be found in objects of great beauty and ornament is produced either by invention and the working of the intellect, or by the hand of the craftsman, or it is imbued naturally in the objects themselves. The intellect is responsible for choice, distribution, arrangement, and so on, which gives the work dignity; the hand is responsible for laying, joining, cutting, trimming, polishing, and such like, which give the work grace; the properties derived from Nature are weight, lightness, density, purity, durability, and the like, which bring the work admiration. These three must be applied to each part of the building, according to its respective use and role." [49]

> Leon Battista Alberti, On the Art of Building in Ten Books

3.4.1   Specify high quality material finishes

- Use interior elements that are perceived as high quality to compensate for the negative associations
- Choose materials that are durable, impact resistant and easy for maintenance and replacement

3.4.2   Define the internal space with colour and texture

- Use bold colour scheme in underground spaces; grey scale monotones are undesirable
- Make use of reflective or mirrored surfaces and light colours to enhance lighting quality and enlarge spatial volume
- Apply pattern, line and texture on material surfaces to create visual interest

3.4.3   Introduce visual interest on vertical planes

- Integrate manmade artifacts such as paintings, murals, and advertisements at focal points that introduce variety on wall surfaces
- Create alcoves and window-like recesses to break up the wall planes and create the illusion of a window
- Place plants, sculptures or other objects of interest in the alcoves and light them indirectly from above
- Place mirrored wall material at the ends of platform to give the impression of an infinite space

Rule of Thumb of using colour and texture

- Cool colours create a feeling of spaciousness, while warm colours create a feeling of warmth
- Vertical lines on wall increase the perception of ceiling height
- Fine patterns and textures seem farther away than those with bolder elements
- More rough-textured surfaces are warmer to the touch than smoother surfaces and they contribute to a more stimulating environment both tactually and visually
- Patterns and textures make an environment more complex, with more visual information to explore. The space seems larger because it cannot be comprehended at a glance

Underground spaces evoke a sense of inferior as second–class spaces. Thus it can be argued that the quality of interior design elements in underground spaces (i.e., furnishings, materials, and artwork) should be higher than for those found in an equivalent above-grade space to compensate for the perceived lack of status and other amenities. [50]

MUNICH U–BAHN, Germany 1971 - 2009

The underground safari

Walking through Munich's subway, better known as the U-Bahn, reveals great examples of underground architecture. Munich's subway is a remarkable collective accomplishment, which calls for innovative technologies and state-of-art architecture of high standards. Architects and interior designers have paid close attention to material details and strived towards a common goal of creating a contemporary appearance and the best visual quality in public spaces within all subway stations around the city. The aesthetic expression of construction detail and the subtle play between harmony and contrast present a seamless architecture that is unique to Munich. A journey through the underground network reflects the evolving tastes and architectural styles of more than 30 years of subway history. [51] A series of noteworthy stations in Munich are selected as case studies, which showcase inspiring uses of material in underground spaces that generate pleasant atmosphere for passengers.

Multi-colored vertical wall claddings laminated with glazing panels
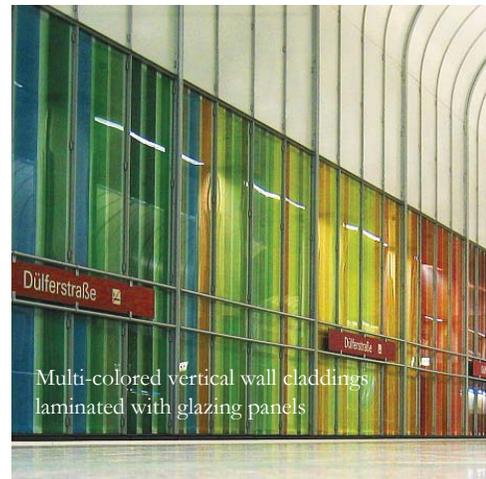
DÜLFERSTRASSE STATION
U2 1993 by Peter Lanz und Jürgen Rauch

Mural sidewalls artistically portray geological strata in gray and earthen hues
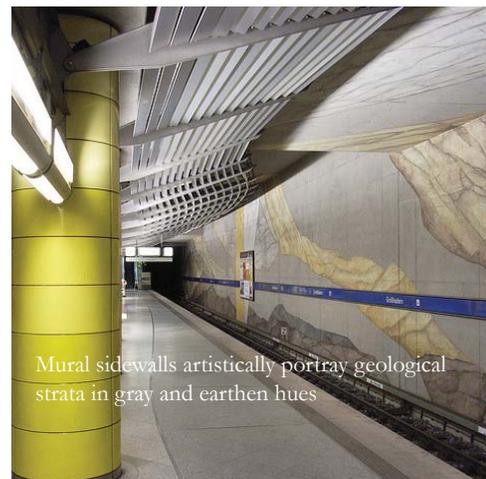
GROSSHADERN STATION
U6 1993 by Grüner + Schnell

Coloured wall panels are arranged in a cadence of changing hues
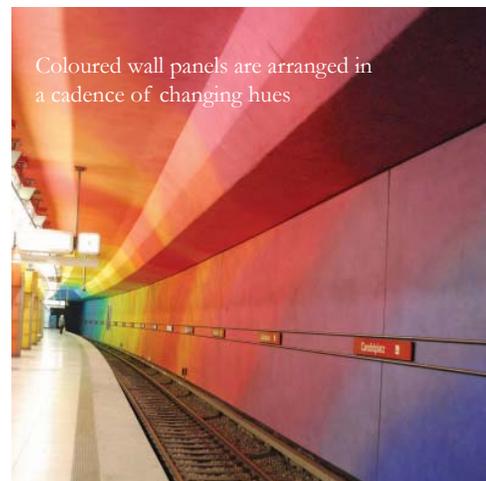
CANDIDPLATZ STATION
U1 1997 by Architekturbüro Egon Konrad

A distinctive black and white wave pattern stretches across the entire platform

FRÖTTMANING STATION

U6 2004 by Bohn Architekten
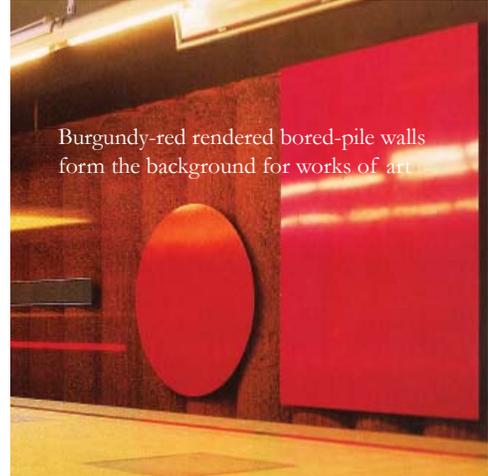
Burgundy-red rendered bored-pile walls form the background for works of art

MACHTLFINGER STRASSE STATION

U3 1989 by Schnetzer and Großkopf
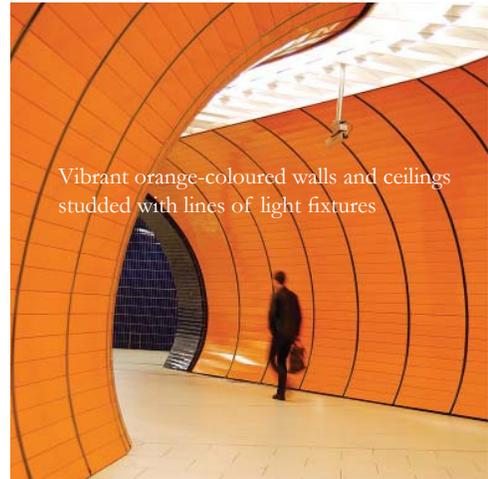
Vibrant orange-coloured walls and ceilings studded with lines of light fixtures

MARIENPLATZ STATION New Tunnel

U3 2006 By Alexander Freiherr von Branca
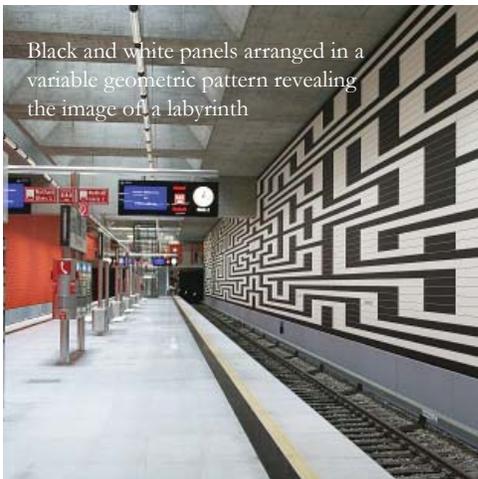
Black and white panels arranged in a variable geometric pattern revealing the image of a labyrinth

OBERWIESENFELD STATION

U3 2007
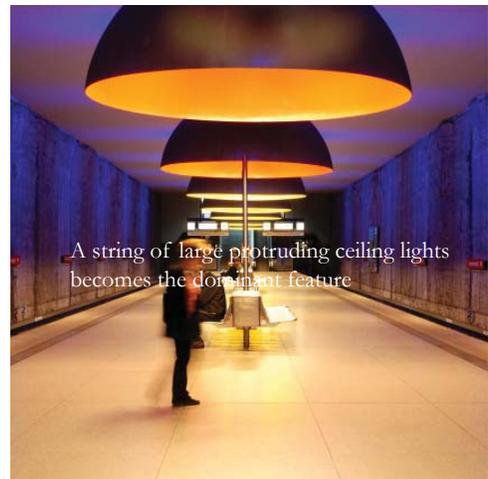
A string of large protruding ceiling lights becomes the dominant feature

WESTFRIEDHOF STATION

U1 2003 By Auer + Weber Mayr + Ludescher

materiality and spatial quality

UNDERGROUND ART GALLERIES

STOCKHOLM METRO, Sweden 1950 - 2009

World's longest underground gallery

The Stockholm Metro is well known for its overwhelming and outlandish decoration of the stations, for which it has been called the longest art gallery in the world. After nearly sixty years of effort, over 90 of the 100 Metro stations have been adorned with sculptures, mosaics, paintings, installations, inscriptions, and reliefs by the hands of over 150 artists. Several stations along the Blue Line were excavated through dense self-supporting bedrock, which have been left exposed and unfinished as part of the decorations and created a unique underground atmosphere. These cavernous spaces have become the inspiration for a group of Swedish artists calling themselves "the concretists", whose work was sculpted, sandblasted, and painted onto some of the rough bedrock surfaces in Stockholm Metro stations.

Artists and sculptors have been offered an opportunity to work closely with architects and engineers, and given the freedom to express their fantasies on the walls and ceilings of the stations. In the end, they have created beautiful rooms and stimulating stations throughout the city, where subway architecture becomes art.

> What they have to offer depends on who is viewing them. Some people see beauty, some have an emotional response, while to others it's mainly a great way of telling the stations apart. [52]
>
> Stockholm Public Transport

Top to Bottom

fig. 3.39   Relics rescued from the buildings demolished during the redevelopment of central Stockholm in the 50s and 60s are on display at Kungsträdgården station, Blue line

fig. 3.40   Art installation at T-Universitetet station, Red Line

fig. 3.41   The bright blue leaf motif on bedrock evokes the image of being under the ocean at T-Centralen station, Blue Line

MUSEUM STATION Toronto, Canada
Diamond and Schmitt Architects, 2008

As part of a five-year station modernization program, nine stations along major subway lines in Toronto will introduce new public art that speaks of the city's heritage. Diamond and Schmitt Architects are commissioned to remake the 45-year-old Museum Station into a mini archeology gallery that evoke exhibits in the adjacent Royal Ontario Museum and Gardiner Museum. The subway platform is transformed into a hypostyle hall decorated with hieroglyphs, and supported by archeologically inspired columns, resembling Egyptian deities, Tolte warriors, Doric columns from the Parthenon, First Nation house posts and Forbidden City columns. The generic unadorned wall tiles from the 60s are replaced with mauve-coloured metal panels to create a monolithic, contemporary backdrop for the featured columns.

Toronto commuters have never thought of the TTC stations as good public spaces, as they have completely failed to reflect the vitality of the city in their state of decay. The opening of the redesigned Museum Station represents a new underground cultural renaissance, and reflects the Toronto Community Foundation's "Arts on Track" initiative. By providing visual clues about landmarks and activities in the vicinity above ground, the new station design helps to orient subway riders in relation to the city above as locale identifier.

Top to Bottom

fig. 3.42 - 3.43   Revitalized Museum station platform

SURFACE STOP PRECEDENT

PHOENIX METRO LRT Stops, United States 2008

The station design responds to Arizona's desert climate. Louvered panels and overhead canopies are used to maximize shade and comfort at all times of day. Cool-surface paint is used to protect furniture from overheating. Collaborating with local artists, unique public art pieces are integrated with selected stations.

Counterclockwise from top-left

fig. 3.44
Typical station at Roosevelt / Central Avenue

fig. 3.45 - 3.47
Louvered panel and overhead canopy details

fig. 3.48
Historical photographs of local community installed at Washington and Central Aveune stations by artist Stephen Farley

fig. 3.49
Sand-cast bronze shading structure installed at 24th St and Washington-Jefferson by local artist Kevin Berry

4. CONTEXT

CONTEXT
A brief history of Toronto subway development

BIRTH OF A TRANSIT CITY: Historic Timeline

For hundreds of years, the land on the north shore of Lake Ontario stretching between the Humber and Don Rivers was called "TORONTO" by Indians. The name is believed to be originated by the Huron tribe, means "place of meeting". [53] Urban community settlement can be dated back to 1793, when Colonel John Graves Simcoe founded the 'Town of York' on the Upper Canadian frontier. By 1834, the town had grown as an important commercial centre with more than 9,000 residents. On March 6th in the same year, York was incorporated as the 'City of Toronto'.

fig. 4.1 - 4.4

The first omnibus service, 1849

Toronto Civic Railways, 1921
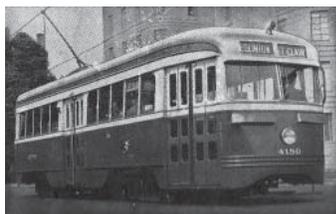
The first electric P.C.C. cars, 1938

Islington Station opening day, 1968

1849	Public Transportation began - a horse-drawn omnibus service was established on King and Yonge Streets.
1861 – 1891	Alexander Easton founded the Toronto Street Railway Company in 1861. At the expiry of its thirty-year franchise in 1891, it owned 68 miles of track and 461 vehicles and sleighs that was carrying 55,000 passengers a day.
1891	The City took over the railway franchise and established the Toronto Railway Company. This brief attempt at public ownership had failed. The property was than sold to Wm. Mackenzie and associates.
1892	First electric car was introduced on Church Street, which then replaced the horse car as regular service.
1911	The Toronto Civic Railways were constructed to serve newly annexed districts.
1920	The Toronto Transit Commission is founded. Since then, public ownership of transportation is established.
1921	The motorbus was first introduced.
1921 – 1953	An era of steady progress. The Commission started 35 new routes. In 1938, 140 new streamlined streetcars, called P.C.C. cars were introduced. By the end of 1953, Toronto had the world's largest fleet of P.C.C. cars in service.
1954	The Yonge Street Subway was opened.
1966	The Bloor-Danforth-University Subway was completed.
1985	The Scarborough Rail Transit was in-service.
2002	The Sheppard Subway was opened to the public.
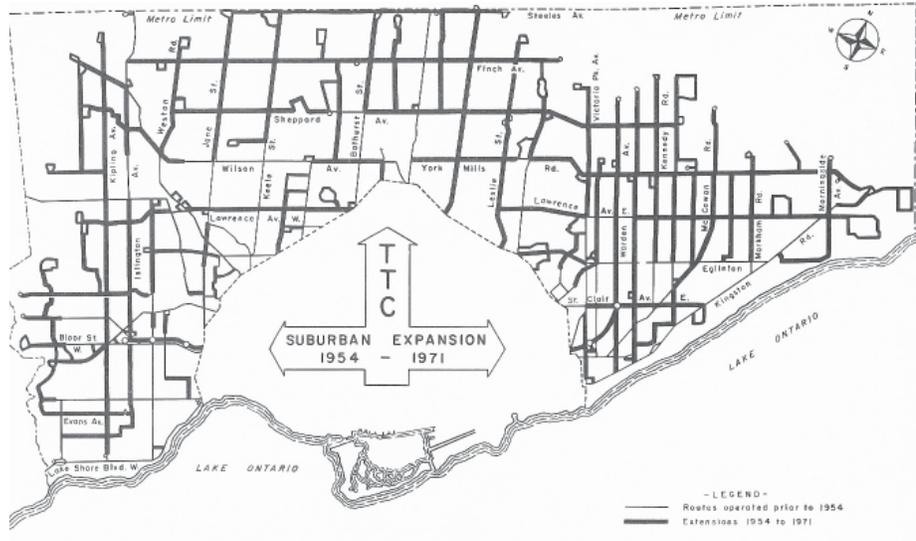
fig. 4.5   TTC service extensions to suburban areas from 1954 to 1971

fig. 4.6   The four subway and rail lines in serve today, 2009

fig. 4.7   Toronto Subway Fantasy Map 2030

YONGE SUBWAY

"The present congestion of traffic on Toronto streets threatens the very economic life of our City. Its welfare varies with the ease and efficiency with which people and goods can move throughout the City." [54]

"Statement of Policy", Rapid Transit Toronto

A major achievement in Metropolitan Toronto public transit has been the successful creation of Canada's first subway system. In 1942, the initial subway proposal was submitted to the Toronto City Council, recommending a north-south subway along Yonge Street from Front Street to St. Clair Avenue, and an east west line beneath Queen Street from Trinity Park to Broadview Avenue. These plans were postponed until the end of WW II. During the municipal election held on January 1st, 1946, the proposal was supported by voters with a favourable ratio of nearly ten to one. [55] Built between 1949 and 1954, the Yonge Subway was opened on March 30th, 1954. It was the first subway to be built in North America since the beginning of World War II, and became the catalyst for the resurgence of rapid transit on this continent. It also initiated an intense building boom along its course that included new apartments, offices, and commercial buildings in downtown and midtown areas from Bloor Street to Eglinton Avenue. [56]

> The Yonge subway was the anchor that gave permanence and stability to the vital downtown business district. [57]

fig. 4.8 Construction on Yonge Street in 1949

fig. 4.9 Subway route map in 1954
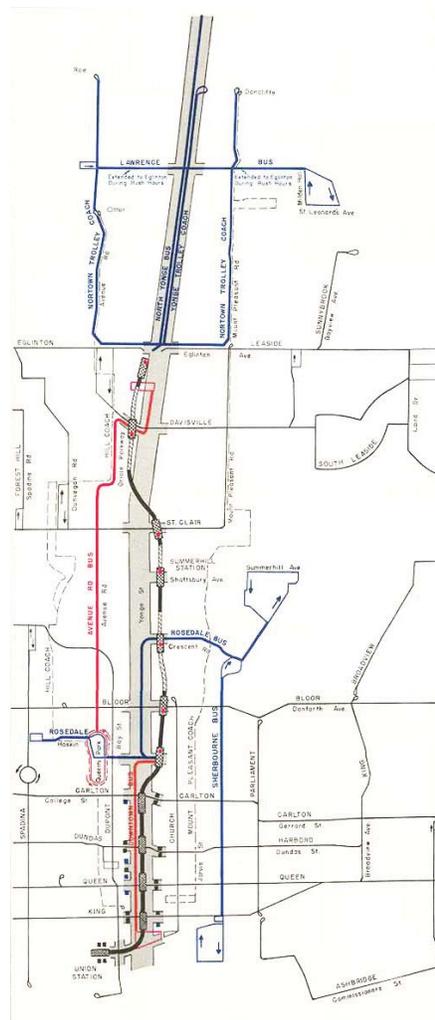
BLOOR–DANFORTH–UNIVERSITY SUBWAY

fig. 4.10
Rosedale Valley bridge under construction

The demand for a subway route along Toronto's major east-west traffic artery was evident even before the completion of the Yonge subway. When the Yonge subway was first planned, the first extension is expected to be a crosstown line along Queen Street. However, community growths and development patterns had shifted significantly since the first subway proposal. It became obvious that the ridership along the Bloor streetcar line is notably higher than any other surface routes. Overloaded rider capacity and severe traffic congestion made it impossible to maintain satisfying on-street transit service. [58]

In 1956, after a series of assessments on the Yonge Subway, a proposal of constructing a ten-mile subway addition is recommended to the Metropolitan Toronto Council, including an eight-mile crosstown line along Bloor Street and Danforth Avenue, and a two-mile extension of the existing subway line connecting to the proposed line. In 1958, the proposal was approved by the Ontario Municipal Board. Due to the heavy capital expenditure required for the construction, the Board ordered the construction agenda to be stretched over ten years and the subway to be built in three stages. Construction work on the Bloor-Danforth line was started in June 1962, and completed in February 1966 in less than the expected ten-year period. [59]

fig. 4.11   Subway route map in 1954
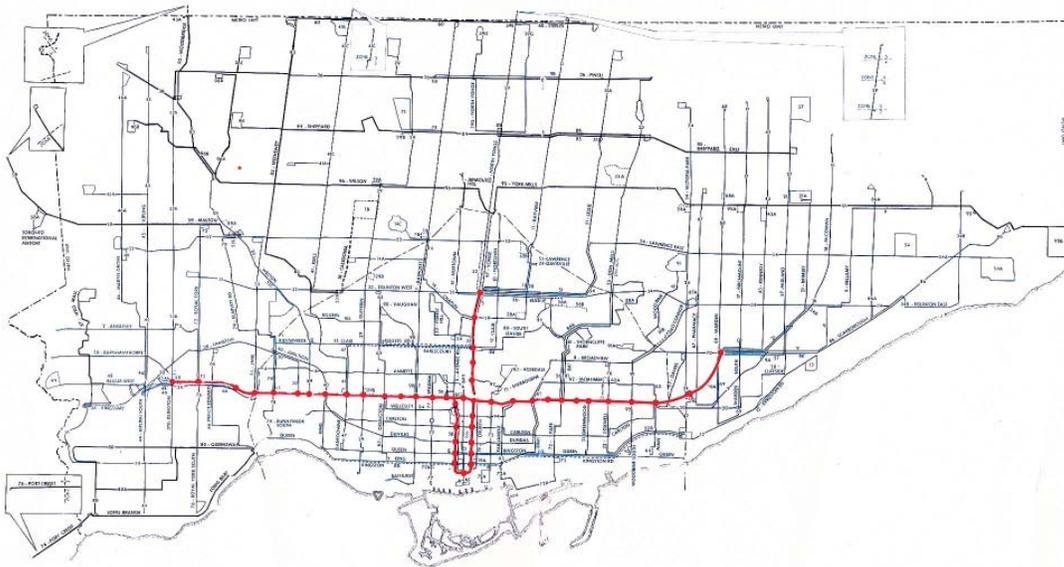
SCARBOROUGH RAIL TRANSIT

Scarborough Town Centre was opened in 1973, with the vision to be the core of a new downtown. However, there was still a gap of miles between the eastern terminus of the Bloor-Danforth subway at Kennedy Station and the new town centre. In the early 1980s, the TTC had proposed and enforced an extension to bridge the gap by using streetcars operating in a private right-of-way, but the Scarborough officials wanted a further extension of the subway line. In 1983, while the TTC continued to plan and build its streetcar-based line, the Province of Ontario was looking for a more high-tech approach and agreeing to finance a large portion of the project. After a long period of deliberation, the Province of Ontario convinced the borough of Scarborough and the TTC to change the design midway through construction. The ICTS (Intermediate Capacity Transit System), an advanced Rapid Transit system was chosen instead. This advanced system allows faster and more consistent services, and significantly larger rider capacity than conventional streetcar system. It also has the advantages of operating on grade and lowering construction cost, while providing comparable services to a subway line. The Scarborough RT line was opened two years later in 1985. In the following years, the ICTS technology had been successfully modified and marketed to Vancouver, Detroit and other cities. [60]

fig. 4.12 Four-car train at McCowan Station
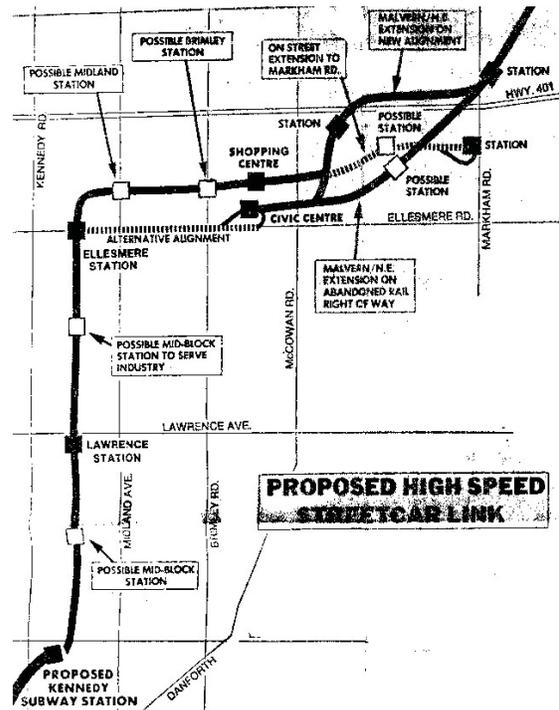
fig. 4.13 Initial alignments for Scarborough RT line

SHEPPARD SUBWAY

fig. 4.14 Despite being built on a budget, the Sheppard subway boasts big spaces; here is a magnificent stairwell leading from the mezzanine level to the platforms below

Proposals for an east-west rapid transit line across the northern edge of Toronto had been debated and studied since the 1960s. The first proposal was made by mayor James Service of North York, who suggested the ends of the Bloor-Danforth subway be extended north through Etobicoke and Scarborough and across North York to form a large belt line. The proposal was not taken seriously for decades. On the other hand, the commuting patterns had been changed significantly with more people living in a suburban home and working downtown. This group of commuters were severely underserved by the transit network that only focusing on mid-town and downtown traveling. In 1982, politicians and planners proposed that a new subway line to be built running from the Yonge-Sheppard intersection, east on Sheppard to Brimley, and then south to the Scarborough Town Centre. By 1984, the Sheppard subway proposal also included a westward extension to the Spadina subway as part of the Network 2011 project.

fig. 4.15 Don Mills Station platform

Due to political changes in the following decade and a major recession in 1994, the proposal was deferred several times. In 1995, the metropolitan Toronto city council rejected three of the four subway proposals, causing the cancellation of all provincial funding for public transit. Consequently, the Eglinton West subway project was terminated and the Sheppard subway was almost cancelled. An alternate scheme of building only a shortened version of the Sheppard line, terminating at Don Mills Road was passed by a narrow margin. The future of the Sheppard Subway line was then confirmed. Its construction was completed in 2002 as the first "suburban" subway. [61]

fig. 4.16 Shelved Sheppard subway expansion plan

TORONTO SUBWAY ARCHITECTURE

Toronto's subway stations are the principal elements that comprise the city's public transportation network. They represent a building typology that focused primarily on serviceability. To many, their sole purpose is to get passengers to their destinations comfortably and efficiently. For many practical reasons, such as politics and funding, the design of these stations is often based on functionalism rather than aesthetics. As a result, subway design has a tendency to dismiss over-elaborate or expensive features that are not contributing in pragmatic terms. When design elaboration is inhibited, the potential of these stations to become meaningful public spaces would be underutilized. As previously mentioned, architecture that only promotes and remains true to functional concerns can never produce lasting value and create places of cultural resonance.

Most TTC stations are underground, situated either below a street or an existing building. Their alignments are largely determined by existing foundations, tunnels, service lines, and other infrastructures. Their design is often subjected to supplementary codes, traffic laws, and structural requirements. Even material choices are limited for safety and sanitary reasons. All these constraints significantly reduce the scope and flexibility in architectural expression. The outcome is that most TTC stations tend to look alike, aside from the colour schemes or the choice of wall tiles. Besides, lighting is another challenge that these stations have failed to overcome. The impression of these spaces is overwhelmingly negative. They are dull, dirty, cluttered, and dim in general, especially older subway lines. Most concourse and platform spaces receive no natural light; moreover they also fail to provide quality artificial light.

There is a widespread recognition from Torontonians that station improvements would engender more positive feeling about underground travel; in turn, an increase in ridership can be expected. [62] New transit stations, as part of a large-scale infrastructure development, have the opportunity to overthrow tradition and put forth a more creative architectonic expression, and thereby generate a new identity for Toronto's subway architecture.

fig. 4.17 Subway, painting by George Tooker, 1950

Lack of architectonic expression in a subway station contributes to the loss of individual identity of the user.

"We shape our buildings and afterwards, our buildings shape us."

Winston Churchill

fig. 4.18 Typical finishes of Toronto subway stations – platform at Lower Bay station

THE VISION OF TRANSIT CITY
The Eglinton Crosstown Proposal

The Transit City LRT Plan is premised on developing a new light-rail network across Toronto, announced by Mayor of Toronto, David Miller and Chair of the Toronto Transit Commission, Adam Giambrone on March 16th, 2007. This LRT network will provide connections to all Greater Toronto regional transit lines, including Mississauga, York Region, and Durham Region. In total, 120 kilometers of service will be added across the city carrying more than 175 million riders per year by 2021. The Plan presents a vision for sustainable urban transport that will alleviate the growing crisis of traffic congestion and create an effective strategy for accommodating future growth.

Seven LRT corridors (See map) are proposed and prioritized in the Plan, all to be completed by 2021. These transit corridors will provide Torontonians with the ability to ride seamless, high-speed, high-frequency transit service throughout most of the City and also provide inter-regional transit connections with existing and planned routes. As part of the Toronto Official Plan, this LRT network also strives to encourage new development and intensification along identified transit corridors by carrying higher passenger loads and allowing a more efficient use of the City's infrastructure and rights-of-way.

The Eglinton Crosstown Light Rail Transit is the longest and most expensive of the seven transit corridors outlined in the Plan. This future transit corridor is approximately 33 kilometers in length, stretching from Kennedy Station in the east to the Lester B. Pearson International Airport in the west; making it the only transit line to cross all municipalities in the former Metropolitan Toronto. In general, the LRT line will operate at surface along Eglinton Avenue at the east and west ends, carrying two lanes of through traffic. However, it will operate underground between Keele Street and Brentcliffe Road due to the narrow width of Eglinton Avenue. The line is expected to open in 2015, the fourth of the seven Transit City corridors to be completed after the Sheppard East, Etobicoke-Finch West, and Waterfront West LRT lines.
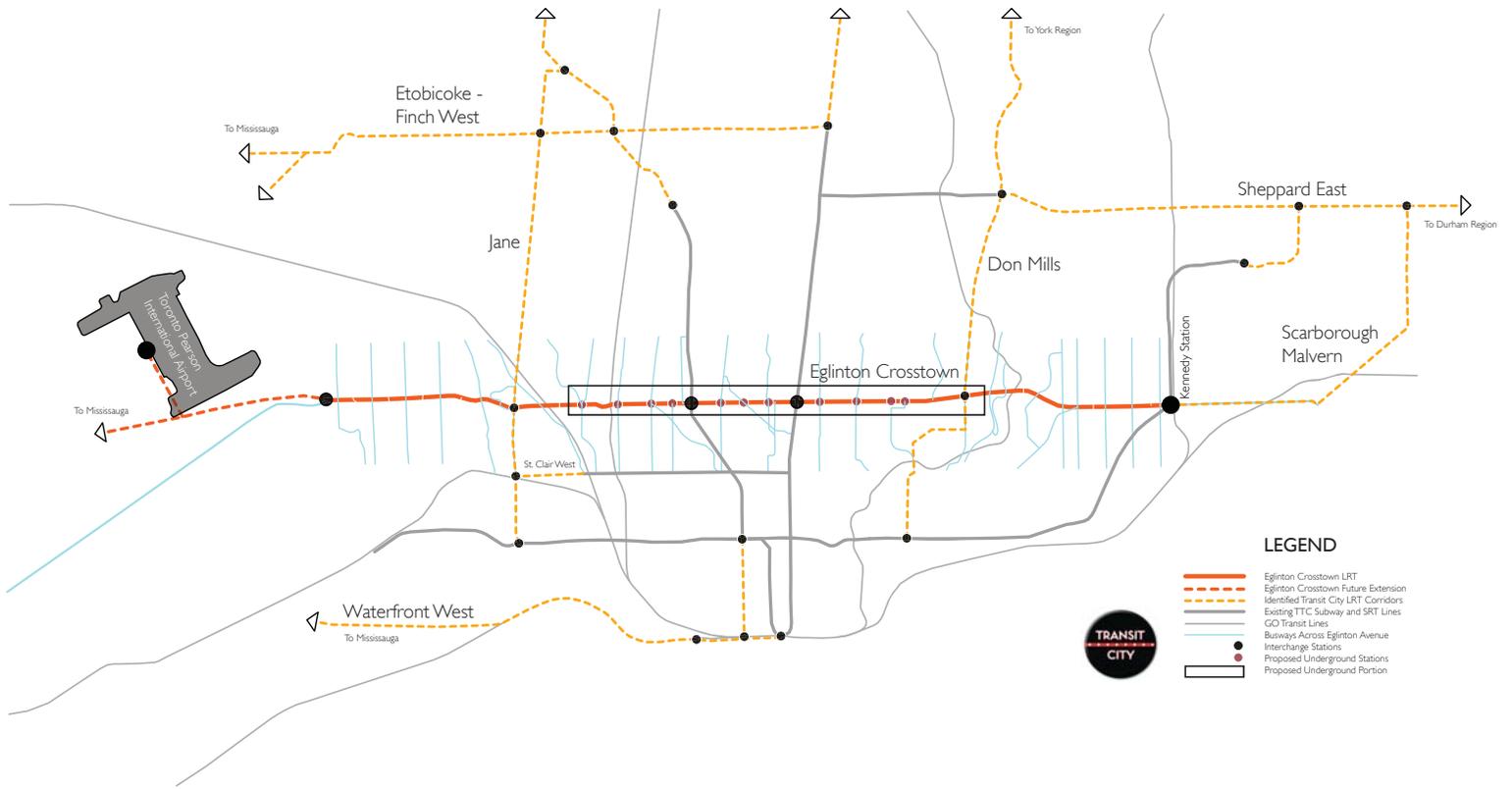
fig. 4.19 Seven proposed LRT corridors in Transit City plan announced in June 2007

Etobicoke - Finch West

To Mississauga

Jane

To York Region

Sheppard East

To Durham Region

Don Mills

Scarborough Malvern

Kennedy Station

Toronto Pearson International Airport

To Mississauga

Eglinton Crosstown

St. Clair West

Waterfront West

To Mississauga

LEGEND

Eglinton Crosstown LRT
Eglinton Crosstown Future Extension
Identified Transit City LRT Corridors
Existing TTC Subway and SRT Lines
GO Transit Lines
Busways Across Eglinton Avenue
Interchange Stations
Proposed Underground Stations
Proposed Underground Portion

TRANSIT CITY

Airport to Keele
Surface LRT

Keele to Brentcliffe
Underground LRT

Brentcliffe to Kennedy
Surface LRT

TO AIRPORT

Martin Grove
Widdicombe Hill / Lloyd Manor
Kipling
Wincott / Bemersyde
Islington
Russell / Eden Valley
Royal York
Mulham
Scarlett
Emmett
Jane
Weston
Black Creek
Keele
Caledonia
Dufferin
Oakwood
Eglinton West
Bathurst
Chaplin
Avenue
Eglinton
Mount Pleasant
Bayview
Brentcliffe
Leslie
Don Mills
Ferrand
Wynford
Swift / Credit Union
Bermondsey
Victoria Park
Pharmacy
Lebovic
Warden
Birchmount
Ionview
Kennedy
SCARBOROUGH LRT

JANE LRT

SPADINA SUBWAY

YONGE SUBWAY

DON MILLS LRT

BLOOR–DANFORTH SUBWAY

SCARBOROUGH MALVERN LRT

fig. 4.20 Proposed stops and transfers on Eglinton Crosstown LRT line

fig. 4.21 Looking west along Eglinton Avenue on a rainy day, with Canada Square and the Yonge Eglinton Centre

A series of analytical diagrams are included in this chapter, documenting land use plan outlined in the Official Plan for the City of Toronto, population density, township boundaries, and ridership pattern along Eglinton Avenue. Within the 1km Study Area centred on Eglinton Avenue , there are:

2	Golf courses	**29**	Elementary schools
41	Parks and parkettes	**11**	High schools
3	Medical institutions	**2**	Colleges
8	Community recreation centres	**3**	Private schools
52	Places of worship	**9**	Libraries
2	Heritage designated properties		

EGLINTON AVENUE
Highway developments and commercial uses

Eglinton Avenue is one of the few east-west routes that cross the entire city of Toronto uninterruptedly in more or less a straight line. It runs from Kingston Road in the east to the western city boundary of Mississauga, which makes it the only street to cross through all six municipalities that made up Metro Toronto: East York, Etobicoke, North York, Scarborough, Toronto, and York. The road is divided into Eglinton Avenue West and Eglinton Avenue East with Yonge Street as the dividing line.

The traffic demand along Eglinton Avenue is notably high, and the city had made several attempts to reconnect the thoroughfare in major transit developments. The Richview Expressway was first proposed in the 1966 Metro Expressway plan, runs from the Mount Dennis area westward to the junction of Highways 401 and 27. The plan was shelved halfway due to the strong opposition from local residents. Today, a widened right-of-way for Eglinton Avenue in Etobicoke and an elaborate connection from the 401 and 427 to Eglinton Avenue still remains. On the other hand, the Spadina Expressway was also proposed in the Metro expressway plan. Originally to run from north of Highway 401 into the downtown area, it was only partially built before being cancelled in 1971. Now, it runs shortly along Allen Road and end abruptly on Eglinton Avenue West. In 1994, the Eglinton West subway project was started by the provincial government. The project was soon abandoned and replaced with a busway.

In the Official Plan for the City of Toronto, land uses along Eglinton Avenue are for the most part residential and mixed-use. However, it becomes a major commercial area from Allen Road to Don Mills Road. Five Business Improvement Areas (BIAs) in Toronto are found in the stretch, between Yonge Street and Keele Street, and three other ones intersect with the avenue at Mount Pleasant Road, Yonge Street and Weston Road. This commercial strip is often referred as the commercial backbone of the city. The retail strip from Marlee Avenue to Keele Street is home to a large number of Caribbean and West Indian stores, known as Little Jamaica, where a diversity of cultural food markets, eateries and stores are found.

On the east end, the Golden Mile is a district with intensive industrial and commercial development that runs along Eglinton Avenue from Victoria Park Avenue east to Birchmount Road. It was one of Canada's first model industrial parks, where a large concentration of power centres, factories, big box stores, and strip malls are located. Major shopping complexes along the avenue also include Erin Mills Town Centre, Eglinton Square, and Yonge-Eglinton Centre.

NATURAL AREAS AND PARKS
Along Eglinton Avenue fig. 4.22

The proposed Eglinton Crosstown LRT cuts across two major rivers in the city, one being the Humber River to the west, the other being the Don River to the east. These two heritage rivers collect hundreds of creeks, and tributaries along their courses, and bound the original settled area of Toronto. The city's unique topography has given birth to numerous distinctive ravines and parklands. Major parks along Eglinton Avenue include Centennial Park in the west, Eglinton Flats Park on the Humber River floodplain, Keelesdale North Park along Black Creek, Eglinton Park in the central district, Sunnybrook Park and E.T. Seton Park in the Central Don area, and Eglinton Ravine Park in the east. Two scenic golf courses can also be found along the avenue, namely the Flemingdon Park Golf Club and the Scarlett Woods Golf Course. It is interesting to know that the north-east corner of the E.T. Seton Park is leased from the former Metropolitan Toronto for ninety-nine years to operate the Ontario Science Centre, one of the biggest science museums in Canada, built down the side of a wooded ravine along the Don River.

Humber River

Eglinton Flats Park
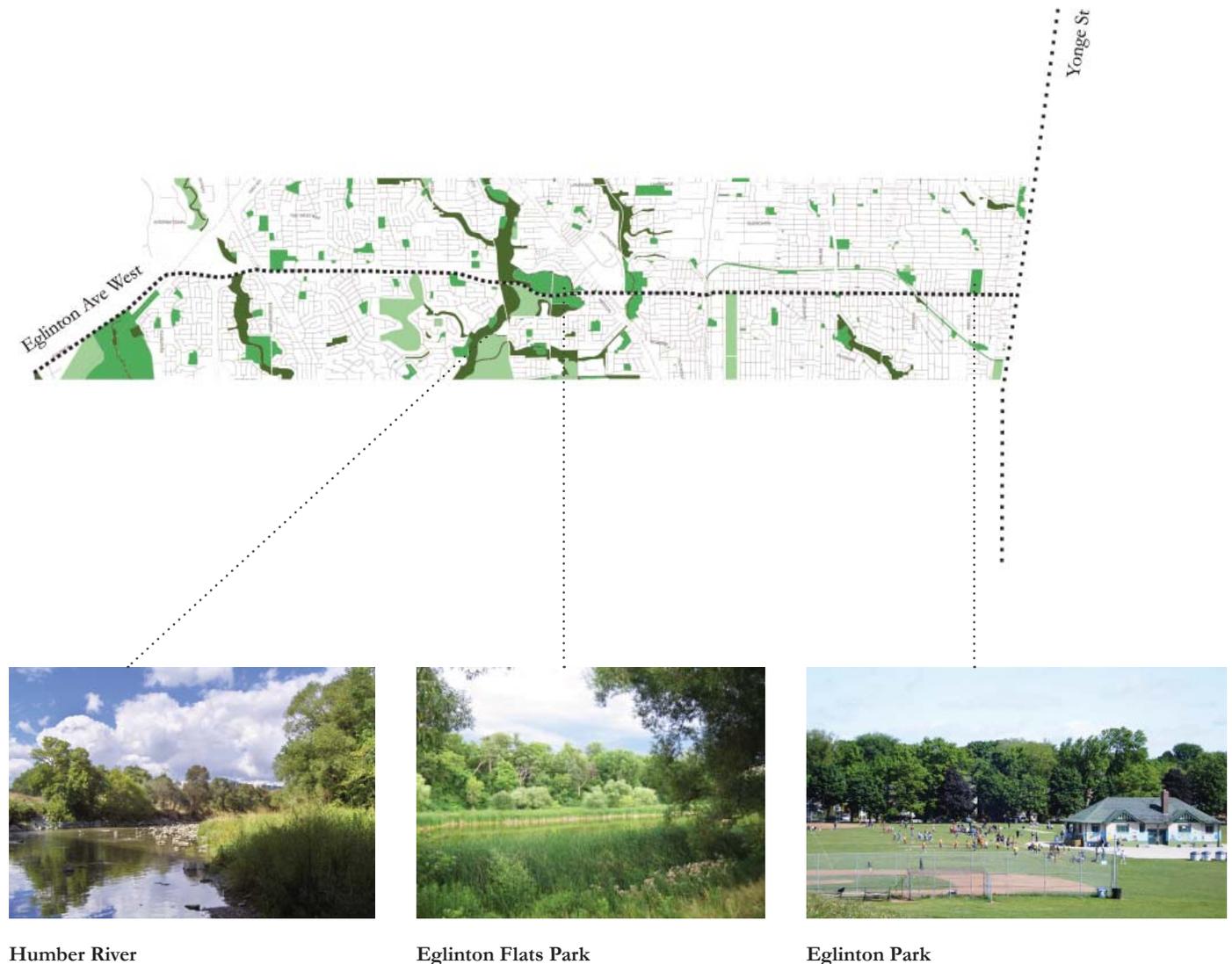
Eglinton Park

Sunnybrook Park

Don River

Yonge St

Eglinton Ave East
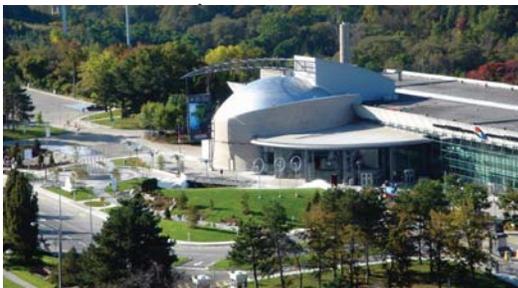
Ontario Science Centre

LAND USE DESIGNATIONS

Natural Areas

Parks

Other Open Space Areas
(Including golf courses,
cemeteries, public utilities)

NEIGHBOURHOODS
Along Eglinton Avenue

Eglinton Avenue is the only street that crosses all six former municipalities that made up Metro Toronto. Land uses along Eglinton Avenue are for the most part residential. The Old City of Toronto area along Eglinton is home to many historically wealthy residential enclaves, such as Forest Hill (101 and 102, refer to fig. 4.24), Lawrence Park (103), and Cedarvale (106). These neighbourhoods feature upscale homes, luxury condominiums and high-end retails. The inner suburbs of Toronto are contained within the former municipalities of York and East York. These are traditionally working class areas, primarily consisting of single-family homes and small apartment blocks. Neighbourhoods such as Thorncliffe Park (55) and Oakwood-Vaughan (107) are also home to many new immigrant families. During the housing boom in the late 1990s and 2000s, many neighbourhoods have undergone urban intensification and gentrification along Eglinton. One of the first neighbourhoods affected was Leaside (56) in East York; the trend has then gradually progressed into the western neighbourhoods in York. As a result, many of these neighbourhoods are currently underserved by public transit. The proposed LRT line also extends into the outer suburbs that include Etobicoke to the west and Scarborough to the east.
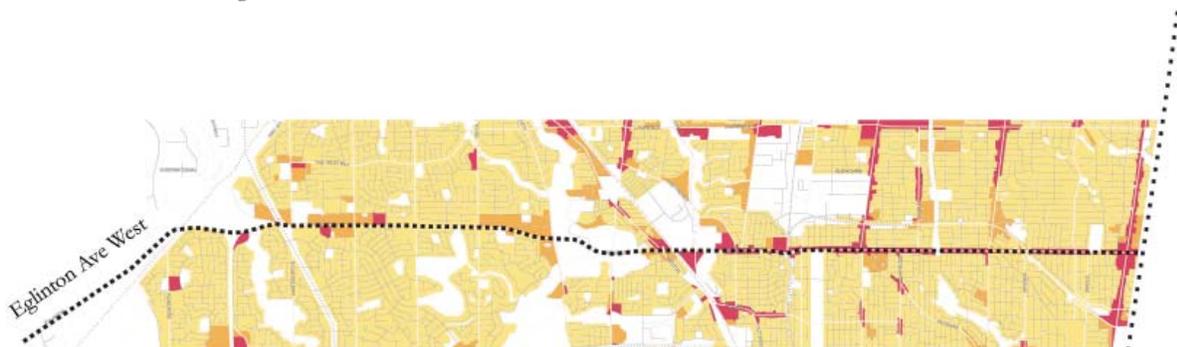
fig. 4.23 Neighbourhoods and mix use areas
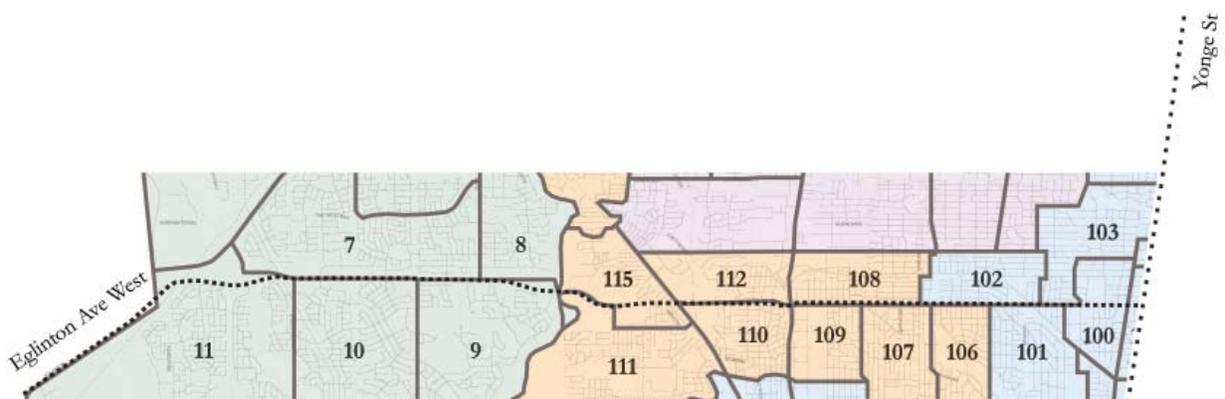
fig. 4.24 Neighbourhoods and municipalities of Metro Toronto

LAND USE DESIGNATIONS

- Neighbourhoods
- Apartment Neighbourhoods
- Mixed Use Areas

MUNICIPALITIES OF METRO TORONTO

- Etobicoke
- York
- North York
- Old Toronto
- East York
- Scarborough

Eglinton Ave East

41 42 43 119 137

104 99 44 125 138 140

56 55 Eglinton Ave East 120 124 123 139
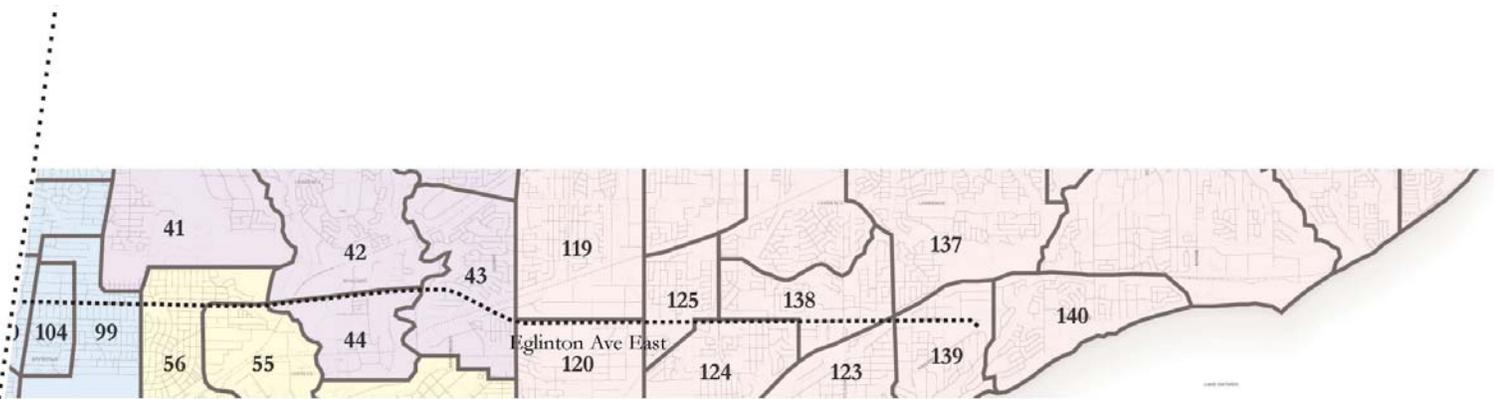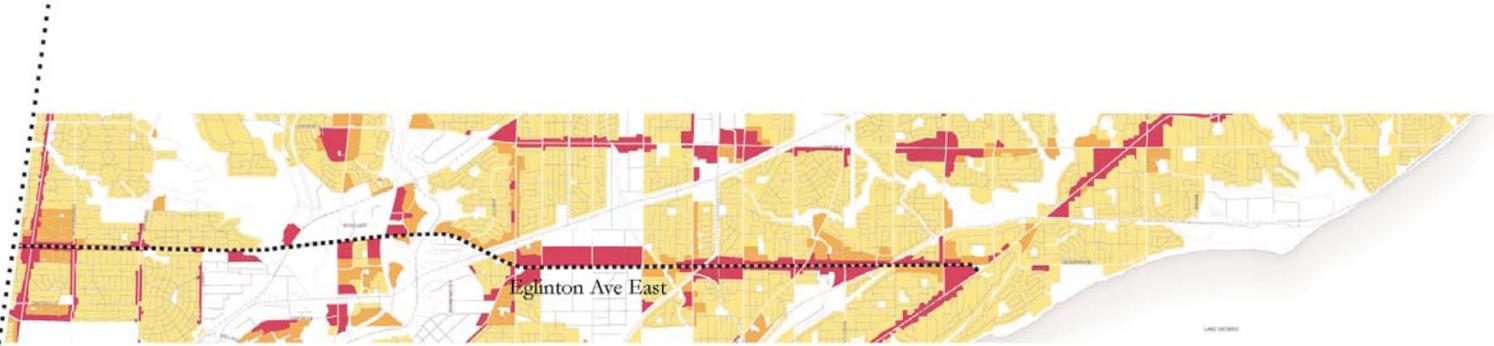
Yonge St

INSTITUTIONAL, EMPLOYMENT, AND BUSINESS IMPROVEMENT AREAS
Along Eglinton Avenue fig. 4.25

Although residential uses dominate along Eglinton Avenue, the section between Allen Road and Don Mills Road becomes a major commercial area, where a number of business improvement areas (BIAs) are established. A significant proportion of land is designated as employment areas between Birchmount Road and Bayview Avenue, as well as between Dufferin Street and Weston Road. Within the study area illustrated below, fifty places of worship, eight community recreation centres, nine libraries, and more than forty educational institutions can be found in the proximity of the Eglinton Avenue.

POPULATION DENSITY
Total population of Toronto 2001 = 2,481,494 fig. 4.26

The population of Toronto has increased by a modest growth rate of 0.9% since census 2001, to a total of 2,503,281 in 2006. While Toronto not keeping pace with Canada's national growth rate of 5.4% in the last eight years, its surrounding suburb communities are booming, all has experienced a double-digit percentage increase according to the newest census data released in 2006. This 'spreading out from the urban centre' phenomena continues to take hold in the city, making cross-town transport a mandatory first step in future urban transit development.
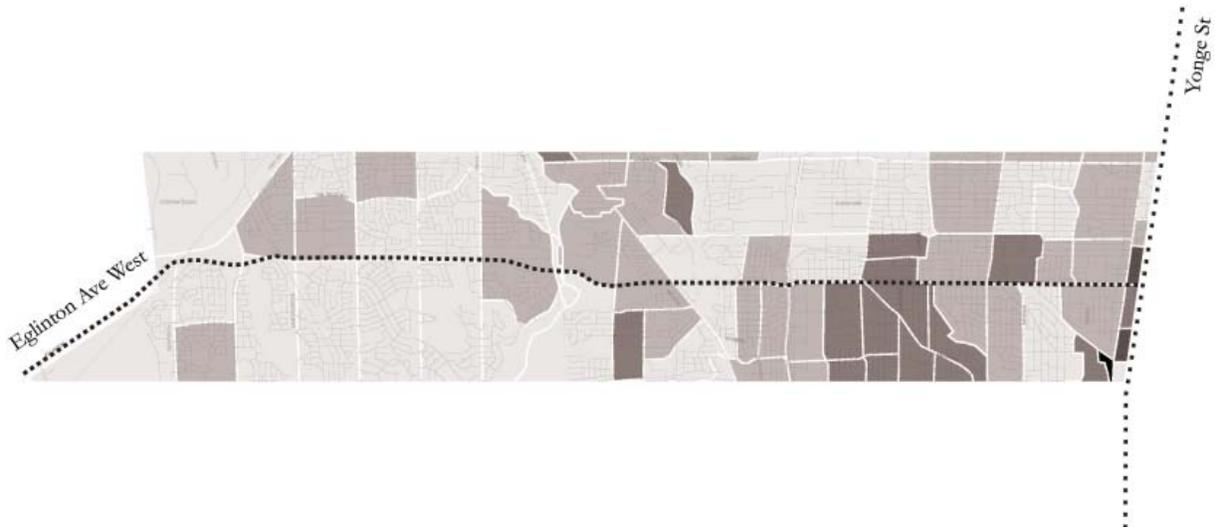
Institutional Areas

Employment Areas

Mixed Use Areas

Business Improvement Areas
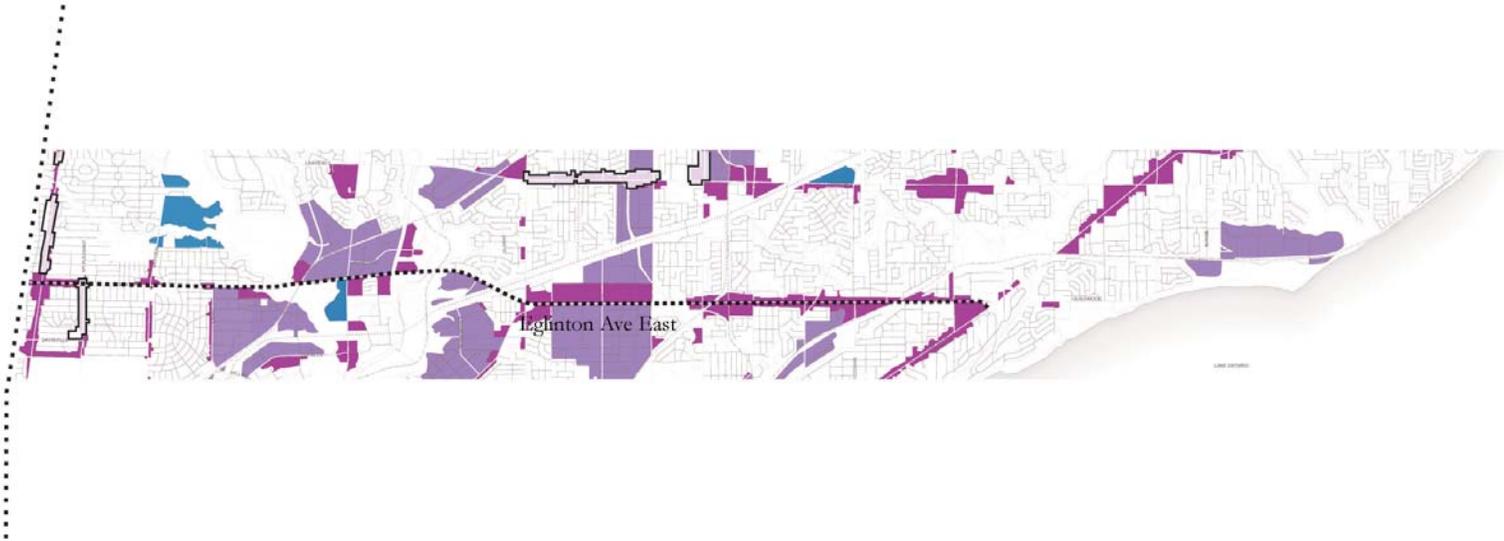
Eglinton Ave East

PERSONS / SQ KM / CENSUS TRACT

31,001 - 43,000

17,001 - 31,000

9,001 - 17,000

4,501 - 9,000

87 - 4,500

Eglinton Ave East

Yonge St

the avenue
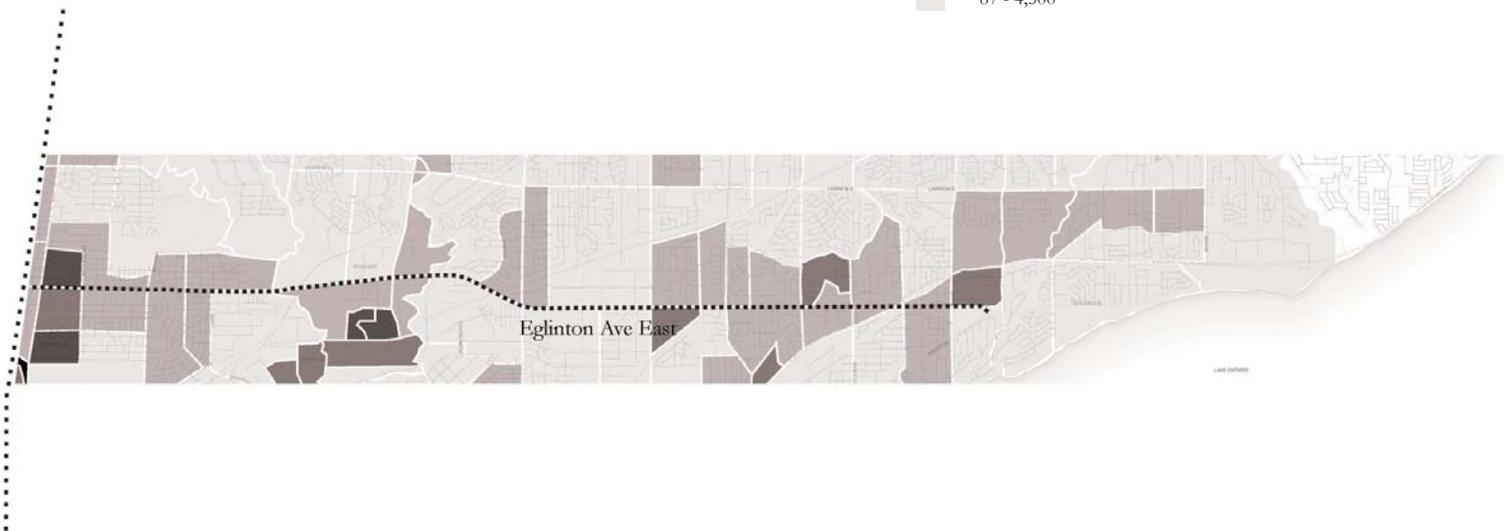
RIDERSHIP STUDY
On existing transit routes
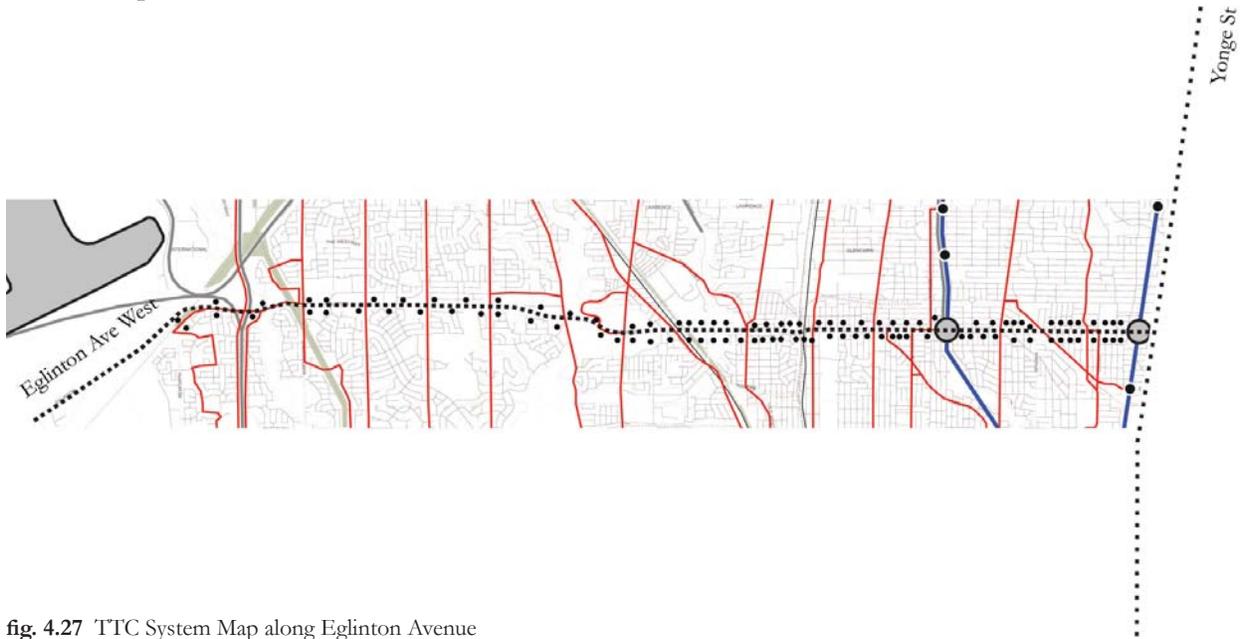
fig. 4.27 TTC System Map along Eglinton Avenue

A number of bus routes provide service to the Eglinton Avenue corridor today. Three routes directly serve all or portions of Eglinton Avenue west of the Yonge Subway, and five routes directly serve all or portions of the avenue east of the Yonge Subway. [63] Thirty-four routes feed the Eglinton Avenue corridor. An online survey on the official Transit City website indicates that out of the seven proposed transit corridors, Eglinton Crosstown LRT is the first in demand. It has received three times the total number of votes of all the other proposed LRT lines combined in ridership demand.

Yonge St

Eglinton Ave East

Sheppard
72,200/day

Eglinton West
18,430/day

Eglinton
73,090/day

Kennedy
74,830/day

St. George
116,840/day

Yonge-Bloor
197,700/day

Union
80,990/day

TTC Daily Ridership
2007 - 2008

○ 100 - 200 K
○ 50 - 100 K
○ 25 - 50 K
○ 15 - 25 K
○ 5 - 15 K
○ 0 - 5 K
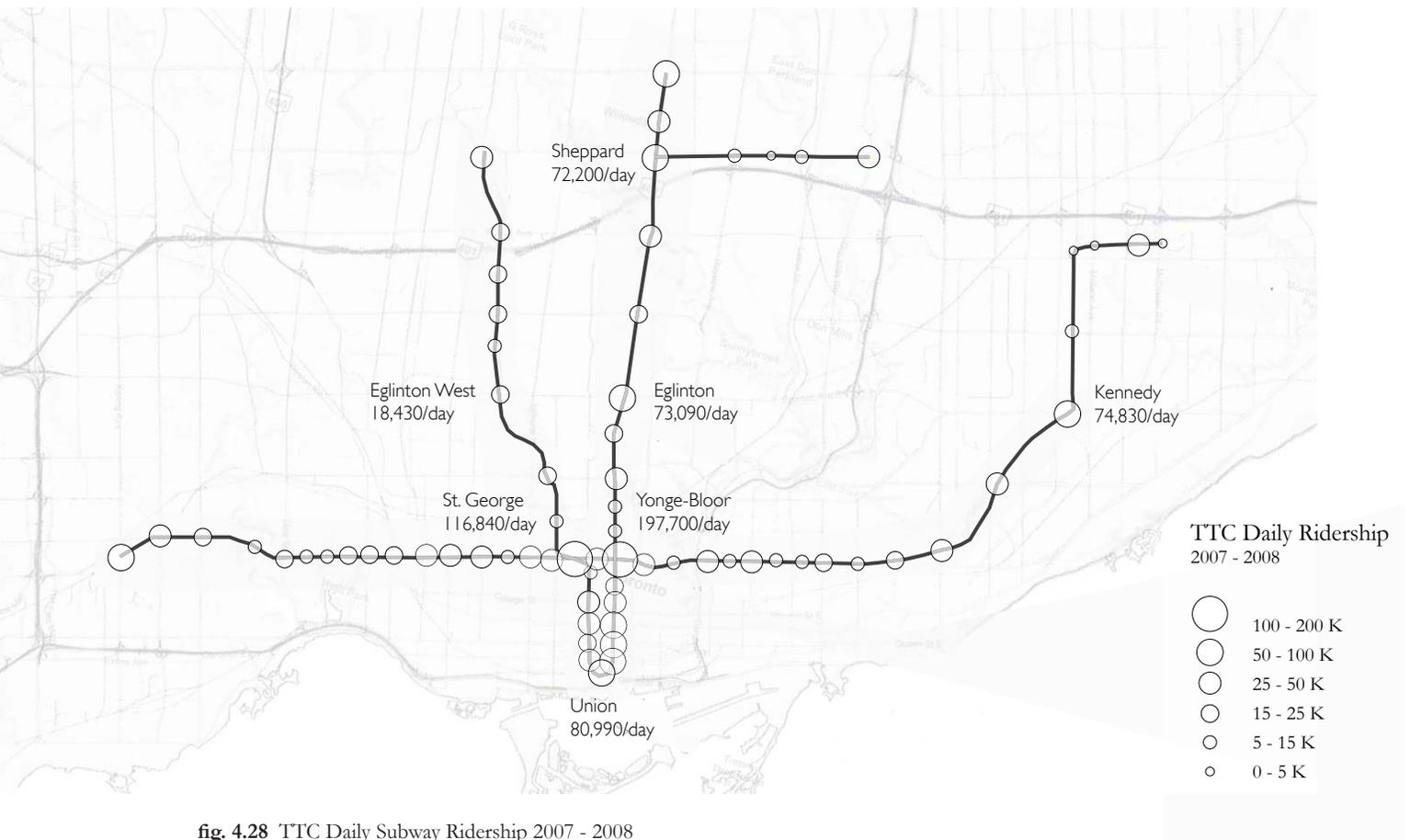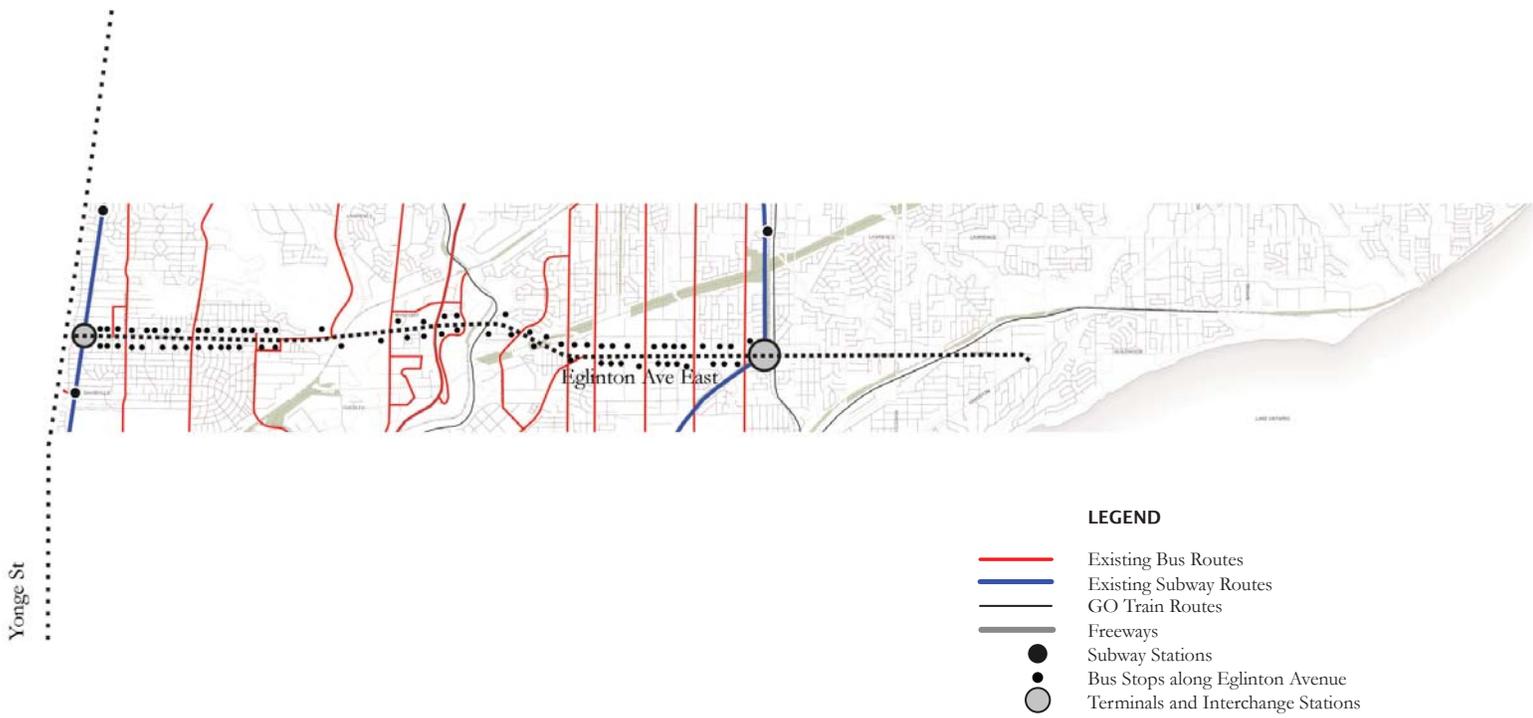
fig. 4.28 TTC Daily Subway Ridership 2007 - 2008

the avenue

RIDERSHIP STUDY

On existing transit routes

Illustrated below is the relative ridership of each bus route that cuts across Eglinton Avenue, as well as the total trips taken along Eglinton East and Eglinton West on a typical weekday. Route numbers are indicated on each bar as a reference to the ridership statistics chart on the opposite page.

Pearson International Airport

Routes that intersect Eglinton Avenue

25

24

68

43

17

11

70

97 103

91

74

67

113

144

EGLINTON EAST
82,600 trips / weekday

Kennedy Station

EGLINTON WEST
46,500 trips / weekday

Routes on Eglinton Avenue

71

142

14

111

109

90

112 191
46

73

79

37

89

47

45

63

7

41

35

29
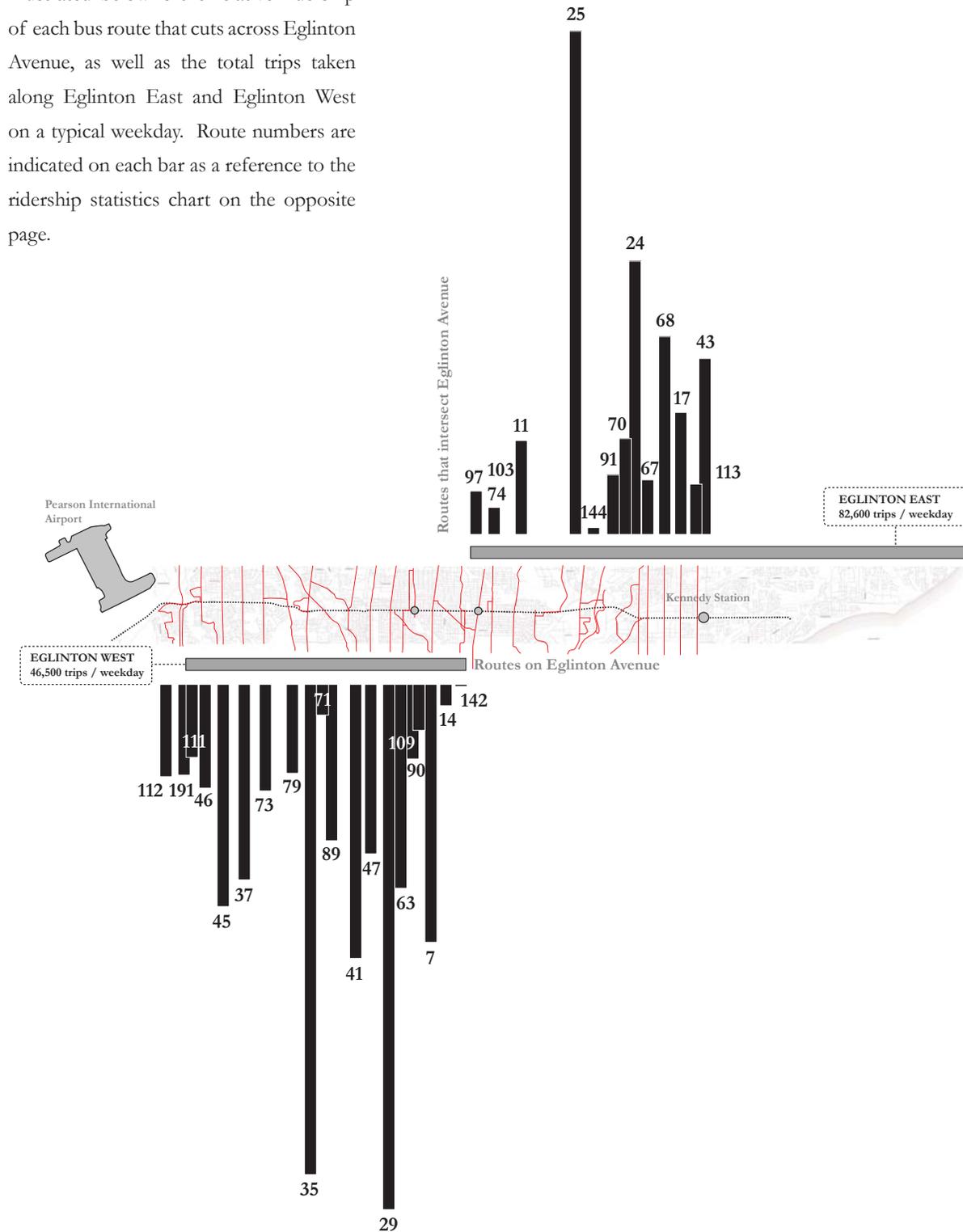
fig. 4.29 Ridership of bus routes along or intersect Eglinton Avenue 2007 - 2008

RIDERSHIP STATISTICS

ROUTES THAT INTERSECT EGLINTON AVENUE

East Corridor

Route	# of customers on typical weekday
25 Don Mills	41,823
24 Victoria Park	22,718
7 Bathurst	21,417
68 Warden	16,442
43 Kennedy	14,624
17 Birchmount	10,137
70 O'Connor	7,960
11 Bayview	7,808
91 Woodbine	4,949
67 Pharmacy	4,537
113 Danforth	4,183
97 Yonge	3,606
103 Mt. Pleasant North	1,381
74 Mt. Pleasant	866
144 Don Valley Exp.	573

West Corridor

Route	# of customers typical weekday
29 Dufferin	43,648
35 Jane	40,731
41 Keele	22,765
45 Kipling	18,461
63 Ossington	16,938
37 Islington	16,241
47 Lansdowne	14,076
89 Weston	12,987
73 Royal York	8,850
46 Martin Grove	8,609
112 West Mall	7,663
191 Hwy. 27 Rocket	7,530
79 Scarlett	7,382
90 Vaughan	6,190
111 East Mall	6,057
109 Ranee	3,815
71 Runnymede	2,547
14 Glencairn	1,764
142 Avenue Exp.	168

East Corridor Total   **163,034**

West Corridor Total   **246,422**

ROUTES ON EGLINTON AVENUE

East Corridor Total   **82,600**
(Route # 54, 34, 100, 56, & 51)

West Corridor Total   **46,500**
(Route # 32, 61, & 5)

fig. 4.30 Eglinton Crosstown LRT Ridership Projection 2006 and 2021

	Etobicoke	Weston	York	North Toronto	Don Mills	Scarborough	Total
Eastbound Trips in millions							
2006	3.26 M	3.54 M	3.26 M	2.46 M	4.20 M		16.72 M
2021	5.30 M	5.75 M	5.29 M	4.00 M	6.82 M		27.16 M
Westbound Trips in millions							
2006	3.02 M	3.53 M	3.20 M	1.97 M	3.55 M		15.27 M
2021	4.91 M	5.74 M	5.20 M	3.21 M	5.78 M		24.84 M
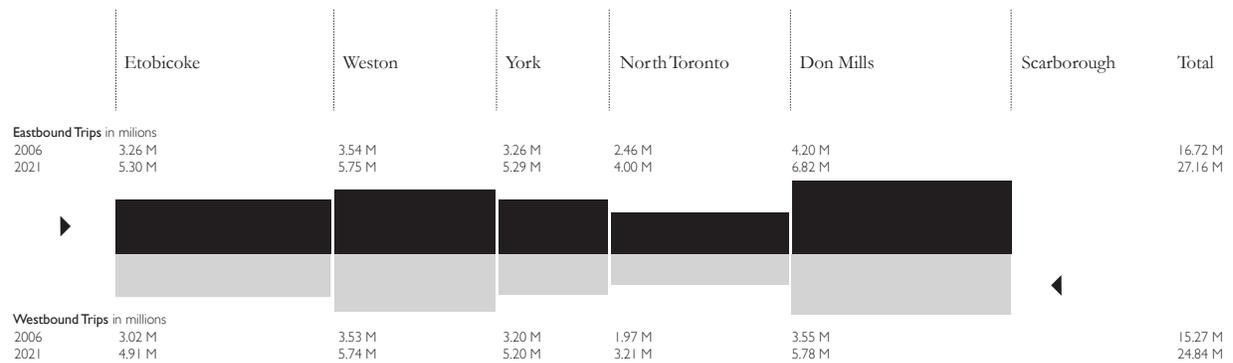
Total Ridership in 2006:   **32 million**
Total Ridership project in 2021:   **52 million**

DESIGN PROPOSAL
Prototypes and stop locations

On the Eglinton Crosstown LRT line, a total of 39 stops are proposed, of which there are 25 new surface stops and 10 new underground stations (from Keele to Brentcliffe). This thesis intends to develop design prototypes that can be implemented flexibly on these 35 new stations. Specifically, there are two basic types of underground stations, one is 14m deep, with a centre platform and a concourse mezzanine; and the other is 10m deep, with side platforms directly below grade. Deep station prototype Type D, allows easier access to both sides of Eglinton Avenue, provides more elaborate amenities at concourse level, and makes room for double height atriums at the ends of platform that are more suitable at high traffic locations. The shallow prototype Type S, on the other hand, has the benefits of minimizing excavation depth, reducing construction cost and maximizing daylight penetration. The decision made between the types is determined by track alignments and the amount of passenger flow at a given location.

In addition, two basic types of surface stops are proposed: 6m centred platform or 3m side platform. Variations of the side platforms include nearside and farside stops. Farside platforms are located beyond the intersection in the direction of travel, whereas nearside platforms are located before the intersection in the direction of travel. The surface stop proposal at each location illustrated below is recommended in the Eglinton Crosstown LRT Preliminary Planning and Project Assessment done by the TTC, with the considerations of road width and left-turn lane requirement.

Existing TTC stations, Kennedy, Eglinton and Eglinton West will be modified into interchange stations. These interchange stations and the connection from Martin Grove to the Pearson International Airport are subjected to more specific site conditions and technical constraints, therefore they are not included in this prototype study.
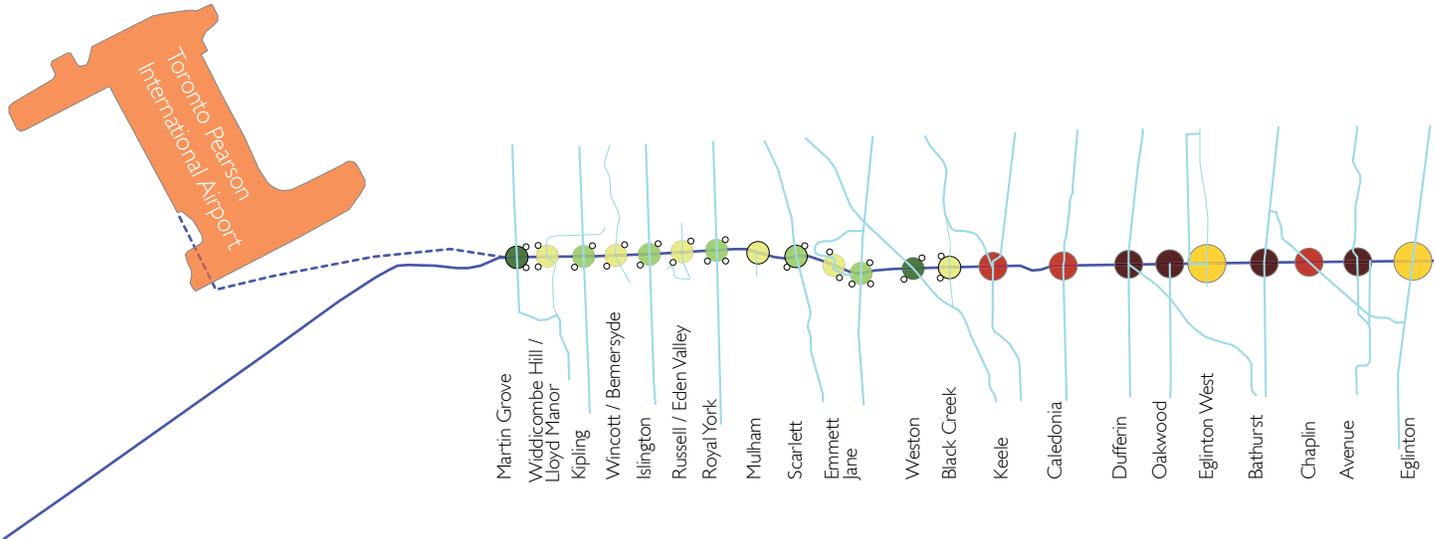
fig. 4.31 Eglinton Crosstown LRT stop and station prototypes

Stops on the Eglinton Crosstown LRT line are located at key intersections to provide convenient connections with other means of transport. Access to existing neighbourhoods and commercial areas has also been taken into consideration. On average, the surface stops are located about 400-500 metres apart, whereas the underground stations are approximately 850 metres apart. This average distance is a good balance between local accessibility and service speed. For reference, existing bus stops along Eglinton Avenue are about 300 metres apart, and existing subway stops on the Bloor-Danforth subway line are on average 875 metres apart. The LRT trains are anticipated to go at an average of 22 km/h on surface and 30 km/h below grade (comparable to the existing TTC subway, which runs at 30 km/h on average). The longer distance between stations allows for faster service and lower construction cost.
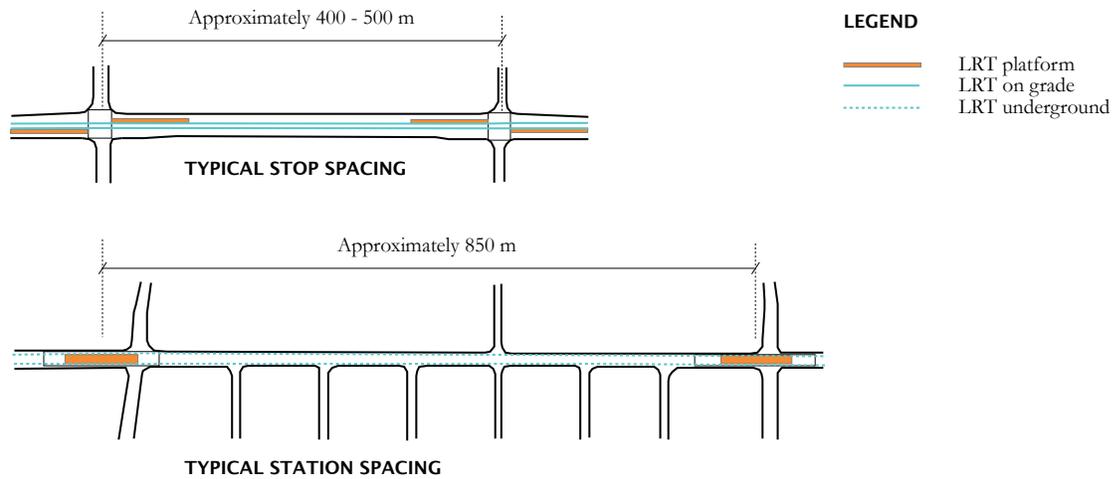
fig. 4.32 Stop and station spacing
Source: Eglinton Crosstown LRT Preliminary Planning by TTC
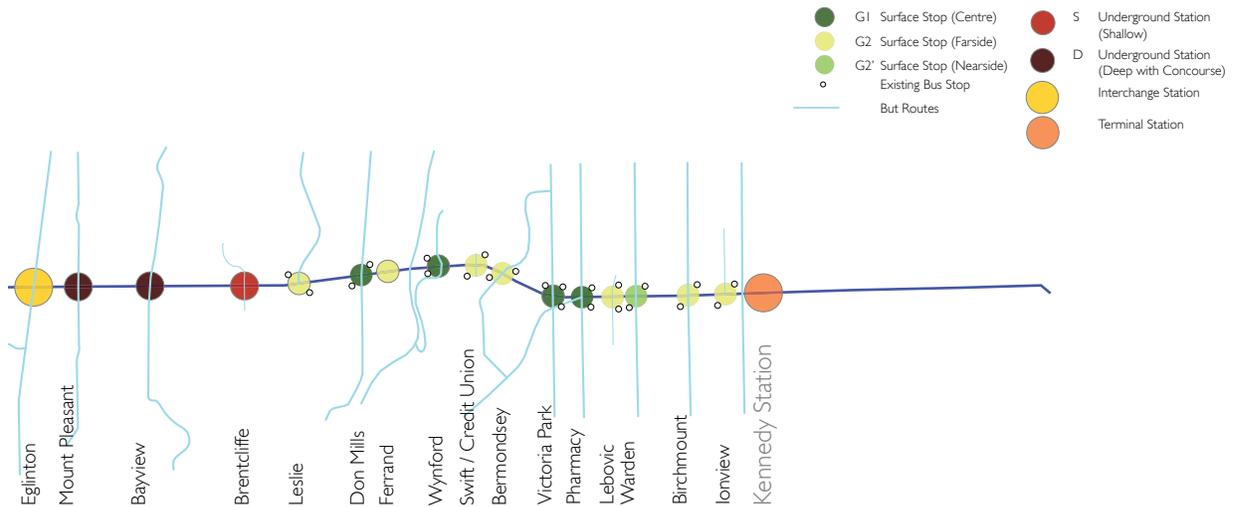
SURFACE STOPS
Prototypes and design parameters

The LRT will be designed to carry two lanes of through traffic per direction in the corridor on surface between Martin Grove Road and Keele Street in the west, and between Brentcliffe Road to Kennedy Road in the east. Most intersections will have farside platforms with left turn lanes. Some intersections will have nearside or centre platforms without left turn lanes.

- Surface side platforms are 90m long by 3m wide
- Centre platforms are 90m long by 6m wide

Every surface stop will:

- Provide shading along the entire length
- Provide handicap access and good sightlines throughout
- Be lit all night and function as landmarks throughout the day
- Include ticket machines and other vending amenities
- Promote public art and integrate with a cultural wall
- Maximize air flow at open seating area
- Incorporate winter sunrooms with a heating system
- Integrate signage, PA speakers, cameras, and arrival time displays
- Include community message boards that help regenerating immediate precinct connections
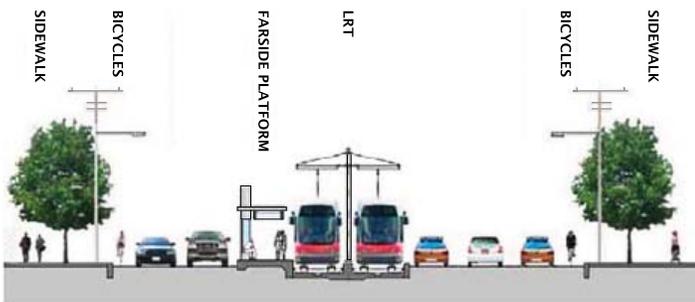
TYPICAL CROSS SECTION WITH FARSIDE PLATFORM
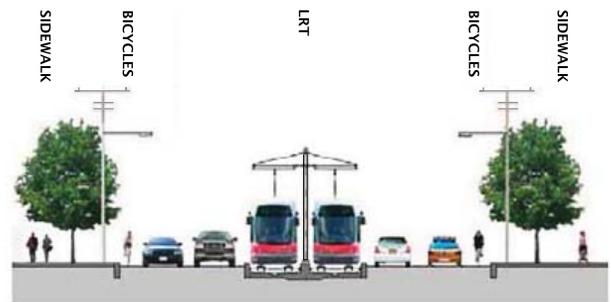
TYPICAL MIDBLOCK CROSS SECTION
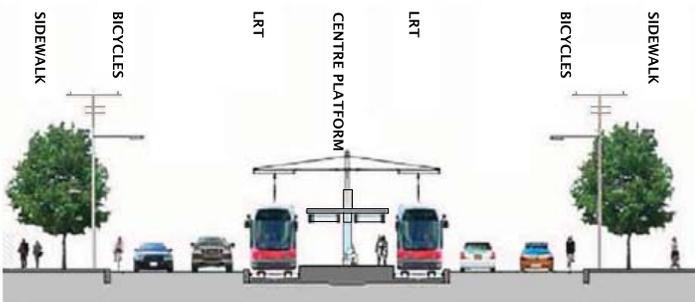
TYPICAL CROSS SECTION WITH CENTRE PLATFORM

fig. 4.33 Surface stop prototype cross sections
Source: Eglinton Crosstown LRT Preliminary Planning by TTC
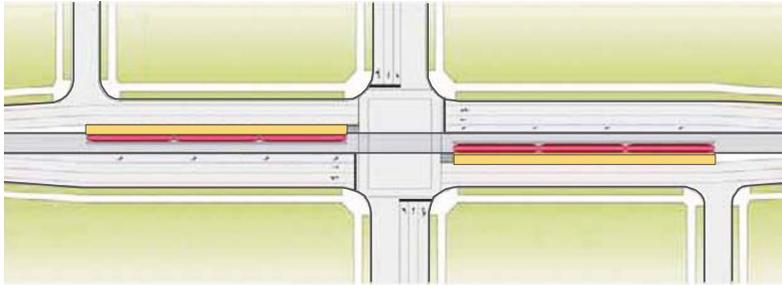
FARSIDE SURFACE STOPS

Widdicombe Hill / Lloyd Manor
Wincott / Bemersyde
Russell / Eden Valley
Mulham
Emmett
Black Creek

Leslie
Ferrand
Swift / Credit Union
Bermondsey
Lebovic
Birchmount
Ionview
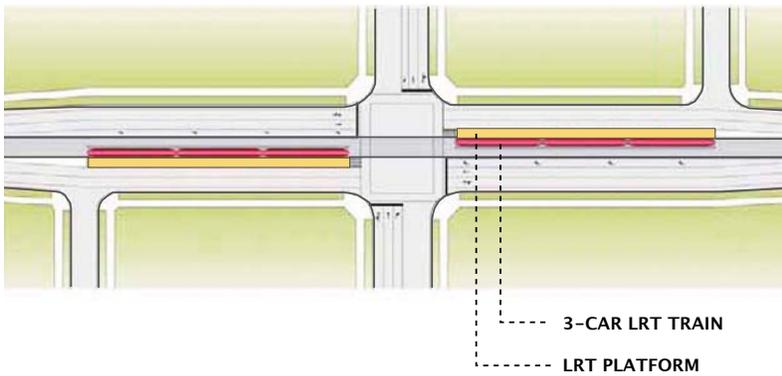
NEARSIDE SURFACE STOPS

Kipling
Islington
Royal York
Scarlett
Jane

Warden

3–CAR LRT TRAIN

LRT PLATFORM
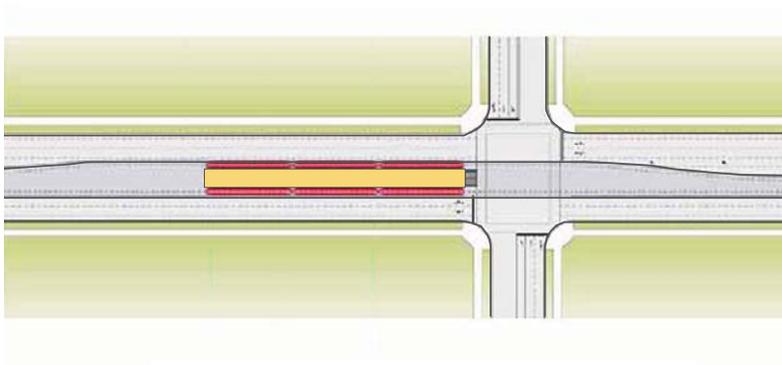
CENTRE SURFACE STOPS

Martin Grove
Weston

Don Mills
Wynford
Victoria Park
Pharmacy

fig. 4.34 Surface stop prototype plans
Source: Eglinton Crosstown LRT Preliminary Planning by TTC

UNDERGROUND STATIONS
Prototypes and design parameters

Typical Deep Underground Station

Typical deep underground station will include two station entrances, one located on each side of Eglinton Avenue. The entrances will be connected through a concourse mezzanine. Main entrances will be 100% barrier free with an elevator and an escalator connecting to the level below and contain an information booth on concourse level. Secondary entrances will include ticket vending machines and automatic turnstiles. Two lanes of through traffic will be maintained in the underground section.

- Centre platforms are 95 to 105m long by 10 to 12m wide; located 14m below grade
- Building width varies between 20 to 24m
- Clear headroom under mezzanine is 4m
- Double height atriums are 10m in height
- 4m of backfilled space above station are available for utility and structure

Typical Shallow Underground Station

Typical shallow underground station has side platforms located directly below grade. Each station will include one main entrance with elevator access on each side of Eglinton Avenue. A mezzanine bridge connects the side platforms to enhance accessibility. The overall design of main and secondary entrances is similar to the entrance design of deep underground station.

- Side platforms are 95 to 105m long by 4 to 6m wide; located 10m below grade
- Building width varies between 20 to 24m
- Clear headroom under the mezzanine bridge is 4m
- Overall ceiling height is 7m
- 3m of backfilled space above station are available for utility and structure

Every underground station will:

- Provide gallery spaces and designated performance area for local artists and musicians
- Include one mural wall and one graffiti wall with design themes that reflects district history and cultural character, both are commissioned to local artists through competition
- Include community message boards that help regenerating immediate precinct connections
- Provide bicycle parking space on grade
- Maximize daylight penetration with light shafts and skylights
- Include a convenience store and a station café / bar with lounge (deep stations only)
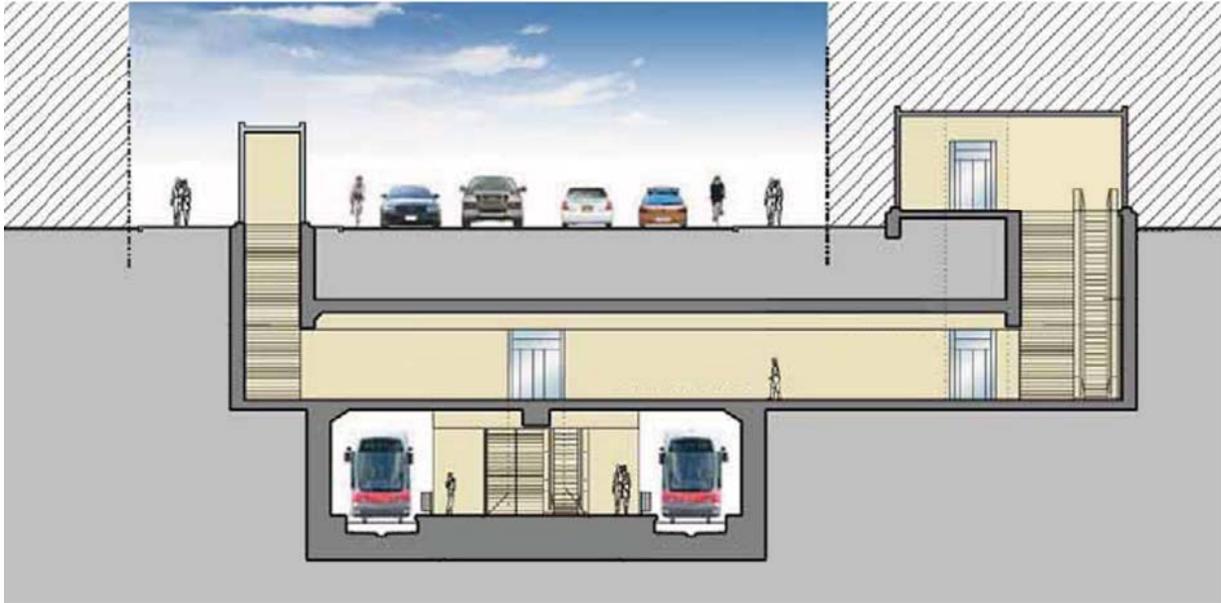
TYPICAL UNDERGROUND DEEP STATION

Dufferin Station   Avenue Station
Oakwood Station   Mount Pleasant Station
Bathurst Station   Bayview Station

TYPICAL UNDERGROUND SHALLOW STATION

Keele Station   Chaplin Station
Caledonia Station   Brentcliffe Station

fig. 4.35 Underground station prototype cross sections
Source: Eglinton Crosstown LRT Preliminary Planning by TTC

LIGHT RAIL VEHICLES

The proposed new Light Rail Vehicle to be used on Eglinton Crosstown Corridor will be twice as long as a standard streetcar in Toronto, approximately 27m in length and has a capacity to carry 130 passengers. Low-floor vehicles with level loading from on-street platforms will provide easy boarding and full handicap accessibility. The feature of loading-on-all-doors will significantly reduce boarding time, and a proof-of-payment system will be used. Operator cabs at both ends of the vehicle allow operation in either direction without the need to turn around.

The LRT is being designed to initially operate in single or two-car trains but with an expansion capability to three cars per train to meet future demand. On average, 17 Light Rail trains carrying two vehicles each will operate per hour. The peak demand projection in 2031 is 5,400 people per hour. When approaching this demand, the vehicles will operate in three-car trains and the passenger movement capacity will be increased from 4,100 to 6,800 people per hour.
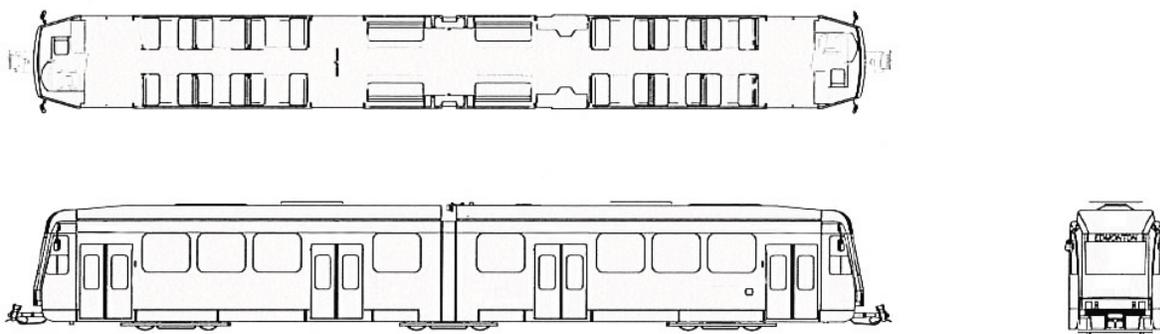
fig. 4.36 Proposed LRT vehicle will have 60 seats, can carry 130 passengers in total; 27m in length, and 2.65m in width

fig. 4.37 Recommended modern LRT precedent - Strasbourg, France

fig. 4.38 Rendering of a future TTC LRT vehicle

CONSTRUCTION

SURFACE

The surface section of the LRT from Martin Grove Road to Keele Street and from Brentcliffe Road to Kennedy Station will be constructed in stages to minimize traffic impacts during construction.
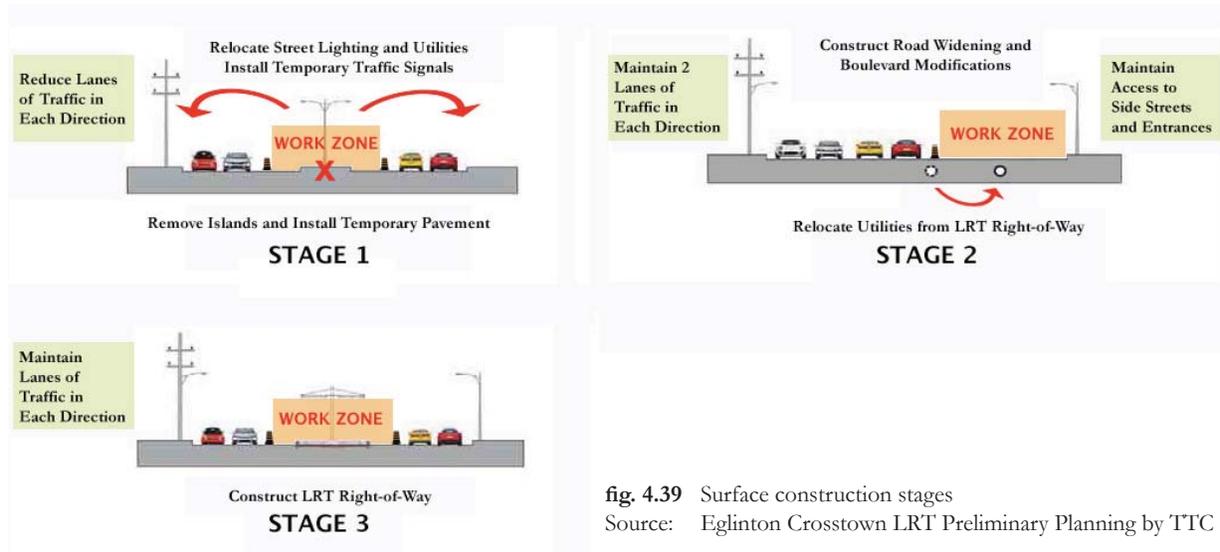
fig. 4.39 Surface construction stages
Source: Eglinton Crosstown LRT Preliminary Planning by TTC

UNDERGROUND

A twin tunnel alignment is being considered for most of the underground section. Each tunnel will be 6 metre in diameter constructed using a tunnel boring machine. The majority of the underground segment will be built using this method. Stations, portals, storage and turn backtracks will be constructed by cut and cover method illustrated below.
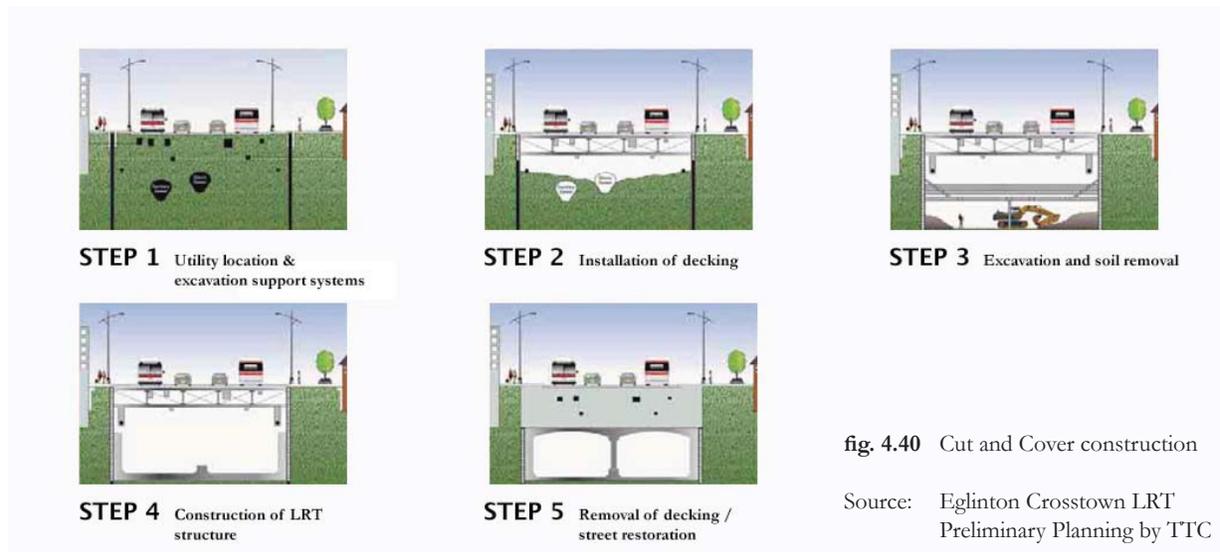
fig. 4.40 Cut and Cover construction

Source: Eglinton Crosstown LRT Preliminary Planning by TTC

5.   DESIGN

5.1   Principles

DESIGN CONCEPT

Following the design guideline developed specifically for underground transit facilities in earlier chapters, the Eglinton Crosstown LRT aims to create a series of successful public places across the city by integrating a number of essential spatial qualities and programmatic functions. As inscribable and contested spaces, these stations encourage commuters' participation in various programs, showcase cultural heritages, and support local artists and musicians. While local identities are embodied in these underground spaces, spatial transparency is also created to enhance orientation and promote freedom of movement.

fig. 5.1   Proposed double-height atrium at Mount Pleasant Station featuring a colonnade at the centre

TRANSPOSED: Station Interior

Creating transposable public spaces is one of the key design objectives. Transposability in public space is achieved by generating spatial transparency, having clearly defined public and private realms and making physical and visual connections between spaces, where easy orientation and freedom of movement are ensured. The interiors of these stations are organized with an open concept, allowing the platform and tracks to be viewed from all places. A greater sense of connection is created between the floors, which are hidden from one another in many existing subway station layouts. Transparent materials, such as glass partitions and glazed railings are used on the mezzanine level to provide uninterrupted visual linkages to platforms, atriums, and exits. These extended interior views and good sightlines help to lessen the feeling or perception of confinement and provide a sense of security. Commuters are also able to overlook adjacent activities, and be led to various loading zones and places of interest.

In a transparent configuration, spatial hierarchy of the new LRT stations is clearly defined, where most private and service areas are hidden from the public realms. Each program zone is designed with a distinct character, marked by variation in height or change of material finishes. The double height atriums at the ends of platform in deep stations and the central area in shallow stations both feature a colonnade of glowing piers down the centre. Light shafts are located between the piers to allow natural light into the underground spaces, and provide visual connections to the exterior environment. Reflective walls are typically found at the ends of a platform, which create the illusion of an infinite space. The design has consciously avoided any disorienting, labyrinthine underground passages. As a result, commuters are able to maintain their sense of spatial relation at all time. Having an interior layout that is easy to understand and creating a series of spatial highlights, the station interior is turned into a fluid, uninterrupted and multi-directional space, rather than a confined black box. Having a continuous flow of traffic will help generating a positive experience for transit users.

CULTURAL ELEMENTS

The design of the Eglinton LRT stations revolves around a number of culture-orientated programs, including a 30-metres long mural wall, a 15-metres long graffiti wall, a designated music performance space, and a mini art gallery at all underground stations. The idea is to transform these practical, mundane transit stations into cultural and artistic hubs, as well as to promote a diverse of art forms. The mural wall is a permanent installation contrasting with the temporary graffiti wall, which will be repainted annually. The mini gallery provides an opportunity to local artists to put their works on display. These collections of art can be used as locale identifiers that give clues to commuters about what neighbourhood they are in before emerging from each station.

> Public art is the display of the creative output of an artist for the enjoyment and benefit of passengers and passersby. It is a sign of imagination, of vibrancy, and of confidence. It may also serve the practical purposes of helping passengers recognize where they are and informing them about the locality. Public artwork on stations may be pure celebration or designed very much for a purpose. [64]

fig. 5.2   Station gallery at Mount Pleasant Station displaying artworks by local artists

CULTURAL EMBODIMENT: Mural Wall

A 30-metres long full height mural wall is featured at each underground station on one side of the platform. Selected themes depict and commemorate Toronto's historic and cultural heritage, distinctive natural landscape, and fascinating community narrative. Each mural reflects the unique characteristics of adjacent neighbourhoods or the particular road, which the station is named after. The idea is to take passengers through a journey of Toronto's community history one by one across the city, and to turn each station into an interesting showroom for locals and visitors. In a storyboard format, local heritage will be put on display in a traditional, enduring art form of glass mosaics.

Besides adding permanent cultural values to each station, these murals also function as locale identifiers that tell passenger their whereabouts at a glance. Local artists' participation is also encouraged. In an open competition, these mural projects will be awarded and commissioned to selected artists. These full height murals are 9m in height at deep stations, 6m at shallow stations or 3m tall at selected surface stops. In deep stations, they are visible from both the mezzanine and platform levels, as well as from bypassing trains. Besides being an eye-catching feature in double height atriums, they also help orienting passengers by leading them toward major loading zones where these walls are located.

fig. 5.3   Featured mural and graffiti walls at Keele Station

INSCRIBABLE ARCHITECTURE: Graffiti Wall

In addition to the mural wall, each underground station on the Eglinton LRT line also features a designated graffiti wall. Contrasting to the permanent, classic mosaic mural, graffiti art is one of the most liberate, informal art media, which can be presented in a wide range of styles. Spray paint, normal paint and markers are the most commonly used materials. It is a rapidly developing art form whose value is highly contested. Unfortunately, this contemporary art form has always been surrounded by controversies, and generally disagreed amongst city officials as an act of vandalism. For these reasons, graffitists in the city are looking for outlets to legally display their works in public locations.

The 15-metres long, designated graffiti wall in each station is one of the unique elements on this proposed LRT line. Annual competitions will be held to select qualifying artists. All winning entries will be chosen by vote of local commuters and commission will be awarded to the artists. The intention is to encourage users' participation in the interior design process and to promote diverse art forms. Graffiti themes may vary year to year, introducing fresh ingredient to the station interiors annually at a relatively low cost. Each graffiti painting should reflect an individual artist's unique creativity and style. In a well-controlled environment, the true spirit of graffiti art will be displayed in an honourable manner.

fig. 5.4   Station café at Dufferin Station which visually connects to the two-storey height graffiti wall

CONTESTED AMENITIES: Station Café, Convenience Store

In addition to art-oriented programs mentioned previously, each deep station is also equipped with a café bar and a convenience store on the mezzanine level. Both the café and the store are minimum 24 square metres in size, which is significantly larger than most of the cafés and convenience booths found in existing stations of comparable size. A stand-up bar will be located adjacent to the café. As a meeting and waiting lounge, the bar overlooks the platform and visually connects to various art features. The walk-in size convenience store gives commuters an opportunity to browse through and pick out goods from the racks themselves while waiting for the next train. Other amenities include barrier-free washrooms, community message boards, and vending machines at all underground stations. These amenities along with a wide range of cultural art programs offer convenience to commuters, improve personal safety, and create an engaging backdrop for informal social interactions to take place. These qualities will turn the new stations into great third places that serve the neighbourhoods nearby.

fig. 5.5   Station café and stand-up bar below light shafts at Mount Pleasant Station

MATERIAL PALETTE

Durable materials such as ceramic wall tiles and self-cleaning concrete are chosen. They have exceptional performance and long service life that require low maintenance. Reflective materials are used to visually expand spatial volumes. Reflective ceiling panels make the loading area to appear larger and taller under the mezzanine. Mirrors are installed at different angles on the end-walls of all platforms to introduce visual interest and to create the illusion of infinite spaces. All furniture and accessories in the stations are made of stainless steel. The vibrant colours of wall tiles contrast with the plain concrete walls and neutral-colour floors. The overall material finishes and colour schemes strive to create a contemporary appearance with excellent visual quality to compensate for the negative associations of underground spaces.

Ceramic Wall Tiles

Self-cleaning Concrete

Reflective Ceiling Panels

Fritted Glass at Entrances

Perforated Stainless Steel Diffusers

Porcelain Floor Tiles

Glass Railing on Mezzanine

Mirrored End-Wall Cladding

Stainless Steel Furniture
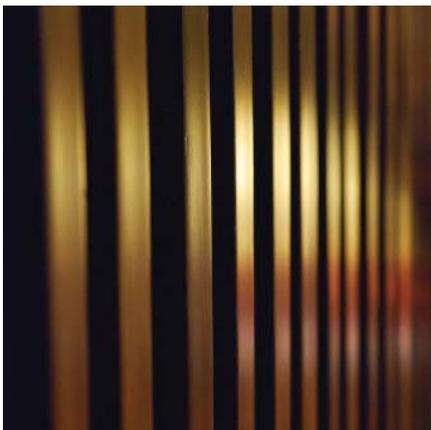
Slatted Wood Partition

Stainless Steel Accessories

material and colour

COLOUR SCHEME
Ceramic wall tiles

Ceramic wall tiles of assorted colours are chosen as the main interior wall finish material to give the underground spaces a refreshing, vibrant appearance. The colour scheme varies from station to station, which makes them recognizable by the colour. Each station's colour palette consists of a dominant theme colour in three different shades, two accent colours, plus black and white. For instance, at Brentcliffe, the first underground station from the east will start with a vivid red theme. As the transit line moves westward, each station's colour scheme changes progressively in the order of a colour wheel or a rainbow. Accordingly, at Keele, the last underground station to the west will have a purple theme. These variations of colour not only create a positive and lively underground environment, they also enhance spatial orientation by allowing passengers to identify each underground station easily and to know its relative location along the line without any reference to the above grade surrounding.

Counterclockwise from top

fig. 5.17 - 5.19
Fiber cement façade panels at
Oslo International School in Bekkestua, Norway

Theme Colour

BW

Accent Colour

fig. 5.20 Ceramic wall tiles with a distinct colour theme at Keele Station

material and colour

COLOUR SCHEME
Of underground stations fig. 5.21

Pearson
Internation Airport

Toronto Pearson
International Airport

Keele
Caledonia
Dufferin
Oakwood
Eglinton West
Bathurst
Chaplin
Avenue
Eglinton
Mount Pleasant
Bayview

Brentcliffe

Kennedy Station

● Shallow Station
● Deep Station
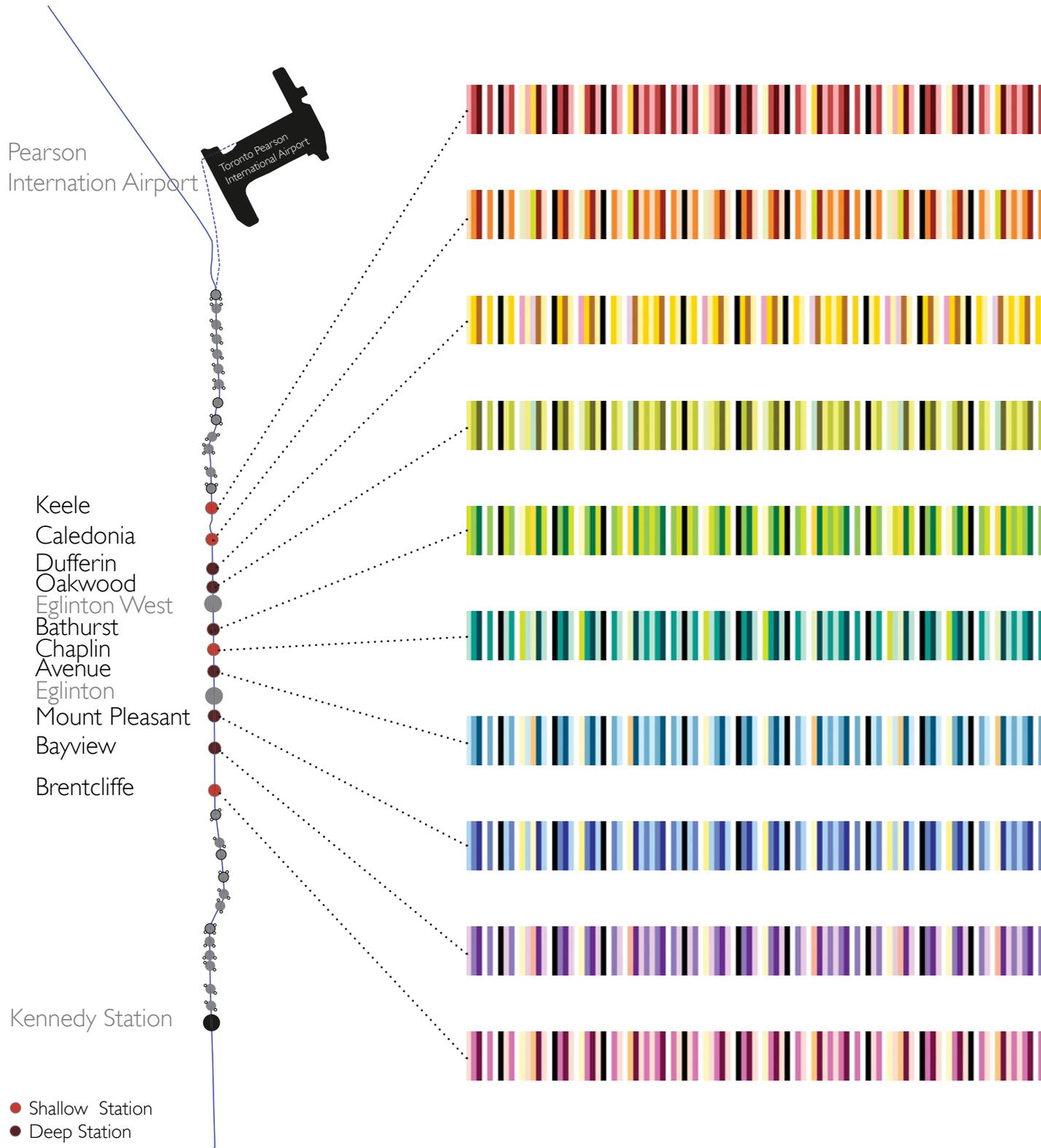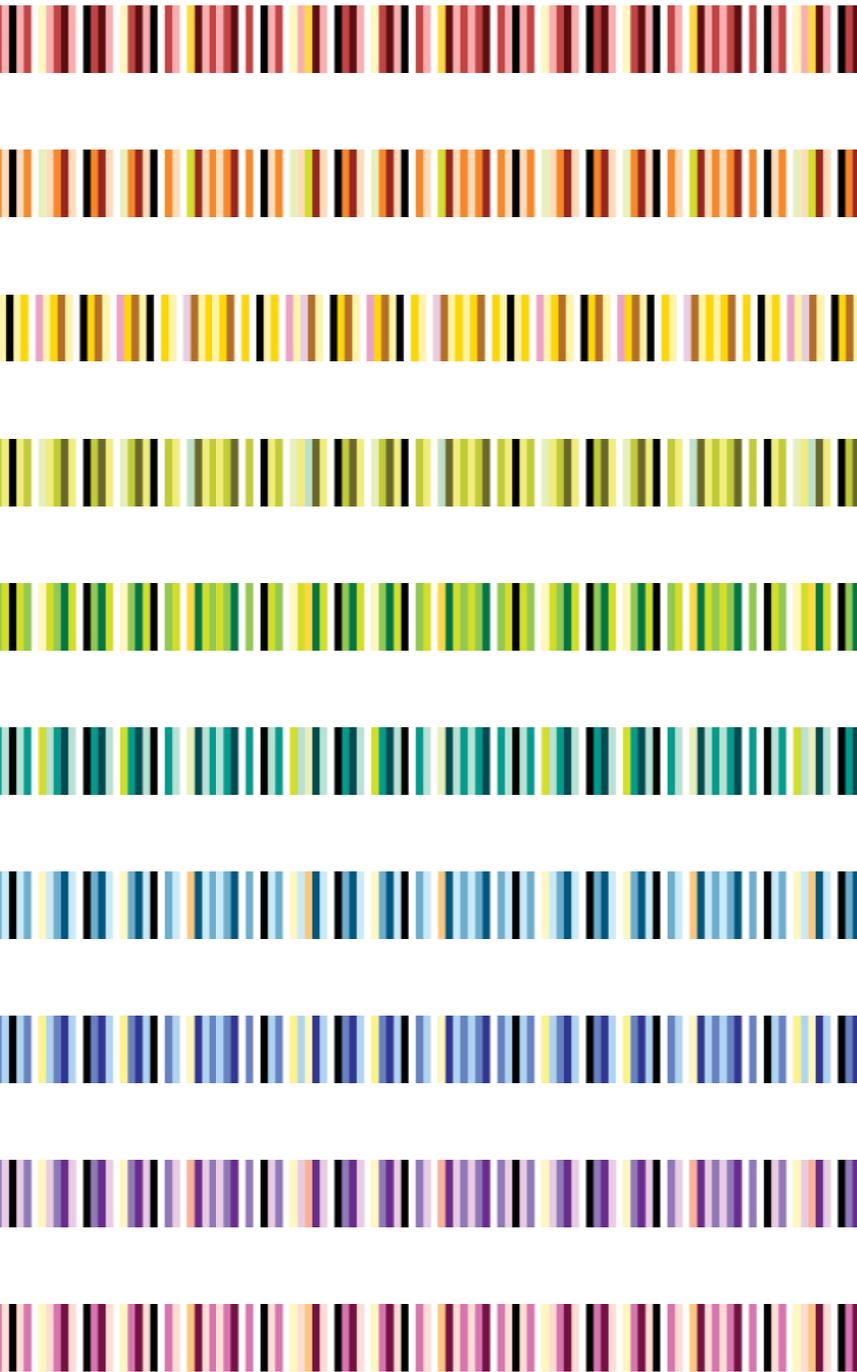
PALETTES

Brentcliffe

Bayview

Mt Pleasant

Avenue
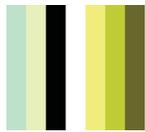
Chaplin

Bathurst

Oakwood

Dufferin

Caledonia

Keele

material and colour

LIGHTING STRATEGY

A number of daylighting strategies are utilized to provide natural light wherever possible in the underground stations. Key strategies include using glazed entrance canopies, skylights, light shafts, and sidewalk lights. Reflective surfaces are applied to maximize daylight penetration and distribution. Light shafts that are 2.5 metres in width by 3 to 4 metres in depth, can be found in most proposed stations. They are typically installed above the atriums in deep stations or the central platform area in shallow stations. These light shafts are integrated into the left turn medians on grade, where new planters will also be added. A colonnade of glowing piers supports the shafts and planters above. Each pier is 2.5 m in diameters with a concrete structural column embedded inside. Fluorescent lights are attached to the structural columns and backlighting the translucent vinyl finishes that wraps around the column to give it a glowing effect. The combination of natural and artificial light provides a balanced illumination, creates a dramatic visual impact, and alleviates the spatial oppression in underground spaces. Sidewalk lights are typically 15 by 15cm glass blocks embedded in sidewalk pavement, which emits a soft glow to the space underneath. They will be installed above underground passages that connect to exits located further away from the stations.

fig. 5.22 The Totem Project by James Tapscott
Material: Back-lit vinyl around fluorescent lights
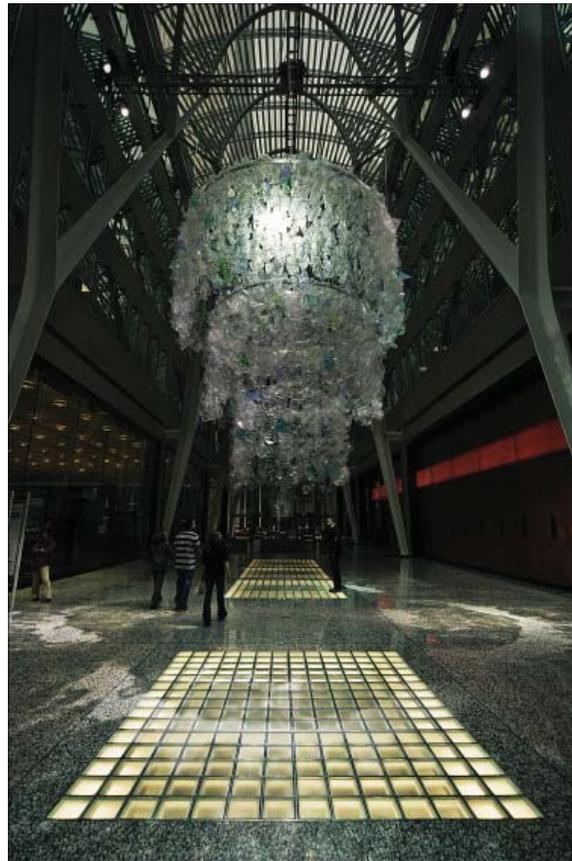
fig. 5.23 Sidewalk lights installed at Brookfield Place, Toronto

DUFFERIN
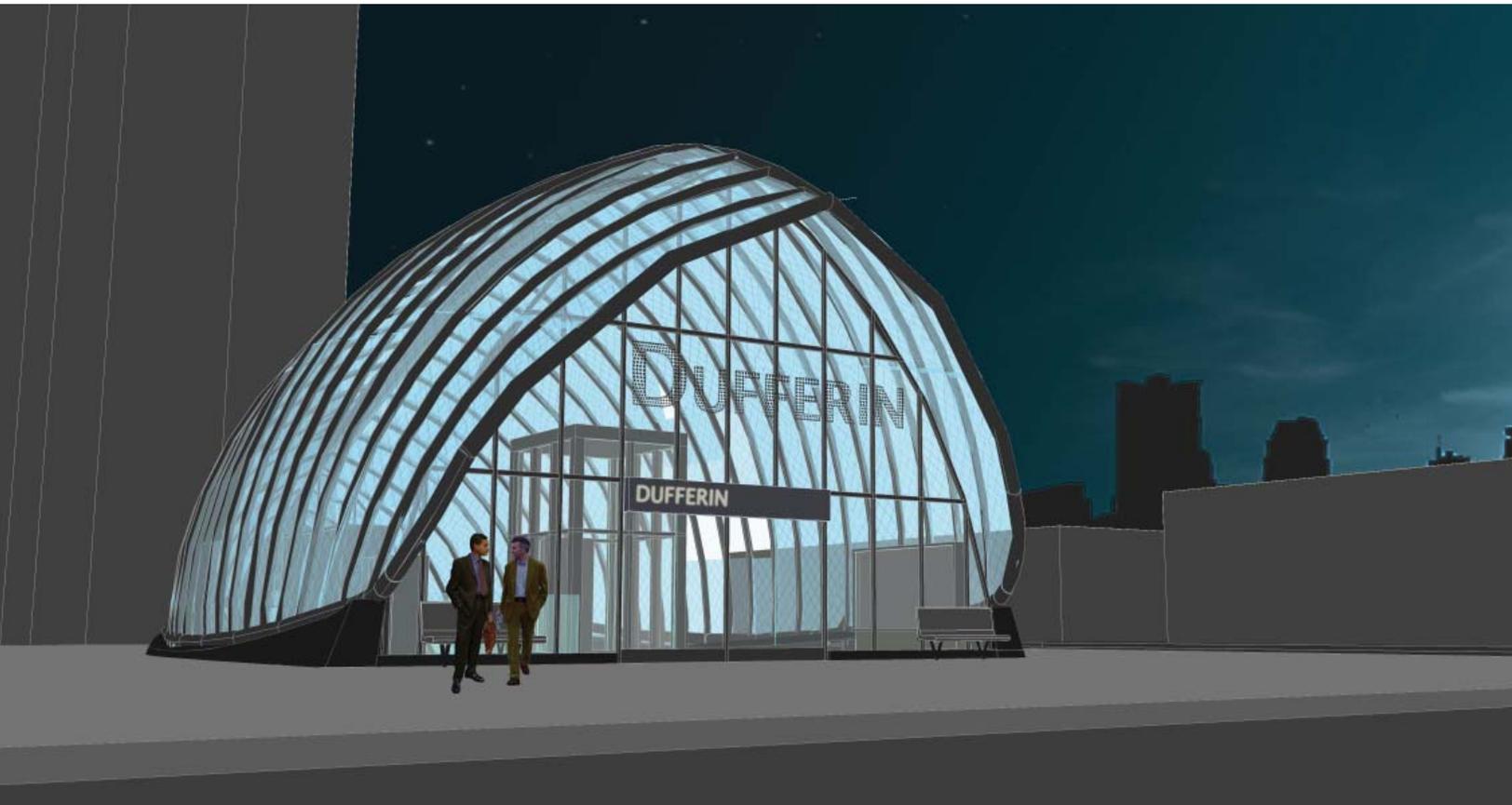
fig. 5.24   Typical station entrance and signage lit at night

lighting strategy and signage

5.   DESIGN

ENTRANCE TYPOLOGY

Four types of entrance typology are developed to address all anticipated entry alignments in relation to the platform, which share the same exterior enclosure. Type A prototypes are controlled entrances designed specifically for shallow stations. A ticket booth, a single-stall staff washroom, turnstiles, and other vending amenities are included. The typical type A entrance consists of an escalator and a staircase that go in reverse direction down to the platform level. A variation in which commuters go straight down to the platform is used at a number of occasions. On the other hand, type B entrances are unmonitored, designed specifically for deep stations, where the ticket area is relocated on the concourse level. Similar to Type A, two arrangements of staircase and escalator are included. Basic amenities such as phone booths, seating, information, community message board, along with bike racks are provided at all main entrances.

Street view at Eglinton Avenue West and Dufferin Street

TYPE A CONTROLLED ENTRANCES OF SHALLOW STATION

2.70 5.00 3.20 12.40 2.70

BIKE RACKS
OPTIONAL

TICKET BOOTH

VENDING / TOKEN
MACHINES

DN

5.50

LOBBY

DN

COMMUNITY
MESSAGE
BOARD

TRANSFER
MACHINES

5.50

INFORMATION

PHONE BOOTH

26.00
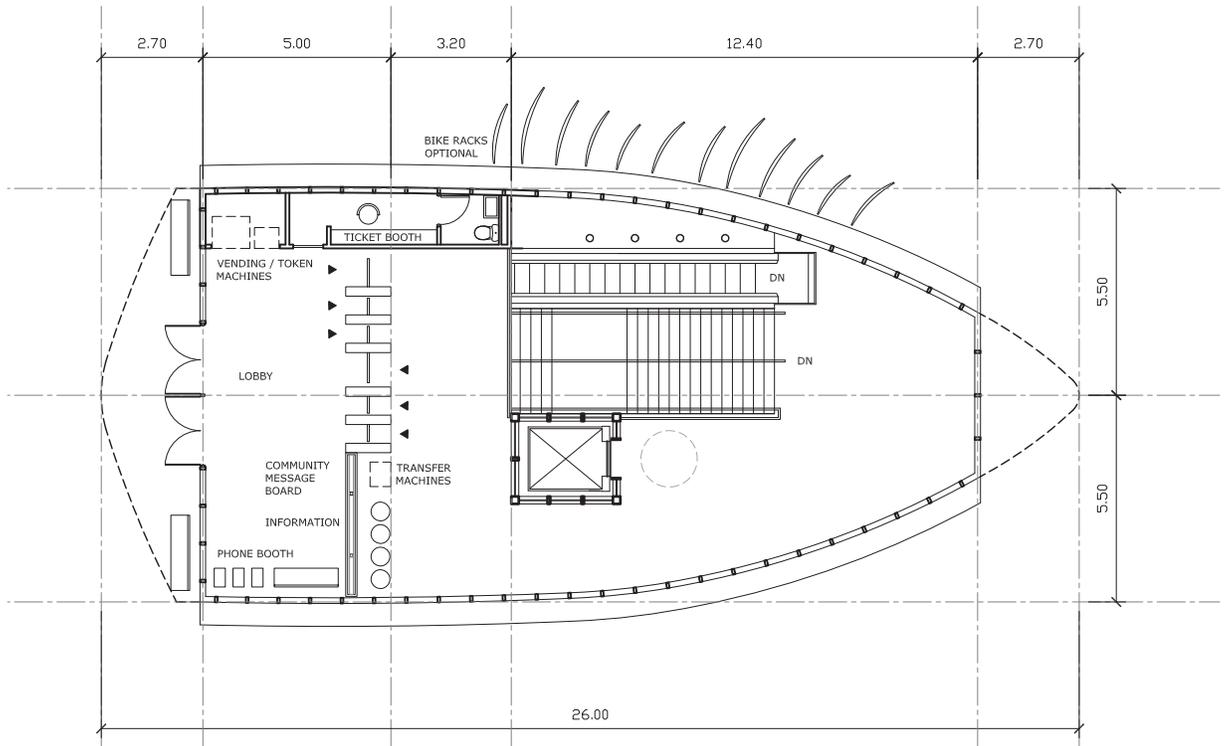
ENTRANCE TYPE A1
Controlled reversed-down

2.70 5.30 4.00 11.30 2.70

BIKE RACKS
OPTIONAL

TICKET BOOTH

CLEANER'S
ROOM

VENDING / TOKEN
MACHINES

DN

5.50

LOBBY

DN

COMMUNITY
MESSAGE
BOARD

TRANSFER
MACHINES

OPEN TO BELOW

5.50

INFORMATION

PHONE BOOTH

26.00
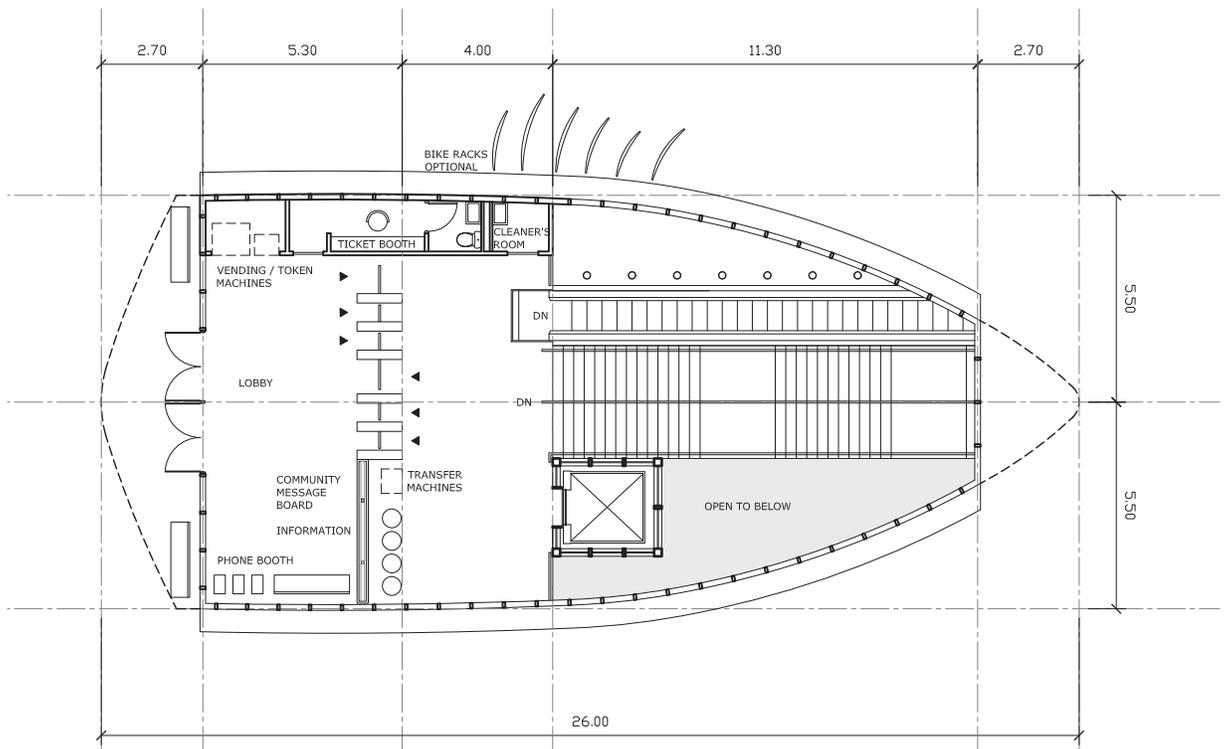
ENTRANCE TYPE A2
Controlled straight-down

99

entrance typology

TYPE B UNMONITORED ENTRANCES OF DEEP STATION
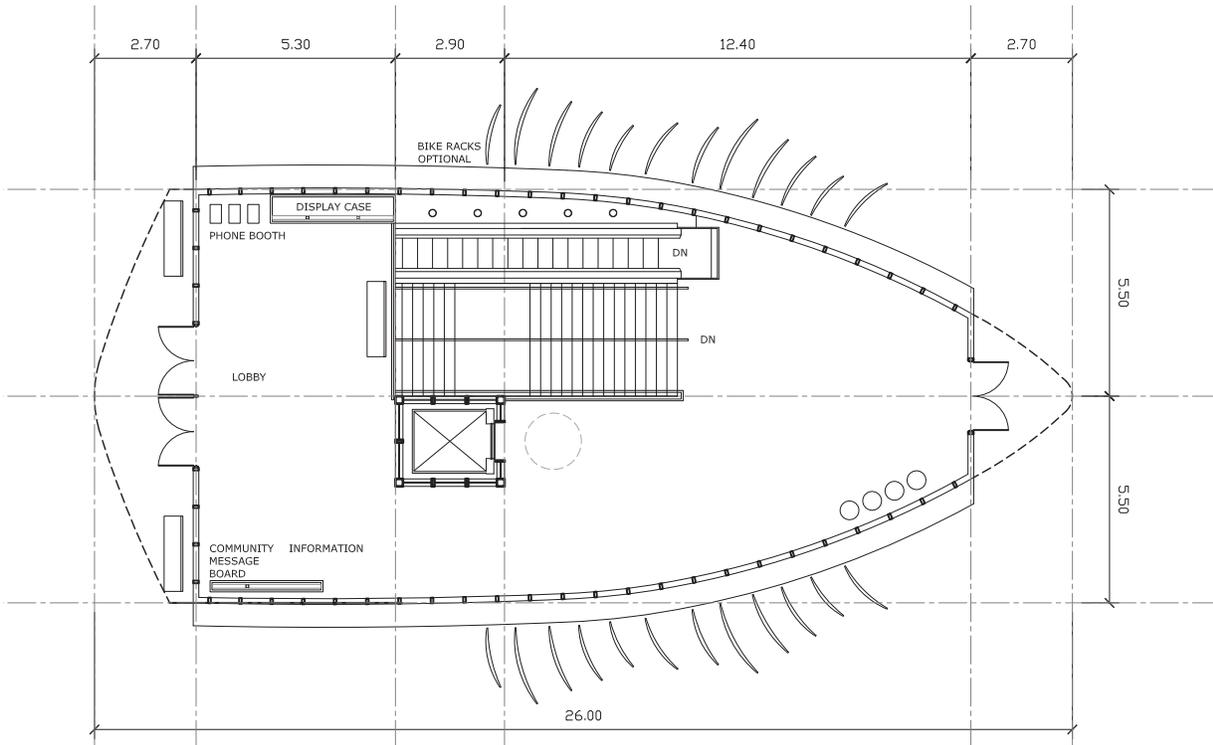
ENTRANCE TYPE B1
Unmonitored reversed-down
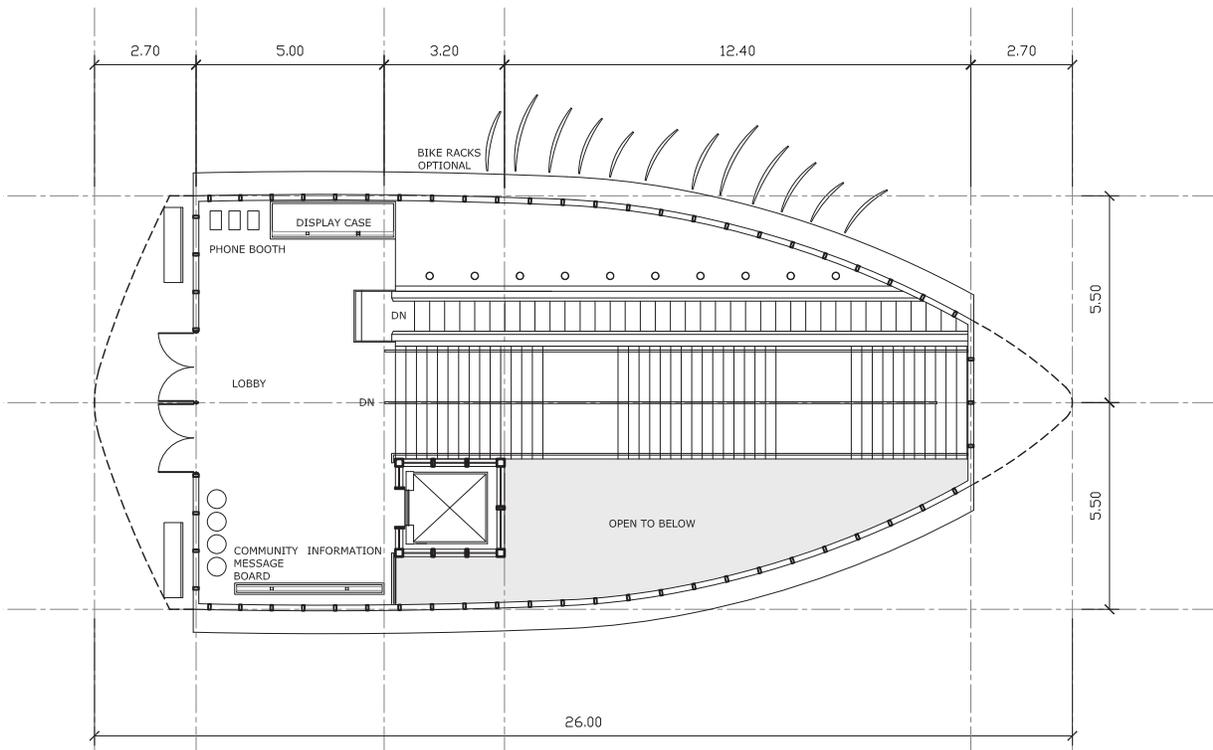
ENTRANCE TYPE B2
Unmonitored straight-down

TYPE A & B ELEVATIONS

2.70   15.30   5.30   2.70

2.50

2.85   9.10

3.75

1.00

SIDE ELEVATION

11.00

5.50   5.50

9.10

2.50

2.85

3.75

Dufferin
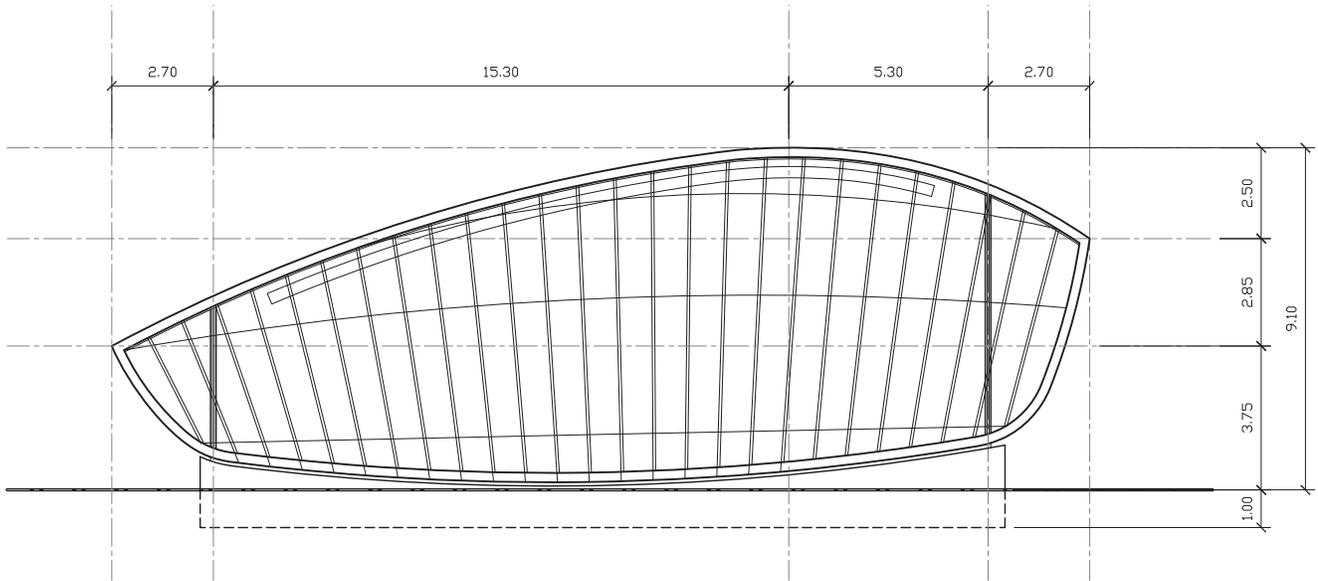
DUFFERIN
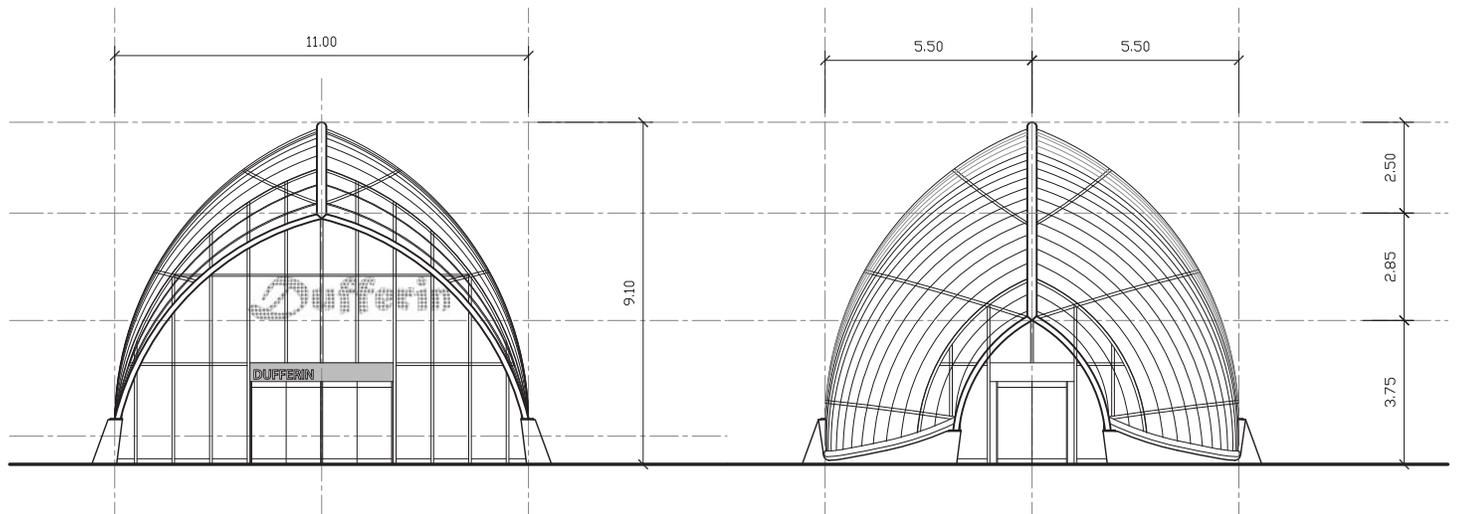
FRONT   **BACK**
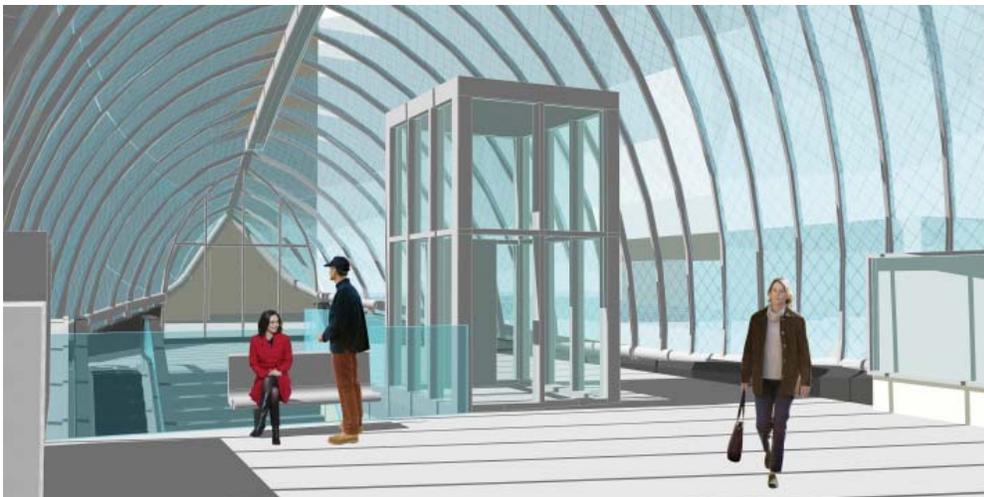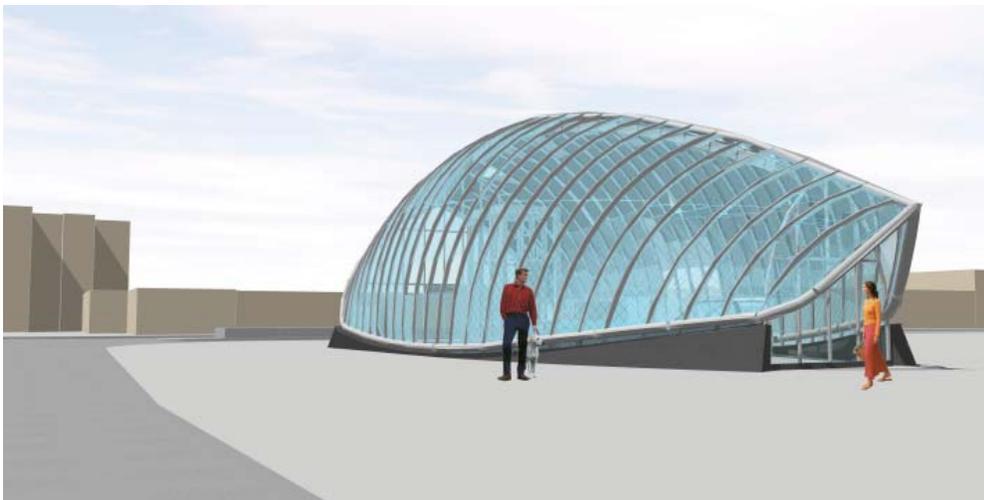
The shell-shaped entrances are made of clear and fritted glass supported by a steel frame. Its unique sculptural form is designed to create a distinct overall building image and to function as a beacon at street level. The entrance façade gives an aesthetic impression upon arrival. The transparent enclosure provides strong visual connections to the surrounding, allows natural light into the lower levels, and offers a gradual transition to the spaces below. All entrances will be lit at nighttime to take role as place markers. As urban landmarks, these entrance structures have the potential to become interesting architectural attractions in the city.
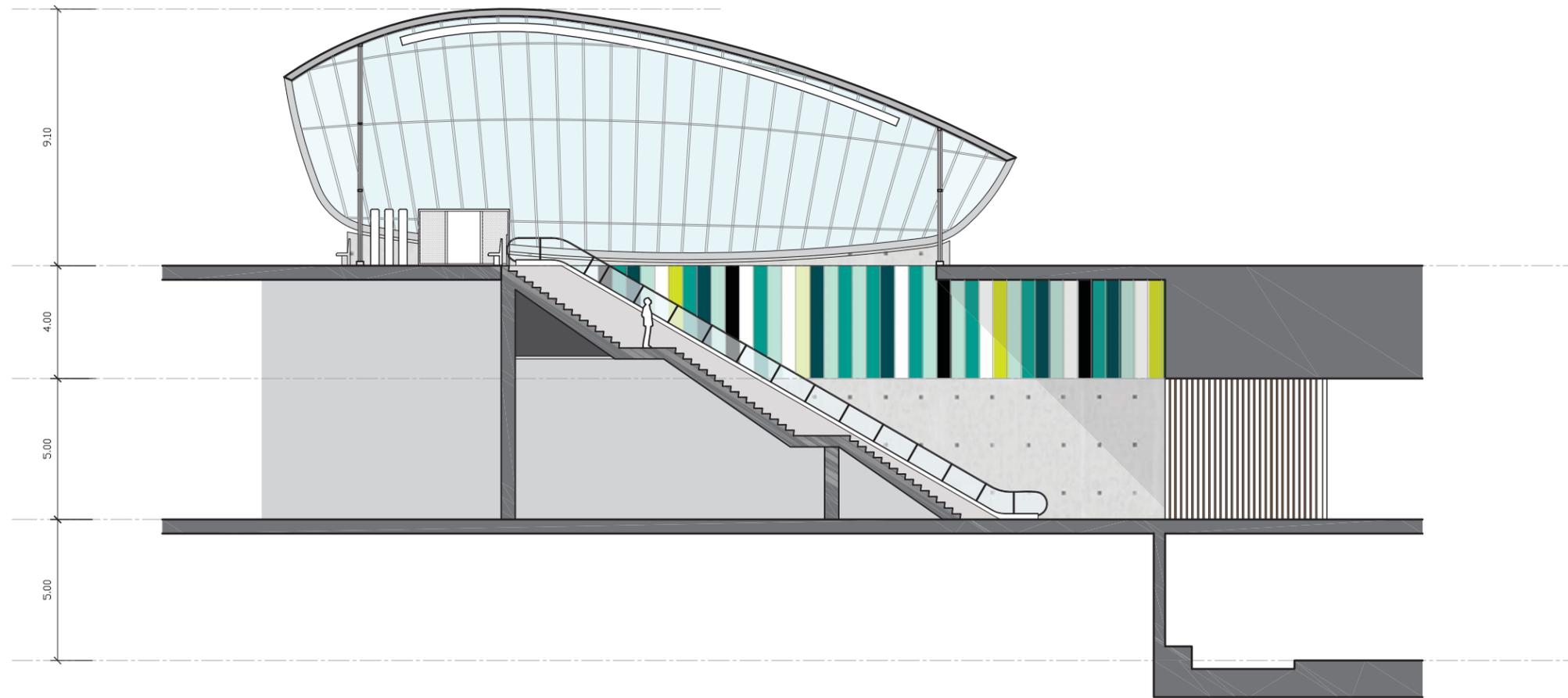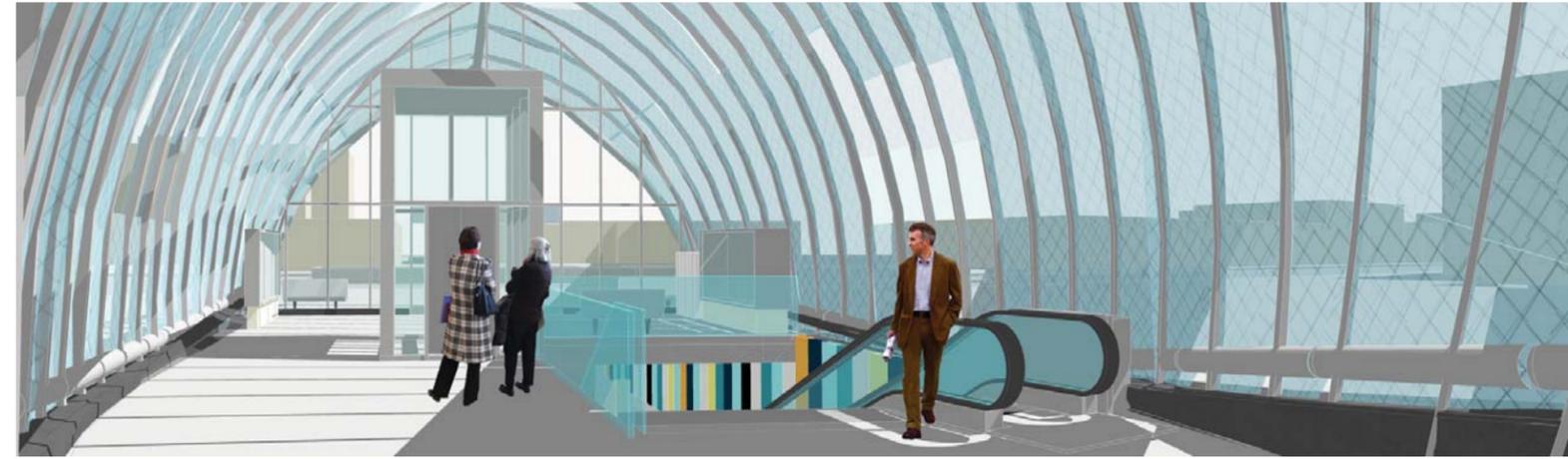
TYPICAL SECTION

TYPE C AUTOMATIC SECONDARY ENTRANCE

17.25

4.50

DN

PLAN

17.25

4.25

7.00

SECTION

4.25

4.50

FRONT

BACK

entrance typology
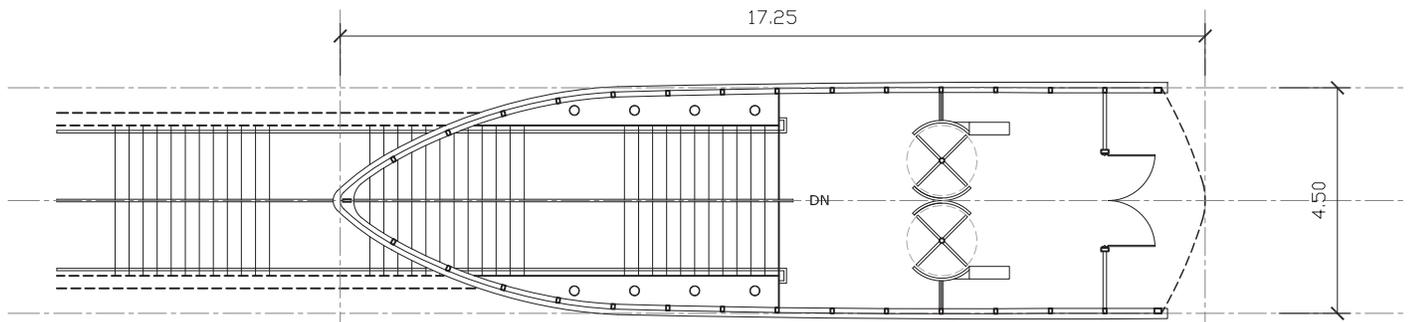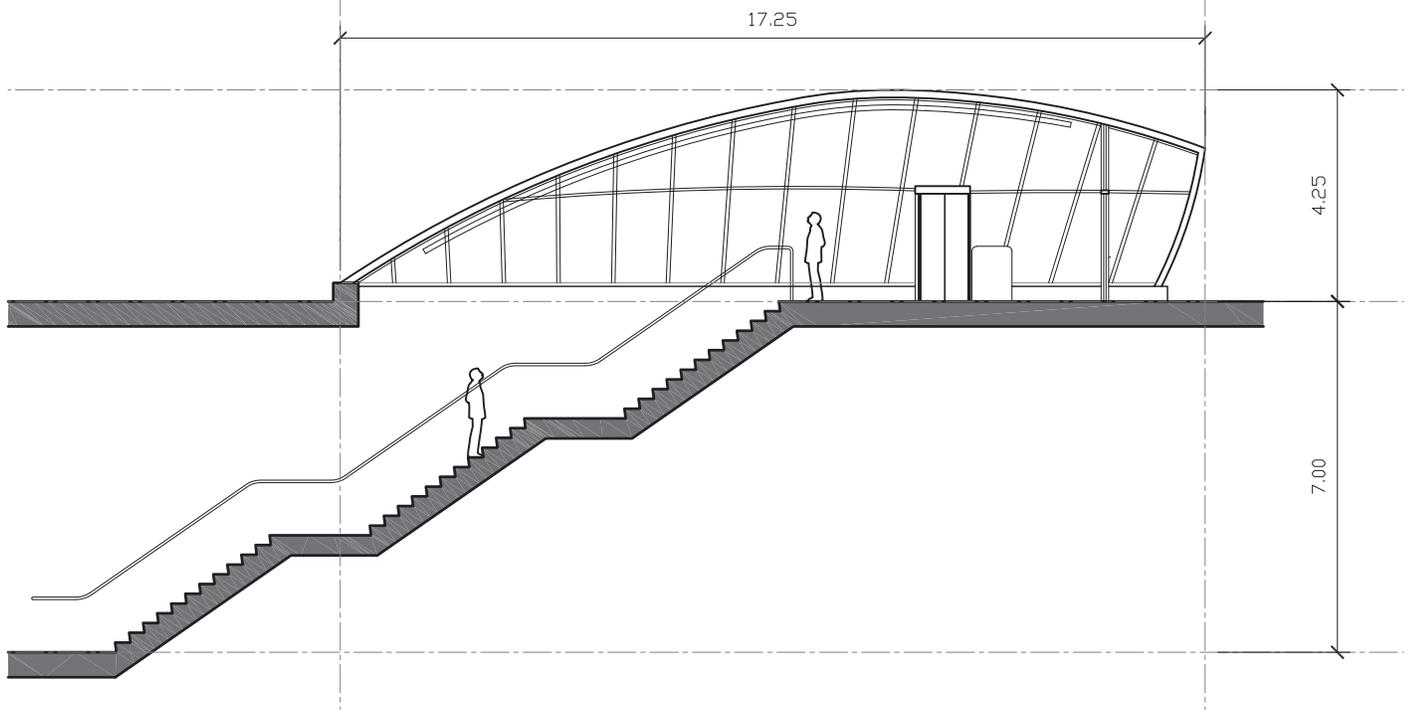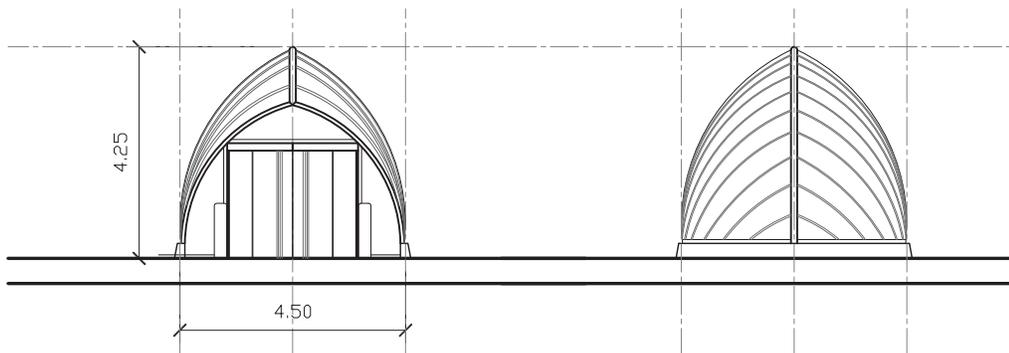
5.   DESIGN

5.2.2   Diagrammatic Proposal of Underground Stations

In the following chapter, a diagrammatic proposal is presented for each underground station demonstrating the overall building organization, entrance alignment and typology. There are four shallow stations and six deep stations in total. Based on the siting relative to the intersection and the length of existing left-turn medians, some deep stations have two atriums, while others have one. All underground stations have light shafts to provide natural light to the platforms, except for Brentcliffe Station. In addition, the aerial map of each intersection identifies landmarks and major institutional buildings nearby, as well as illustrates proposed track alignments and bus stop locations.

KEELE STATION
Shallow underground stations S
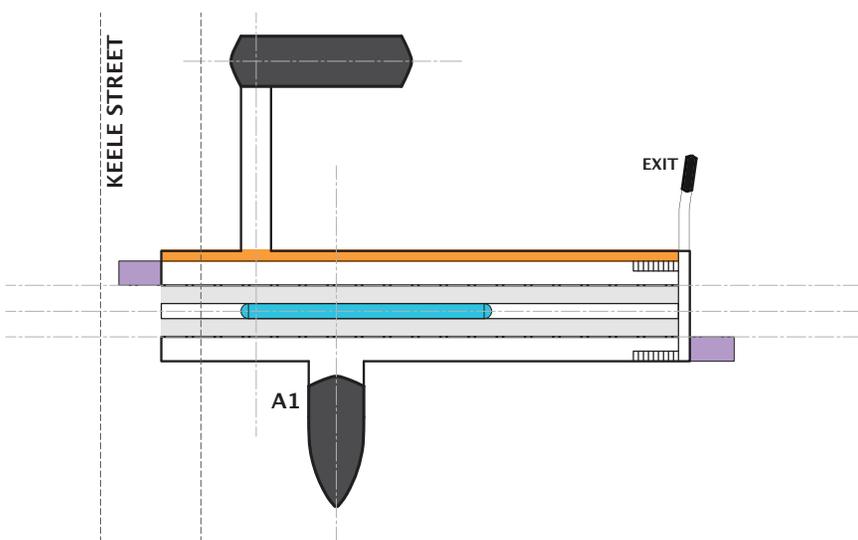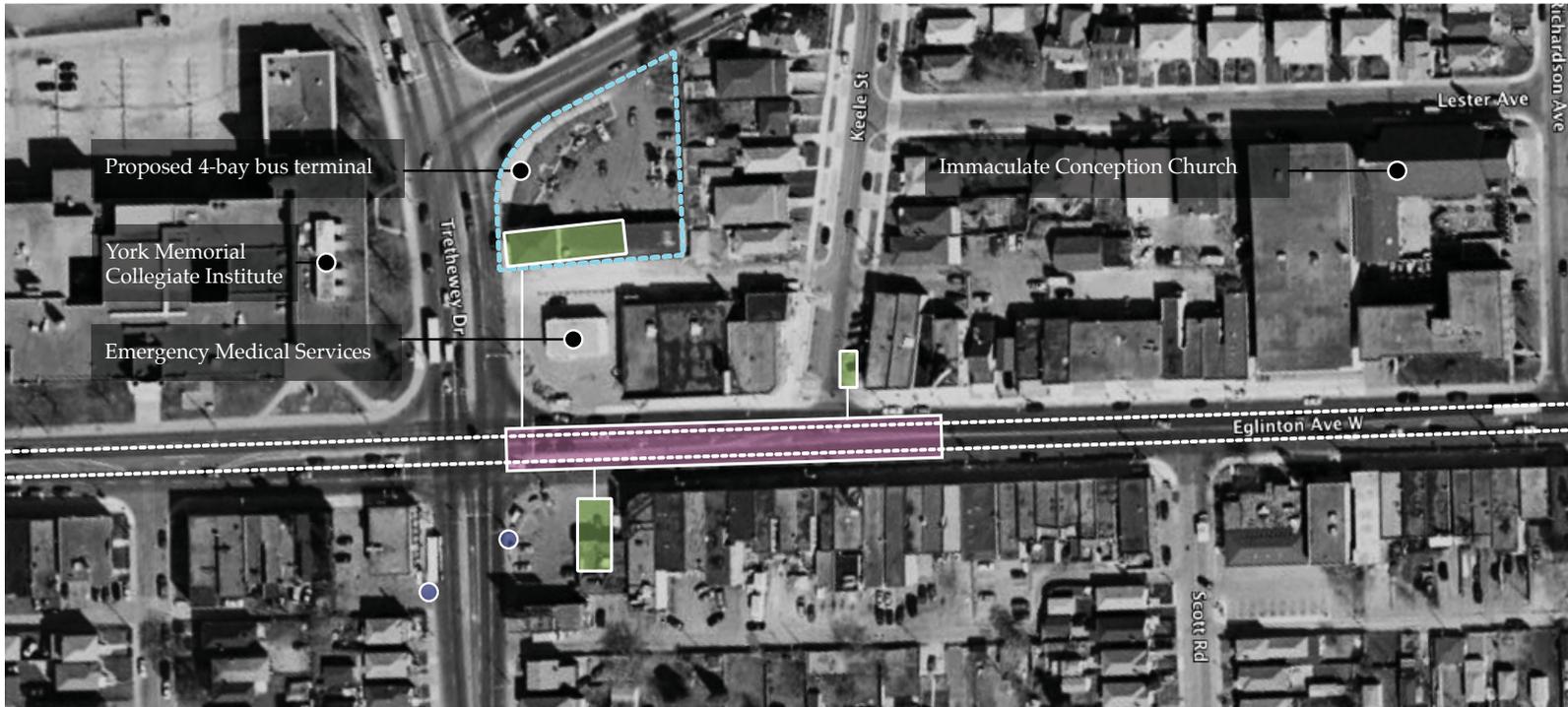
Proposed 4-bay bus terminal

York Memorial Collegiate Institute

Emergency Medical Services

Immaculate Conception Church

KEELE STREET

EXIT

A1

LEGEND

- Station Platform
- Primary Entrance
- Secondary Entrance
- Existing Bus Stop
- Potential Future Bus Stop

- Skylight
- Public Washroom
- Gallery and Cultural Wall

CALEDONIA STATION
Shallow underground stations S

Westside Shopping Centre

GO Rail: Barrie

Future GO Transit rail station interface location

Gabian Way

Eglinton Ave W

Proposed bus loop for 47B,C Lansdowne via Caledonia

A1

EXIT

A1
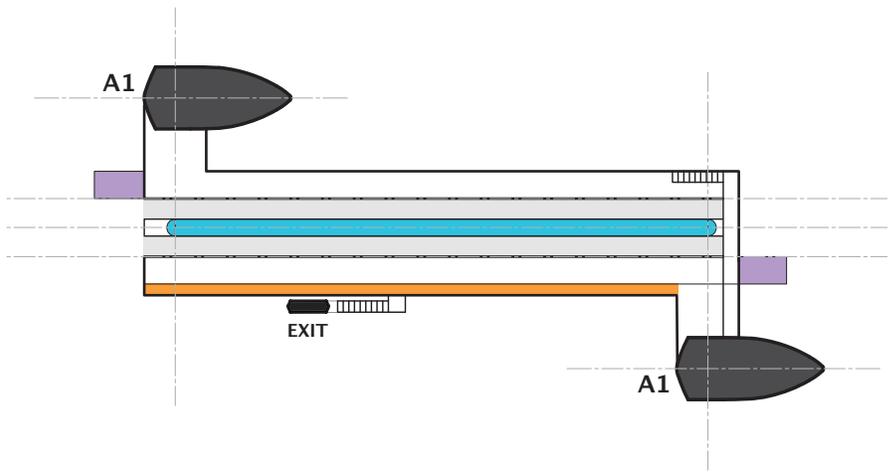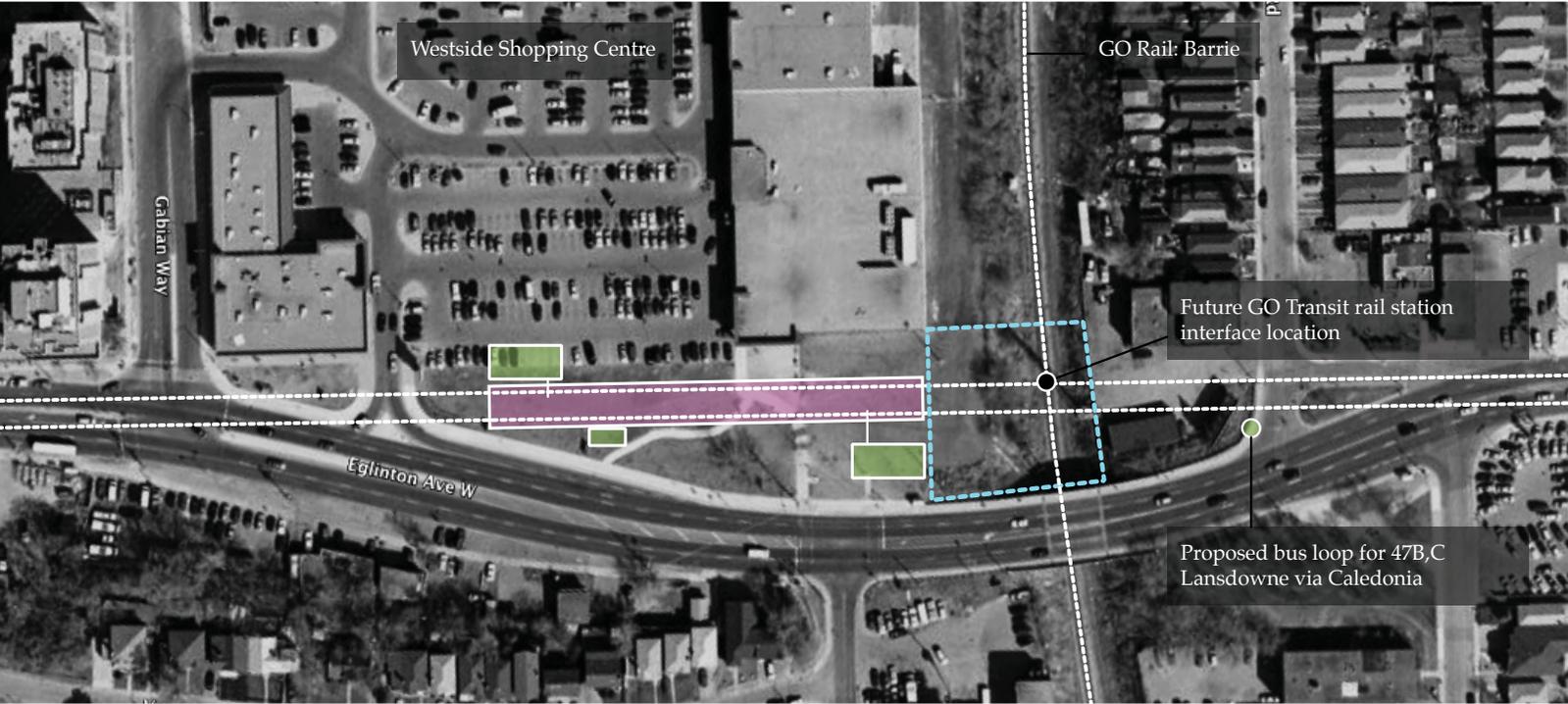
DUFFERIN STATION

Deep underground stations with two atria D1

St. James United Church

Existing right turn channel lane to be removed to provide improved pedestrian access to station entrance

Eglinton Ave W

Dufferin St

Existing right turn channel lane proposed to be romoved to provide

St. Hilda's Retirement Residence & Anglican Church

Shortt St

Kirknewton Rd

Dynevor Rd

C

B1

DUFFERIN STREET

LEGEND

▇	Station Platform
▇	Primary Entrance
▬	Secondary Entrance
●	Existing Bus Stop
●	Potential Future Bus Stop
▇	Skylight
▇	Public Washroom
▇	Cafe / Retail
▇	Atrium / Open to Below

OAKWOOD STATION
Deep underground stations with two atria D1
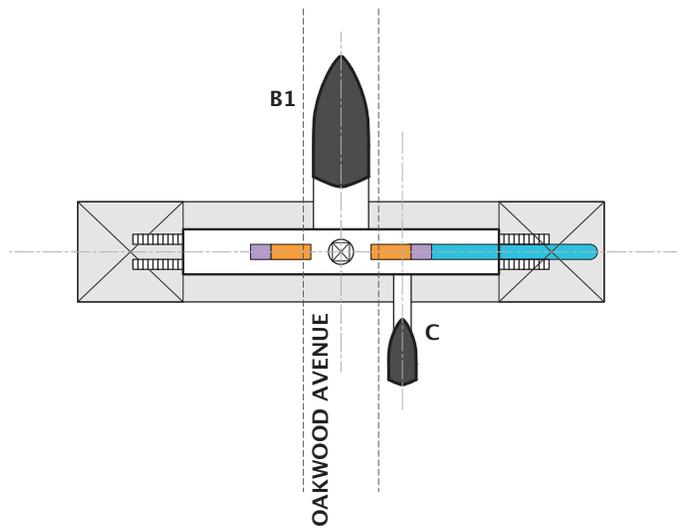
BATHURST STATION
Deep underground stations with two atria D1

Forest Hill United Church

BATHURST STREET

B1

C

LEGEND

Station Platform
Primary Entrance
Secondary Entrance
Existing Bus Stop
Potential Future Bus Stop

Skylight
Public Washroom
Cafe / Retail
Atrium / Open to Below
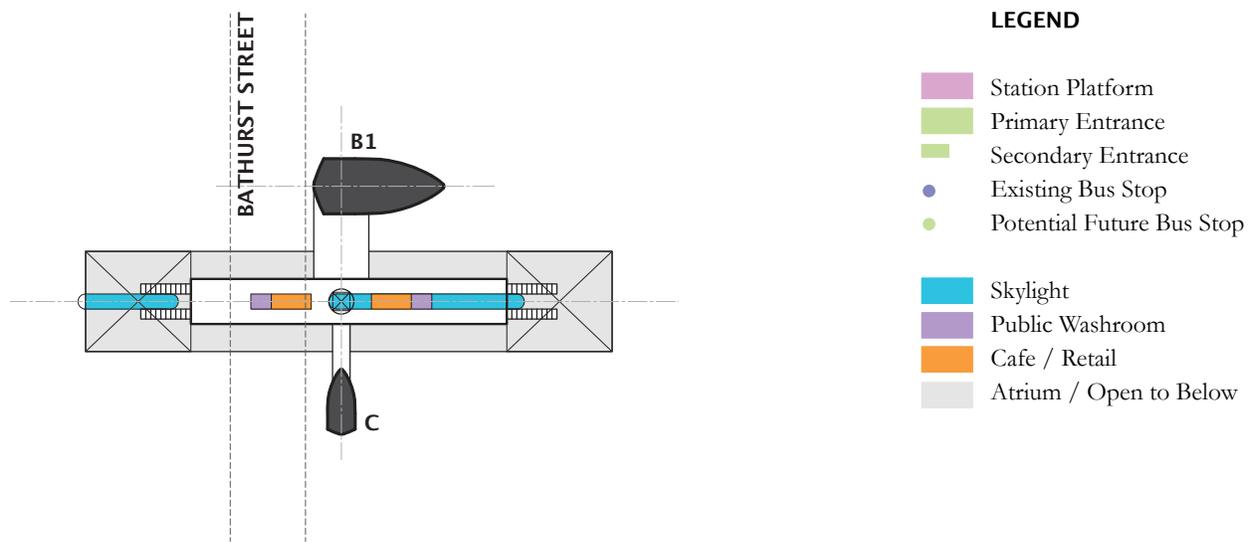
CHAPLIN STATION
Shallow underground stations S

Forest Hill Collegiate Institute

Belt Line Discovery Walk

Toronto Public Library
Forest Hill Branch

Spadina Rd

Cilgorm Rd

Latimer Ave

Eglinton Ave W

Emergency Medical Services   Toronto Fire Station # 135

ell Hill Rd

LEGEND

Gallery and Cultural Wall

A2

EXIT

CHAPLIN CRESCENT

A1
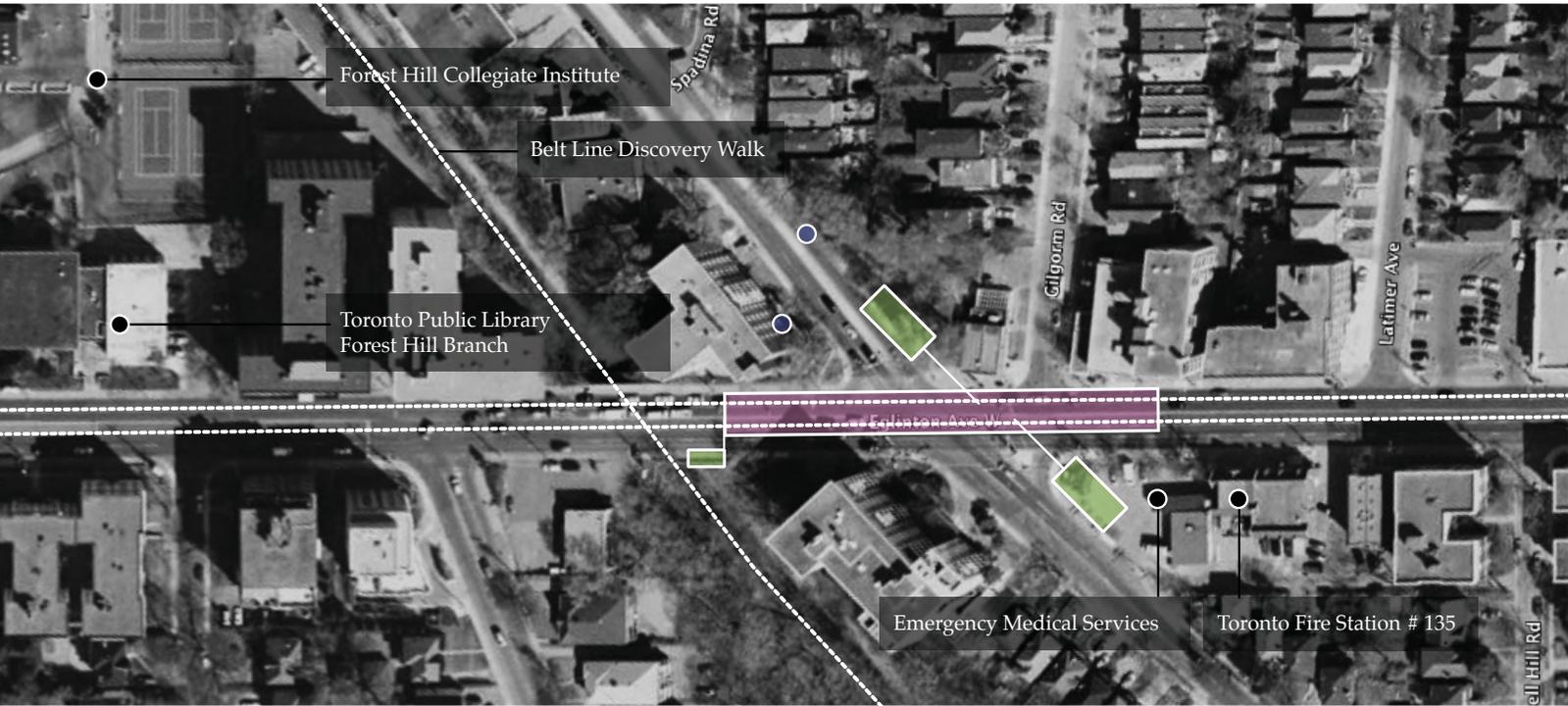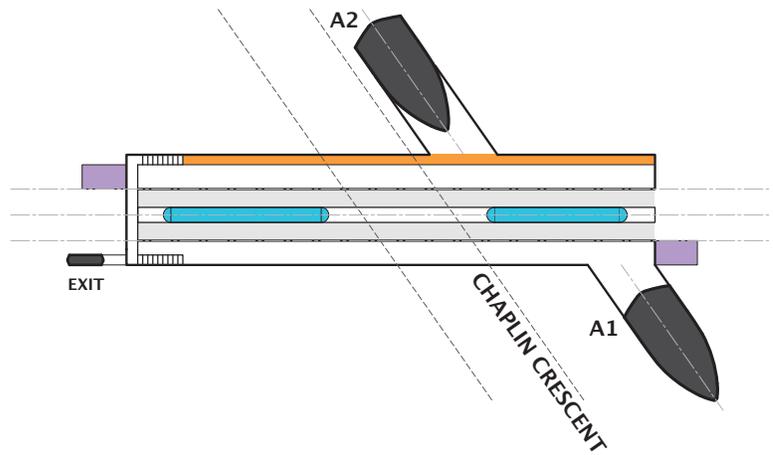
AVENUE STATION
Deep underground stations with one atrium D2

LEGEND

▮	Station Platform
▮	Primary Entrance
▬	Secondary Entrance
●	Existing Bus Stop
●	Potential Future Bus Stop
▮	Skylight
▮	Public Washroom
▮	Cafe / Retail
▮	Atrium / Open to Below
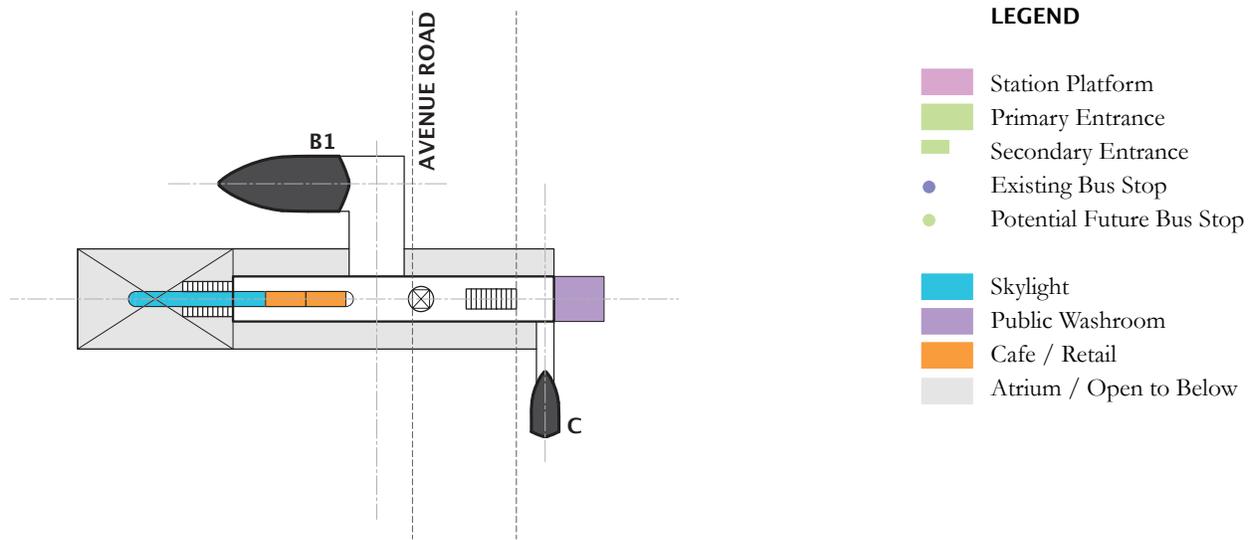
MOUNT PLEASANT STATION
Deep underground stations with one atrium D2

St. Peter's Estonian Evangelical
Lutheran Church

Proposed sidewalk expansion
while maintaining existing traffic lanes

Eglinton Ave E

Redpath Ave

Rawlinson Ave

Eglinton Jr. Public School

B1

MOUNT PLEASANT ROAD

C
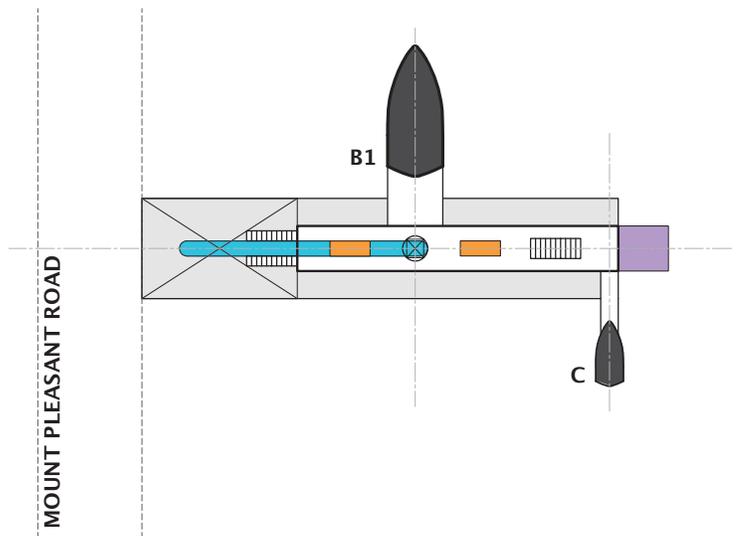
BAYVIEW STATION
Deep underground stations with one atrium D2
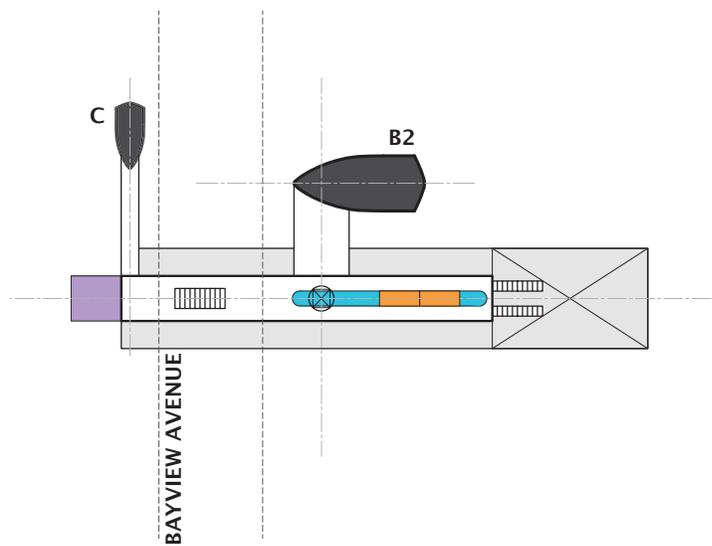
LEGEND

▮ Station Platform	
▮ Primary Entrance	
▬ Secondary Entrance	
• Existing Bus Stop	
• Potential Future Bus Stop	
▮ Skylight	
▮ Public Washroom	
▮ Cafe / Retail	
▮ Atrium / Open to Below	

BRENTCLIFFE STATION
Shallow underground stations S

Don Avon Dr

Eglinton Ave E

East Portal

Leaside Centre

LEGEND

Gallery and Cultural Wall

BRENTCLIFFE ROAD

A1

EXIT

A2

DUFFERIN STATION SITE PLAN
DEEP STATION TYPE D1
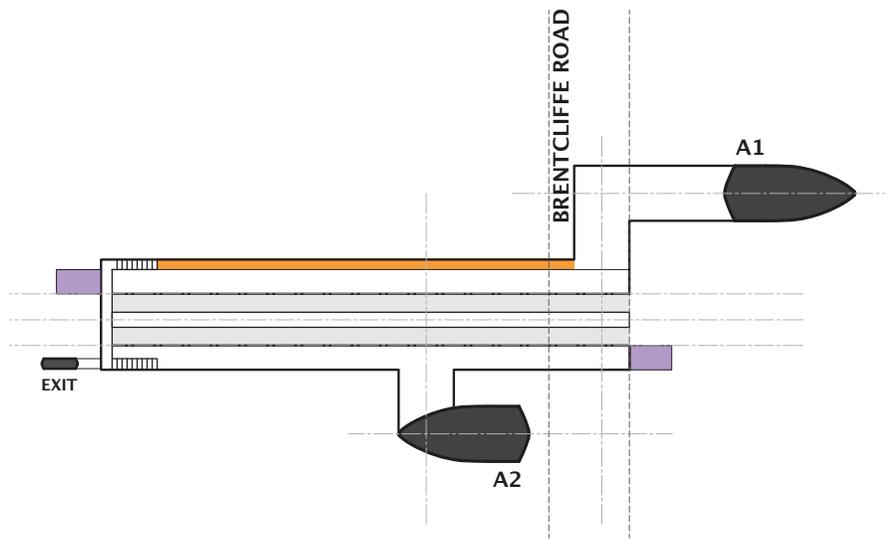
DUFFERIN STATION

5.2.3.1   Deep Station D1 with double atria

Dufferin Station is one of the few stations that centre on the intersection, which allows light shafts to be located at both ends of the platform, down from the two expanded left-turn medians on grade. The main entrance is located at the southeast corner, while the secondary entrance is located at the northwest corner.

Glazed entrance allows natural light into the ticket area on concourse

Platform view at Dufferin Station

EGLINTON AVENUE WEST

DUFFERIN STREET

B
C

WALL PANELS – ASSORTED COLOUR
GRAFFITI WALL

MIRRORED WALL
MIRRORED WALL

VENT SHAFT
VENT SHAFT

A
A

SKYLIGHTS ABOVE
SKYLIGHTS ABOVE

UP

DN
DN

STATION CONVENIENCE STORE
STAND UP BAR
STATION CAFE

DN
DN
DN

PHONE BOOTH
INFO

MURAL WALL
WALL PANELS – ASSORTED COLOUR

VENDING / TOKEN

UP

CLEANER'S ROOM

B
C
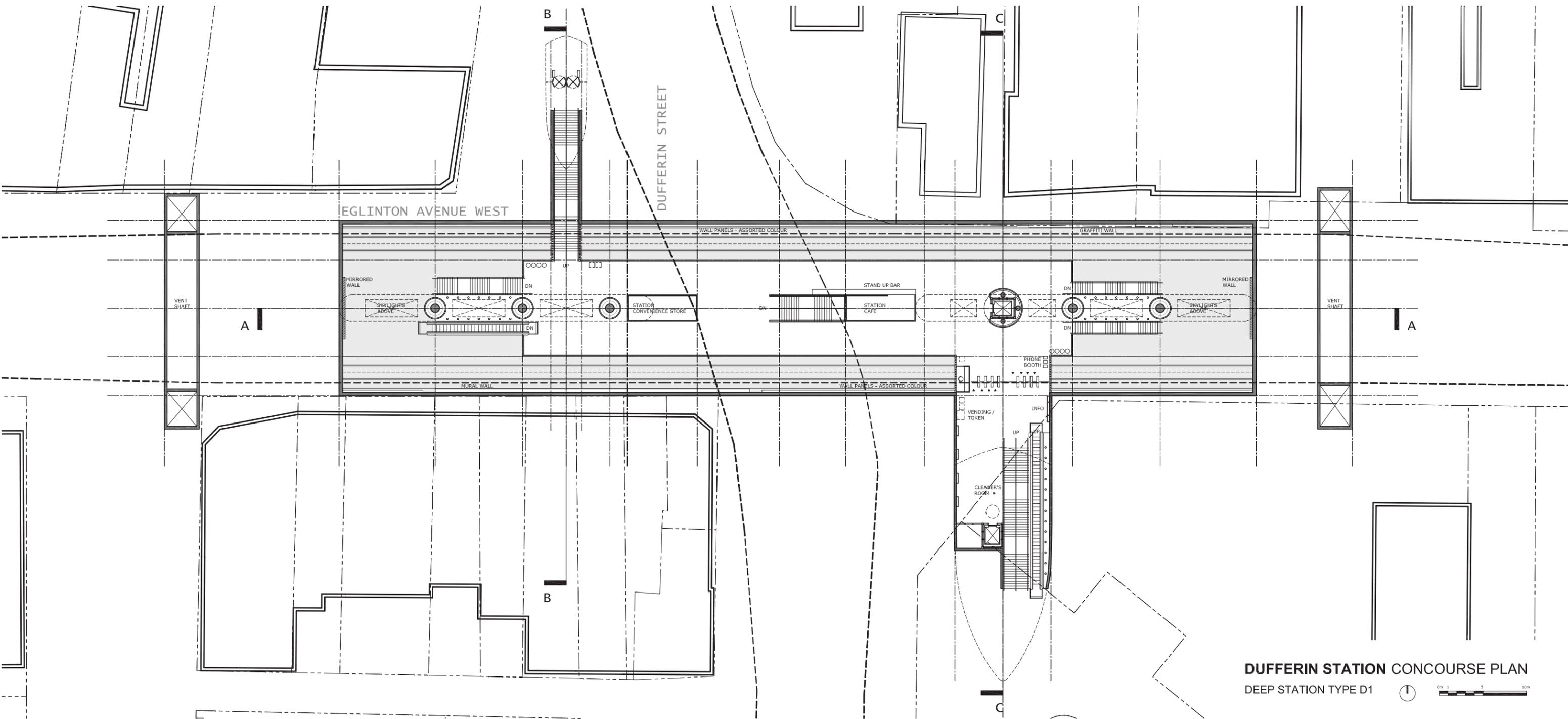
DUFFERIN STATION CONCOURSE PLAN

DEEP STATION TYPE D1

0m 1   5   10m

DUFFERIN STATION PLATFORM PLAN

DEEP STATION TYPE D1

schematic proposal of selected stations
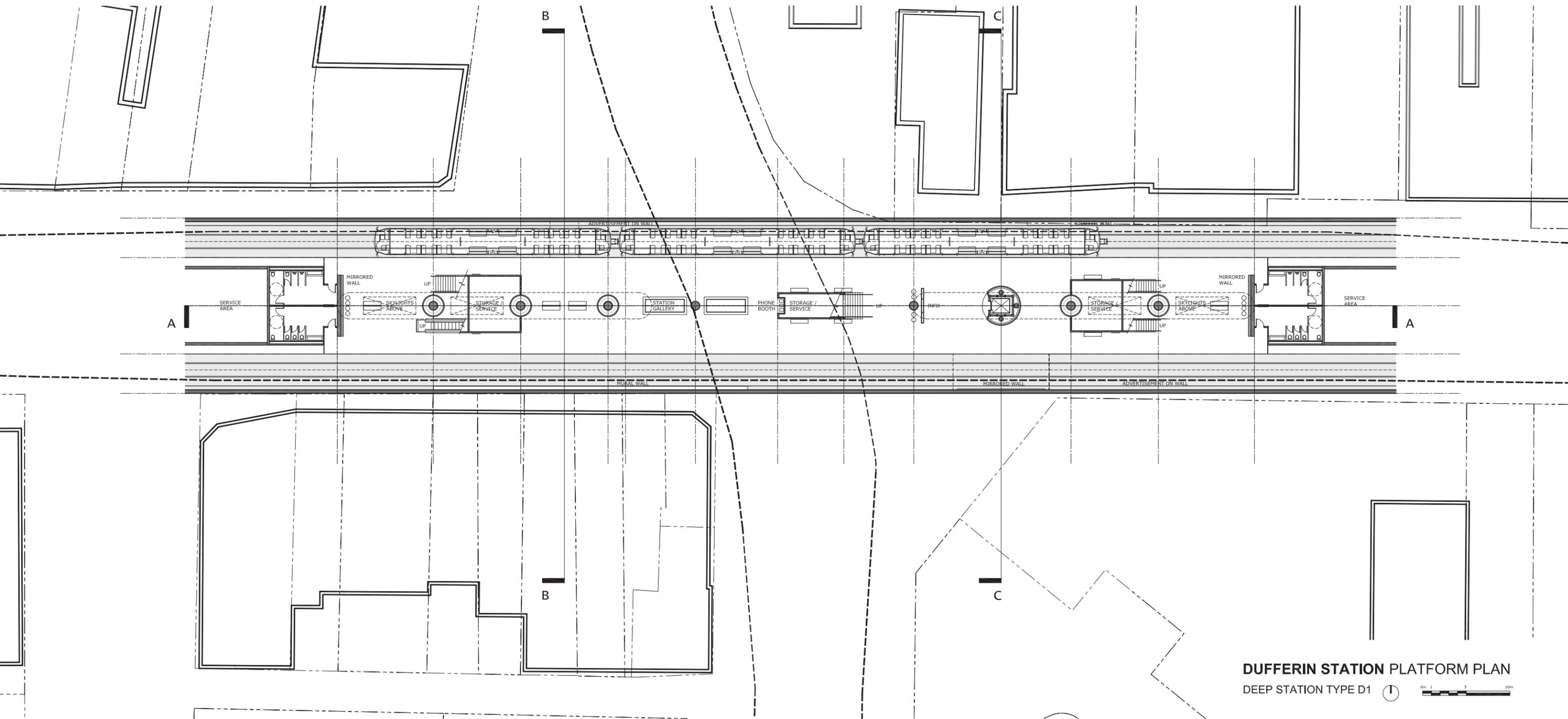
SECTION A

SECTION B

SECTION C

DUFFERIN STATION SECTIONS

DEEP STATION TYPE D1

MOUNT PLEASANT ROAD

EGLINTON JUNIOR
PUBLIC SCHOOL

VENT SHAFT
EXHAUST

LIGHT SHAFTS TO STATION BELOW

EGLINTON AVENUE EAST

VENT SHAFT
EXHAUST

TAUNTON ROAD

B1

C

MOUNT PLEASANT STATION SITE PLAN
DEEP STATION TYPE D2

MOUNT PLEASANT STATION

5.2.3.2 Deep Station D2 with single atrium

Mount Pleasant Station is located at the east side of the intersection, which allows light shafts to be provided only at the west end of the platform above the single atrium. The main entrance is located at the north side of Eglinton Avenue East between two high-rise buildings. The overall building width is 22m, 2m wider than the Dufferin Station.
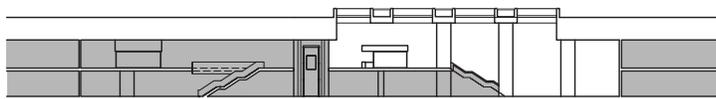
Platform view at Mount Pleasant Station

Concourse ticket area

MOUNT PLEASANT ROAD

EGLINTON AVENUE EAST

TAUNTON ROAD

C

B

A

A

B

C

CLEANER'S ROOM

VENDING / TOKEN

INFO

PHONE BOOTH

UP   UP

GRAFFITI WALL

WALL PANELS - ASSORTED COLOUR

MIRRORED WALL

STAND UP BAR

SKYLIGHT ABOVE

STATION CAFE

DN

DN

DN

DN

STATION CONVENIENCE STORE

STORAGE / CLEANER'S ROOM

VENT SHAFT

VENT SHAFT

STAND UP BAR

MURAL WALL

WALL PANELS - ASSORTED COLOUR

UP

MOUNT PLEASANT STATION CONCOURSE PLAN

DEEP STATION TYPE D2

0m 1   5   10m

MOUNT PLEASANT ROAD

EGLINTON AVENUE EAST

C

B

GRAFFITI WALL   MIRRORED WALL   ADVERTISEMENT ON WALL

MIRRORED
WALL

SERVICE
AREA   STAFF'S
              ROOM

A   SKYLIGHTS   STORAGE /   STATION   INFO   PHONE   STORAGE /   STAFF'S   SERVICE
                                           ABOVE   SERVICE   GALLERY   BOOTH   SERVICE   ROOM   AREA

                                     UP   UP   A
                                     UP   UP

MURAL WALL   ADVERTISEMENT ON WALL

TAUNTON ROAD

B   C

MOUNT PLEASANT STATION PLATFORM PLAN

DEEP STATION TYPE D2

0m 1   5   10m
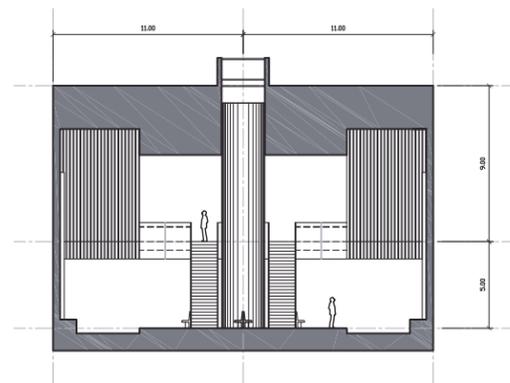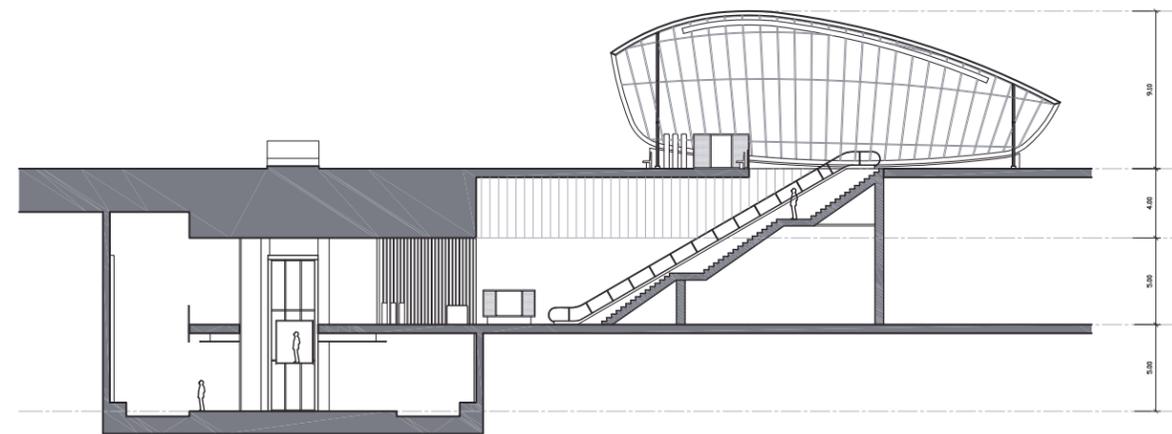
SECTION A

SECTION B

SECTION C

MOUNT PLEASANT STATION SECTIONS

DEEP STATION TYPE D2

Site plan labels:

PROPOSED FOUR-BAY
BUS STATION

YORK MEMORIAL
COLLEGIATE INSTITUTE

TRETHEWEY DRIVE

SIDEWALK LIGHT

EMERGENCY MEDICAL
SERVICE STATION

EXIT

KEELE STREET

VENT SHAFT
EXHAUST

VENT SHAFT
EXHAUST

EGLINTON AVENUE WEST

LIGHT SHAFTS TO STATION BELOW

A1

KEELE STATION SITE PLAN
SHALLOW STATION TYPE S

0m 2   10   20m

KEELE STATION

5.2.3.3   Shallow Station S with no concourse mezzanine

Keele Station is located at the east side of the intersection. The main entrance
is located at the south side of Eglinton Avenue West. A four-bay bus station is
proposed north of the EMS station, which will be used as the secondary entrance
to the LRT. Sidewalk lights will be installed above the short underground passage
between the proposed LRT station and bus station.
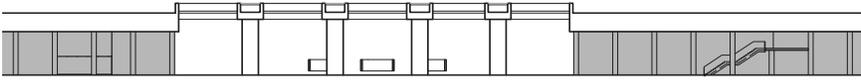
Staircase and escalator leading down to the platform at Keele Station
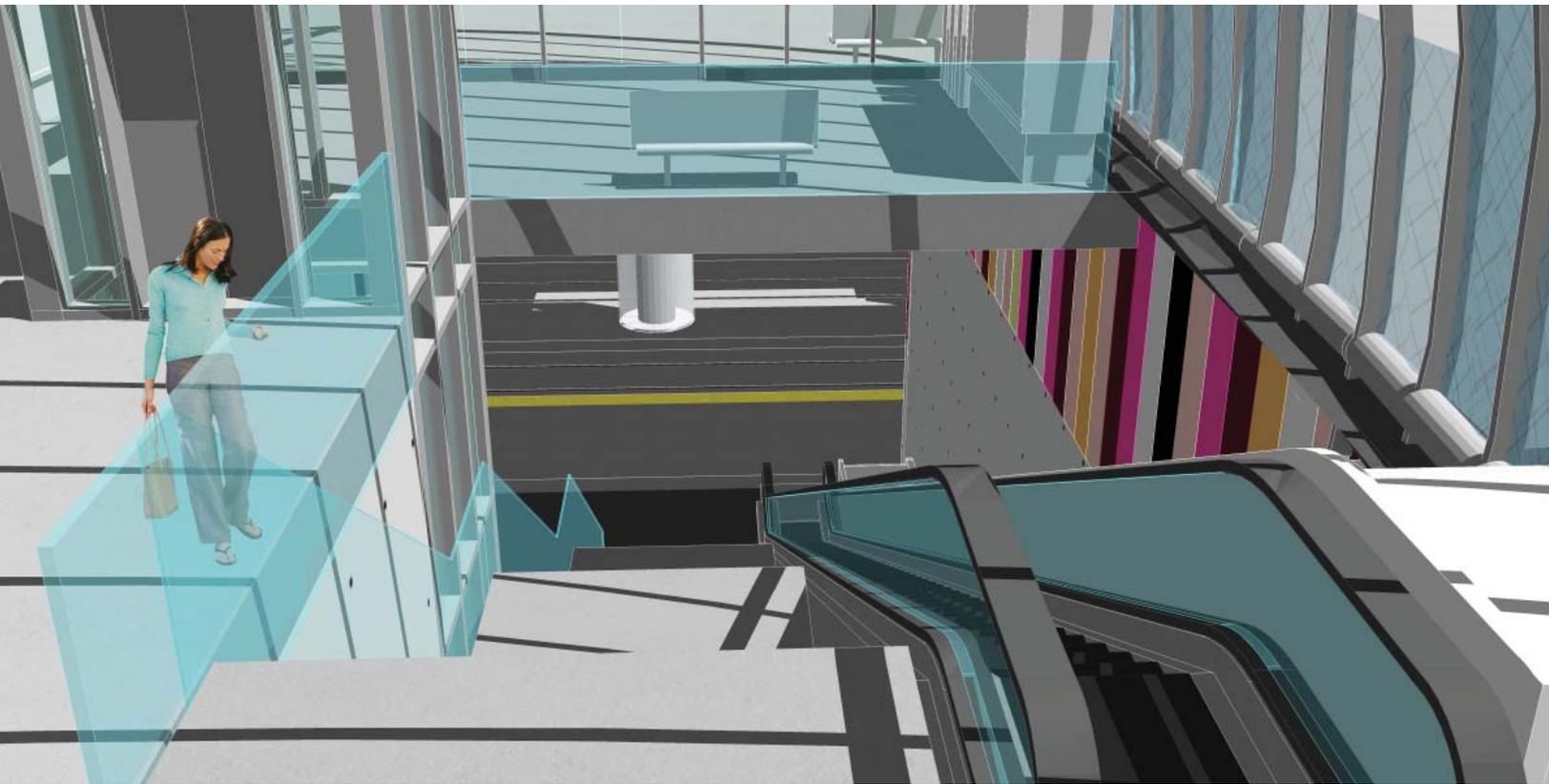
Platform view at Keele Station

TRETHEWEY DRIVE

KEELE STREET

D

EGLINTON AVENUE WEST

A

STAFF'S ROOM / SERVICE AREA

PHONE BOOTH

INFO

STATION GALLERY
STRIPE COLOURED WALL PANELS ABOVE

MURAL WALL

UP

SERVICE / STORAGE

SKYLIGHTS ABOVE

MEZZANINE ABOVE

SERVICE / STORAGE

ADVERTISEMENT ON WALL
STRIPE COLOURED WALL PANELS ABOVE

ADVERTISEMENT ON WALL
GRAFFITI WALL ABOVE

UP

STAFF'S ROOM / SERVICE AREA

UP

UP

CLEANER'S ROOM

C

D

D
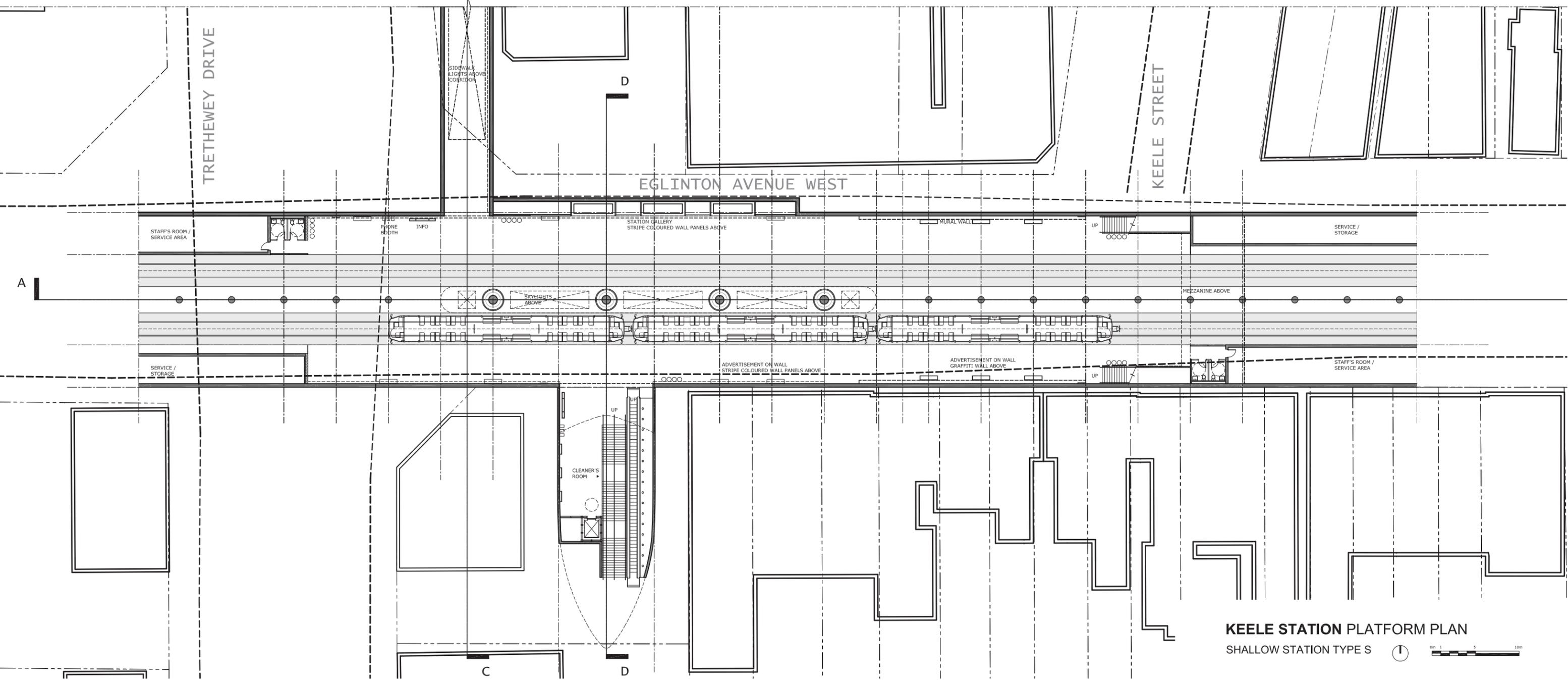
KEELE STATION PLATFORM PLAN

SHALLOW STATION TYPE S

0m 1 5 10m

TRETHEWEY DRIVE

C

PROPOSED FOUR-BAY BUS TERMINAL

MIRRORED
WALL

UP

UP

ADVERTISEMENT
ON WALLS

SIDEWALK
LIGHTS ABOVE
CORRIDOR

D

CONTINUED ON PREVIOUS PAGE
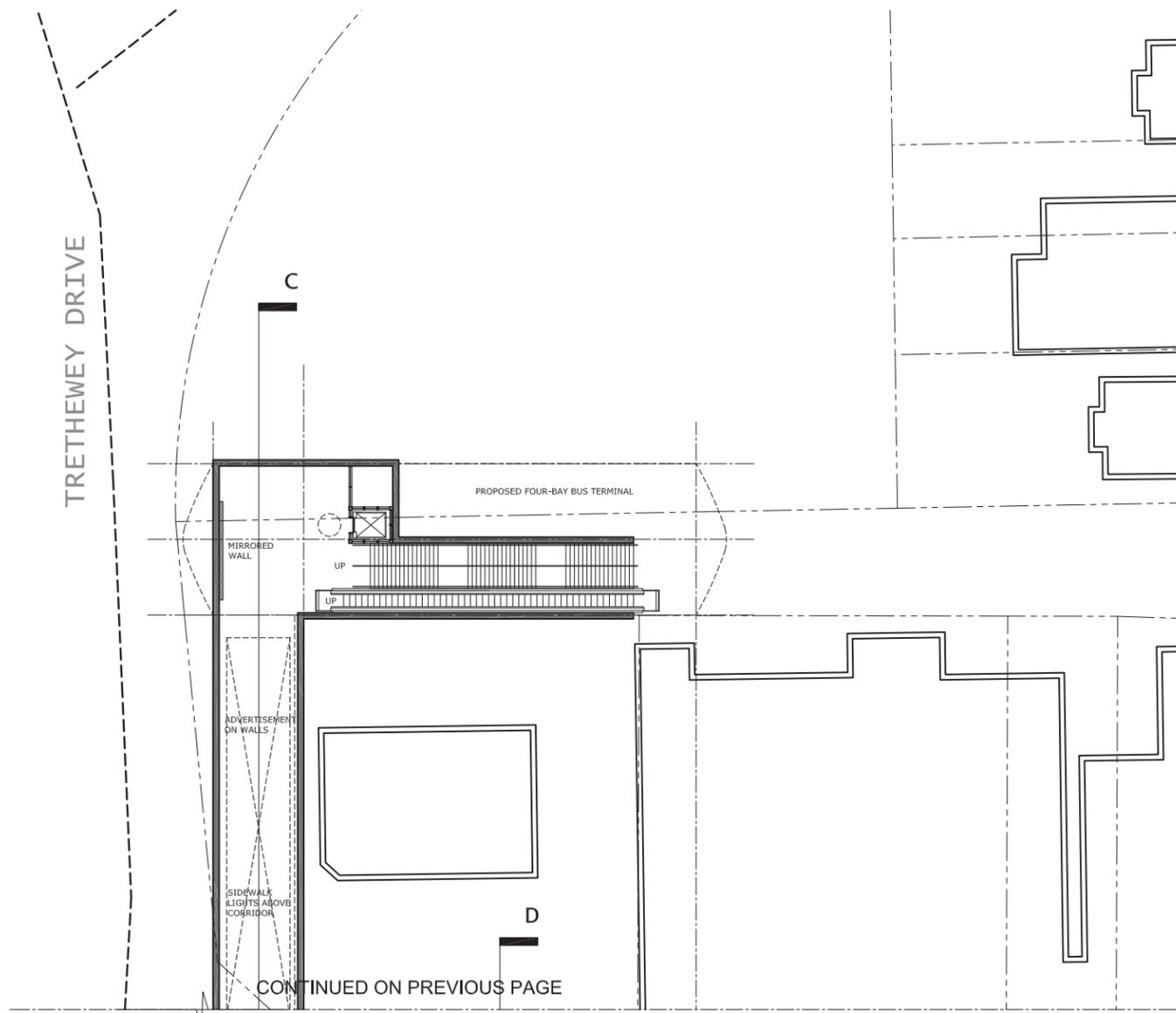
PLAFORM PLAN - CONNECTION TO PROPOSED BUS STATION

KEELE STREET

UP

AUTOMATIC
EXIT

DN

TRACKS BELOW

REFLECTIVE
WALL FINISH

VENT
SHAFT

VENT
FAN ROOM

A

DN
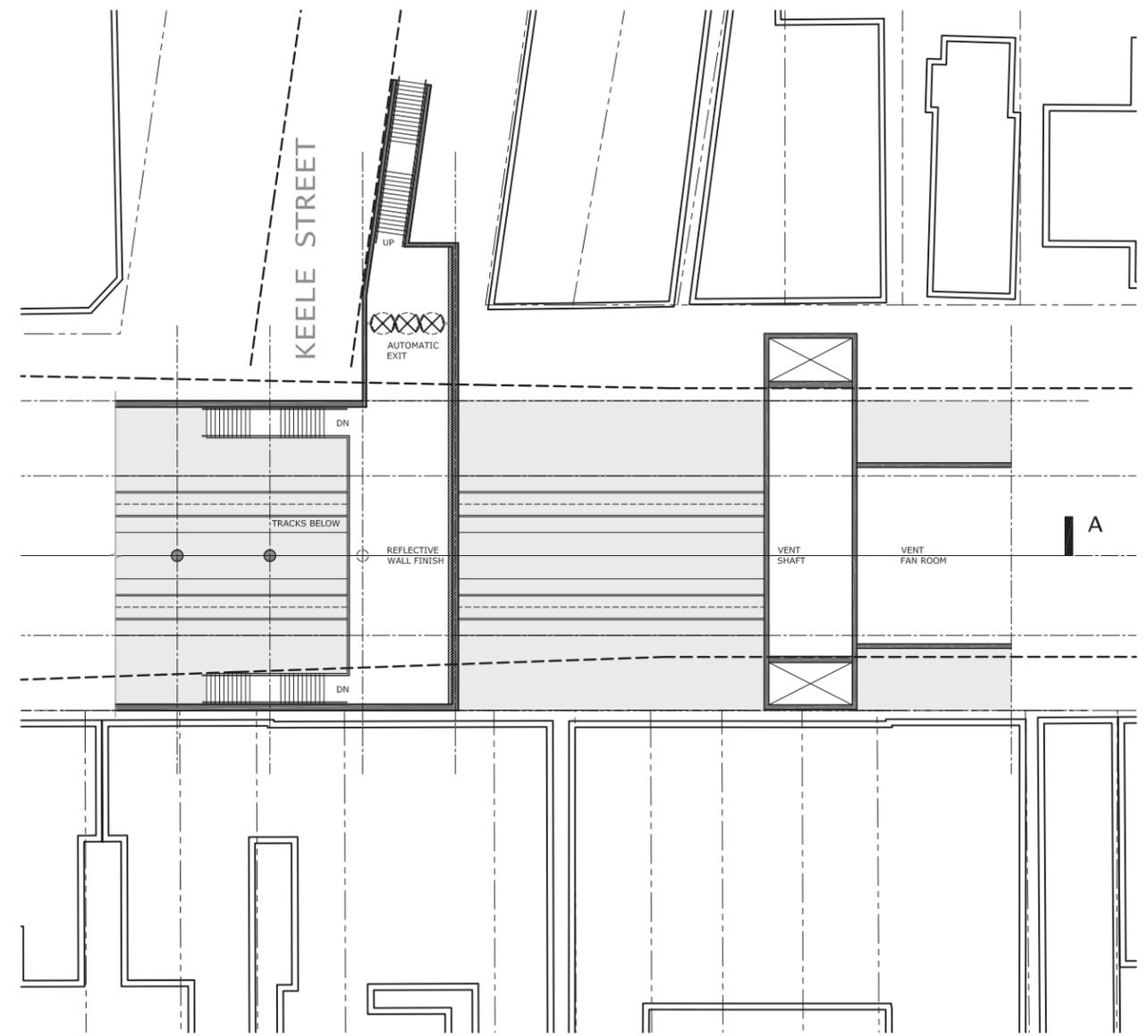
MEZZANINE PLAN - EAST END

KEELE STATION PLANS

SHALLOW STATION TYPE S

0m   5   10m
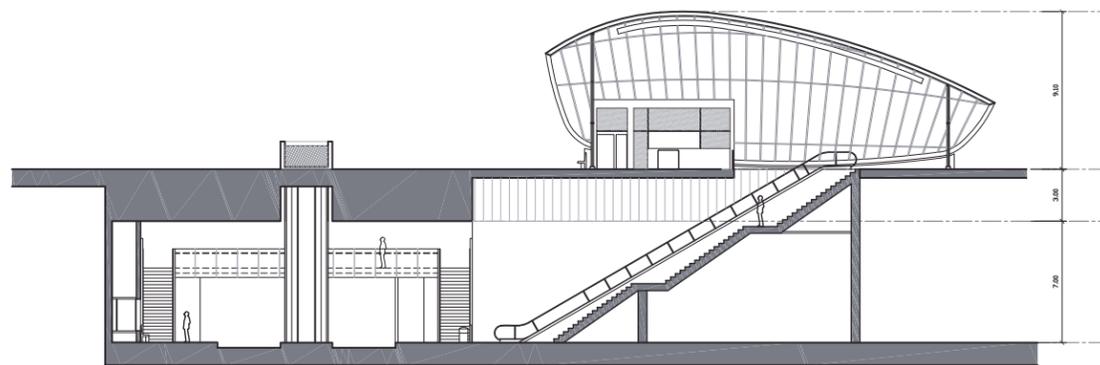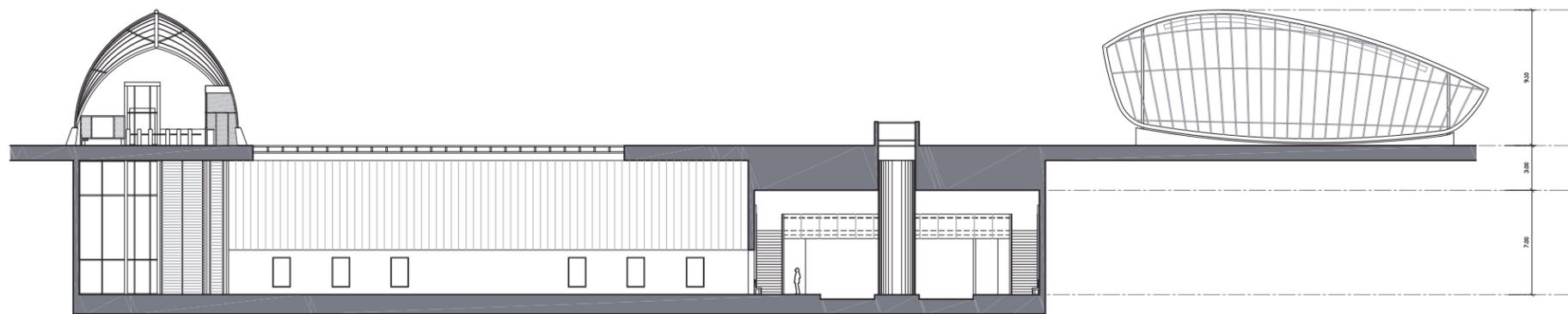
SECTION A

SECTION B

SECTION C

KEELE STATION SECTIONS

SHALLOW STATION TYPE S

SURFACE STOP

Each surface stop is organized with five program zones – information, vending, open seating, sheltered seating, and cultural. The information zone is the first zone next to the intersection, providing system maps, train schedules and a community message board. This zone is marked by a glowing pier, which is identical to the ones in underground stations. The vending zone provides essential amenities to commuters, which contains ticket and vending machines, coffee machines, newspaper stands, and a phone booth. Open seating and sheltered seating zones are organized in an alternating pattern. The cultural program zone is designated for small-scale art installations that are unique at each stop. It offers an opportunity to insert various art elements into the public transportation system. Art mediums can range from photography, mural, sculpture to furniture design. Design details will be coordinated with participating artists.

With a simple structural grid, the thin roof, cladded with aluminum panels is supported by a steel beam that cantilevers out from two steel columns. Transparent materials and ample lighting are used to create good sightlines and enhance public safety. Handicap access is provided throughout the entire platform length, while the platform height is matched with the LRT vehicle's low floor design to allow level boarding. In addition, sheltered seating will be heated during the winter season. Overall, the key objective is to design a LRT shelter that will not only serve its practical purpose but also to promote public art and in turn, to provide a unique travel experience to commuters.
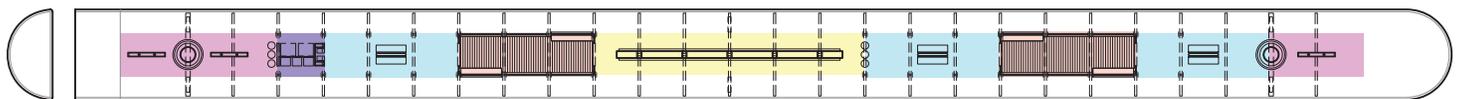
Information
Vending
Open Seating
Sheltered seating
Cultural

Surface stop program zones

schematic proposal of surface stops

SLOPE TO DRAIN THROUGH COLUMNS

ALUMINUM CLADDING
ON CEILING AND ROOF EDGES

HSS 127X76 STEEL JOISTS ON
W250X101 CANTILEVERED
STEEL BEAM ON W250 COLUMNS

4.50

6.00

CENTRE PLATFORM TYPICAL SECTION

SLOPE TO DRAIN THROUGH COLUMNS

ALUMINUM CLADDING
ON CEILING AND ROOF EDGES

HSS 127X76 STEEL JOISTS ON
W250X101 CANTILEVERED
STEEL BEAM ON W250 COLUMNS

4.50

3.65   3.00

SIDE PLATFORM TYPICAL SECTION

0m   2   2.5   5m

ANNOUNCEMENT
DISPLAY ABOVE

ADS BEHIND
SEATS

ANNOUNCEMENT
DISPLAY ABOVE

ANNOUNCEMENT
DISPLAY ABOVE

INFORMATION

6.00

VENDING

PHONE
BOOTH

INFORMATION

COMMUNITY
INFO BOARD

TICKET

ADS BEHIND
SEATS

SHELTER

CULTURAL WALL

RECYCLING
BINS

INFORMATION

4.50

9.00

90.00

TYPICAL SURFACE STOP CENTRE PLATFORM

0m 1   5   10m

Sheltered seating zone of centre-platform surface stop

schematic proposal of surface stops

Sheltered seating zone of side-platform surface stop

3.00

ANNOUNCEMENT
DISPLAY ABOVE
INFO   COMMUNITY
INFO BOARD
VENDING
TICKET
PHONE
BOOTH
ADS
ANNOUNCEMENT
DISPLAY ABOVE
CULTURAL WALL
ANNOUNCEMENT
DISPLAY ABOVE

4.50

4.50   9.00
90.00
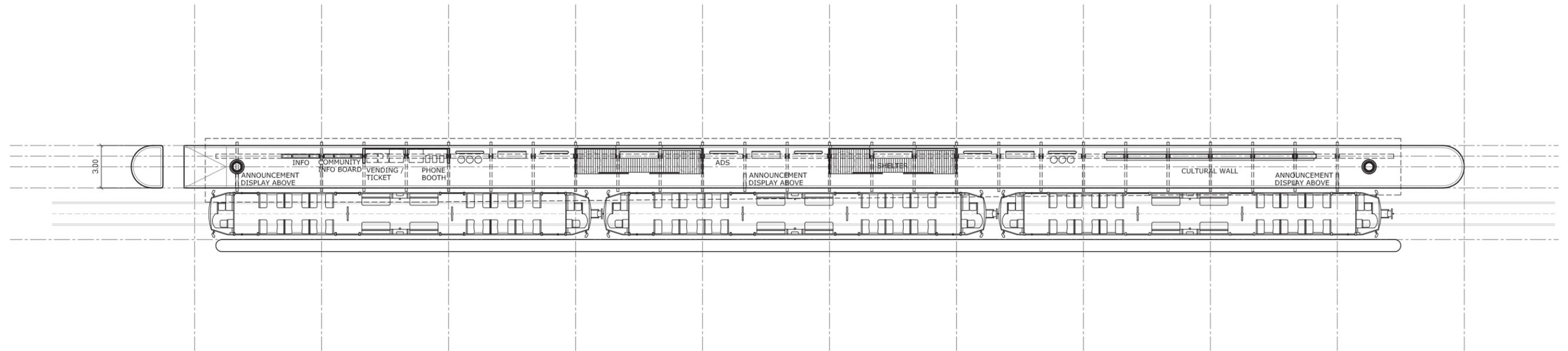
TYPICAL SURFACE STOP SIDE PLATFORM

0m 1   5   10m

6.   CONCLUSION

CONCLUSION

Spatial anthropology theories are proven to be useful design tools for laying out fundamental criteria in early design stages. These theories are based largely on in-depth studies of human interactions with the environment. Thus, they are the key for architects and interior designers to better understand the needs of occupants in a particular built environment. In response, designers can create a place that is stimulative and more accommodating. Four different types of spatial quality are defined in this thesis study – inscribed, embodied, transposed and contested spaces. In theory, these spatial qualities combined will create a great third place for informal social gathering that is distinct from home and workplace social environments.

In reality, the performance of a third place becomes limited when placed within a secured facility, and thus its function as an informal social space is diminished to some extent. The nature of a transit building is radically different than a traditional third place, such as a sidewalk patio, but there is no doubt that some qualities of third place can be actualized in a more restricted built environment. In general, the more complex and flexible a public building is, the more opportunities it has for creating lively third places. Despite having some limitation, it is evident that the effectiveness of public space in the proposed stations is enhanced significantly and a beneficial social environment is provided. The spatial discourses and guidelines are developed to manifest how third places could work even in small transit facilities, which then can be used as a reference for large-scale transit developments. It is reasonable to say that when third places are sited in more complex pubic buildings, they can make a greater social impact. In a larger city context, third places are not exclusive to transit facilities. A city should provide a network of third places that are embedded in and supported by all public buildings. Accordingly, integrating third places into our transportation system is one of the many steps to take to create such a network across the city.

Using the spatial discourses as references and following the design guideline in the early chapters, the primary design goals of promoting enjoyable travel experience to commuters, provide engaging public spaces in the vicinity, and supporting greater social and cultural matrices across the city along the Eglinton Crosstown LRT are achieved. As inscribable and contested spaces, the new LRT stations encourage users' participation in a variety of programs, showcase Toronto's cultural heritages, and provide great opportunities to local artists and musicians. At the same time, neighbourhood and district identities are embodied in these underground spaces, turning each station into a showroom of the locality. Mural, graffiti, mini galleries and other art installations are desirable cultural amenities to be included at these underground stations and surface stops. Although it requires a significant amount of management and coordination, it is certain that these amenities will become valuable assets in the city. When the transit line is completed, it will be the longest gallery in Toronto exhibiting the city's unique culture and history.

The succinct design of the prototypes allows for flexible implementation on all proposed sites along the entire transit line. The simple and open layout of underground stations and the modular grouping of surface stops are completely adaptable. The three selected sites disclose all conditions that are anticipated at other locations and demonstrate the way in which the design guideline can facilitate positive development of transit facilities. However, the three existing subway stations at Kennedy, Eglinton and Eglinton West, as well as the new terminal station at the Pearson International Airport are not included in this prototype study. They are subjected to more complex site conditions and technical constraints with the interference of existing transit lines. Nevertheless, they provide unique challenges and rewarding opportunities for future study.

Construction costs of this crosstown line is probably one of the major concerns to provincial and city officials, which may affect the execution of the design proposal. The proposed architectural form, material finishes, and construction method are chosen to keep the cost at a reasonable level and to ensure minimum building maintenance requirement in the future. The shell-shaped station entrance structures are the only exception. The sculptural form made of double-curved glass offers an aesthetic, distinct image that can transform streetscapes and function as landmarks.

The proposed stations will appear drastically different from all existing transit stations in the city. Most existing subway stations in Toronto were built in the 1950s and 60s. Nowadays, there is a consensus among contemporary architects that the design focus of any public buildings has shifted from functionalism to aesthetics. Numerous contemporary transit stations built in the last decade around the world have manifested this new design approach and the evolution in architectural style. The generally accepted image of underground station as a confined box can no longer satisfy the need of commuters, and a new image is the desideratum.

The new LRT stations recommended in this prototypical design proposal not only reflect the needs of people but more importantly they embody the spirit of the city. They will act as catalyst to initiate and set example for future transit development. By promoting spatial continuity, embracing cultural values, supporting secondary diversities, and stimulating creative interactions among users, the quality of space is ensured. As a result, these new transit stations, usually considered as non-places, are turned into social and cultural convergences and lend themselves positively to the image of the city. When this new identity is formed, a transit station is no longer a locus that people pass through, and it becomes a destination that people may take pleasure in. Combined with culturally oriented public spaces, the Toronto metro can be more than just a means of transport but something that Torontonians to be proud of.

ENDNOTES

[1] Ray Oldenburg, The Great Good Place: cafés, coffee shops, bookstores, bars, hair salons, and other hangouts at the heart of a community (New York: Marlowe & Company, 1999), xiv.

[2] Ibid., xvi-xvii.

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