# Transit-Oriented Communities

*A Primer on Key Concepts*



TRANSLINK

# Introduction

Creating communities that are more "transit-oriented" is one of the key goals of most land use and transportation plans in Metro Vancouver. Transit-oriented communities are not only more livable, sustainable, resilient and economically thriving, they also support higher levels of walking, cycling and transit and result in lower levels of automobile use and greenhouse gas emissions.

In response to requests from local government partners, TransLink has prepared this primer to highlight the key attributes of community design that most strongly influence travel behaviour. This is not an official policy document but is rather an effort to share current thinking on how community design can best support walking, cycling, and transit.

## What are Transit-Oriented Communities?

*Transit-Oriented Communities* (TOCs) are places that, by their design, allow people to **drive less** and **walk, cycle, and take transit more.** In practice, this means concentrating higher-density, mixed-use, human scale development around frequent transit stops and stations, in combination with mobility management measures to discourage unnecessary driving. Ultimately, transit-oriented communities are really walking- and cycling-friendly communities that are focused around frequent transit.

## A Regional Tradition of Transit-Oriented Planning

Metro Vancouver has long supported a transit-oriented land use approach, with the 1975 Livable Region Plan envisioning a transit-oriented regional community of compact urban centres linked by frequent transit corridors. This approach was reaffirmed in the 1996 Livable Region Strategic Plan and continues to be a key direction in the new Regional Growth Strategy adopted in 2011.

**TransLink Terminology**

**Transit-Oriented Communities (TOC):**
*Places* (regions, municipalities, neighbourhoods) that facilitate a decreased reliance on the automobile by:

- focusing higher-density, mixed-use, pedestrian-friendly development within walking distance of frequent transit; and
- implementing mobility management measures to discourage unnecessary driving.

**Transit-Oriented Development (TOD):**
Specific *buildings* or *development* projects that are fundamentally shaped by their close proximity to frequent transit.

# Frequent Transit Network
## Organizing Framework for Growth and Development

The key principle to creating transit-oriented communities is to concentrate growth in centres and corridors that are well-served by frequent transit. To further advance this "centres and corridors" concept, TransLink has introduced the concept of a Frequent Transit Network (FTN).

The FTN is a network of corridors where transit comes along at least every 15 minutes in both directions, throughout the day and into the evening, every day of the week. The FTN does not refer to specific routes or technologies or vehicle types – rather it refers to a high frequency and span of transit service within a corridor. This level of service may be provided by a single route or by a combination of multiple routes and/or technologies within the same corridor.

For the travelling public, the FTN provides a legible and interconnected network of convenient, reliable, easy-to-use services that are frequent enough to be schedule-free. For municipalities and the development community, the FTN provides an organizing framework around which to focus growth and development.

### Service Type and Development Patterns

Transit-oriented communities come in many shapes and sizes. One of the key factors determining the pattern of neighbourhood development is the type of frequent transit service. As illustrated in Table 1, service types can be defined based on speed and local access – attributes that are primarily determined by the type of right-of-way and the station or stop spacing.

Frequent transit services with limited stops, spaced every 1-1.5km, tend to have faster journey times but have less convenient local access. Frequent transit services with many local stops, spaced every 250-400m, have more convenient local access but have slower journey times.

All else being equal, people will walk farther to access faster and more reliable services. The distances people are willing to walk to transit vary depending on trip length and purpose, weather, topography, demographics, and quality of the pedestrian environment. TransLink follows international practice in assuming that, on average, most people will walk roughly 10-12 minutes (800m) to access frequent limited-stop service that runs in an exclusive right-of-way; 6-8 minutes (600m) to access frequent limited stop service that runs in mixed traffic; and 5-6 minutes (400m) to access frequent local stop service. While actual pedestrian catchment areas will vary according to context, these general guidelines are useful in helping to plan transit-oriented communities.

As a result of wider stop spacing, limited stop services support a nodal development pattern with the highest concentrations of density focused around the stops and stations. Due to tighter stop spacing, local stop services support more of a linear development pattern with densities distributed more equally along the transit corridor.

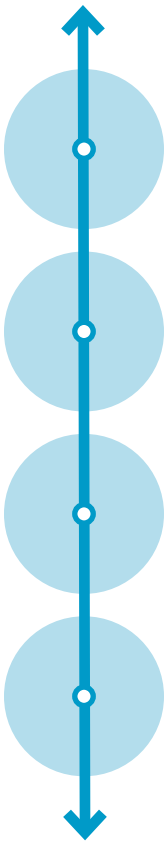
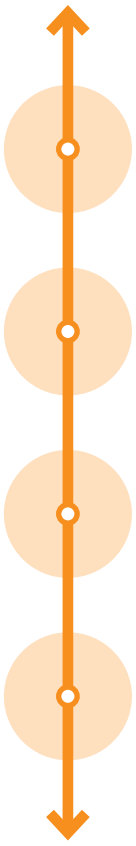
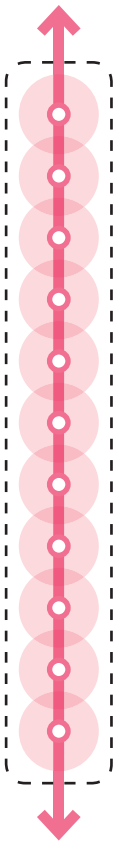
| | | FREQUENT TRANSIT SERVICE TYPES | | |
|---|---|---|---|---|
| ATTRIBUTES | **Stop Spacing:** | Limited Stop (every 500-2,000m) | | Local Stop (every 250-400m) |
| | **Right-of-Way:** | Exclusive | Shared | Exclusive or Shared |
| LAND USE INFLUENCE | **Pedestrian Catchment Area:** | 800m Radius | 600m Radius | 400m Radius |
| | **Pattern:** |  |  |  |

**Table 1** – Frequent Transit Service Types and Development Patterns

# The "Six Ds" of Transit-Oriented Communities

There is no single "right way" to create successful transit-oriented communities and, ultimately, many variations on these basic development patterns are possible depending on a community's aspirations for how it wants to grow. In addition, the shape of a community may change and evolve over time, in response to the introduction of new types of transit service, market and cultural forces, demographics and other factors. There are, however, several attributes that are common to nearly all places with high levels of transit demand and productive transit service:

- Major **DESTINATIONS** and centres are lined up in reasonably direct corridors making them easy to serve efficiently by frequent transit;
- Walking **DISTANCE** to frequent transit is minimized by creating a fine-grained urban structure of well-connected streets around which to focus:
  - » people-friendly urban **DESIGN** including safe, comfortable, and direct pedestrian and cycling routes;
  - » higher levels of residential and employment **DENSITY**;
  - » a rich **DIVERSITY** of land uses and housing types;
  - » **DEMAND** management measures that discourage unnecessary auto trips.

While each of the "Six Ds" is important in shaping travel behaviour, some aspects of built form are more permanent than others (Figure 1). For instance, once a neighbourhood is established, its location and its street network become very difficult to change over the long term, whereas building form and the uses within buildings change more readily along with market trends. Accordingly, it is critical to make good decisions on location, urban structure, and street network in the early stages of community design in order to establish an urban fabric conducive to walking, cycling and transit.

Since no single measure is truly effective in isolation, in successful transit-oriented communities all of the "Six Ds" are **implemented in concert.** There are no magic thresholds for density or any of the other variables that, once achieved, will automatically produce certain travel outcomes. Instead, each of the "Six Ds" works synergistically to support higher levels of transit service and reduced levels of automobile dependence.

Likewise, to be effective all "Six Ds" must be implemented at **all spatial scales** of planning – starting at the regional scale and moving down to the community, neighbourhood, and site scales.

- At the *regional scale*, urban centres and frequent transit corridors are identified to provide the basic framework for shaping regional growth.
- At the *community and neighbourhood scales,* frequent transit stops and stations provide the focus around which to create a fine-grained network of well-connected streets and foster higher density, mixed-use, walkable neighbourhoods.
- At the *site scale,* buildings are oriented toward transit facilities and the wider public realm to enhance the pedestrian experience.

The following sections explain each of the "Six Ds" in further detail.

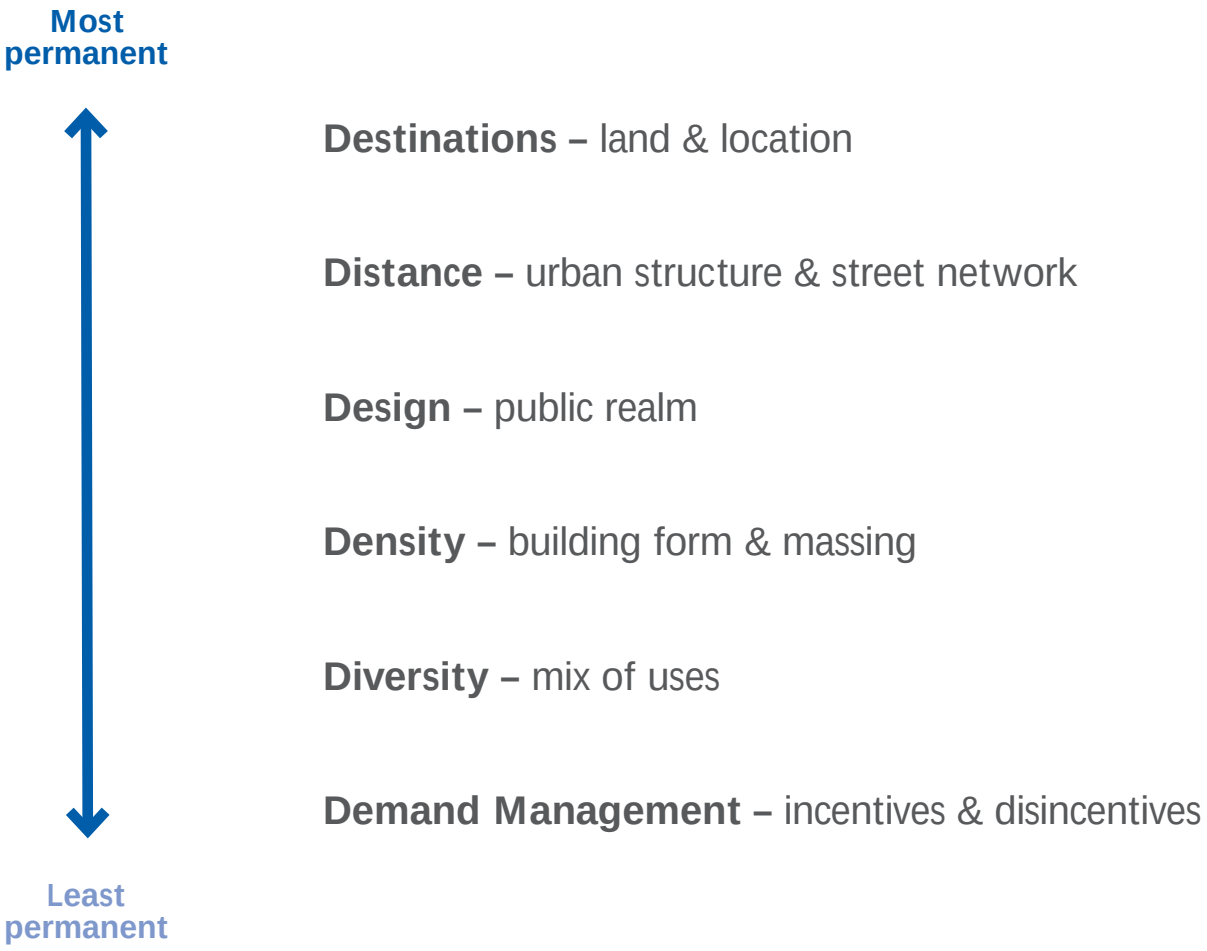



**Figure 1** – Relative permanence of the "Six Ds"

# 1 Destinations
## Be on the Way

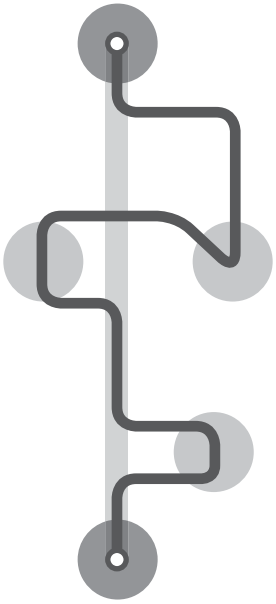


**Figure 2** – Poor transit geography forces a choice between providing a slow meandering route or one that bypasses key destinations.

**Figure 3** – Good transit geography lines up destinations along a reasonably direct corridor. Be on the Way!

An efficient transit corridor – and hence one that will support frequent transit service – *connects multiple high demand destinations* along a reasonably direct line. For the customer, the transit trip becomes more competitive since it is perceived as a direct route between any two points on the line. For the transit provider, more destinations and riders can be captured in fewer kilometres travelled leading to more cost-effective service provision.

A poor transit geography (Figure 2) is one with destinations that are not lined up so that transit must either bypass them and miss out on additional ridership potential, or meander from the main route to reach them and increase the trip length and travel time to the other passengers. Where land use has not been well-coordinated with transit, this tradeoff is the perennial dilemma facing the transit planner.

Good transit geography (Figure 3) is one in which transit destinations are on a reasonably direct path between other destinations. Ideally, this path is anchored at either end by major trip generators since these anchors can justify better service along the entire corridor – even to smaller destinations in between.

Ultimately, the first and most important step to creating a more transit-oriented community is to align major destinations along a reasonably direct corridor so that they can be efficiently served by frequent transit. In other words: **Be on the Way!**

# 2 Distance
## Connect the Blocks

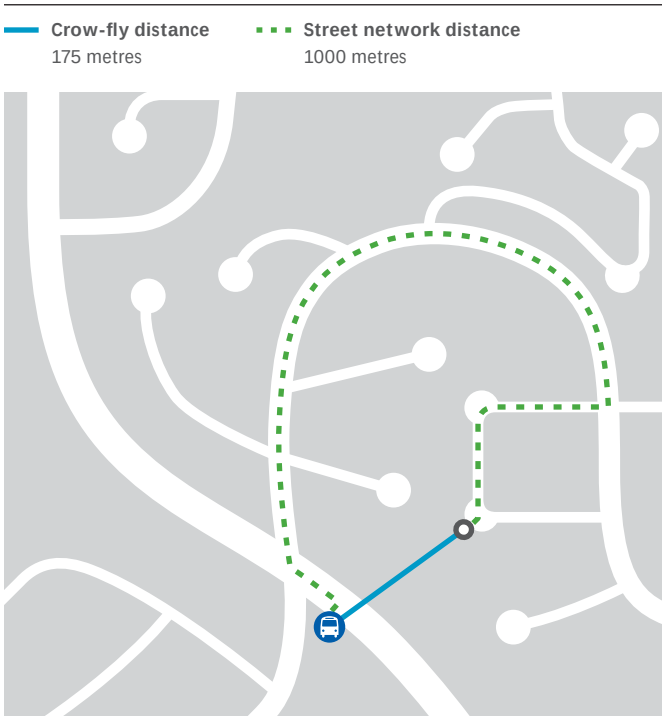



**Figure 4** – A disconnected street network full of cul-de-sacs results in long walking distances and less efficient transit operations.

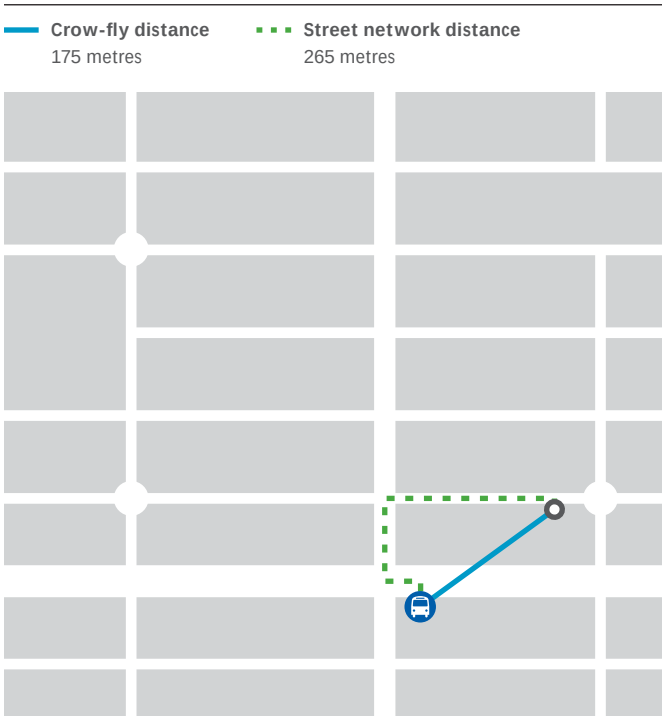



**Figure 5** – A well-connected, fine-grained street network enables shorter, more direct walking connections and is easier to serve cost-effectively with transit.

In order for frequent transit to be successful, it is essential that people can walk to the transit service quickly and conveniently from the places they live, work, shop, and play. While the distance used to define this pedestrian catchment area will vary based on local conditions, generally people will walk farther to access higher capacity transit services, as illustrated in Table 1.

When considering a destination's distance from transit, it is important to consider the actual walking distance, rather than measuring as the crow flies. For example, a poorly connected network with large blocks and many cul-de-sacs (Figure 4) means that the actual walking distance is much longer than the crow-fly distance. Even destinations that are physically close to a transit stop or station may still require a long walk, reducing the attractiveness of that transit service.

In contrast, a fine-grained street network with many connections for pedestrians (Figure 5) will shorten the walk to transit and other destinations by providing more direct walking routes. The traditional grid of the streetcar suburb, with main streets spaced about 800m apart and local blocks no more than 150m long, is a very effective street network for providing both a fine-grained network of pedestrian routes and efficient transit operations.

In places where the street network is already built, it may be possible to improve connectivity for non-motorized modes by creating short-cut pathways for pedestrians and cyclists across larger development sites or to connect cul-de-sacs.

# 3 Design
## Make it Pedestrian-Friendly

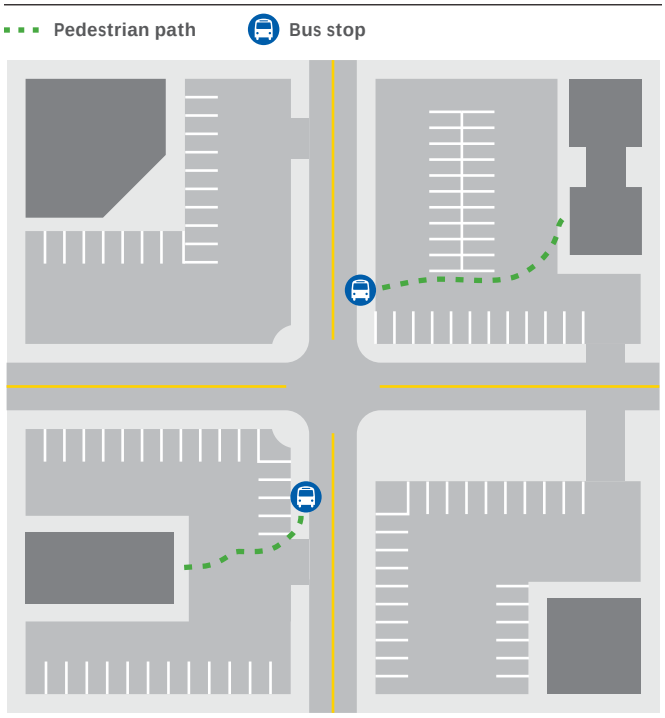



**Figure 6** – Automobile-oriented urban design often sets buildings back from the street with parking in front.

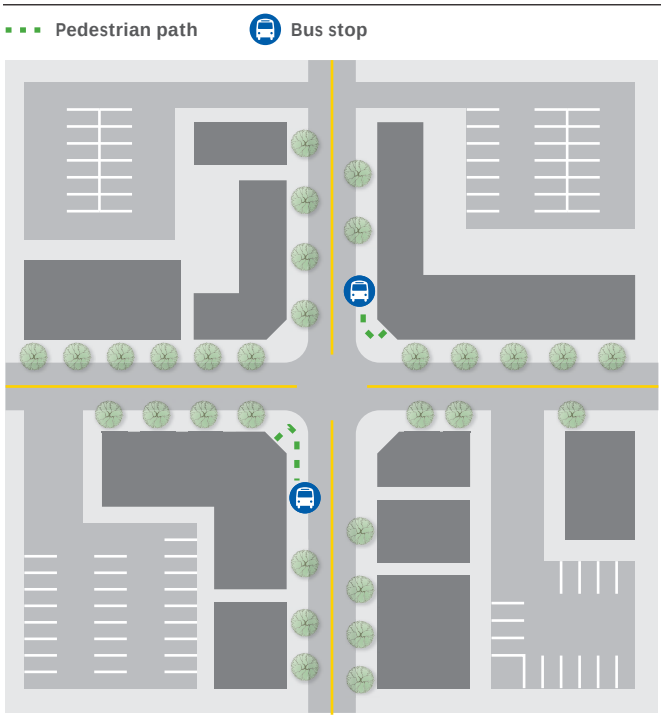



**Figure 7** – Pedestrian-oriented urban design features buildings with fine-grained active frontages built right to the street and with parking tucked behind or provided underground.

Ultimately, transit-oriented communities are really walking- and cycling-oriented communities focused around frequent transit. Accordingly, an attractive, engaging, and well-designed public realm that invites walking and cycling is critical to success. Good walking and cycling infrastructure is also required, including sufficiently wide pedestrian and cycling routes that are accessible to all ages and abilities and that are sufficiently protected from motor vehicle traffic.

The design quality of the street environment also influences rates of walking, cycling and transit use. Provision of shade, weather protection, pedestrian-scaled lighting, street furniture, bus shelters, street trees, and public art all help to enhance the attractiveness and safety of the street environment and thus our willingness to walk, cycle and take transit.

Unlike automobile-oriented areas which are typified by relatively large distances between segregated, lower density uses and a public realm that prioritizes high speed vehicle movement, transit-oriented communities need to be more intimately scaled to maintain the visual interest of pedestrians and cyclists who are travelling at much slower speeds. Accordingly, buildings should have active frontages with many doors and windows, avoiding long, undifferentiated facades and blank walls. Surface parking lots, parking structures and other large format buildings should be avoided or, where necessary, should be wrapped with fine-grained street-oriented uses to minimize negative impacts on the pedestrian environment.

As density increases, peoples' private yards and spaces inevitably get smaller. To make up for smaller private open spaces, ample high quality public open spaces including parks and plazas should be provided. Surrounding selected frequent transit stops and stations with vibrant public spaces also promotes ridership.

While particular urban design strategies need to be tailored to suit the local context of each neighbourhood, the general principle of making walking and cycling safe, welcoming, and comfortable applies to all transit-oriented communities.

# 4 Density
## Fill It In

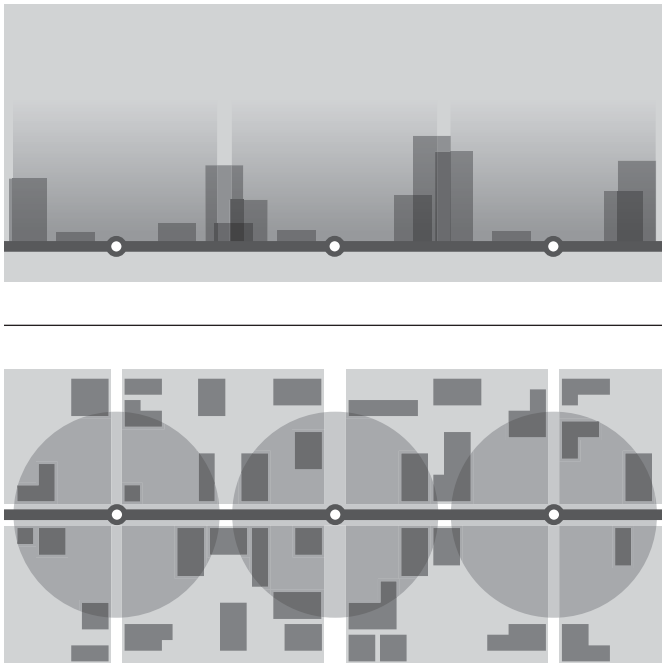


**Figure 8** – Auto-oriented density distribution (patchy development not focused around transit).

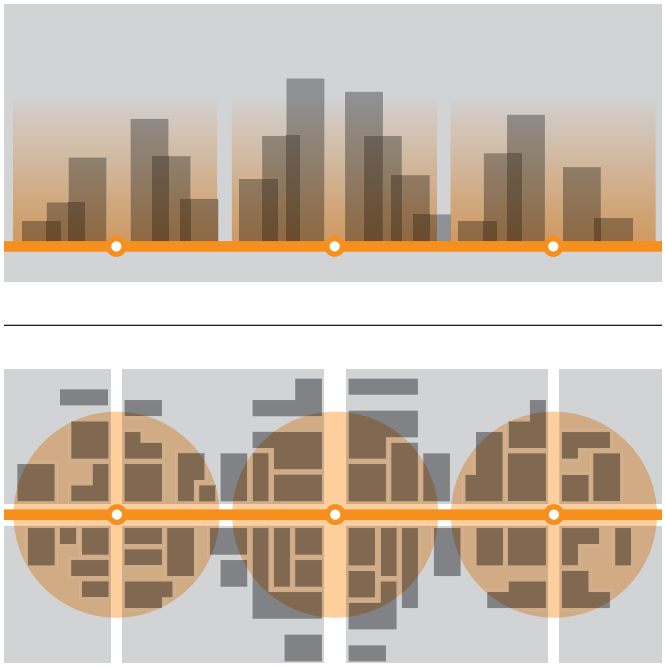


**Figure 9** – Transit-oriented density distribution (highest at transit, stepping down to surrounding neighbourhood).

The next critical ingredient is to concentrate most growth and development within the pedestrian catchment areas of frequent transit stops and stations. Without sufficient density, there is unlikely to be sufficient transit demand to justify frequent transit service.

Generally, higher densities should be concentrated as close to frequent transit stops and stations as possible in order to minimize walking distances to more destinations for more people. Densities can then gradually step down in order to integrate with surrounding lower-density neighbourhoods, where applicable. This typical pattern of density distribution can be modified or adapted to support other neighbourhood goals. What is important is that most of the residential, commercial, and employment density within a community is concentrated within a relatively short walk of frequent transit – no matter what form such density might take in each particular case.

Since employment uses tend to generate more trips throughout the weekday and more trips overall than residential uses, concentrating high-intensity employment uses like office buildings within walking distance of frequent transit is the most effective way to build transit demand and justify service improvements.

It is rare for a city to experience rapid enough population and employment growth to simultaneously develop several corridors that are dense enough to support efficient and effective frequent transit service. There are cost and implementation advantages, therefore, to concentrating on the development of a relatively small number of frequent transit corridors rather than dispersing development activity across a larger area.

# 5 Diversity
## Mix It Up


**Figure 10** – A poor mix of uses and housing along the corridor leads to poor bi-directional transit productivity.


**Figure 11** – A rich mix of pedestrian-friendly uses, and housing types, tenures, and price points distributed along the corridor helps to optimize transit utilization.

Land use mix describes the degree to which different types of land uses (e.g., residential, commercial, institutional, light industrial, entertainment) are located within close proximity to one another. A higher degree of mixing of compatible land uses increases the likelihood that a desired destination is nearby in the neighbourhood making it easier for people to access it by walking or cycling. In such neighbourhoods, multiple errands can be accomplished on foot on the way to transit, over the lunch hour, or on the way home from work.

A rich mix of pedestrian-friendly uses also facilitates more street-level activity throughout the day and evening resulting in greater personal security from the natural surveillance of "eyes on the street."

Land use diversity is also important at the corridor scale. With a rich variety of destinations accessible from stops and stations all along the corridor, transit vehicles are less apt to be crowded in one direction and running empty in the other direction. This corridor-level land use diversity leads to a more balanced bi-directional flow of riders in each direction helping to optimize existing transit capacity and justify better service.

Many land uses generate demand for transit service only at specific times of the day, week, or year. It is important, therefore, to have a good mix of land uses, at the appropriate scale, that generate demand not only in the peak periods, but also in the mid-day, evenings, and weekends across the year. Land uses that generate trips in these off-peak times include retail, service, residential, entertainment, as well as visitor attractions. Some uses, like colleges and universities, may produce high levels of transit demand throughout most of the year but this demand tends to decline during the summer months.

As with land use diversity, demographic diversity also improves transit performance. For example, neighbourhoods with lower-income residents tend to have higher demand for transit since lower-incomes are correlated with higher transit use. Neighbourhoods with housing that is typically occupied by seniors or students tend to have higher mid-day, evening and weekend demand, justifying improved off-peak service.

Ultimately, this demographic diversity can be facilitated through decisions to include a wide range of housing types, tenures, and price points in close proximity to frequent transit stops and stations. Special efforts should be made to accommodate seniors, students, and lower-income residents adjacent to frequent transit.

# 6 Demand Management
## Discourage Unnecessary Driving


**Figure 12** – Free parking is an invitation to drive and leads to inefficient utilization of limited space.


**Figure 13** – Carefully managing the supply and price of parking can discourage unnecessary driving and optimize turnover to support local businesses.

The first five "Ds" all address important transit-supportive changes to the built environment. However, the built form alone is not sufficient to significantly alter travel behaviour without also introducing measures that increase the cost of driving relative to walking, cycling, and transit.

For instance, residents of a higher density, mixed use, walkable community focused around a rapid transit station are less likely to take transit if that community also has ample free parking and an adjacent toll-free highway that is largely free of congestion. Ultimately, individuals will weigh the relative financial, convenience and time costs of their different travel options. Despite the physical appearance of a highly transit-oriented community – if it is still significantly easier, cheaper, and faster to drive – changes to the built environment will not lead to significant increases in transit demand.

Fortunately, many strategies that improve a neighbourhood for pedestrians, cyclists and transit uses also serve to discourage unnecessary driving. For example, reallocating, narrowing, or managing access to road lanes to accommodate other modes can reduce or slow traffic, thereby making the street more comfortable for pedestrians and for passengers waiting at transit stops.

Another effective demand management strategy is to relax parking standards (e.g., lowering or eliminating the number of minimum parking spaces for developments in areas that can be well served by transit) and to actively manage parking supply and pricing. Limiting off-street parking supply and increasing short-term parking rates can reduce the overall attractiveness of driving while encouraging higher levels of parking turn-over that supports local retail businesses. Where parking is not metered, decreasing parking time limits can have a similar effect.

Demand management measures are most effective at discouraging unnecessary driving when accompanied by attractive alternatives that are well promoted. Accordingly, demand management measures should be introduced and scaled up along with walking, cycling, and transit improvements. Overall, the focus should be on making walking, cycling, and transit ridership equal or better travel options than driving.

# Summary

This primer discusses how to implement the "Six D's" – those key elements that are required to create more transit-oriented communities.

## 1 Destinations

First, get the location right: focus high demand destinations along frequent transit corridors and limit growth elsewhere. **Be on the Way!**

## 2 Distance

Next, create a supportive urban structure by introducing a fine-grained network of pedestrian- and bicycle-friendly streets. If block sizes are too big and streets are too discontinuous, distances will be too far to walk. **Connect the Blocks!**

## 3 Design

Design a public realm that is **pedestrian- and bicycle-friendly.** Bring buildings up to the sidewalk, animate them with active frontages, provide amenities and weather protection, and tuck automobile parking behind or underground.

## 4 Density

**Fill It In!** Place the highest residential and employment density near to frequent transit stops, stations, and exchanges and step these densities down to transition to surrounding neighbourhoods.

## 5 Diversity

**Mix It Up!** Ensure a good diversity of uses, especially those which animate the streetscape; provide a mix of housing types, tenures, and price points; and a good jobs-housing balance so that people are never too far from work, shopping and other destinations.

## 6 Demand Management


Introduce demand management measures like parking pricing to **discourage unnecessary driving.** No matter what changes are made to the built environment, if it is still significantly cheaper and easier to drive, most individuals with a choice won't shift to walking, cycling, and transit.

In the most successful transit-oriented communities all of the "Six Ds" are implemented in concert at all spatial scales of planning – from the regional to the local. No one measure is completely effective in isolation – rather they work synergistically to support higher levels of walking, cycling, and transit ridership and reduced levels of driving.

This positive "transportation and land use feedback loop" is key to creating communities that are more livable, resilient and sustainable.

## Acknowledgements:

Figure 1 is adapted from a concept by Bev Sandalack (The Calgary Project, 2006).

The phrase "Be on the Way" was usefully coined by Jarrett Walker (Human Transit Blog, 2009). Figures 2 and 3 are also adapted from illustrations by Jarrett Walker.

Figures 4 and 5 are adapted from a 2009 paper by Frank LD, Winters M, Patterson B, Craig CL entitled "Promoting Physical Activity Through Community Design."

Figures 8 and 9 are adapted from the City of Calgary's Transit-Oriented Development Policy Guidelines (2005).

## For more information and resources:

Visit our website at **translink.ca**

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