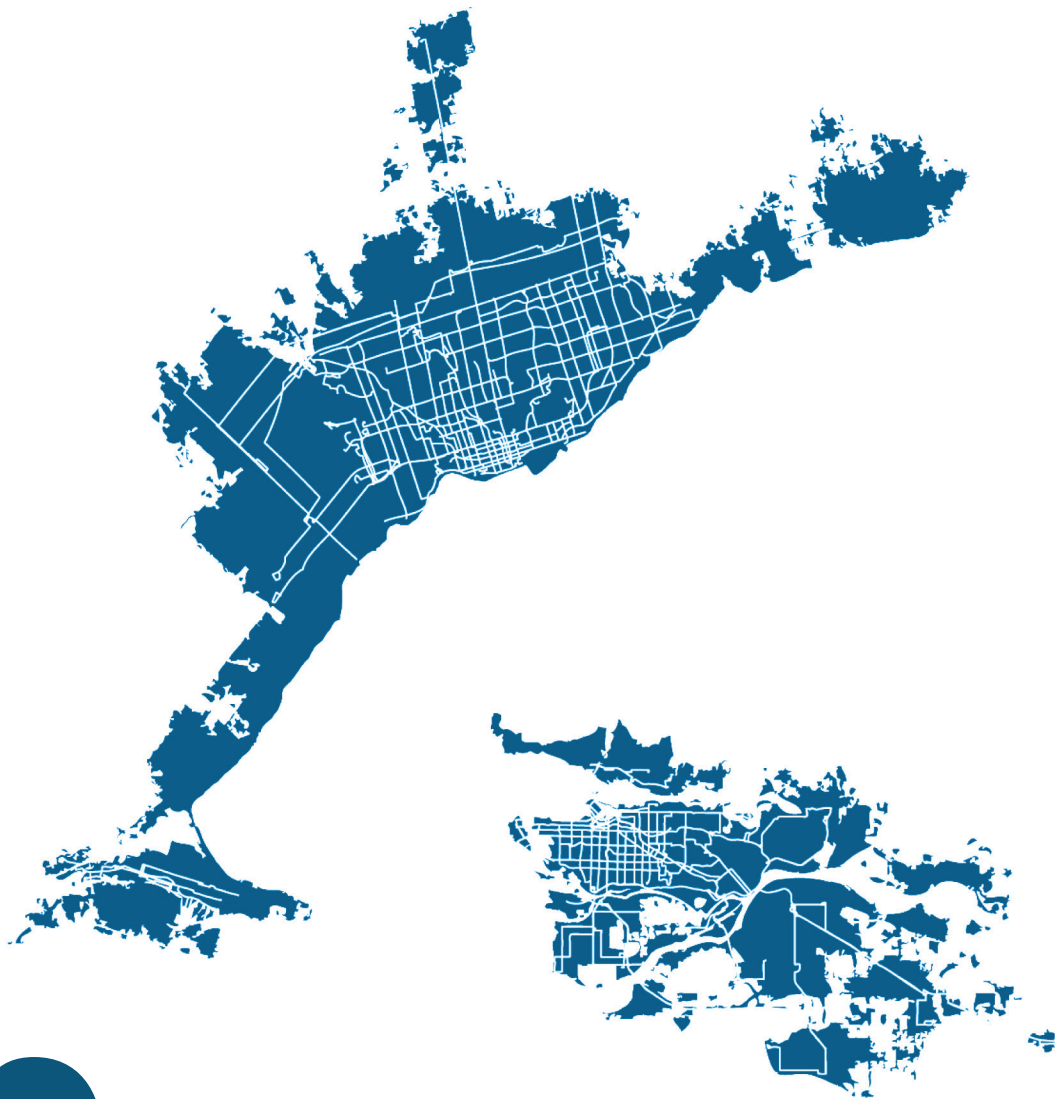


# GROWING PAINS



UNDERSTANDING THE NEW  
REALITY OF POPULATION  
AND DWELLING PATTERNS  
IN THE TORONTO AND  
VANCOUVER REGIONS

**Marcy Burchfield  
and Anna Kramer**

*with assistance from  
Vishan Guyadeen*

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# EXECUTIVE SUMMARY

Long-term efforts to build sustainable city-regions are rooted in attempts to slow down sprawl by building more compact communities that can be served effectively by transit.

Two of Canada's largest and fastest-growing city-regions, Metro Vancouver and the Greater Toronto and Hamilton Area (GTHA), have ambitious long-term plans that aim to do exactly that. Both share similar planning goals and have used similar policy mechanisms to combat sprawl, achieve a more compact form, and focus transit-oriented development around urban centres. These two city-regions differ, however, in the timing of their plans and their approach to implementation and monitoring. Together they make an interesting case for comparison.

A 2010 Neptis report first compared the growth patterns of these two city-regions between 1991 and 2001 and found that the key to success in the Vancouver region lay in its consistent approach to policy that has survived changes in government and the collapse and reformation of its regional planning program (Taylor and Burchfield 2010).

But a consistent approach to policy-making does not mean that a plan cannot evolve. Success in the long term requires policy refinement based on emerging trends that are measured and tracked over time against the goals of the plan.

This current Neptis research extends the study to 2011. This comparison of how the two regions have grown over a 20-year period is timely, as both jurisdictions are reviewing their respective land use and transportation plans.

Metro Vancouver had a head start on growth management relative to the Greater Toronto and Hamilton Area. Starting in the 1970s, British Columbia put in place strong protections for agricultural land with its Agricultural Land Reserve. But it is a consistent and long-standing approach to urban containment, to prevent growth from spilling into the countryside, that has produced results, including a reduction in the amount of land used for urban expansion and a greater diversity of housing stock. In recent years, Metro Vancouver has taken a more strategic approach to growth management, directing intensification to frequent transit corridors and urban centres.

## SUCCESS IN THE LONG TERM REQUIRES POLICY REFINEMENT BASED ON EMERGING TRENDS THAT ARE MEASURED AND TRACKED OVER TIME AGAINST THE GOALS OF THE PLAN.

Ontario's growth management effort began in 2006, and like British Columbia, it has strong protections for agricultural land in southern Ontario. However, its plan takes a more generalized approach to intensification: 40% of new residential development is directed to the already urbanized area. In addition, a complementary greenfield target was introduced that was meant to increase densities in new development at the urban edge.

As this report's findings show, growth in the GTHA is still tilted towards greenfield development. Ontario could learn from Metro Vancouver, by introducing a more strategic approach to growth that directs more new residents to areas with frequent transit service.

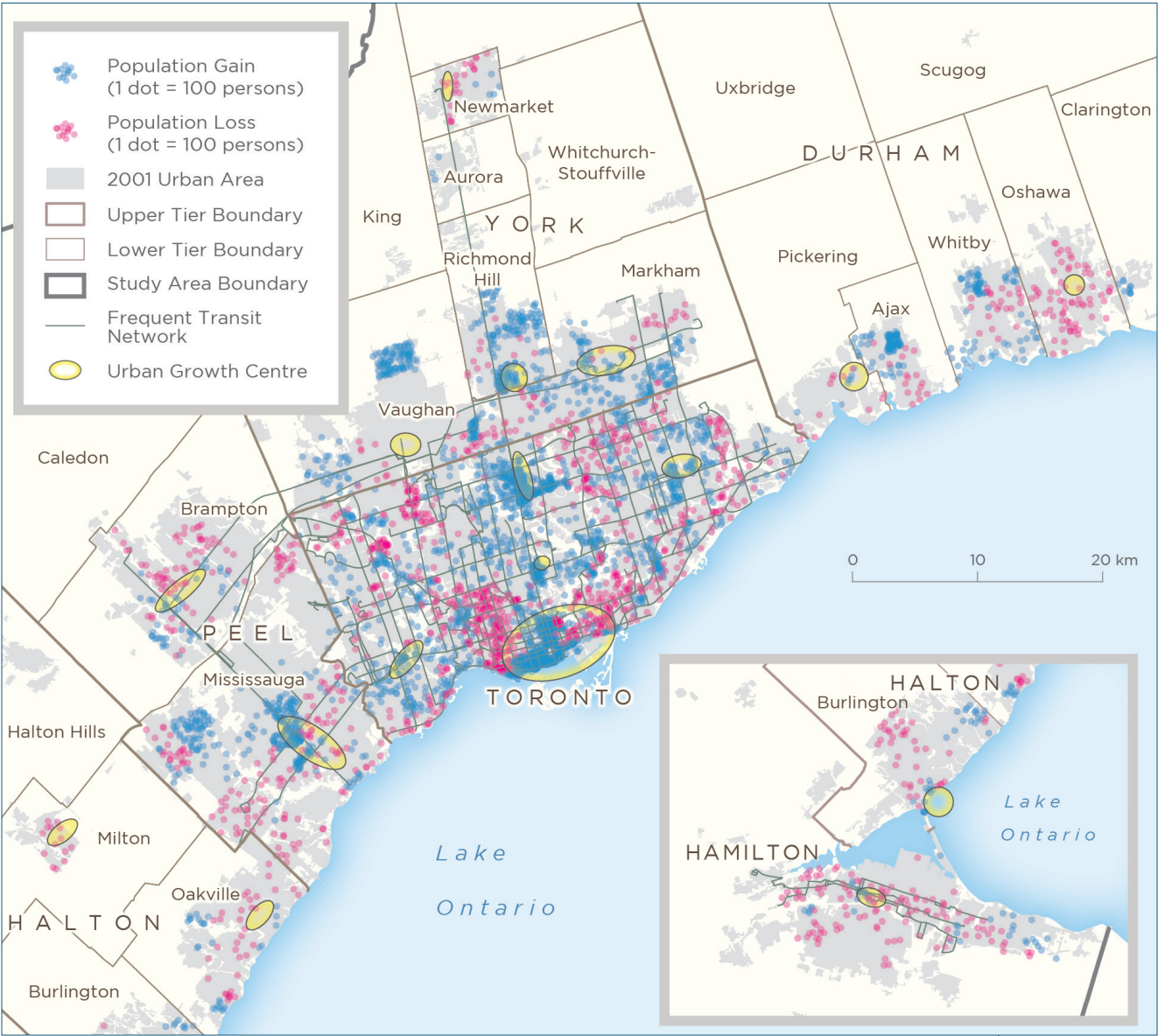
### FINDINGS

Three important differences in the way growth has been accommodated in the Vancouver and Toronto regions offer a reality check and possible guidance for the regions' policy reviews at this critical juncture.

*1. The GTHA is losing population in some established urban areas while growing mostly through greenfield development; Metro Vancouver is intensifying.*

Between 2001 and 2011, Metro Vancouver continued to accommodate most population growth through intensification, while the GTHA continued to accommodate the majority of new population growth through greenfield development.

- Despite a condo boom in parts of downtown Toronto, in the Greater Toronto and Hamilton Area as a whole, only 14% of net new residents were accommodated through the intensification of existing urban areas. In other words, 86% of the net new residents added between 2001 and 2011 were housed in new suburban subdivisions built on greenfield sites.
- By contrast, 69% of net new residents were accommodated in existing urban areas through intensification in the same period in Metro Vancouver.
- In both city-regions, intensification accommodated a greater number of dwellings than people; 46% of net new dwellings were accommodated in the existing urban area of the GTHA and 76% of net new dwellings were accommodated in the existing area of Metro Vancouver.



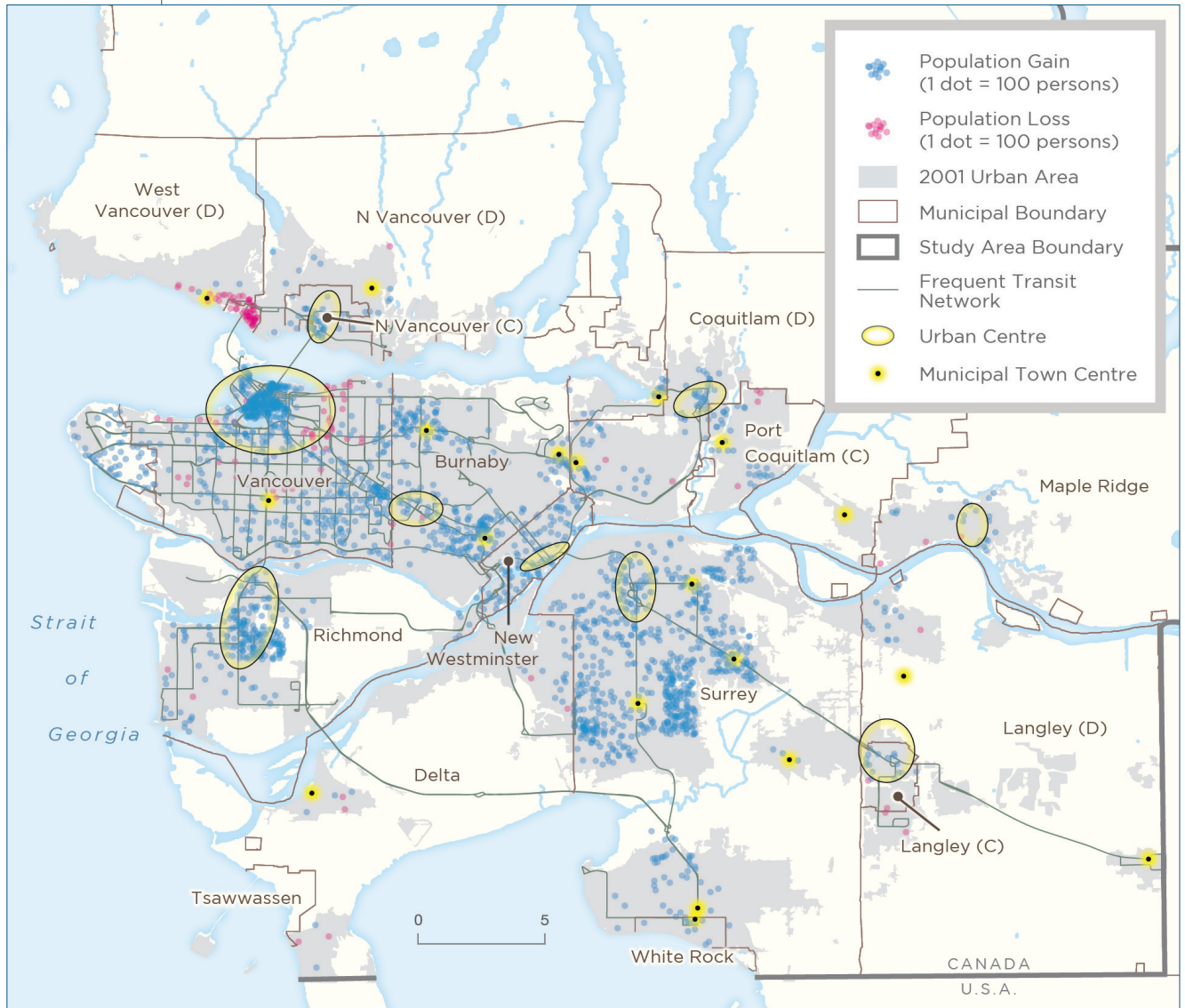
POPULATION GAIN AND LOSS  
IN ESTABLISHED URBAN  
AREAS, GTHA, 2001-2011





**METRO  
VANCOU-  
VER**

POPULATION GAIN AND LOSS  
IN ESTABLISHED URBAN AREAS,  
METRO VANCOUVER, 2001-2011



THE ESTABLISHED URBAN AREAS ACROSS METRO VANCOUVER HAVE NOT SEEN ANYTHING LIKE THE POPULATION LOSS APPARENT IN THE GREATER TORONTO AND HAMILTON AREA.

Our research also found that new greenfield development in the GTHA was being built at higher densities than in the 1990s, as the rate of urban expansion slowed down while the rate of population increase stayed the same. Between 1991 and 2001, the urban area of the GTHA grew by 26%; it grew by only 10% between 2001 and 2011. One definition of urban sprawl is that the increase in urban expansion is greater than the increase in population (Fulton et al. 2001). By this measure, the GTHA is no longer sprawling.

However, neighbourhoods in the older established urban areas of the GTHA are losing population, from Hamilton to Brampton to central Toronto to Oshawa. A striking example can be found in the suburb of Brampton. While Brampton gained more than 200,000 new residents through greenfield development, it experienced a net loss of population in its existing urban area. The loss signals changing demographics that need to be considered. As the suburban municipalities in the GTHA mature, there is a need to understand the internal dynamics of each municipality as it plans for future growth.

By comparison, the established urban areas across Metro Vancouver have not seen anything like the population loss apparent in the GTHA. The GTHA experienced population loss in some inner and outer suburbs in both the City of Toronto and other municipalities, with intensification focused mostly in a few urban centres. In Vancouver, intensification was more evenly spread throughout the whole urban area. In terms of overall growth, the urban area of Metro Vancouver increased by 16% between 1991 and 2001, and by a mere 4% between 2001 and 2011, while population increased by 24% in the first decade and 16% in the second.

Existing urban areas already have a range of services and infrastructure, from schools to sewer pipes. But in many of these areas, population has declined and these services and facilities are underused, while new residents are accommodated in greenfield developments that require new infrastructure and services.



Furthermore, in both city-regions, the housing stock grew at a faster rate than the population. This finding is consistent with long-term demographic trends showing that the size of Canadian households has been shrinking and the proportion of one-person households has been increasing. We refer to this finding as “running hard to stand still,” meaning that we are building more housing to accommodate the same or less population.

*2. Growth in the GTHA is going to areas without transit; Metro Vancouver is achieving transit-oriented development.*

Our analysis of population and dwelling growth within walking distance of frequent transit corridors and stations shows:

- Very little of the GTHA’s population growth was located near frequent transit corridors or near GO train stations. Only 18% of the region’s net new residents were accommodated near frequent transit routes, and only 10% of net new residents were accommodated within 1000 metres of a GO station.
- In Metro Vancouver, almost 50% of the region’s net new population was accommodated near a frequent transit route and 23% of new residents were accommodated within 800 metres of a SkyTrain Station.

Although the plans for both city-regions contain transit-oriented development policies, only Metro Vancouver’s regional growth strategy directly integrates with its long-range regional transportation plan. An example is the adoption of the Frequent Transit Development Area policy in the 2011 strategy, which directs growth to corridors that are or will be served by frequent transit, as defined by TransLink, Metro Vancouver’s regional transit agency.

	GREATER TORONTO AND HAMILTON AREA	METRO VANCOUVER
	Change (% of regional growth)	Change (% of regional growth)
FREQUENT TRANSIT NETWORK		
Population	181,390 (18%)	151,530 (46%)
Dwellings	171,820 (37%)	86,650 (53%)
TRANSIT STATIONS	GO Stations	SkyTrain Stations
Population	104,600 (10%)	74,890 (23%)
Dwellings	48,500 (11%)	42,860 (26%)
URBAN CENTRES		
Population	134,560 (13%)	82,610 (25%)
Dwellings	91,620 (20%)	43,890 (26%)

In the GTHA, land use planning and transportation planning appear to be on separate tracks. Municipalities began planning in conformity with the Growth Plan in 2006, two years before the release of *The Big Move*, the regional transportation plan. As a result, there was less focus on accommodating growth around corridors and centres with existing or planned frequent transit service.

Similar differences are found in the comparison of population growth directed at Urban Growth Centres in the Toronto region and Urban Centres in the Vancouver region:

- In the Greater Toronto and Hamilton Area, Urban Growth Centres accounted for about 13% of the region's net growth in population between 2001 and 2011.
- In Metro Vancouver, Urban Centres accommodated 28% of the population growth.

This analysis suggests that Metro Vancouver's more directed and strategic intensification may be more effective than the Ontario Growth Plan's generalized requirement that 40% of all housing development occur in the form of intensification, a policy that does not direct intensification to locations in which it would have the greatest benefit.

The Growth Plan policy is premised on the assumption that intensification—no matter where it is located—will contribute to reduced congestion, the efficient use of infrastructure, and more sustainable communities. This research shows, however, that intensification alone may not achieve these goals, especially in the context of declining household sizes.

*3. The GTHA offers a limited range of housing choices; Metro Vancouver has created a more balanced housing stock over the past 20 years.*

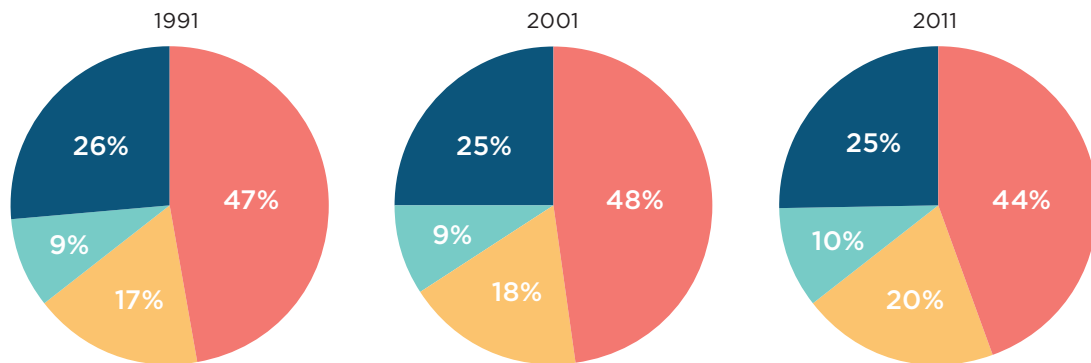
In the GTHA, between 2001 and 2011 almost 86% of net new residents were accommodated in dwellings built on greenfields. Most were single detached houses (62%). In fact, over a 20-year period (1991–2011), the proportional composition of the GTHA's housing stock has remained unchanged. In Metro Vancouver, by comparison, the housing stock has been transformed from one dominated by single detached homes to a more balanced stock offering residents a greater choice of housing types across the region.

Housing affordability is a problem in both regions. However, increasing the range of housing options is an important component of any policy to address housing price increases.

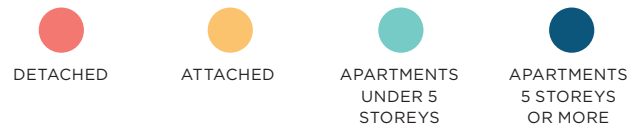
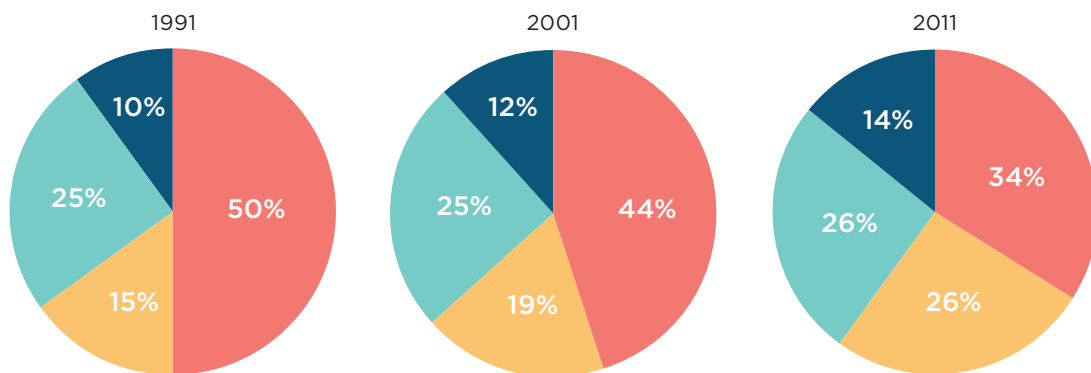
IN THE GTHA, URBAN  
GROWTH CENTRES  
ACCOUNTED FOR  
ABOUT 13% OF THE  
REGION'S POPULATION  
GROWTH. IN METRO  
VANCOUVER  
URBAN CENTRES  
ACCOMMODATED 28%  
OF THE POPULATION  
GROWTH.

COMPOSITION OF HOUSING STOCK, GTHA AND  
METRO VANCOUVER, 1991, 2001, AND 2011

GTHA



METRO VANCOUVER



## IMPLICATIONS FOR GROWTH POLICY

Three policy lessons arise from our study of the two city-regions.

*1. A hard urban boundary and a clear regional structure can support growth management.*

In Metro Vancouver, a defined Urban Containment Boundary acts as a brake on outward development. Within that boundary, growth is targeted to urban centres, which are organized into a hierarchy according to their regional and local roles, and to areas served by the frequent transit network.

Ontario's Greater Golden Horseshoe has no such hard boundary. Instead there is a requirement for 40% of housing development to go to built-up areas and for greenfield development to be built at a certain density within an Urban Settlement Area. The settlement area is not delineated in the Growth Plan itself and is therefore not a hard edge.

*2. Planning for land use and for transportation should be coordinated.*

Both regions have transit-oriented development policies, but only Metro Vancouver's regional growth strategy directly integrates with its long-range regional transportation plan.

In the Toronto region, there is a lack of integration between the Growth Plan and the regional transportation plan *The Big Move*, partly because the creation of a regional transportation agency and a long-range transportation plan came after the introduction of the Growth Plan. Neither plan attempts to direct a certain percentage of growth to particular transit-accessible locations across the region.

### *3. Support for regional growth management calls for cooperation and monitoring.*

Metro Vancouver is a regional body that coordinates services across municipalities in the Vancouver region. It acts as a convener of local stakeholders and municipalities, all of which have to buy into the regional growth strategy. The role of convener is important in the success of the strategy, to ensure that local interests do not trump the regional perspective.

The Growth Plan for the Greater Golden Horseshoe does not have any similar structure for reconciling the needs of individual municipalities and the region as a whole. Implementation is carried out by individual municipalities and there is no requirement that these municipalities work together or consider regional priorities in their decisions.

Metro Vancouver also has a well-established monitoring program that tracks 55 indicators relating to land use, the environment, and the economy. In the Greater Golden Horseshoe, the Ontario Growth Secretariat has only recently established 14 indicators to monitor the effectiveness of the Growth Plan. Although the monitoring program for the Greater Golden Horseshoe is too new to have produced results, it is starting from a less robust foundation.

\* \* \*

It is hoped that this research, analysis, and commentary will provide evidence of new population and housing patterns, particularly in the GTHA. As part of its 10-year review, the Province of Ontario should consider these patterns as it evaluates current policies in the Growth Plan. The GTHA is no longer “sprawling” according to the traditional definition of this term. However, the problems associated with “sprawl” remain, since the majority of the new population is being accommodated in automobile-dependent neighbourhoods.

Meanwhile, new problems have emerged: smaller households, older households, emptying neighbourhoods, unused infrastructure in some places and overused infrastructure in others. It is time for planning policy to evolve to address the growing pains of fast-growing city-regions. As an often-quoted saying has it: The future is not what it used to be.

WHILE THE GTHA IS NO LONGER SPRAWLING, THE PROBLEMS OF SPRAWL REMAIN.



# INTRODUCTION

It has been nearly 20 years since smart growth was added to the lexicon of the North American planning profession (Glendening 1997; State of Maryland 1997). In the new millennium, the tenets of smart growth—increased density, transit-oriented and mixed-use development, and reurbanization—have become conventional wisdom for many planners and the goals of many municipal and regional plans. Among other things, smart growth is designed to favour alternative modes of transportation to the automobile, such as walking, cycling, and transit, in order to reduce traffic congestion (International City-County Management Association–Smart Growth Network, 1998).

At first, the ideas of smart growth were more popular with planners than with land developers. However, in the years following the 2008 recession, researchers have documented a shift in the U.S. housing market whereby in fast-growing city-regions, development is occurring in core areas and not just the suburbs (Frey 2014). Some have postulated that this new shift is part of a larger restructuring of American cities (Ehrenhalt 2012; Nelson 2013), while others see it as generational trend representing the preferences of millennials (Flint 2014).

## THE CITY-REGIONS OF TORONTO AND VANCOUVER HAVE REGIONAL PLANS WITH SIMILAR GOALS, BUT DIFFER IN THE TIMING OF THEIR PLANS AND THEIR APPROACH TO IMPLEMENTATION.

In recent years, like their American counterparts, planners in Canada's fastest-growing cities have promoted smart growth principles, as evidenced in the most recent plans (Filion and Kramer 2012). Politicians have begun to support plans that call for redirecting growth to existing urban areas, given the high cost of building infrastructure to service new urban areas (Taylor, Burchfield, and Kramer 2014).

Two city-regions in particular, those of Vancouver and Toronto, have established regional plans intended to direct growth to existing urbanized areas to achieve a more compact form and focus transit-oriented development around officially designated regional centres. The two jurisdictions have similar planning goals and have used similar policy mechanisms to achieve them. The city-regions differ, however, in the timing of their plans and their approach to implementation. Together, therefore, they make an interesting case for comparison.

The growth patterns of Canadian cities differ from those of American cities, exhibiting fewer characteristics of leapfrog development and less ultra low-density sprawl (Bourne et al. 2011; Newman and Kenworthy 1999; Sorensen and Hess 2007). This difference is mainly attributed to local and regional planning policies that shape growth patterns. Although planning policies have led to different outcomes among Canadian cities (some cities have emphasized efficiently serviced outward expansion, while others have focused on the intensification of existing urbanized areas), a general acceptance of regulatory land use policies has historically influenced the shape of Canadian cities (Bourne et al. 2011; Taylor and Burchfield 2010).

In 2006 the Province of Ontario introduced the *Growth Plan for the Greater Golden Horseshoe*, a regional growth plan for a large area in South-Central Ontario that includes the Greater Toronto and Hamilton Area (GTHA) and the surrounding 15 upper- and single-tier municipalities.<sup>1</sup> In the same year that the Growth Plan was released, the province created a regional transportation authority, later named Metrolinx, which introduced a regional transportation plan for the GTHA, *The Big Move*, in 2008.<sup>2</sup>

- 
- 1 In the Greater Toronto and Hamilton Area, municipal governance is made up of two-tier or single-tier municipalities. The Regional Municipalities of Halton, Peel, York, and Durham are upper-tier or regional municipalities containing several lower-tier municipalities; Toronto and Hamilton are single-tier municipalities (see fuller discussion on the governance structure of the GTHA in Taylor and Burchfield 2010).
  - 2 The Growth Plan covers a larger geography than the regional transportation plan. *The Big Move* covers the Greater Toronto and Hamilton Area, known as the Inner Ring of the Greater Golden Horseshoe in the Growth Plan.

In 1996, the Livable Region Strategic Plan (LRSP) was adopted by the board of the Greater Vancouver Regional District (later renamed Metro Vancouver).<sup>3</sup> The plan was comprehensively revised in 2011. A long-range transportation plan has been in effect in Metro Vancouver since 1993. In 2008, this transportation plan was updated by TransLink, an agency established in 1998 and responsible for the regional transportation network in Metro Vancouver.<sup>4</sup>

At the time of writing (2015), planning agencies in both city-regions are reviewing their respective land use and transportation plans. Our analysis provides an opportunity to juxtapose rates and patterns of residential development against the objectives of the plans.

In this study, we compare the rates at which the Greater Toronto and Hamilton Area and Metro Vancouver have grown and the regional patterns of residential growth for the 20-year period, 1991–2011 (see **Figure 1** for a comparison of the scale of the two city-regions and **Figures 2 and 3** for detailed maps). We further examine sub-regional patterns of residential growth between 2001 and 2011 to better understand how the patterns compare to location-specific planning policies contained in the plan for each jurisdiction.

In both regions, we consider the most recent growth management plans (2006 in the Toronto region and 2011 in Metro Vancouver) as well as long-standing planning policies to examine the questions: (1) What is the influence of planning policy versus the market in shaping development patterns in a fast-growing city-region? (2) How can planning policy evolve to address emerging trends and meet the overall goals of a plan?

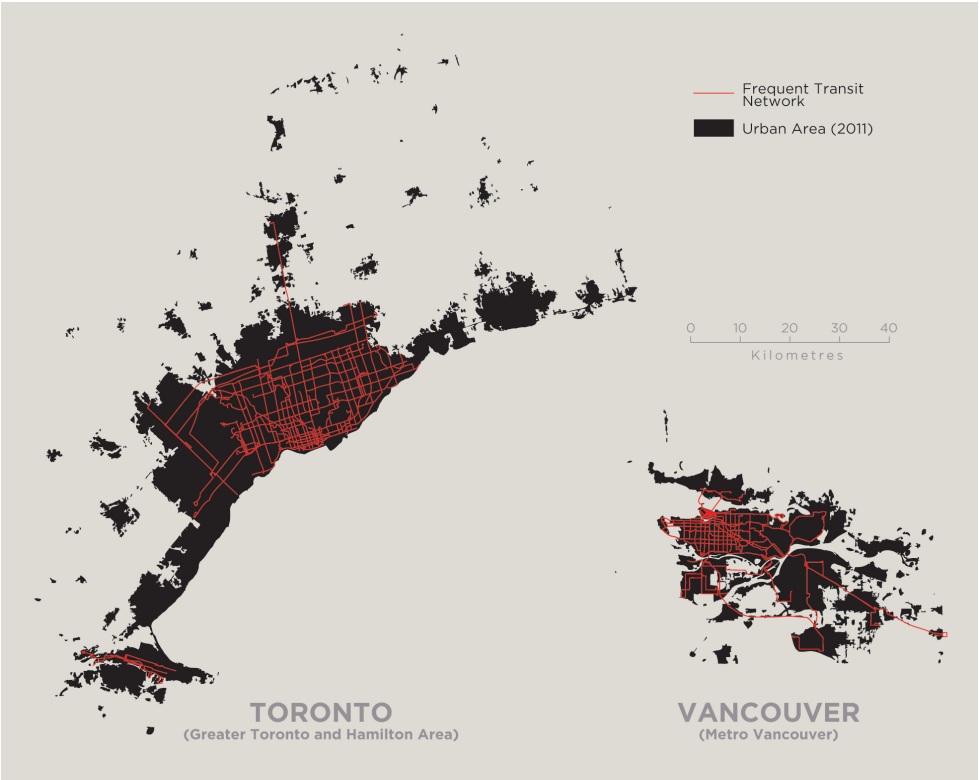
In Metro Vancouver, where the 2011 plan refined policies brought in 15 years earlier, our results shed light on what is working and where policy challenges still exist. In the GTHA, where the regional plan was introduced at the midpoint of our analysis, the findings shed light on how the market has anticipated planning policy in shaping the region, and what challenges remain.

A LONG-RANGE  
TRANSPORTATION PLAN  
HAS BEEN IN EFFECT  
IN METRO VANCOUVER  
SINCE 1993. THE REGIONAL  
TRANSPORTATION PLAN  
FOR THE GTHA WAS  
INTRODUCED IN 2008.

3 Regional district authorities were set up by the Province of British Columbia in 1965 to facilitate the coordination and delivery of services across a region. The board of each regional authority is made up of municipal council representatives in proportion to a municipality's population (Taylor and Burchfield 2010).

4 *Transport 2021* was released in 1993 and *Transport 2040* in 2008. <http://www.translink.ca/en/Plans-and-Projects/Regional-Transportation-Strategy.aspx>





GREATER TORONTO AND HAMILTON  
AREA AND METRO VANCOUVER,  
2011 URBANIZED AREA AND 2009  
FREQUENT TRANSIT NETWORK

FIGURE  
NO. 1

FIGURE  
NO. 2

THE GREATER TORONTO  
AND HAMILTON AREA

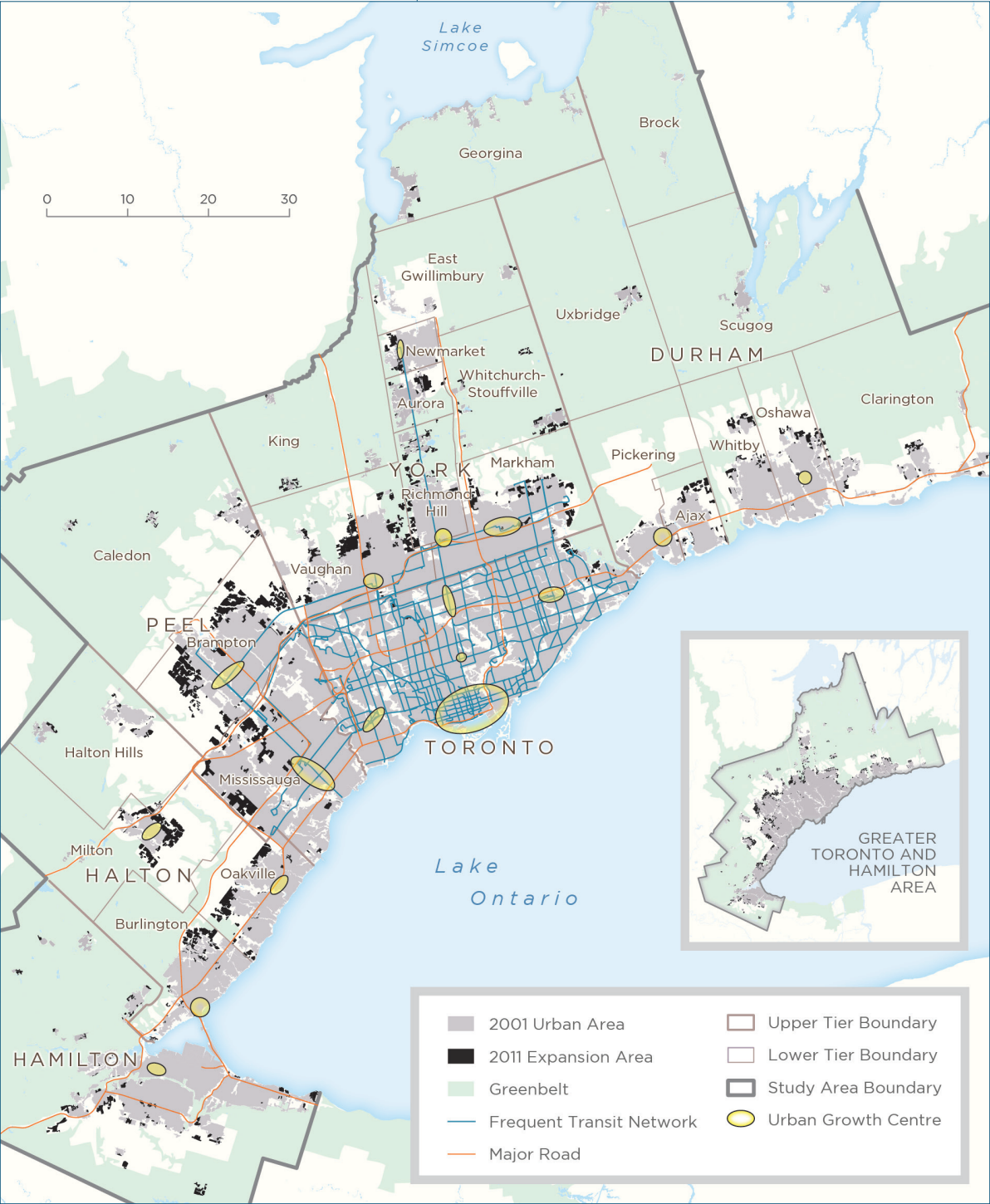
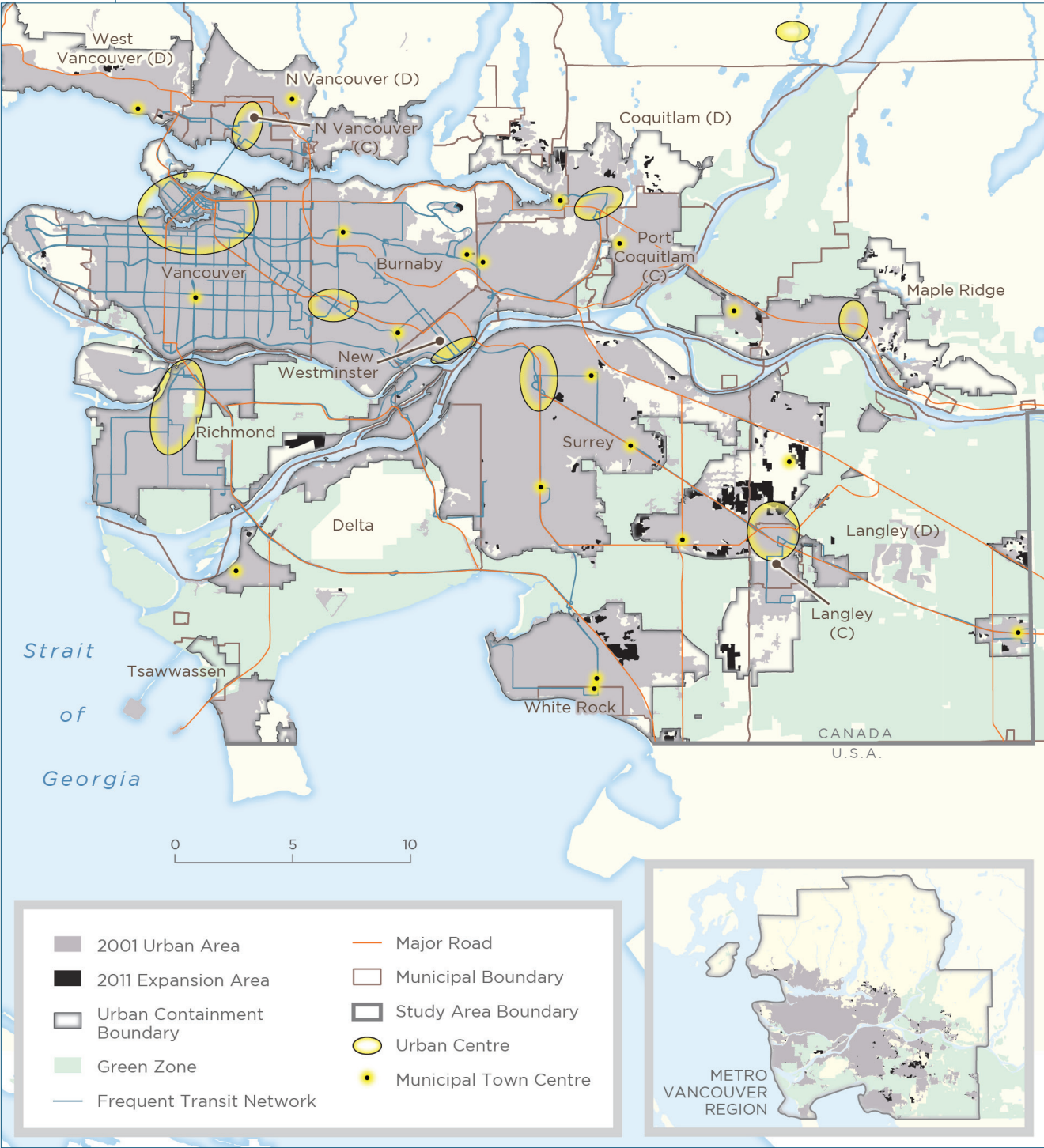


FIGURE  
NO. 3

METRO VANCOUVER



# PLANNING POLICY MECHANISMS

The Toronto and Vancouver metropolitan regions are attempting to manage rapid growth by slowing down the rate of urban expansion onto undeveloped lands (green-field development) and redirecting growth to existing urban areas (intensification). Both regions have used similar policy mechanisms to achieve the outcome of a more compact region, but the implementation and overall approach to these policy mechanisms have led to different results in each region. In this section, we summarize the policy approaches used in each region. For an extended discussion on the historical development of regional planning policy in each city-region, see Taylor and Burchfield (2010).

## URBAN CONTAINMENT

Urban containment, that is, the limiting of the outward growth of cities, can take the form of policies or of natural barriers to growth or both (Taylor and Burchfield 2010). In the Toronto region, Lake Ontario creates a natural barrier to growth; in the Vancouver region, the mountains, Pacific Ocean, and United States border do the same. In addition to these natural barriers, each region has chosen to designate large swaths of land for the protection of agriculture, wildlife, water resources, and ecologically sensitive areas. These are areas where policies prevent or limit urban development (see **Figures 2 and 3**).

The Province of Ontario established the Greenbelt Plan for the Toronto region in 2005. The Greenbelt protects and limits development on rural and ecologically sensitive lands, including the large landforms known as the Niagara Escarpment and the Oak Ridges Moraine.

## THE 2011 PLAN FOR METRO VANCOUVER ESTABLISHED AN URBAN CONTAINMENT BOUNDARY WITHIN WHICH GROWTH WILL TAKE PLACE. THE GROWTH PLAN IN THE TORONTO REGION DOES NOT DELINEATE URBAN SETTLEMENT AREAS.

In addition to the Greenbelt, the Growth Plan specifies that major development, whether greenfield or intensification, must be directed to an *Urban Settlement Area*, which includes areas for future urban expansion. The urban settlement areas are not, however, delineated in the Growth Plan itself, but are laid out in municipal official plans. Municipalities determine the extent of their own designated urban settlement areas through a process known as “land budgeting,” which determines how much land will be needed for greenfield development, taking into account population and employment projections, past trends of development, and the density and intensification targets in the Growth Plan.

British Columbia introduced the Agricultural Land Reserve (ALR) in 1973, which includes a large area within the Vancouver region. As part of the 1996 *Livable Region Strategic Plan* (LRSP), ecologically sensitive lands such as floodplains were added to the ALR to create a Green Zone, which has since functioned as a limit on urban expansion. Further urban containment was introduced in 1996 through the identification of a *Growth Concentration Area*, which is made up of the core areas of the largest municipalities and is where 70% of the region’s growth is to be directed by 2021.

Metro Vancouver comprehensively reviewed the policies in the LRSP and adopted a revised plan in 2011 called *Metro 2040: Shaping Our Future*. In our report, we refer to this plan as the 2011 regional growth strategy. This

plan introduced the *Urban Containment Boundary*, which is essentially the area that is not part of the Green Zone or the ALR; the *Urban Containment Boundary* includes both urban and non-urban land. The plan proposes that the region’s growth to 2041 will occur within the *Urban Containment Boundary* through greenfield development and intensification (Metro Vancouver 2011).

### INTENSIFICATION

There is no fixed definition of the term “intensification.” In this study we use the word to describe development that is directed to an existing urban (or built-up) area and thus the opposite of greenfield development. A number of policy mechanisms can achieve the goal of intensification and contribute to the wider planning goal of developing a more compact city-region.

In the Toronto region, residential intensification has long been generally, if vaguely, encouraged in documents such as the Provincial Policy Statement of 1996.<sup>5</sup> The 2006 Growth Plan introduced a more specific goal through a general intensification target: 40% of residential development for all upper- and single-tier municipalities must be directed to the existing built-up urban area (an area delimited by a boundary reflecting the extent of the built-up area as of 2006).

5 Policy 1.1.2: “Land requirements and land use patterns will be based on...(d) providing opportunities for redevelopment, intensification and revitalization in areas that have sufficient existing or planned infrastructure.” <http://www.mah.gov.on.ca/Page1492.aspx>



## IN THE TORONTO REGION, THERE IS A LACK OF INTEGRATION BETWEEN THE GROWTH PLAN AND THE REGIONAL TRANSPORTATION PLAN.

Although the Growth Plan does not specify where intensification should occur within the existing urban area, it does suggest *Urban Growth Centres* (UGCs), *major transit station areas*, and *intensification corridors* as focal points for intensification. Building on earlier municipal plans, the Growth Plan identifies 25 UGCs, of which 17 are in the Greater Toronto and Hamilton Area. These UGCs include urban nodes within the City of Toronto, downtown areas in smaller suburban cities, and as-yet undeveloped suburban centres (Filion 2007). The Plan calls for minimum gross densities of between 150 to 400 people plus jobs per hectare by 2031 in these UGCs. There are no other location-specific targets. Municipalities are responsible for creating intensification strategies and policies in their official plans to achieve the intensification target every year after 2015 and the UGC density targets by 2031.

In the Vancouver region, intensification is implemented through complementary policy mechanisms. The *Urban Containment Boundary* includes both intensification and greenfield development areas and sets a target of accommodating 99% of all growth inside the Boundary between now and 2041.

*Regional Town Centres* have a long history in Vancouver's regional and local plans, dating back to the 1970s (Taylor and Burchfield 2010). In 2011, a hierarchy of urban centres was introduced in the regional plan, which gave greater prominence to the Metropolitan Core in the City of Vancouver and the Surrey Metro Centre, while the other seven Regional Town Centres have been renamed Regional City Centres. The plan introduced an additional 17 Municipal Town Centres that represent "hubs of activity" (Metro Vancouver 2011). All urban centres are expected to accommodate 40% of dwelling growth and 50% of employment growth to 2041: these targets are meant to act as guidance for future regional and local planning. Metro Vancouver has also developed guidelines for the land use and transportation characteristics of the centres. The guidelines differentiate between centres that play a regional role versus those that play a more local role.

New to the 2011 regional growth strategy is the addition of *Frequent Transit Development Areas*. Frequent transit is defined as all-day bus, tram, or train service that runs at least every 15 minutes (TransLink, n.d.). The Frequent Transit Development Areas along these routes are meant to accommodate 28% of new dwellings and 27% of employment growth by 2041. Like the urban centres, these targets are meant to guide future regional and local planning. Between the urban centres and Frequent Transit Development Areas, 77% of employment and 68% of residential growth will be directed to areas that are well served by transit.

## INTEGRATION OF LAND USE AND TRANSPORTATION

Both regions have adopted the concept of transit-oriented nodes and corridors in their plans as a focus for growth and have set targets in these policy areas.

The goal of nodal development policies is to gradually transform a region from a monocentric structure (in which people commute from the residential suburbs to a single downtown employment district) to a polycentric one (in which both jobs and housing are clustered in multiple centres). A polycentric structure can allow for more efficient and balanced use of a regional transit network because commuters are not all travelling in the same direction at peak hours. However, polycentric regions require transit networks that make it possible to commute to and from different centres. Most public transit in North American cities does not facilitate suburb-to-suburb travel or contra-flow peak travel.

Although both plans have transit-oriented development policies, only Metro Vancouver's regional growth strategy directly integrates with its long-range regional transportation plan. An example of direct integration is the adoption of the Frequent Transit Development Area policy in the 2011 plan, a policy that directs growth along transit corridors defined by TransLink. The 2011 plan also sets out the roles and responsibilities for a range of stakeholders, including Metro Vancouver, local municipalities, TransLink, and provincial and federal governments, that suggest actions to be taken to support the Plan's five main goals. The inclusion of explicit roles and responsibilities provide clear direction on how policies in the plan are to be implemented.

TransLink, established in 1998, is responsible for both planning and overseeing the operations of transit service in the region. TransLink also shares responsibility for the Major Roads Network and for cycling with the municipalities. Prior to its establishment, the Greater Vancouver Regional District (now Metro Vancouver) and the Province of British Columbia together had produced *Transport 2021: Long-range Plan for Greater Vancouver* (Transport Action BC n.d.). The Transport 2021 Plan was intended to reduce residents' reliance on the private automobile and expand the range of alternative modes throughout the region. The Plan included the urban form goals found in the LRSP of 1996.

In 2008, TransLink produced an updated plan, *Transport 2040: A Transportation Strategy for Metro Vancouver Now and in the Future* (TransLink 2008). The Plan introduced the concept of the frequent transit network, which identifies existing and future transit routes on which vehicles run with frequent headways across the region. The Plan's third strategic goal relates directly to land use, indicating that the majority of the region's growth in employment and housing will occur along the frequent transit network (TransLink n.d.).

In the Toronto region, there is a lack of integration between the Growth Plan and the regional transportation plan. This is partly a matter of timing, since the creation of a regional transportation agency and long-range transportation plan came *after* the introduction of the Growth Plan.

The regional transit agency, Metrolinx (formerly called the Greater Toronto Transportation Authority), was established in 2006 by the Province of Ontario to improve the coordination and integration of transportation planning in the Greater Toronto and Hamilton Area (GTHA). In 2009 it merged with GO Transit (the regional commuter rail and bus network), making it a transit operator, not just a transportation planning body. Moreover, many other municipal transit operators operate within the GTHA, of which the largest by far is the Toronto Transit Commission (TTC), making coordination difficult.<sup>6</sup>

In 2008, Metrolinx developed a regional transportation plan for the GTHA, called *The Big Move* (Metrolinx 2008). Metrolinx is in the process of executing a number of local and regional large-scale rapid transit projects as part of the “first wave” of projects identified in the 2008 plan. However, the transit priorities for Metrolinx have changed over the years. The agency’s current priority emphasizes the transformation of GO commuter rail through electrification of the most heavily used lines and increased frequency and span of service as well as adding two-way service on those lines, in effect creating a regional express rail network along existing GO rights of way.

The Growth Plan contains policies that relate to transportation planning in the region. Although *The Big Move* constitutes a regional transportation plan, the task of linking land use decisions with transportation planning has been delegated to municipalities.

The main reference in *The Big Move* that relates to land use planning is *Strategy #7: Build communities that are pedestrian, cycling and transit-supportive*. As part of this strategy, Metrolinx identified a network of 51 mobility

hubs, 17 of which correspond to the Growth Plan’s 17 Urban Growth Centres in the GTHA. Municipalities in consultation with transit agencies are responsible for preparing detailed master plans for the mobility hubs in their jurisdiction. Strategy #7 of *The Big Move* also suggests the assessment of transportation corridors as high-density intensification corridors and recommends that policies be created to conform with the Growth Plan policies for intensification corridors.

Although both plans mention the land use–transportation connection, neither plan *requires* a certain percentage of growth to be directed to transit-accessible locations across the region, as the regional growth strategy for Metro Vancouver does. Furthermore, since municipalities in the GTHA began their land budgeting and growth allocation and planning exercises in 2006, over two years before the release of *The Big Move*, they could not have focused growth around mobility hubs (which had not yet been identified) and would simply have planned for the overall 40% intensification target. In fact, research shows that most municipalities in the GTHA prioritized greenfield development and the expansion of the urban settlement area as part of their conformity to the Growth Plan (Allen and Campsie, 2013).

The legislated review of *The Big Move* and the Growth Plan is scheduled for 2016, and consultation on the review of the Growth Plan is already under way. At the time of the writing of this report (April 2015), the reviews of the Growth Plan and *The Big Move* have different timelines and are being managed by different ministries, so the level of future integration of the two plans is unclear. This review is an opportunity for a much clearer and more direct integration of the two plans.

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6 One reason for creating Metrolinx was to integrate fares, schedules, and operations of the many transit services in the region, and some progress has been made in implementing a smart fare card called Presto in some parts of the region, but as of 2015, the goal of full integration has not been realized.



## IMPLEMENTATION AND MONITORING OF PLANS

Metro Vancouver will review its regional growth plan in 2016, and TransLink will soon review its transportation plan. In addition, the region is holding a referendum in May 2015 on whether to dedicate a portion of new sales tax to pay for identified transportation priorities.

Metro Vancouver's plans build on a long history of regional growth management efforts, and there is evidence that a consistent approach has already been effective in achieving the goal of a compact region (Taylor and Burchfield 2010). The 2011 regional growth strategy has been supported by years of research conducted by Metro Vancouver staff and ongoing discussions and collaboration with municipal planning staff and municipal council representatives in the region. As part of the evaluation framework by which the current plan will be assessed, Metro Vancouver released *Progress Toward Shaping our Future: Baseline Annual Report* in late 2014 (Metro Vancouver 2014).

The report describes the first three years of the 2011 plan's implementation, including the status of the Regional Context Statements that municipalities are required to complete to show how their local plans align with regional objectives. The report lists some minor amendments to the plan as well as mechanisms used to achieve consensus and resolve differences between local and regional perspectives. It is a full assessment of how the regional strategy has been implemented.

The report also identifies no fewer than 55 tracking and performance measures that provide measurable indications of whether the plan is on track to meet its five stated goals. In the report, Metro Vancouver also introduced 2011 baseline data that can be used measure growth outcomes and to assess whether the region is on track to meet the goals and objectives of the plan. It also analyzed 2013 data for most of the 55 measures.

A POLYCENTRIC REGIONAL  
STRUCTURE CAN ALLOW  
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AND BALANCED USE OF  
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DIRECTION AT PEAK HOURS.

In the Toronto region, a historical legacy of consistent regional planning is absent; in fact, the *Growth Plan for the Greater Golden Horseshoe* has not yet been fully implemented by all municipalities (Allen and Campsie 2013). Two major amendments to the plan were released in 2012 and 2013 (Ontario Ministry of Municipal Affairs and Housing, n.d. a and b). Amendment 1 amends the policies of the Growth Plan to respond to a specific growth pressure in one local area, Simcoe County. Amendment 2 affects the entire regional geography by extending the life of the plan by 10 years to 2041.

The Growth Plan has been led and managed by the Ontario Growth Secretariat (OGS), a unit that previously resided in the Ontario Ministry of Infrastructure and moved to the Ontario Ministry of Municipal Affairs and Housing in 2014. The OGS released a brief update in 2012 that reported on municipal implementation of the plan and provided some high-level modelling work that compared future growth in the Toronto region with and without the plan's intervention.

COMPARISON OF  
TORONTO AND  
VANCOUVER REGIONS'  
PLANNING POLICIES  
AND INSTITUTIONS

In 2014, the OGS released *Towards Performance Indicators for the Growth Plan for the Greater Golden Horseshoe* as a document for public consultation (Ontario 2014). The document proposed four themes that correspond to the overarching goals of the plan and 12 measurable indicators to track how growth is occurring in the region. Four of the 12 indicators were developed specifically to measure progress towards the plan's policy targets. After the consultation concluded, the OGS released a final list of 14 performance indicators (Ontario 2014).

The Growth Plan's performance indicators report contains less data and is less robust than Metro Vancouver's performance indicators report. It has little land-based data and contains mostly aggregated statistics. There is no information on the amount of land that has been urbanized or designated for urbanization since the time the plan came into effect, a basic metric that would indicate whether the plan is succeeding in its primary goal to reduce expansion at the urban edge. In contrast, Metro Vancouver's performance indicators report tracks several land-based metrics including detailed information on the total amount of land being added to or taken out of industrial use or mixed employment areas, a measure related to the region's overall strategy for protecting the industrial land base.

In order to assess whether planning policies are achieving their goals or not, a measurement framework and baseline data for monitoring change over time are needed. The framework requires foresight in the identification and collection of data that will serve as proxies for tracking progress towards planning goals. In Metro Vancouver, a

performance indicators framework was developed early in the life of the plan with extensive data sets from federal, provincial, and local government sources and a robust set of metrics. The performance indicators for the Growth Plan were developed seven years into the life of the plan using available data and few metrics tailored specifically for the Plan, so it may not provide enough detail to monitor and track the Plan's progress and emerging trends in growth patterns.

**Table 1** compares the policy mechanisms and strategies used to achieve the goals of the growth plans in the Toronto and Vancouver regions.

METRO VANCOUVER  
ESTABLISHED A  
BASELINE FOR  
MEASURING THE  
PROGRESS TOWARDS  
THE PLAN'S FIVE  
GOALS WITHIN  
THREE YEARS OF ITS  
IMPLEMENTATION.

	PLANNING GOAL	POLICY MECHANISM	
		GTHA	METRO VANCOUVER
	URBAN CONTAINMENT	<p>Greenbelt Plan (2005)</p> <p>Growth Plan for the Greater Golden Horseshoe (2006):</p> <ul style="list-style-type: none"> <li>• Municipalities determine designated urban settlement area to 2031.</li> </ul>	<p>Agricultural Land Reserve (1973)</p> <p>Livable Region Strategic Plan (1996):</p> <ul style="list-style-type: none"> <li>• By 2021, 70% of the city-region's population to be located in the Growth Concentration Area.</li> <li>• Introduction of Green Zone.</li> </ul> <p>Metro 2040: Shaping Our Future, regional growth strategy (2011):</p> <ul style="list-style-type: none"> <li>• By 2041, 99% of new growth to be in the Urban Containment Boundary</li> </ul>
	INTENSIFICATION	<p>Provincial Policy Statement (1996)</p> <p>Growth Plan for the Greater Golden Horseshoe (2006):</p> <ul style="list-style-type: none"> <li>• Target: 40% of residential development to be in built-up areas of upper- and single-tier municipalities by 2015</li> <li>• Urban Growth Centres: minimum density of 150–400 people plus jobs per hectare by 2031</li> <li>• Growth encouraged in Intensification Corridors and Major Transit Station Areas</li> </ul>	<p>Livable Region Strategic Plan (1996):</p> <ul style="list-style-type: none"> <li>• By 2021, 70% of the city-region's population are located in the Growth Concentration Area</li> <li>• Regional Town Centres (1996)</li> </ul> <p>Metro 2040: Shaping Our Future, a regional growth strategy (2011)</p> <ul style="list-style-type: none"> <li>• By 2041, 99% of new growth is in the Urban Containment Boundary</li> <li>• Urban Centres Hierarchy (2011) <ul style="list-style-type: none"> <li>» 40% of dwellings by 2041</li> <li>» 50% employment by 2041</li> </ul> </li> <li>• Frequent Transit Development Areas (2011) <ul style="list-style-type: none"> <li>» 28% of new dwellings by 2041</li> <li>» 27% employment by 2041</li> </ul> </li> </ul>
	INTEGRATION OF REGIONAL LAND USE & TRANSPORTATION PLANNING	<p>Ontario Growth Secretariat (2005)*: provincial unit originally within Ministry of Infrastructure, now part of Ministry of Municipal Affairs and Housing; responsible for coordinating implementation of the Growth Plan; reports to the Minister.</p> <p>Metrolinx (2006):</p> <ul style="list-style-type: none"> <li>• Provincial agency with limited responsibility for transit planning (i.e., transit expansion in the GTHA) and for operations in transit networks in the region (GO Transit only)</li> <li>• Role includes regional coordination with multiple local transit agencies, including fare and service integration</li> </ul> <p>The Big Move (2008): regional transportation plan.</p>	<p>Greater Vancouver Regional District (1967)/Metro Vancouver (2007)**</p> <ul style="list-style-type: none"> <li>• Manages water, wastewater, and solid waste.</li> <li>• Manages regional land use plans, air quality, regional park system, and affordable housing.</li> <li>• Governed by board made up of elected representatives from all municipalities in the region</li> </ul> <p>Transport 2021: Long-range Transportation Plan for Greater Vancouver (1993):</p> <ul style="list-style-type: none"> <li>• Joint District-Provincial plan to shift modal split away from private automobile</li> </ul> <p>TransLink (1998):</p> <ul style="list-style-type: none"> <li>• Provincial agency responsible for planning and managing operations of entire regional transit network</li> <li>• Transport 2040: A Transportation Strategy for Metro Vancouver Now and in the Future (2008)</li> </ul>
	IMPLEMENTATION AND EVALUATION PROCESS	<p>Growth Plan for the Greater Golden Horseshoe:</p> <ul style="list-style-type: none"> <li>• 9 years into implementation</li> <li>• Planning forecasts extended to 2041 (Amendment 2, 2013)</li> <li>• Monitoring: Towards Performance Indicators for the Growth Plan for the Greater Golden Horseshoe (2014)</li> <li>• Due for review in 2016</li> </ul>	<p>Livable Region Strategic Plan/Metro 2040: Shaping Our Future, a regional growth strategy</p> <ul style="list-style-type: none"> <li>• 15 years into implementation of 1996 Plan</li> <li>• Regional Growth Strategy (2011): revision of Livable Region Strategic Plan with time horizon of 2041.</li> <li>• Monitoring: Progress Toward Shaping our Future: Baseline Annual Report (2014)</li> <li>• Plan due for review in 2016</li> </ul>

\* The Ontario Growth Secretariat was given responsibility under the Places To Grow Act of 2005, but the unit has been in existence since the early 2000s and was created as part of Smart Growth for Ontario Program. It was originally named the Smart Growth Secretariat (White 2007).

\*\* Metro Vancouver was renamed in 2007. It was originally formed by the Province of British Columbia as the Greater Vancouver Regional District in 1967 (Taylor and Burchfield 2010).

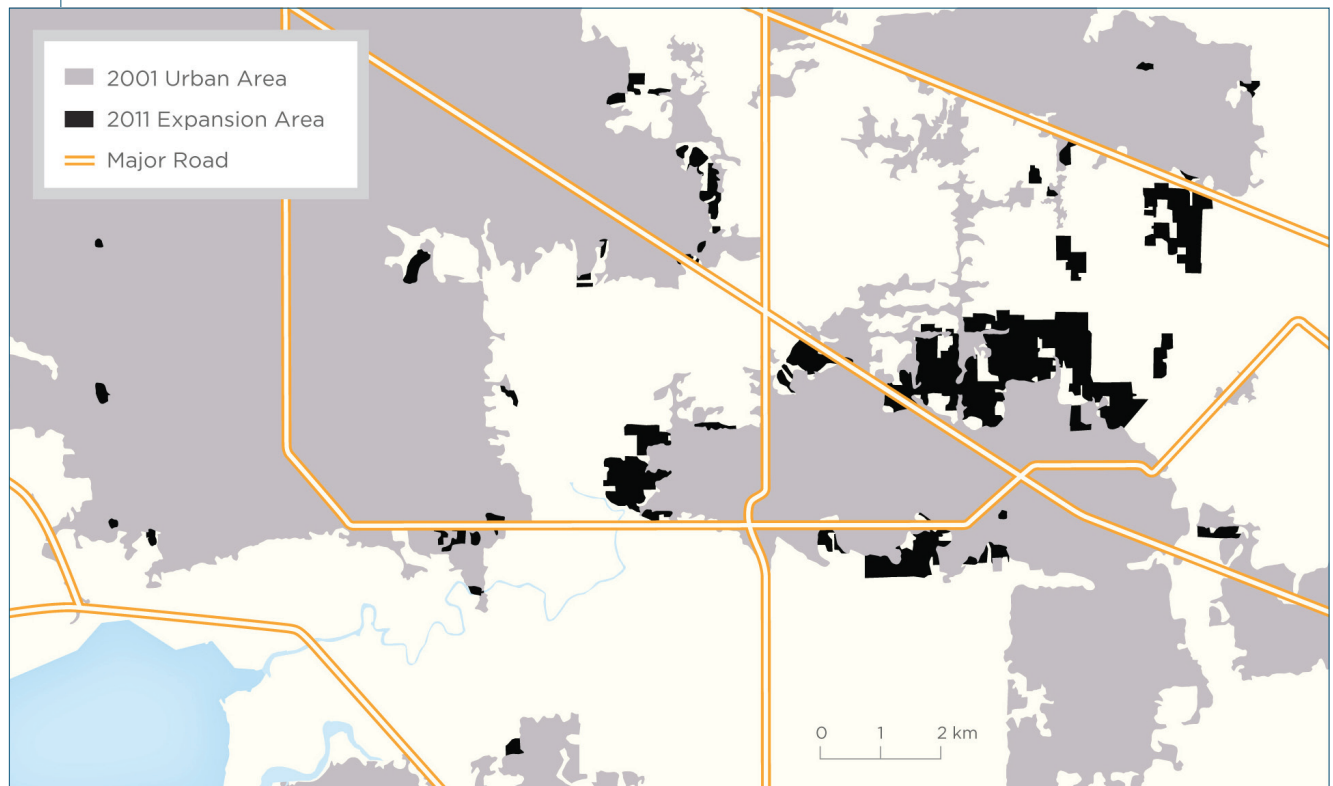
# FRAMEWORK FOR MEASURING URBAN FORM & GROWTH PATTERNS

Researchers have measured urban form patterns using different metrics. These include residential density, the mixture or separation of land uses in an area,<sup>7</sup> and the amount of automobile dependency of the area—or conversely, the “walkability” and transit-accessibility of an area (Clifton et al. 2008; Talen 2003). Queen’s University professor David Gordon has categorized areas in Canadian city-regions by the predominant mode of transportation that residents use to commute to work to support his hypothesis that Canada is a suburban rather than urban nation (Gordon and Janzen 2013). University

of Waterloo professor Pierre Filion, along with other researchers, has noted that the decade of construction of neighbourhoods often defines their urban form, with neighbourhoods built before the Second World War having narrower and more connected street grids, higher densities and mixed uses, while postwar neighbourhoods are characterized by single-family homes in residential-only neighbourhoods with curvilinear street patterns organized into superblocks by wide arterial roads (Filion et al. 2010).

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7 “Mixed use” refers to areas that have some combination of residential, commercial, institutional, industrial, and recreational land use within a given area.

FIGURE  
NO. 4URBAN FOOTPRINTS AND URBAN  
FORM MEASUREMENTS

NOTE: GROWTH THROUGH INTENSIFICATION IS MEASURED WITHIN THE 2001 URBAN AREA (SHOWN IN GREY). GROWTH THROUGH GREENFIELD DEVELOPMENT IS MEASURED WITHIN THE 2011 EXPANSION AREA (THE ADDITIONS IN BLACK).

In our analysis, we categorize urban growth into one of two forms: *intensification* and *greenfield development*. In our study, these terms refer to both a process and a specific geographic area in a city-region (see **Figure 4**).

*Intensification* is defined as net increase in new dwellings and/or population within the existing **built-up urban area** over a particular period of time. This process may occur even without specific policies to promote it and takes various forms: conversion (such as turning a former factory

into loft apartments or adding secondary suites within existing houses), infill (building new residential units on previously vacant or underused lots), or redevelopment (demolishing existing buildings and constructing others where they once stood). In public policy terms, intensification is intended to achieve a number of goals, such as mitigating urban sprawl, optimizing the use of existing urban infrastructure, revitalizing downtown areas, or supporting public transit networks.<sup>8</sup>

8 Although residential intensification *may* help cities achieve these outcomes, it is possible to find examples of intensification that do not. Some forms of intensification even have some undesirable consequences, such as overburdening aging infrastructure or contributing to road congestion in areas not well served by transit.

*Greenfield development* is defined as the addition of new dwellings and population on previously undeveloped land through the expansion of the existing built-up urban area. Greenfield development involves subdividing previously rural land and extending municipal services and infrastructure, such as roads, water, sewers, and electricity, into these subdivisions. This process is sometimes equated with “urban sprawl,” a term that usually connotes low-density development on formerly rural lands that produces communities in which residential uses are separated from other uses and residents require automobiles to get to work, school, and shops. However, it is important not to conflate the terms *urban sprawl* and *greenfield development*. In some cases, greenfield development may be more compact than well-established areas within the existing built-up area.

In this paper, we use spatial analysis techniques to determine the amount and location of growth occurring through intensification and greenfield expansion.

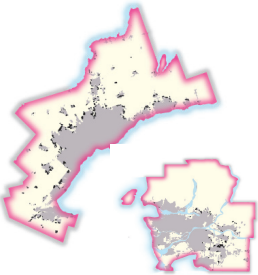
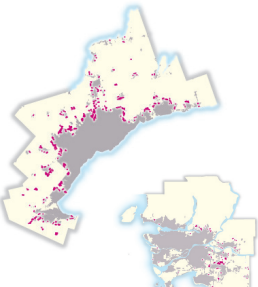
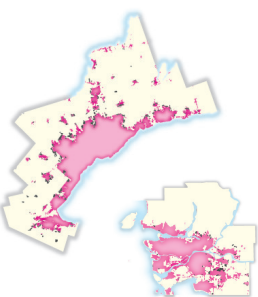
We measured dwelling and population growth through intensification and greenfield expansion by comparing the urban area footprints with census data on population and dwelling counts. The method used to calculate intensification for this report was tailored to compensate for the loss of the long-form census in 2011 (we were restricted to using the short-form census); a main benefit of this revised method is that it allows us to compare changes in population growth along with residential dwellings. For a detailed account of the method, see **Appendix A**.

It is important to understand what is being measured where. In the body of the report, we use schematic maps to highlight in magenta where measurements are being made. These maps can be found at the beginning of each section and in **Table 2**.

In **Table 2**, we list the geographic scale at which we measured each metric. For a big-picture perspective, we examined two decades (1991–2011) of population, dwelling, and urban area increases to understand the rate at which each region is growing. We also compared the amount of regional growth that has occurred through intensification versus greenfield development. Finally, we examined the composition of the housing stock across each region for 1991, 2001, and 2011.

To better understand the subregional dynamics in each place, we mapped growth patterns of intensification and greenfield development for the more recent decade (2001–2011). We examined where intensification (net increase in dwellings and population) has occurred in the 2001 built-up urban area and greenfield growth in the 2011 expansion area. We examined the housing composition of each part of the regions and how the patterns of development compare across municipalities. Finally, we compared the growth patterns in policy-specific locations such as urban growth centres and near frequent transit networks in each city-region.

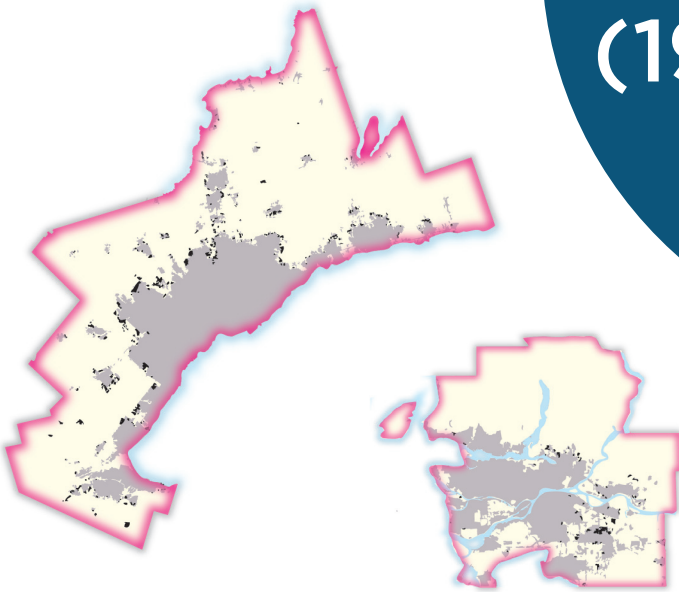
TABLE  
NO. 2RESIDENTIAL DEVELOPMENT  
PATTERN METRICS BY  
GEOGRAPHIC AREA, 1991,  
2001, AND 2011

GEOGRAPHIC AREA	METRIC
<b>CITY-REGION</b> 	<p><b>Change in growth (1991–2011):</b> Absolute and percentage change in population, dwelling units, urban area for the region as a whole</p> <p><b>Intensification vs. Expansion (1991–2011):</b> Proportion of dwelling growth through intensification and expansion.</p> <p><b>Housing Stock Composition (1991, 2001, 2011):</b> Proportion of dwelling unit types (detached, attached, apartments less than 5 storeys, apartments 5 storeys or more).*</p>
<b>EXPANSION AREA</b> 	<p><b>Population and dwellings (2001–2011):</b> Addition and proportion of greenfield development in upper-tier municipalities and region.</p> <p><b>Urban Area increase (2001–2011):</b> Expansion of the urban area outward from 2001 to 2011 resulting in the conversion from non-urban to urban land.</p> <p><b>Housing Stock Composition (2011):</b> Proportion of dwelling types of new greenfield development built between 2001 and 2011 (detached, attached, apartments less than 5 storeys, apartments 5 storeys or more).</p> <p><b>Household size (2011):</b> Average household size of new greenfield development (calculated by dividing the number of people by the number of dwellings).</p>
<b>EXISTING URBAN AREA</b> 	<p><b>Population and dwellings (2001–2011):</b> Addition and proportion of intensification in upper-tier municipalities and region.</p> <p><b>Housing Stock Composition (2011):</b> Proportion of dwelling types in the existing urban area built between 2001 and 2011 (detached, attached, apartments less than 5 storeys, apartments 5 storeys or more).</p> <p><b>Spatial distribution of intensification (2001–2011):</b> Map of location and amount of dwellings and population net change between 2001 and 2011; includes loss and gain.</p> <p><b>Household size (2001, 2011):</b> Average household size calculated by dividing the number of people by the number of dwellings in the 2001 existing urban area for 2001 and 2011 census.</p> <p><b>Population and Dwelling Change in Policy Areas (2001–2011):</b> Absolute and percent change in regional population and dwelling units in designated urban growth centres, select transit station areas, and frequent transit network (see earlier discussion for definition).</p>

\* In the Census, the term apartments refers to dwellings in any multi-unit residential building regardless of tenure (owned or rented). These “apartments” therefore also include condos.



# REGIONAL FINDINGS (1991–2011)



NOTE: THE REGIONAL BOUNDARY FOR GREATER TORONTO AREA AND HAMILTON AND METRO VANCOUVER IS HIGHLIGHTED IN MAGENTA. ALL NUMBERS REPORTED IN THIS SECTION HAVE BEEN MEASURED WITHIN THE HIGHLIGHTED AREA. **MAPS NOT TO SCALE.**

Toronto and Vancouver are two of Canada's largest and fastest-growing city-regions. Between 1991 and 2011, the Greater Toronto and Hamilton Area added nearly 2 million people, while Metro Vancouver added just over 700,000 people. The population of the GTHA grew steadily over the 20-year period, by slightly less than 20% each decade. Metro Vancouver's population increase slowed down over the 20-year period, increasing by 24% in the first decade and 16% in the latter decade (see **Table 3**).

In both city-regions, the housing stock grew faster than the population. In the GTHA, the total number of dwellings grew by more than 20% in both decades. Similarly in Metro Vancouver, the increase in dwellings exceeded the growth in population in both decades, although dwelling and population growth slowed during the second decade. In both regions, the gap between the growth in population and dwellings widened in the second decade. These findings are consistent with long-term demographic trends that show the size of Canadian households has been shrinking and the proportion of one-person households has been increasing (CBC News 2012; Statistics Canada 2013).



TABLE  
NO. 3

GROWTH IN POPULATION, DWELLING UNITS, AND  
URBAN AREA, GREATER TORONTO AND HAMILTON  
AREA AND METRO VANCOUVER, 1991, 2001, AND 2011

					CHANGE (%)	
		1991	2001	2011	1991–2001	2001–2011
GTHA	Population	4,687,400	5,572,090	6,574,140	19	18
	Dwellings	1,663,100	2,015,000	2,476,590	21	23
	Urban Area (ha)	125,200	157,270	172,260	26	10
METRO VANCOUVER	Population	1,600,600	1,986,970	2,313,330	24	16
	Dwellings	610,000	786,280	949,570	29	21
	Urban Area (ha)	58,600	67,770	70,310	16	4

NOTE: THE POPULATION AND DWELLINGS NUMBERS WERE SUMMED FOR THE GEOGRAPHIC AREA REPRESENTED BY THE REGION BOUNDARY. THIS TABLE INCLUDES POPULATION AND DWELLINGS ADDED IN THE RURAL PARTS OF EACH REGION, SO THE TOTALS WILL NOT BE CONSISTENT WITH THOSE FOR THE “GREENFIELD” AND “INTENSIFICATION” AREAS OF EACH REGION.

One of the most interesting findings in our analysis is the change in the rate of urban expansion between the two decades. While population and dwellings have continued to grow, the *rate* at which formerly rural land is being urbanized through greenfield development has decreased over time.

The results of Metro Vancouver’s long-standing approach to urban containment are evident in the findings. The urbanized area of the region increased by 16% between 1991 and 2001, and by a mere 4% between 2001 and 2011. In the GTHA, although the increase in urban area was 26% between 1991 and 2001, outward expansion slowed down dramatically, to 10%, in the second decade of the analysis, while the increase in population and dwelling numbers maintained a steady pace.

## THE SLOWDOWN IN URBAN EXPANSION IN BOTH THE GTHA AND METRO VANCOUVER BETWEEN 2001 AND 2011 SEEMS TO BE PART OF A TREND IN FAST-GROWING CANADIAN CITIES, AS CALGARY AND EDMONTON ALSO SLOWED THEIR RATE OF URBAN EXPANSION AND GREW MORE DENSELY AT THE URBAN EDGE.

One definition of urban sprawl is that the increase in urban expansion is greater than the increase in population (Fulton et al. 2001). By this measure, Metro Vancouver cannot be characterized as sprawling during this two-decade period, while the GTHA shows patterns of sprawl in the first decade, but not in the most recent decade.

Both regions' slowdown in urban expansion seems to be part of a trend in fast-growing Canadian cities, as both Calgary and Edmonton also exhibited patterns of sprawl in the 1990s, but not in the first decade of the new millennium (Neptis 2014; Taylor, Burchfield and Kramer 2014). These trends point to higher densities in the construction of residential dwellings at the edges of cities compared with the greenfield development of previous decades.

While both Toronto and Vancouver regions strive to achieve a compact form, our findings show that the approaches taken to achieve that goal differ. In **Figure 5**, we compare the proportion of dwellings constructed through greenfield development versus intensification. In Metro Vancouver, the vast majority of dwelling construction was directed to the existing urban area, resulting in an intensification rate of 80% in first decade and 75% in second decade. In the GTHA there has been a more even split, with a small majority of dwellings constructed through greenfield development in both decades.

The composition of the housing stock in each region also differs when we compare proportions in 1991, 2001, and 2011 (see **Figure 6**).<sup>9</sup>

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9 Notes: All counts are for single units, and are categorized by building type:

“detached” refers to a low-rise single unit that is not attached to another housing unit (i.e., house);

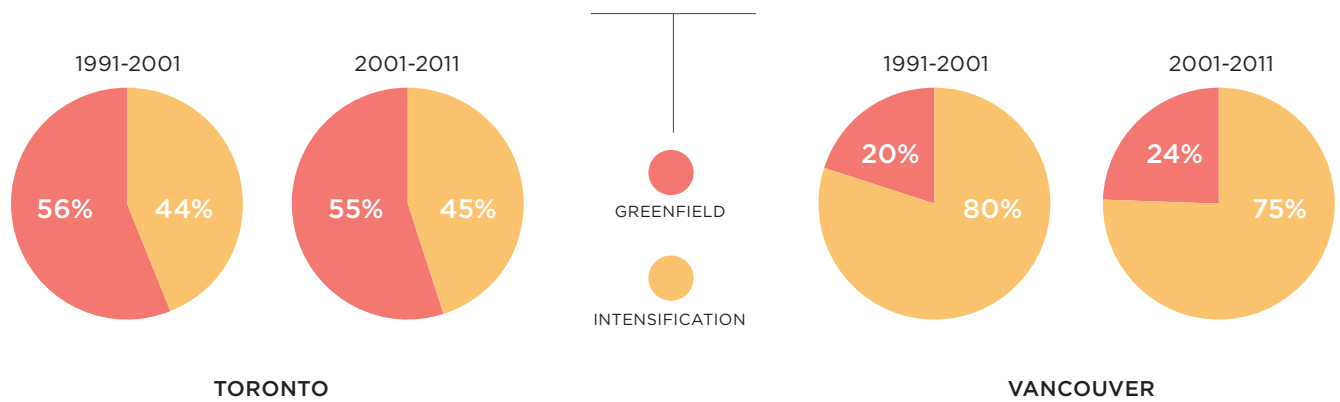
“attached” refers to a low-rise unit that shares at least one wall with another unit (i.e., duplex, rowhouse, semi-detached house);

“less than 5 storeys” refers to a building of fewer than five storeys, presumably a multi-unit building that is not a duplex or rowhouse;

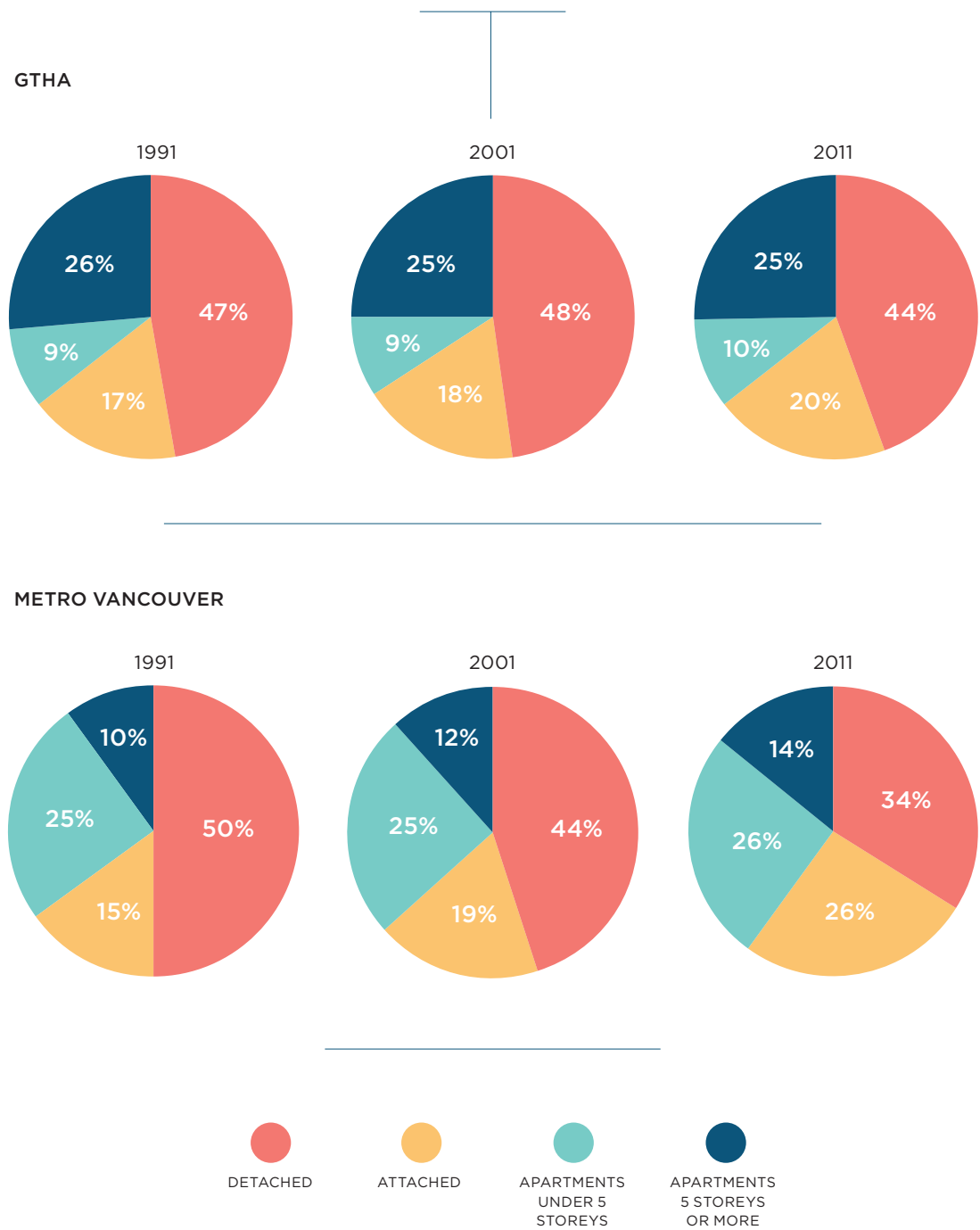
“5 or more storeys” refers to a building with more than four storeys.

Statistics Canada does not differentiate between buildings of over 5 storeys, although in general, a building of 5 to 8 storeys is considered a midrise, rather than highrise, building. Note that the apartments category includes both rental and condominiums.

**FIGURE NO. 5**  
PROPORTION OF DWELLING UNITS  
ACCOMMODATED THROUGH INTENSIFICATION  
AND GREENFIELD DEVELOPMENT, GTHA AND  
METRO VANCOUVER, 1991-2011



**FIGURE NO. 6**  
COMPOSITION OF DWELLING STOCK, GTHA AND  
METRO VANCOUVER, 1991, 2001, AND 2011



IN METRO VANCOUVER,  
THE HOUSING STOCK HAS  
BEEN TRANSFORMED  
FROM ONE DOMINATED  
BY SINGLE DETACHED  
HOMES TO A MORE  
BALANCED STOCK OVER  
A 20-YEAR PERIOD.

In 2011, Metro Vancouver exhibits a more evenly distributed proportion of housing types compared with the GTHA's marked split between single-detached houses and high-rise apartments. What is remarkable is that in Metro Vancouver, the housing stock has been transformed from one dominated by single-detached homes to a more balanced stock over a 20-year period, while the GTHA's housing stock changed very little over that same period, even though the rate of dwelling growth remained steady in the Toronto region while it declined in the Vancouver region. These differences may be attributed to differences in zoning, land use policy, consumer preferences, and market demand.

Our regional findings suggest that as the Toronto region continued to add people and dwellings at a pace similar to that of the previous decade, this growth is taking up less space than it did in previous decades, although the proportions of the different types of housing stock remained largely the same over the 20-year period. Metro Vancouver's growth in population and dwellings slowed after the 1990s, and the growth of its urban footprint also slowed while at the same time the region was able to transform its housing stock to ensure a greater balance of different types than was achieved in the Toronto region over that same period. Metro Vancouver continues to accommodate the majority of its growth through intensification, while the GTHA's development leans more towards greenfield development.

In the remaining sections of the paper, we focus our analysis on subregional patterns that emerged in the first decade of the 21<sup>st</sup> century—what is happening at the edges of these two city-regions and within the existing urban area. Are new residents and dwellings clustering in urban centres or near accessible transit service? Which municipalities contributed most to growth through greenfield development and intensification?



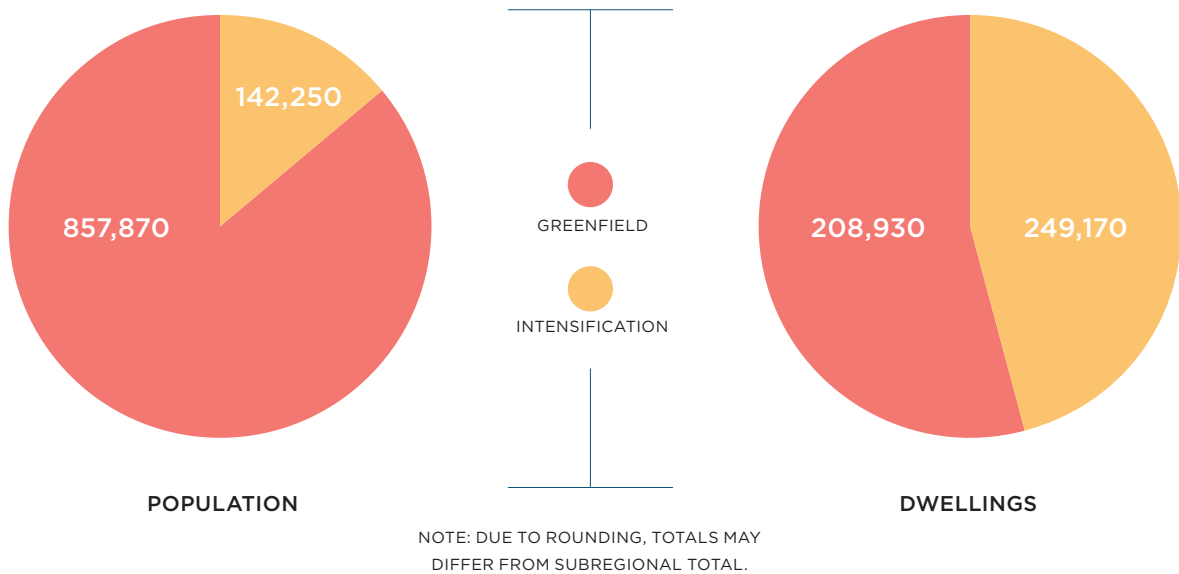
# THE TORONTO REGION'S GREENFIELD DEVELOPMENT AND INTENSI- FICATION (2001-2011)

The growth of the Greater Toronto and Hamilton Area (GTHA), the largest metropolitan region in Canada, tells an interesting story. As the region continued to add nearly 100,000 people a year, as it has for the last 20 years, it began to accommodate that growth more efficiently in the early part of the 21<sup>st</sup> century, even before policies were fully in place to support more efficient growth patterns.

In this section we explore growth between 2001 and 2011 more closely for the two patterns of urban development—intensification and greenfield development.

In **Figure 7**, we compare the net gain in population and dwellings accommodated through greenfield development versus intensification. The majority of the net new population was accommodated through greenfield development, even though the newly developed areas absorbed just over 50% of net new dwellings. And while nearly half of net new dwellings were located in the existing urban footprint, this area accommodated only 14% of population growth.

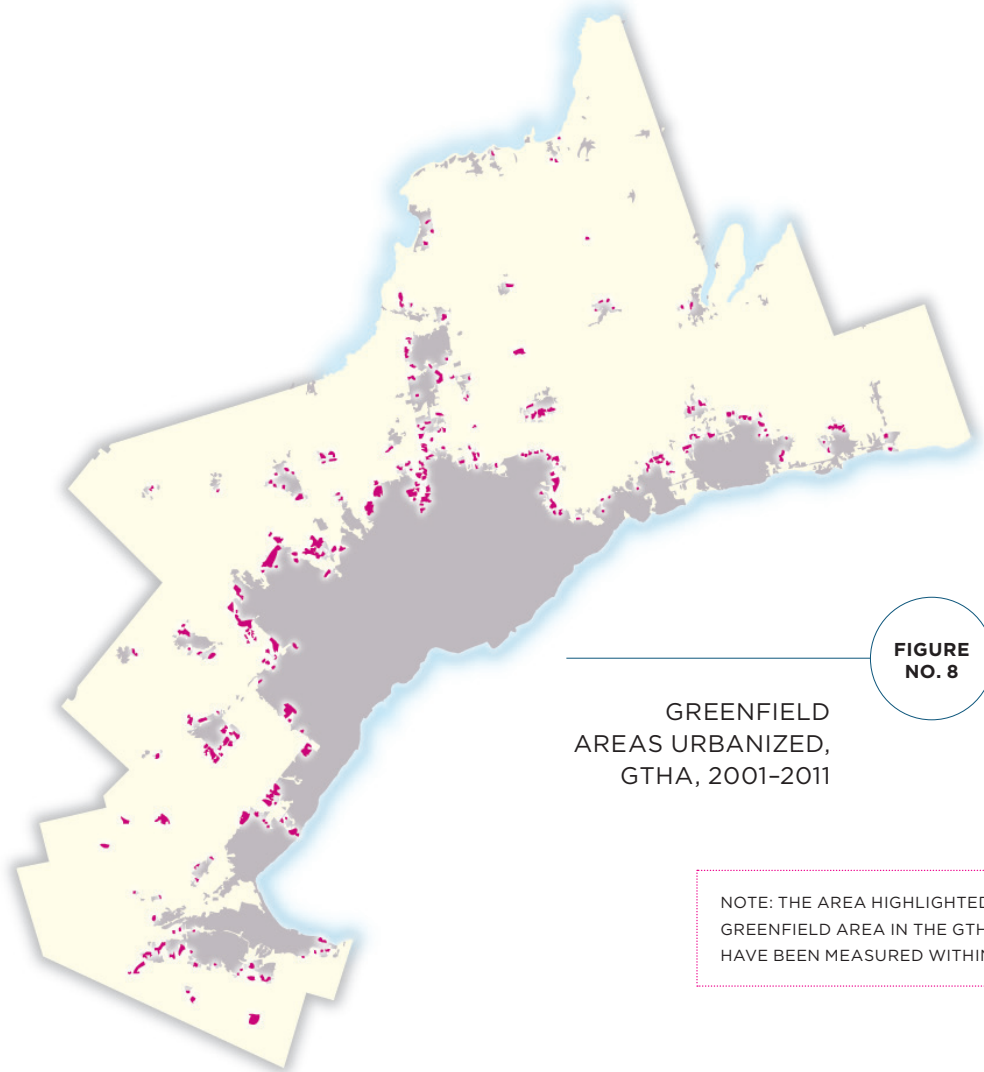
**FIGURE NO. 7**  
NET GAIN IN POPULATION AND  
DWELLINGS, GTHA, 2001-2011



Our analysis measures only *net* changes in population and dwelling stock, which means we account for both gain and loss of population and dwellings in a single figure. This matters most for intensification, which is measured in urban areas where there is existing housing and population. For example, while the urban areas in the GTHA have added new residents, these areas also lost residents who moved away or died as neighbourhoods matured. Our maps in the intensification discussion illustrate the losses and gains in urban neighbourhoods in more detail.

It is also interesting to note the wide gap between the number of people and the number of dwellings being added through intensification versus those added through greenfield development. In the existing urban areas, there was a larger net gain in dwellings than in population; the opposite pattern occurred for greenfield development. The difference indicates that different household sizes are being accommodated in different parts of the region.



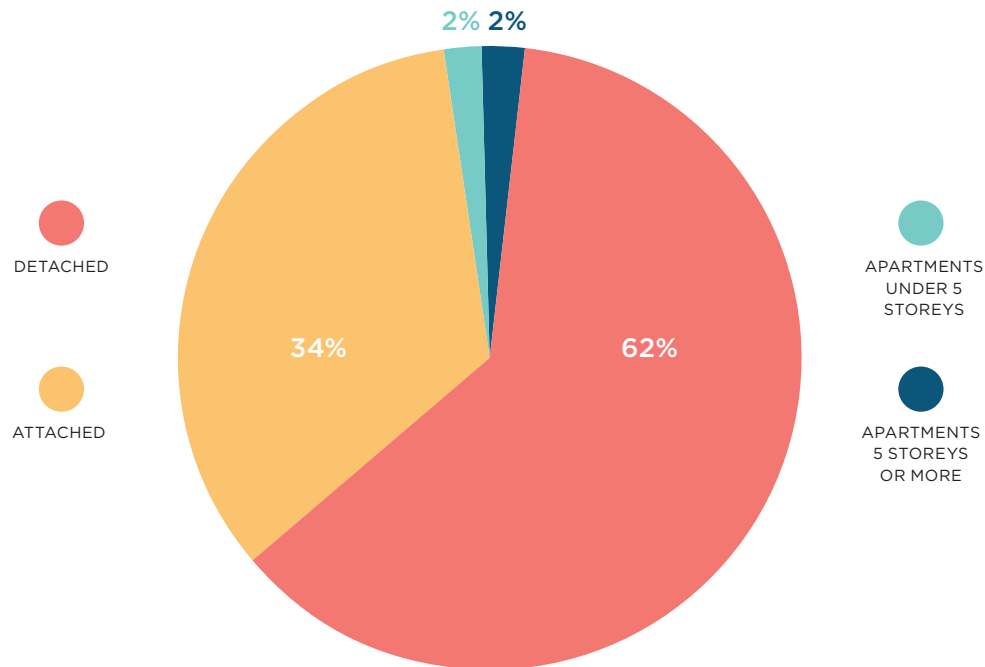


BETWEEN 2001 AND 2011, 86% OF THE POPULATION GROWTH IN THE GTHA WAS ACCOMMODATED THROUGH GREENFIELD DEVELOPMENT.

#### GREENFIELD GROWTH IN THE GREATER TORONTO AND HAMILTON AREA

While greenfield development accounted for 54% of the dwellings, 86% of the population growth was accommodated in the newly built area of the GTHA between 2001 and 2011 (shown in magenta on **Figure 8**). The difference between the numbers of population and those of dwellings added indicates that larger households are being accommodated through greenfield development.

**FIGURE NO. 9**  
COMPOSITION OF DWELLING STOCK ADDED IN  
GREENFIELD AREA, GTHA, 2001-2011



When we look at the dwelling stock, we find that these larger households are being accommodated in ground-related housing, mostly single-detached houses (see **Figure 9**). In the GTHA, greenfield development has traditionally delivered larger dwellings to accommodate families with children. Our findings show that this continues to be the case. The average household size accommodated through greenfield development between 2001 and 2011 is 3.4 persons per household compared to the region's average of 2.65.

10 Statistics for the lower-tier municipalities can be found in Appendix A.

11 The suburban municipalities in the Greater Toronto Area and Hamilton outside the City of Toronto are colloquially referred to as the "905," for their telephone area code.

TABLE  
NO. 4POPULATION AND DWELLINGS ADDED  
IN GREENFIELD AREA AND URBAN  
EXPANSION, GTHA, 2001-2011

	POPULATION ADDED TO GREEN- FIELD AREA	PROPORTION OF POPU- LATION GROWTH IN MUNICIPAL- ITY (%)	PROPORTION OF GTHA GREENFIELD POPULATION GROWTH (%)	DWELLINGS ADDED TO GREENFIELD AREA	PROPORTION OF ALL DWELLING GROWTH IN MUNICIPAL- ITY (%)	PROPORTION OF GTHA GREENFIELD DWELLING GROWTH (%)	URBAN EXPANSION (HECTARES)	PERCENT INCREASE IN URBAN AREA OF MUNICI- PALITY	PROPORTION OF GTHA URBAN EXPAN- SION (%)
CITY OF TORONTO	25,540	19	3	7,570	5	3	300	1	2
PEEL REGION	293,760	95	34	75,360	73	30	5,040	15	34
YORK REGION	260,850	86	30	76,240	72	31	4,180	14	28
DURHAM REGION	109,940	100	13	36,160	81	15	1,560	9	10
HAMILTON	36,500	100	4	12,360	61	5	1,160	8	8
HALTON REGION	131,280	100	15	41,490	91	17	2,750	19	18
TOTAL	857,870			249,180			14,990		

NOTE: UPPER- AND SINGLE-TIER MUNICIPALITIES ARE LISTED BY SIZE OF 2011 POPULATION. ALL ABSOLUTE NUMBERS ARE ROUNDED TO THE NEAREST 10. FIGURES FOR THE LOWER-TIER MUNICIPALITIES ARE IN APPENDIX B.

FOUR MUNICIPALITIES  
ACCOUNT FOR  
ALMOST HALF OF THE  
OVERALL GREENFIELD  
DEVELOPMENT  
IN THE GTHA:  
BRAMPTON, VAUGHAN,  
MISSISSAUGA, AND  
MARKHAM.

**Table 4** provides a summary of greenfield development statistics for the six upper- and single-tier municipalities in the GTHA.<sup>10</sup> The Growth Plan requires upper- and single-tier municipalities to direct 40% of new residential development to the existing urban area. Given this intensification target, one might assume that greenfield development would make up the other 60%. Our findings, however, show that between 2001 and 2011, 905 municipalities were growing mainly through greenfield development.<sup>11</sup> With the exception of the Cities of Toronto and Hamilton, these municipalities did not achieve the target of 40% intensification between 2001 and 2011. The Regional Municipality of Halton had the highest proportion of greenfield development at 91%, followed by Durham (81%), York (72%), Peel (73%), and Hamilton (61%). The City of Toronto had minimal greenfield development, located in the northeast (the only part of the City that is not already fully built out).

As our findings show, suburban municipalities in the Toronto region continued to focus on greenfield development between 2001 and 2011—such momentum is difficult to break. In political science literature, the concept of *path dependence* is used to describe the difficulty of departing from an institution's long-standing policy choices and their consequences (Taylor and Burchfield 2010). It is clear that shifting away from planning for greenfield development will be difficult for many suburban municipalities, given their predominant form of historical development.

When we examine greenfield patterns at the lower-tier municipality level, we find that a few lower-tier municipalities in Peel and York Regions were the main contributors to dwellings added through greenfield development, accounting for almost 50% of the overall greenfield development in the GTHA—Brampton (20%), Vaughan (10%), Mississauga (9%), and Markham (9%). In 10 years, Brampton alone added 50,000 dwellings through greenfield development and accommodated more than 200,000 people in these newly developed areas.

These same municipalities also had some of the highest average household sizes; Brampton had the highest, at 3.9 persons per household in the greenfield expansion area (see **Appendix B** for lower-tier numbers).

When we examine rates of urban expansion, we find that over half of the newly urbanized land in the GTHA is in Peel and York. Once again, Brampton, Vaughan, Mississauga, and Markham were the main contributors to urban expansion. In Markham, our findings show that land was used more efficiently over the 10-year period than in the other large, fast-growing municipalities. Markham's urban footprint contributed to less than 6% of the GTHA's urban area expansion, while its growth in dwellings contributed to 9% of the region's greenfield dwellings, resulting in a more efficient use of land in Markham than in Brampton, Vaughan, or Mississauga.

NET NEW POPULATION  
ABSORBED IN THE  
EXISTING URBAN AREA  
IN THE GTHA WAS A  
MERE 14% OF THE TOTAL  
POPULATION ADDED TO  
THE REGION.

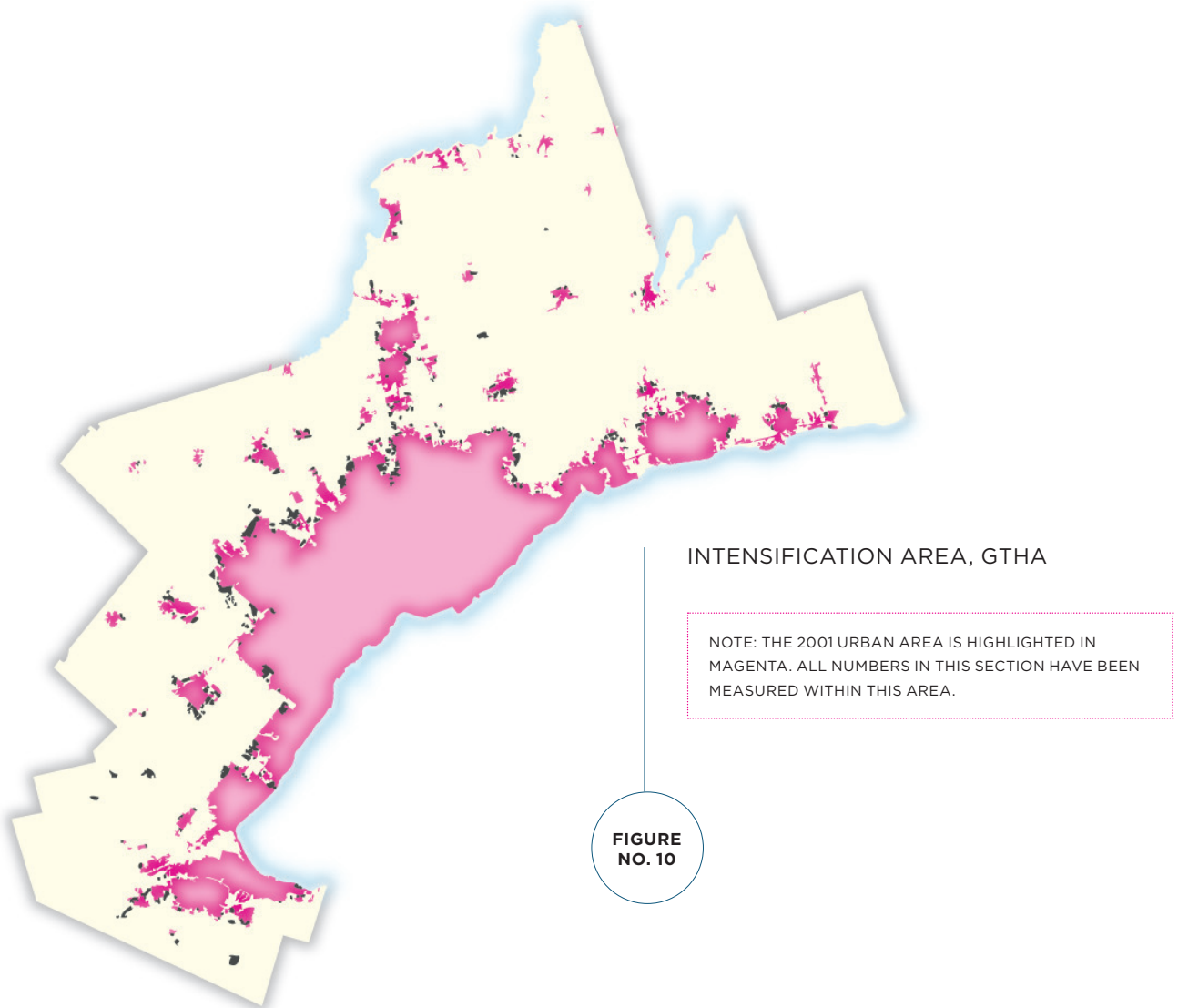
Although the proportion of different types of housing stock remained much the same between the two decades, our findings show that land was being used more economically in this period, since the growth rate in dwellings and population held steady, while the rate of growth of the urban area slowed down in the latter decade. This means that housing was being built more densely than it had been through the 1990s, while continuing to accommodate larger households.

Municipalities like Markham show evidence of even more compact greenfield development compared with other large, fast-growing, lower-tier municipalities. Markham was an early adopter of “New Urbanist” planning policies, an approach that emphasizes “mixed use, mixed housing types, compact form, an attractive public realm, pedestrian-friendly streetscapes, defined centres and edges and varying transportation options” (Grant 2006, p. 8). Our findings show that a change in Markham’s planning approach distinguishes its growth patterns from those of its neighbouring suburban municipalities.

## INTENSIFICATION IN THE GREATER TORONTO AND HAMILTON AREA

The geographic area in which we measure intensification is much larger than the area in which we measure greenfield development. Our method for calculating intensification yields the net changes in population and dwellings for the area highlighted in **Figure 10**. Unlike the urban expansion area where greenfield development takes place, there was a substantial population and dwelling stock pre-existing in the built-up urban area prior to 2001. Our method allows us to show how that stock has changed and how many people have been added or lost overall, but it does not allow us to specify how many people went specifically into new or pre-existing dwellings. People may move into an area and occupy new or pre-existing dwellings; others may move out. We can only measure the overall net change of a specific geographic area at the end of the decade (2001–2011).

However, calculating the net gain and loss of population and dwellings is informative. Our analysis indicates that the net new population absorbed in the existing urban area in the region, an area of more than 157,000 hectares, was a mere 14% of the total population added to the region. This is a small fraction of new residents to the GTHA, even though almost half of all new dwellings were created in this same area. Again, we see a big gap between the addition of dwellings and population in the existing urban area. Our analysis shows that this gap is partially due to population losses in established urban neighbourhoods that offset population gains through intensification.



The decline in average household size, while an observed trend across Canada, is especially visible in existing urban areas of the GTHA. Household size in this area declined from 2.74 to 2.52 in a 10-year period. Declining household size in existing urban areas undoubtedly reflects demographic changes in established urban areas—an aging population, a lower birth rate, delayed child-bearing, and

generally an increase in the number of single-headed and single-person households. Our analysis provides only a snapshot in time, but declining household size and the gap between the net gain in population and dwellings have large impacts on planning in the region. Below we discuss *where* population loss is happening within the established urban areas in the region.

HAMILTON, HALTON, AND DURHAM EXPERIENCED A NET LOSS OF POPULATION IN THEIR EXISTING URBAN AREAS BETWEEN 2001 AND 2011.

#### POPULATION GAIN AND LOSS IN THE EXISTING URBAN AREA

Not surprisingly, the City of Toronto gained the most net new residents through intensification, more than 100,000 people over 10 years. York gained just of 13% of its net new residents through intensification while Peel gained only 4%. However, what is surprising is that three of the five suburban municipalities experienced net losses. Hamilton, Halton, and Durham all experienced a net loss in population in their existing urban areas between 2001 and 2011, even though there was a net gain in dwellings (see **Table 5**).

Although the City of Toronto and the Regions of Peel and York experienced a net gain in both population and dwellings through intensification, there was a net loss in certain established urban areas across these municipalities (see **Figure 11**). This is an important finding that we refer to as “running hard to stand still.” Existing urban areas contain (hard and soft) services that are already in place. But in many areas, population has declined, while an ever-increasing number of new residents are accommodated in greenfield developments. These new areas require investment in new services and infrastructure while existing infrastructure in the already built-up areas is serving fewer people.

A striking example can be found in the suburb of Brampton. While Brampton gained more than 200,000 new residents through greenfield development, it experienced a net loss of population in its existing urban area (see **Appendix B** for results for lower-tier municipalities). The loss signals changing demographics that need to be considered. As the suburban municipalities in the GTHA mature, there is a need to understand the internal dynamics of each municipality as it plans for future growth.

**Figure 11** illustrates where the net loss is occurring within the region. In addition to Brampton, large parts of the Cities of Toronto, Mississauga, Oshawa, Whitby, and Hamilton are experiencing a net loss of population in certain established areas.



TABLE  
NO. 5

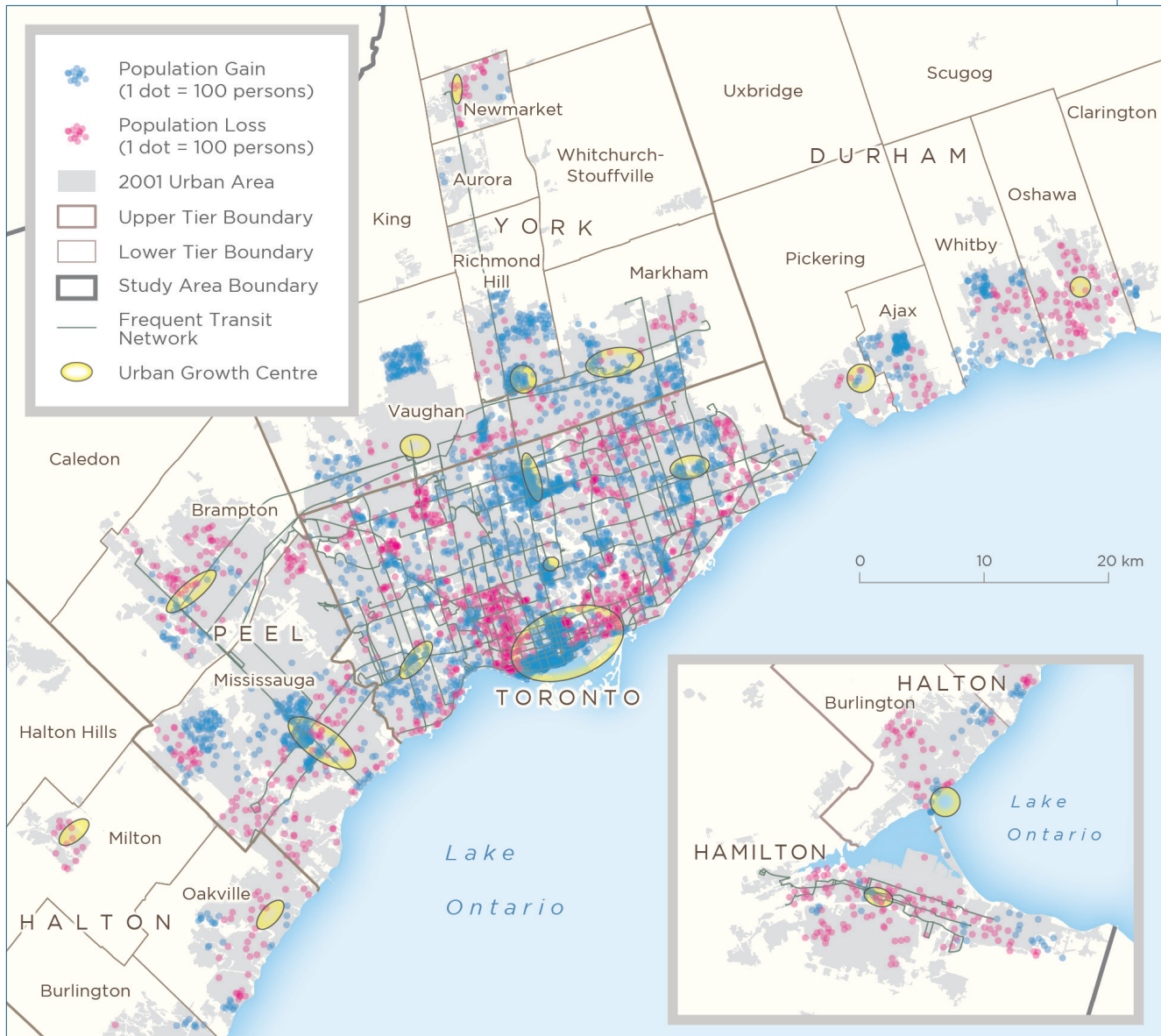
POPULATION AND DWELLING  
CHANGE, GTHA INTENSIFICATION  
AREA, 2001-2011

	POPULATION CHANGE IN INTENSIFICA- TION AREA	PROPORTION OF POPULA- TION GROWTH IN MUNICI- PALITY (%)*	PROPORTION OF GTHA INTENSI- FICATION POPULATION GROWTH (%)*	DWELLINGS ADDED TO INTENSIFICA- TION AREA	PROPORTION OF DWELL- ING GROWTH IN MUNICI- PALITY (%)	PROPORTION OF GTHA INTENSIFICA- TION DWELLING GROWTH (%)
CITY OF TORONTO	108,030	81	67	134,730	95	64
PEEL REGION	12,710	4	8	27,180	26	13
YORK REGION	40,020	13	25	27,250	26	13
DURHAM REGION	-7,860	-	-	7,790	17	4
HAMILTON	-5,940	-	-	7,840	38	4
HALTON REGION	-4,720	-	-	4,140	9	2
TOTAL	160,760			208,930		

\* The proportion of population growth through intensification for the GTHA does not include the loss in population in the 2001 existing urban area.

FIGURE  
NO. 11

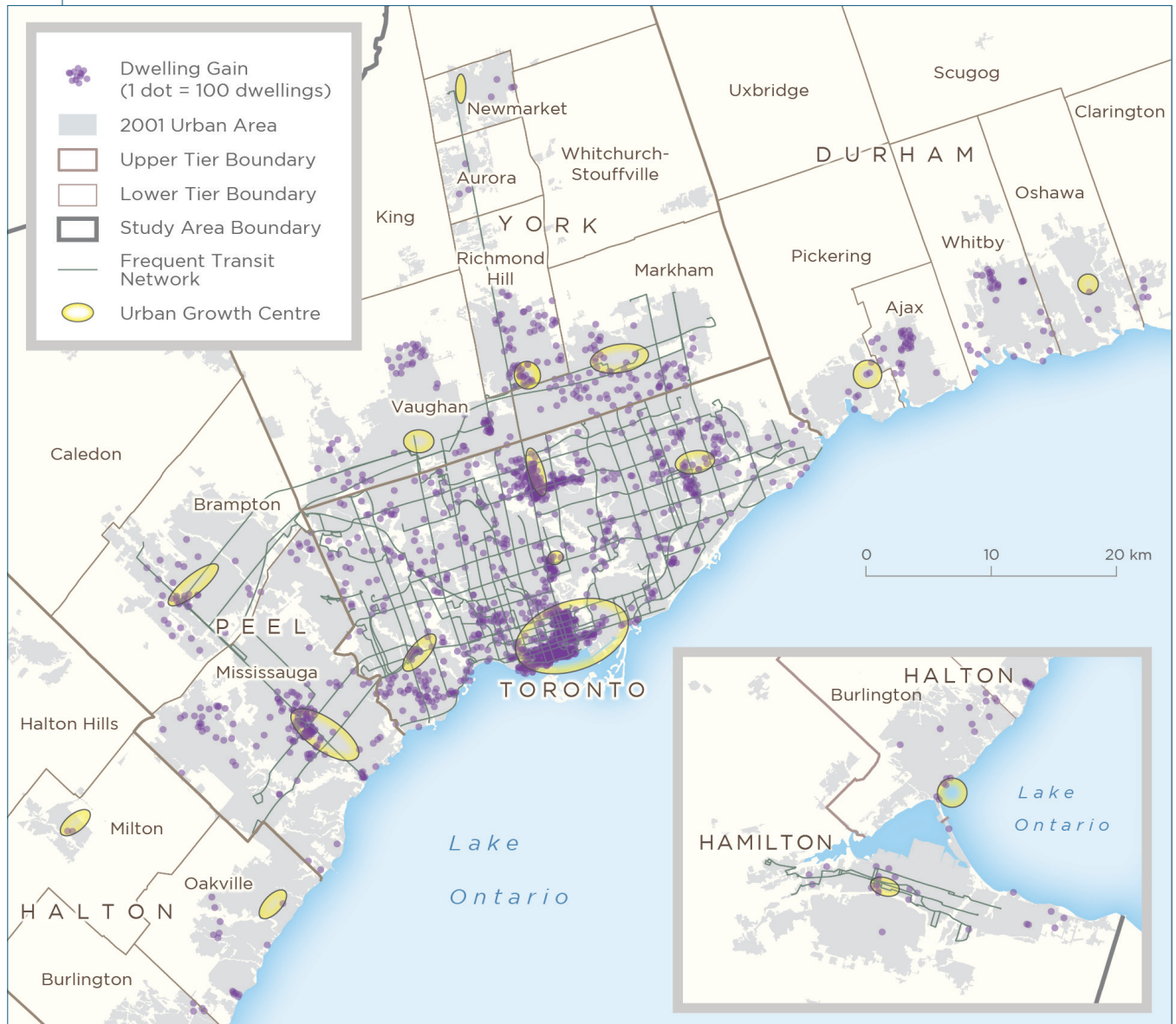
POPULATION GAIN AND LOSS  
IN ESTABLISHED URBAN AREAS,  
GTHA, 2001-2011



NOTE: THE DOTS ON THE MAP REPRESENT APPROXIMATE LOCATIONS. THE MAP USES A DOT DENSITY TECHNIQUE TO ILLUSTRATE CLUSTERS OF POPULATION LOSS OR GAIN. THE DOTS HAVE BEEN PLACED RANDOMLY WITHIN CENSUS TRACTS, ALTHOUGH THE BOUNDARIES OF CENSUS TRACTS ARE NOT SHOWN IN ORDER TO ILLUSTRATE OTHER DATA LAYERS MORE CLEARLY.

**FIGURE  
NO. 12**

DWELLINGS ADDED  
THROUGH INTENSIFICATION,  
GTHA, 2001-2011



NOTE: THE DOTS ON THE MAP REPRESENT APPROXIMATE LOCATIONS. THE MAP USES A DOT DENSITY TECHNIQUE TO ILLUSTRATE CLUSTERS OF DWELLINGS. THE DOTS HAVE BEEN PLACED RANDOMLY WITHIN CENSUS TRACTS, ALTHOUGH THE BOUNDARIES OF CENSUS TRACTS ARE NOT SHOWN IN ORDER TO ILLUSTRATE OTHER DATA LAYERS MORE CLEARLY.

## DWELLING GAIN IN THE EXISTING URBAN AREA

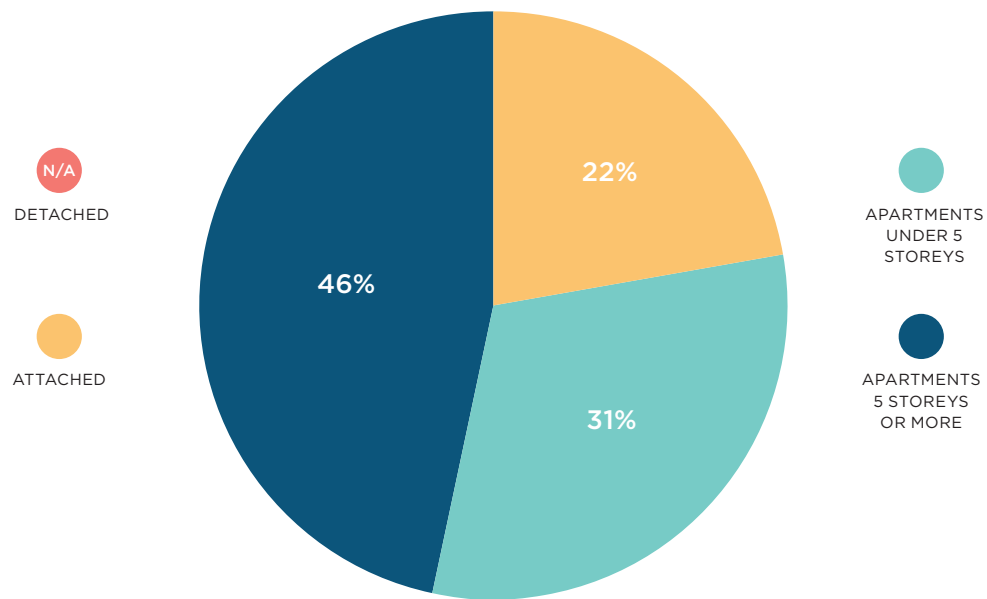
**Figure 12** shows the spatial distribution of new dwellings added through intensification. There was an overall net gain of dwellings in the existing urban area. It comes as no surprise that the City of Toronto accounted for the lion's share (64%) of the GTHA's new dwellings added through intensification (see **Table 5**). Peel and York each accounted for about 13% of the GTHA's dwellings gained through intensification, while Hamilton, Halton, and Durham contributed a minimal amount.

At the lower-tier level, the same large, fast-growing municipalities in the 905 area that contributed the most to greenfield development also contributed the most to intensification—Mississauga, Markham, and Vaughan. Mississauga on its own contributed 10% of the region's overall dwelling intensification rate (see **Appendix B** for results for lower-tier municipalities).

A net gain in dwellings brought about changes to the composition of the housing stock in the existing urban area. The region lost about 43,000 single-detached houses through demolition, conversion, or redevelopment. Most of the newly added units were in the form of apartments (see **Figure 13**), with the remaining 22% being attached, ground-related units. The size of the units gained through intensification of the existing urban area contributed to a change in household size. As the average household size in the existing urban area continued to shrink over the 10-year period from 2.74 to 2.52, it appears that the new units did not accommodate larger households and that households in the existing housing stock continued to shrink.

THE SAME LARGE, FAST-GROWING MUNICIPALITIES THAT CONTRIBUTED THE MOST TO GREENFIELD DEVELOPMENT ALSO CONTRIBUTED THE MOST TO INTENSIFICATION: MISSISSAUGA, MARKHAM, AND VAUGHAN.

**FIGURE NO. 13**  
COMPOSITION OF DWELLING STOCK ADDED  
THROUGH INTENSIFICATION, GTHA, 2001-2011



	POPULATION 2001	DWELLINGS 2001	POPULATION 2011	DWELLINGS 2011	POPULATION CHANGE 2001-11	DWELLING CHANGE 2001-11
TORONTO: DOWNTOWN	157,310	87,480	209,770	131,260	52,460	43,780
MISSISSAUGA CITY CENTRE	60,380	23,600	79,780	34,850	19,400	11,250
TORONTO: NORTH YORK	36,570	16,840	63,830	32,060	27,260	15,200
TORONTO: YONGE- EGLINTON CENTRE	15,550	10,260	19,870	13,220	4,320	2,960
DOWNTOWN BRAMPTON	14,910	6,170	16,340	8,020	1,430	1,850
TORONTO: ETOBICOKE CENTRE	13,980	6,300	18,950	9,310	4,970	3,010
DOWNTOWN BURLINGTON	12,190	6,530	13,420	7,320	1,230	790
RICHMOND HILL/LANGSTAFF	10,450	3,480	16,900	6,240	6,450	2,760
TORONTO: SCARBOROUGH CENTRE	9,800	4,090	19,970	9,280	10,170	5,190
DOWNTOWN PICKERING	9,140	3,520	8,960	3,760	-180	240
DOWNTOWN HAMILTON	8,640	5,180	9,440	5,700	800	520
DOWNTOWN OSHAWA	8,060	4,030	7,860	4,180	-200	150
DOWNTOWN MILTON	4,620	1,850	4,890	2,190	270	340
MARKHAM CENTRE	3,550	1,050	9,490	4,300	5,940	3,250
NEWMARKET CENTRE	2,290	750	2,230	830	-60	80
VAUGHAN METROPOLITAN CENTRE	2,060	620	2,130	640	70	20
MIDTOWN OAKVILLE	1,100	390	1,320	600	220	210
TOTALS	370,586	182,132	505,148	273,749	134,562	91,617

TABLE  
NO. 6

% POPU- LATION CHANGE	% DWELL- INGS CHANGE	PROPORTION OF POPU- LATION GROWTH IN CENTRES (%)	PROPORTION OF DWELL- INGS GROWTH CENTRES (%)	PROPORTION OF GTHA POPULATION GROWTH (%)	PROPORTION OF GTHA DWELLING GROWTH (%)
33	50	41	49	5	10
32	48	15	13	2	2
75	90	21	17	3	3
28	29	3	3	<1	1
10	30	1	2	<1	<1
36	48	4	3	<1	1
10	12	1	1	<1	<1
62	79	5	3	1	1
104	127	8	6	1	1
-2	7	0	<1	0	<1
9	10	1	1	<1	<1
-2	4	<1	<1	<1	<1
6	18	0	<1	0	<1
167	310	5	4	1	1
-3	11	0	<1	0	<1
3	3	<1	<1	<1	<1
20	54	<1	<1	<1	<1
36	50	-	-	13	20

POPULATION  
AND DWELLING  
CHANGE,  
GTHA URBAN  
GROWTH  
CENTRES,  
2001-2011



## POPULATION AND DWELLING CHANGE IN URBAN GROWTH CENTRES AND FREQUENT TRANSIT SERVICE AREAS

The Growth Plan identifies 25 Urban Growth Centres, of which 17 are in the Greater Toronto and Hamilton Area. **Figure 12** illustrates the spatial distribution of the net new dwellings in the existing urban area across the region and indicates the approximate location of the Urban Growth Centres. The map also shows corridors with frequent transit service (see **Appendix A** for the process used to identify FTNs and **Appendix C** for the Dissemination Areas included in the analysis).

Of the GTHA's growth through intensification, the Urban Growth Centres absorbed 95% of the net new residents and 44% of the net new dwellings. This is superficially a good-news story from the perspective of policy-making. People use infrastructure and services, which means that population growth through intensification is best placed in the region's urban growth centres, which typically have better access to transit and existing services.

However, if we look at the GTHA's overall growth, including growth through greenfield development, the Urban Growth Centres absorbed only 13% of the net new residents and 20% of the net new dwellings due to the extraordinary amount of growth that went to the greenfield areas.

**Figure 12** shows that within the City of Toronto, most of the new dwellings are clustered in the City's core and the area immediately to its west, including the Liberty Village redevelopment area. There is also a substantial cluster of net new dwellings near the North York Centre at the intersection of the Yonge and Sheppard subway lines. In the 905 area, the most apparent cluster is near Mississauga City Centre.

**Table 6** breaks down the net new residents and dwellings across the 17 Urban Growth Centres. The table confirms what is depicted in the maps: that 75% of the population and dwelling growth in centres went to only three centres—Downtown Toronto, North York Centre, and Mississauga City Centre. Downtown Toronto gained the largest amount of dwellings and population (44,000 units and 53,000 people between 2001 and 2011). Many of the Urban Growth Centres had little or no intensification.

The centres experiencing the greatest percentage change between 2001 and 2011 were the suburban Scarborough Town Centre and Markham Centre. Although these two UGCs contributed about 10% of the intensification in all UGCs, they experienced the greatest transformation relative to their state in 2001. Markham Centre's population grew by 167% and its dwellings by 310%, and Scarborough City Centre's population grew by 104% and its dwellings by 127%.

In addition to the UGCs, we examined population and dwelling change in frequent transit corridors and near GO Train stations. Since the geography of these areas overlaps the 2001 existing urban area and the 2011 urban expansion area, we measured how much of the GTHA's net new population and dwellings coincided with the station areas. Although GO Train service is currently focused on the a.m./p.m. peak commute, the service is slowly being transformed to more frequent service and is expected to offer 15-minute, all-day service by 2025. Currently many GO stations are surrounded by parking lots.

TABLE  
NO. 7

POPULATION AND DWELLINGS  
ADDED NEAR FREQUENT TRANSIT  
NETWORK (FTN) AND GO  
STATIONS, GTHA, 2001-2011

	ADDED NEAR FTN	% OF TOTAL CHANGE	ADDED NEAR GO STATIONS	% OF TOTAL CHANGE
POPULATION	181,390	18	104,600	10
DWELLINGS	171,820	37	48,500	11

Between 2001 and 2011, 18% of the region's net new population and 37% of the net new dwellings were accommodated in frequent transit areas (see **Table 7**). As can be seen in **Figure 2**, the majority of the frequent transit lines are located in the City of Toronto, where service is provided by the TTC. The large gap between net new population and dwellings is likely because the frequent transit corridors are in the established urban areas in the City that have experienced net population loss. The gap matters, because it is people who ride transit, not dwellings.

Given that the Ontario Government's transit priority of the next 10 years is to invest in the transformation of the GO train service, it is important to understand the development potential of the areas around GO stations. Some are embedded within the existing urban area and others are surrounded by parking lots and in low-density industrial areas. When we measure growth around GO station areas, we find that 10% of the GTHA's net new population and 11% of the region's dwellings were accommodated within one kilometre of a GO Station. This percentage could be increased in future years, given the development potential in converting parking surfaces and large lots near many of the GO stations to more intensified urban uses.

URBAN GROWTH CENTRES  
IN THE GTHA ABSORBED  
ONLY 13% OF THE NET NEW  
RESIDENTS AND 20% OF  
THE NET NEW DWELLINGS  
BETWEEN 2001 AND 2011.

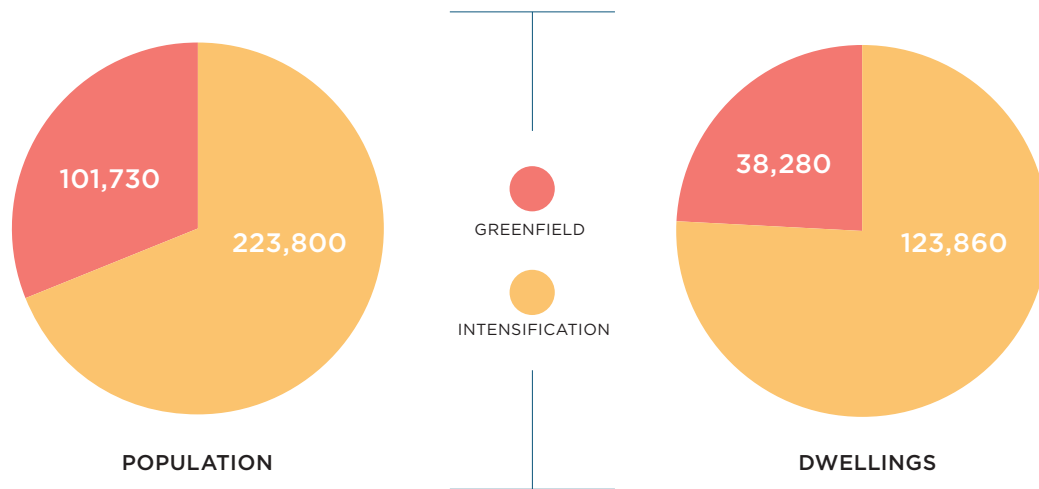


# METRO VANCOUVER'S GREENFIELD DEVELOPMENT AND INTENSI- FICATION (2001-2011)

The Vancouver region has a longer and more consistent history of managing growth than the Toronto region. The approach has been to concentrate growth with the ultimate goal of maintaining a compact urban form. It should therefore come as no surprise that in both decades under study, the vast majority of the region's growth was through intensification rather than greenfield development.

Between 2001 and 2011, the region's urban area increased by a mere 4%, while its regional population increased by 16% and its dwellings by 21%. Unlike the GTHA, the existing urban area accommodated the majority of the net gain in both population (69%) and dwellings (76%).

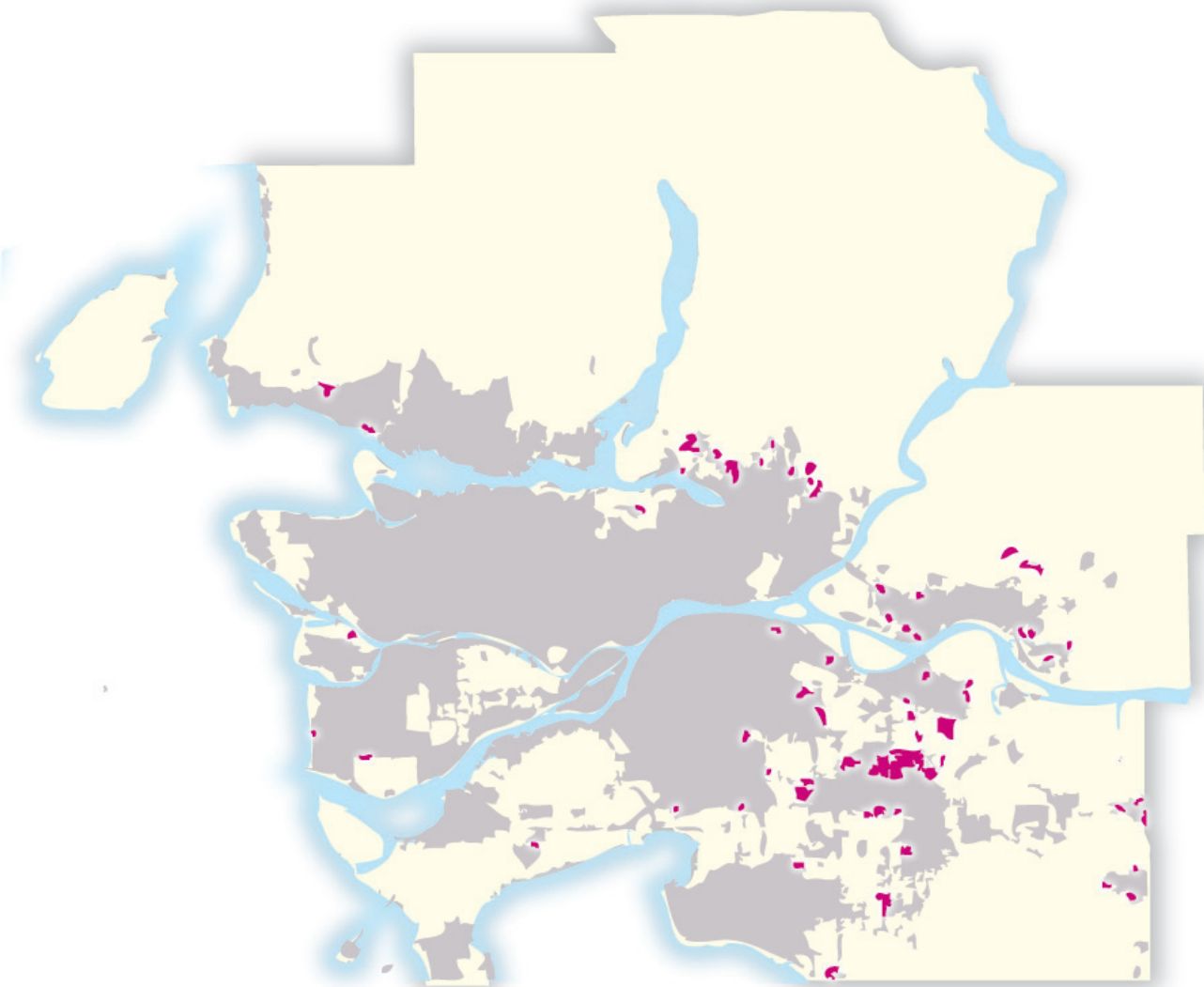
**FIGURE NO. 14**  
NET GAIN IN POPULATION AND DWELLINGS,  
METRO VANCOUVER, 2001-2011



NOTE: DUE TO ROUNDING, TOTALS MAY  
DIFFER FROM SUBREGIONAL TOTAL.

In the Vancouver region, there was a larger net gain in population compared with dwellings for greenfield development, and a larger net gain in dwellings compared with population in the existing urban area. Although similar gaps were identified in the GTHA, the gaps are much smaller in Metro Vancouver than in the Toronto region, indicating that household sizes in the Vancouver region are more evenly balanced between the existing urban areas and the new expansion areas (see **Figure 14**).

BETWEEN 2001 AND 2011, THE URBAN AREA OF METRO VANCOUVER INCREASED BY A MERE 4% WHILE ITS REGIONAL POPULATION INCREASED BY 16% AND ITS DWELLINGS BY 21%.

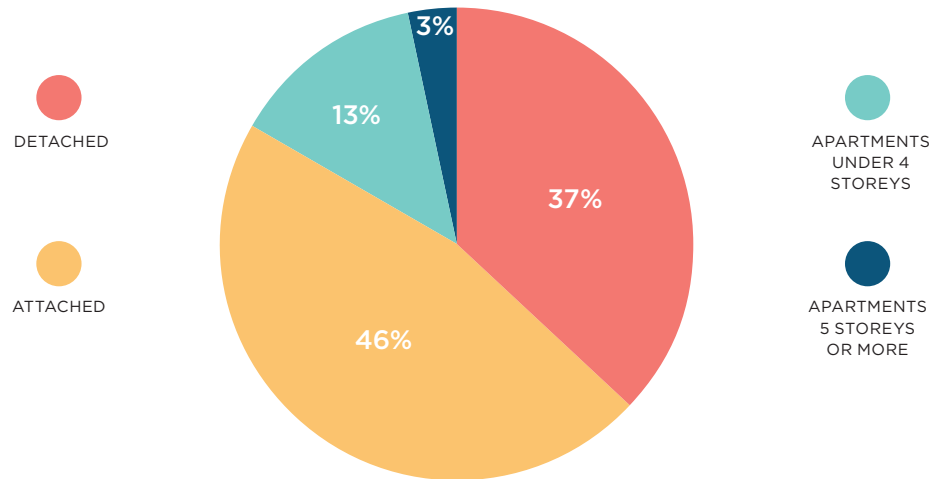


GREENFIELD AREAS URBANIZED,  
METRO VANCOUVER, 2001-2011

NOTE: THE AREA HIGHLIGHTED IN MAGENTA REPRESENTS THE GREENFIELD AREA IN METRO VANCOUVER. ALL NUMBERS IN THIS SECTION HAVE BEEN MEASURED WITHIN THIS AREA.

FIGURE  
NO. 15

**FIGURE NO. 16**  
COMPOSITION OF DWELLING STOCK ADDED IN  
GREENFIELD AREA, METRO VANCOUVER, 2001-2011



## GREENFIELD GROWTH IN METRO VANCOUVER

Metro Vancouver's urban expansion between 2001 and 2011 is shown in **Figure 15**. These small areas accommodated 31% of the region's population growth and 24% of the region's dwelling gain.

As in the Toronto region, suburban greenfield development in the Vancouver region has traditionally accommodated larger households in larger dwelling units. The average household size in the new urban area is larger than the regional average, 2.65 compared with 2.43.

The housing stock for Metro Vancouver's greenfield development is mainly ground-related housing, although with a much higher percentage of attached dwellings than the GTHA and a sizable proportion of mid-rise apartments (see **Figure 16**).

Most of the region's urban expansion took place in the suburban municipalities of Surrey, Langley, Richmond, and Maple Ridge.<sup>12</sup> But the majority of the region's population and dwelling growth in greenfield areas was accommodated in Surrey, Langley, and Maple Ridge. Although Richmond contributed to the region's urban expansion, it did not add much population or dwellings through greenfield growth. This is likely due to Richmond's role as an employment-rich municipality. Growth in employment is captured only by our measure of urban expansion, not in the census data used for this study.

The region's total greenfield growth consists of just under 102,000 people and 40,000 dwellings (see **Table 8**). It is interesting to note that these numbers represent less than half the population growth and about four-fifths of the dwellings added through greenfield development in the City of Brampton, one lower-tier municipality in the GTHA.

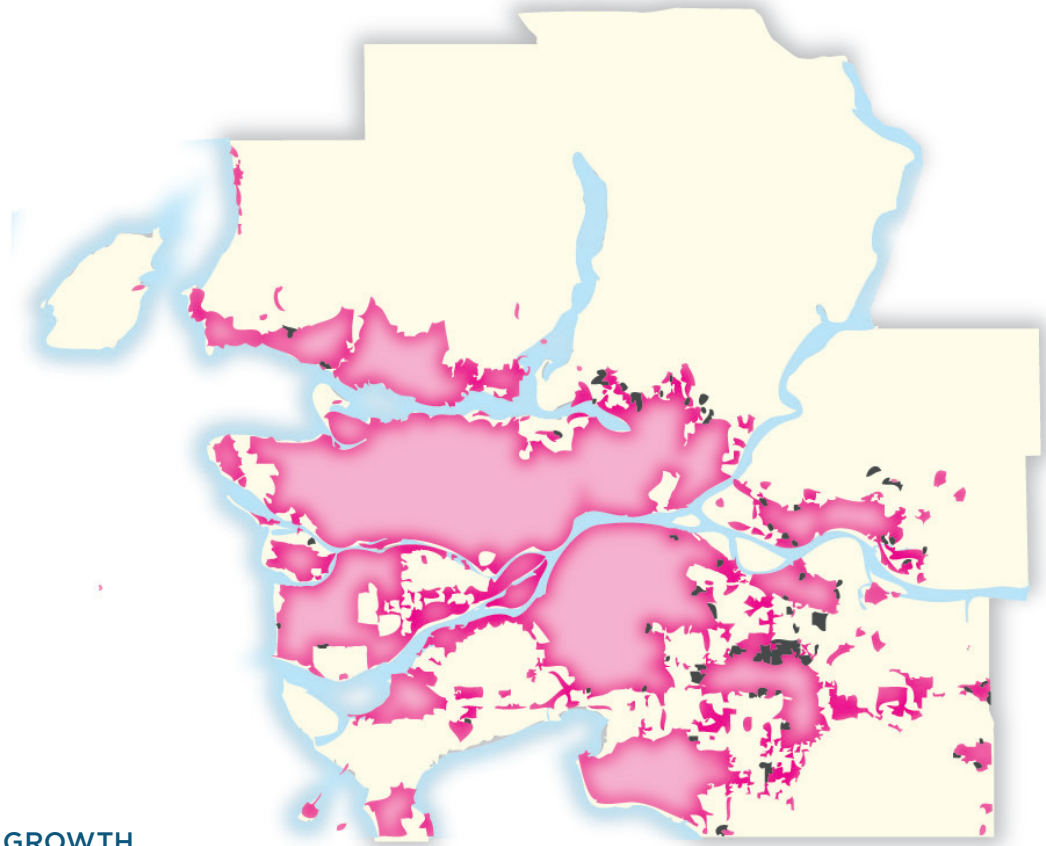
<sup>12</sup> Metro Vancouver has a single-tier municipal system unlike the two-tier system in the GTHA. See Taylor and Burchfield (2010) for a more detailed discussion of Metro Vancouver's municipal structure.

TABLE  
NO. 8POPULATION AND DWELLINGS  
ADDED IN GREENFIELD AREA  
AND URBAN EXPANSION, METRO  
VANCOUVER, 2001-2011

	POPULATION ADDED IN GREEN- FIELD AREA	PROPORTION OF POPU- LATION GROWTH IN MUNICIPAL- ITY (%)	PROPORTION OF METRO VANCOUVER GREEN- FIELD POPULA- TION (%)	DWELLINGS ADDED IN GREEN- FIELD AREA	PROPORTION OF ALL DWELLING GROWTH IN MUNICIPAL- ITY (%)	PROPORTION OF METRO VANCOUVER GREENFIELD DWELLING GROWTH (%)	TOTAL URBAN EXPANSION (HECTARES)	PERCENT INCREASE IN URBAN AREA OF MUNICI- PALITY	PROPORTION OF METRO VANCOUVER URBAN EXPAN- SION (%)
BURNABY	2,280	8	2	1,200	8	3	20	0	1
COQUITLAM	6,260	46	6	2,450	37	6	65	2	3
DELTA	480	17	0.5	190	8	1	15	0	1
LANGLEY	18,050	96	18	6,820	66	18	500	11	25
MAPLE RIDGE	12,010	93	12	3,980	66	10	100	5	5
NEW WESTMINSTER	1,710	15	2	600	10	2	5	0	0
NORTH VANCOUVER	390	6	0.4	190	3	1	1	0	0
PITT MEADOWS	2,030	66	2	780	48	2	40	7	2
PORT COQUITLAM	0	0	0	0	0	0	0	0	0
PORT MOODY	7,650	84	8	3,170	75	8	60	6	3
RICHMOND	130	0.5	0.1	90	1	0	170	3	8
SURREY	46,070	36	45	16,510	36	43	910	6	46
VANCOUVER	0	0	0	0	0	0	0	0	0
WEST VANCOUVER	1,340	74	1	630	37	2	30	1	2
WHITE ROCK	0	0	0	0	0	0	0	0	0
OTHER	3,340	52	3	1,680	57	4	85	8	4
TOTALS	101,740			38,290			1,916		

NOTE: THE "OTHER" CATEGORY INCLUDES NON-MUNICIPAL JURISDICTIONS SUCH AS THE ENDOWMENT LANDS OWNED BY THE UNIVERSITY OF BRITISH COLUMBIA.





### INTENSIFICATION GROWTH IN METRO VANCOUVER

The vast majority of population and dwellings added in Metro Vancouver took the form of intensification. More than 223,000 people and 123,000 units were absorbed into the existing urban area, a total area of 67,800 hectares (see **Figure 17**).

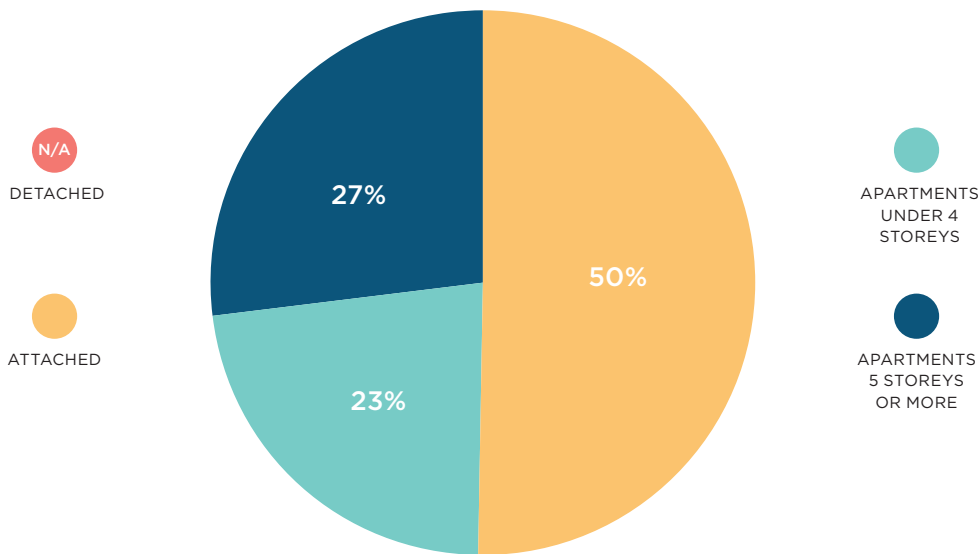
Household size in the existing urban area decreased between 2001 to 2011 from 2.5 to 2.4, following the general trend in Canada. However, the composition of the new housing stock in the existing urban area represents a different mix from that in the GTHA. The majority is in the form of attached ground-related housing, with the rest of the stock almost evenly split between mid- and high-rise apartments (see **Figure 18**). The region lost more than 39,000 single-detached homes in the existing urban area, a similar number to the decline observed in the GTHA (43,000 units), but within a much smaller urban area, 67,800 versus 157,300 hectares.

### INTENSIFICATION AREA, METRO VANCOUVER

NOTE: THE 2001 URBAN AREA  
IS HIGHLIGHTED IN MAGENTA. ALL  
NUMBERS IN THIS SECTION HAVE  
BEEN MEASURED WITHIN THIS AREA.

**FIGURE  
NO. 17**

**FIGURE NO. 18**  
COMPOSITION OF DWELLING STOCK  
ADDED THROUGH INTENSIFICATION,  
METRO VANCOUVER, 2001-2011



## POPULATION GAIN AND LOSS IN THE EXISTING URBAN AREA

**Figure 19** illustrates the spatial distribution of the net population loss and gain across Metro Vancouver and **Table 9** shows the amount and percentage of population change in the existing urban areas for all municipalities in Metro Vancouver.

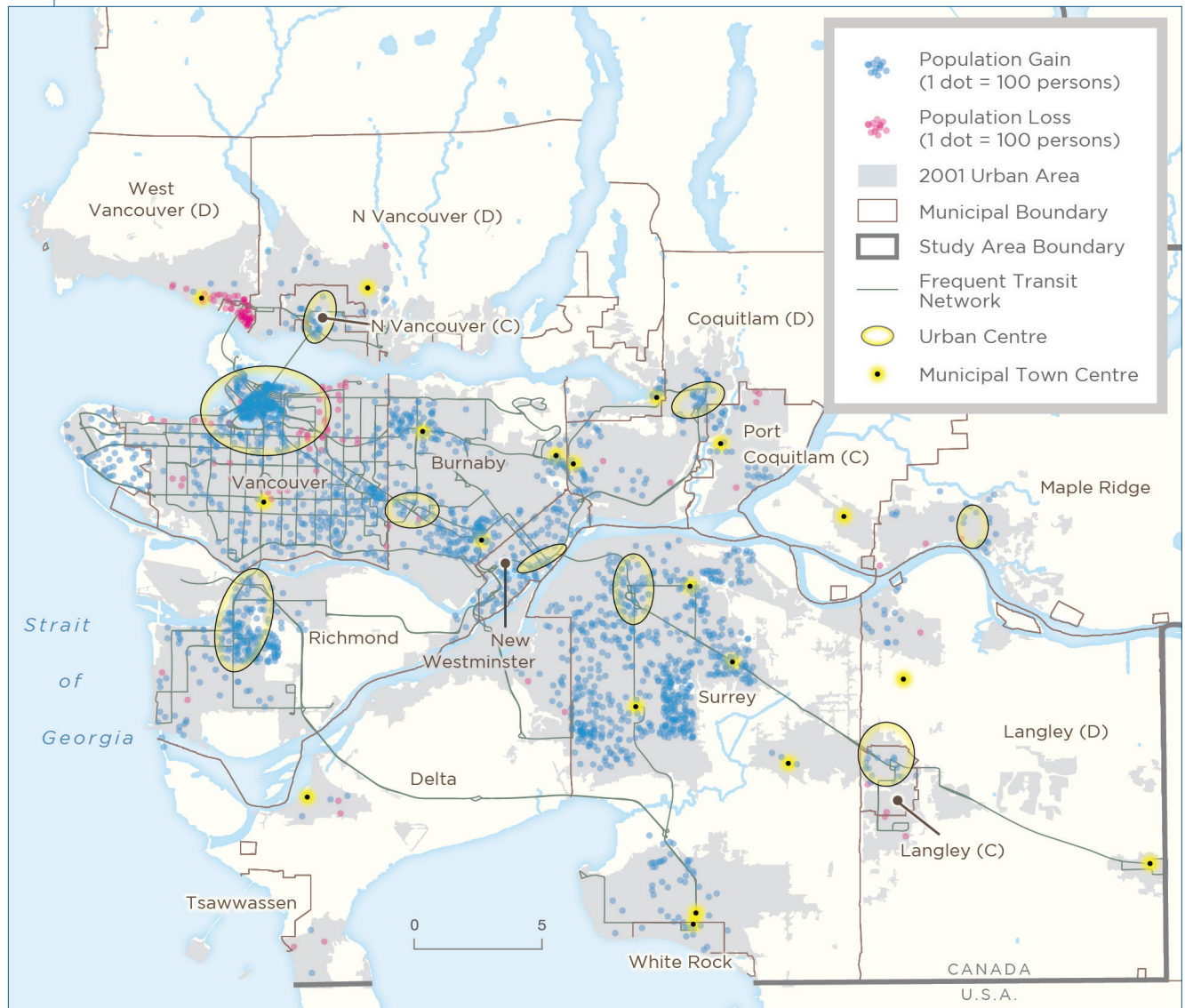
There has been a net population gain in all but two municipalities in Metro Vancouver; the exceptions are West Vancouver and Langley, which experienced a very small loss of population. The map shows that established urban areas in the Vancouver region have not experienced much population loss. Despite some population loss in the City of Vancouver, the loss is not as noticeable as that observed in the City of Toronto or other urban areas in the GTHA. Although the Vancouver region is presumably experiencing similar demographic shifts as those in the Toronto region, since the trends are Canada-wide, these

shifts are not resulting in large overall losses of population within the urbanized area, presumably because of the higher rate of intensification.

**Figure 19** also indicates that the majority of the net new population went to the existing urban areas of Surrey, City of Vancouver, Richmond, and Burnaby, with the largest number of net new residents going to Surrey's established urban areas, about 74,000 people or 23% of the region's entire new population growth in ten years. By 2040, the population in the City of Surrey is projected to be on a par with the population of the City of Vancouver. Surrey is taking advantage of this growth through the massive redevelopment of Surrey Metro Centre that includes an integrated district energy centre that will eventually be fuelled by renewable sources of energy (Giratalla and Owen 2014).

**FIGURE  
NO. 19**

POPULATION GAIN AND LOSS  
IN ESTABLISHED URBAN AREAS,  
METRO VANCOUVER, 2001-2011



NOTE: THE DOTS ON THE MAP REPRESENT APPROXIMATE LOCATIONS. THE MAP USES A DOT DENSITY TECHNIQUE TO ILLUSTRATE CLUSTERS OF POPULATION LOSS OR GAIN. THE DOTS HAVE BEEN PLACED RANDOMLY WITHIN CENSUS TRACTS, ALTHOUGH THE BOUNDARIES OF CENSUS TRACTS ARE NOT SHOWN IN ORDER TO ILLUSTRATE OTHER DATA LAYERS MORE CLEARLY.

TABLE  
NO. 9POPULATION AND DWELLING  
CHANGE, METRO VANCOUVER  
INTENSIFICATION AREA, 2001-2011

	POPULATION CHANGE IN INTENSIFICA- TION AREA	PROPORTION OF POPULA- TION GROWTH IN MUNICI- PALITY (%)	PROPORTION OF METRO VANCOUVER POPULA- TION ADDED THROUGH INTEN- SIFICATION (%)	DWELLINGS ADDED TO INTENSIFICA- TION AREA	PROPORTION OF DWELL- INGS GROWTH IN MUNICI- PALITY (%)	PROPORTION OF METRO VANCOUVER DWELL- INGS ADDED THROUGH INTENSIFICA- TION (%)
BURNABY	27,020	92	12	13,970	92	11
COQUITLAM	7,860	58	4	4,150	63	3
DELTA	2,430	83	1	2,300	95	2
LANGLEY	-80	-	-	2,930	28	2
MAPLE RIDGE	1,030	8	0.5	1,920	32	2
NEW WESTMINSTER	9,610	85	4	5,380	90	4
NORTH VANCOUVER	6,520	98	3	5,320	97	4
PITT MEADOWS	460	15	0.2	500	31	0.4
PORT COQUITLAM	5,090	100	2	3,290	100	3
PORT MOODY	1,510	16	1	1,050	25	1
RICHMOND	26,000	100	12	12,810	99	10
SURREY	74,370	62	33	28,950	64	23
VANCOUVER	57,830	100	26	37,760	100	30
WEST VANCOUVER	460	26	0.2	1,070	63	1
WHITE ROCK	1,090	100	0.5	1,100	100	1
OTHER	2,620	41	1	1,360	41	1
TOTALS	223,820			123,860		

NOTE: THE OTHER CATEGORY INCLUDES NON-MUNICIPAL  
JURISDICTIONS SUCH AS THE ENDOWMENT LANDS OWNED  
BY THE UNIVERSITY OF BRITISH COLUMBIA.

FIGURE  
NO. 20

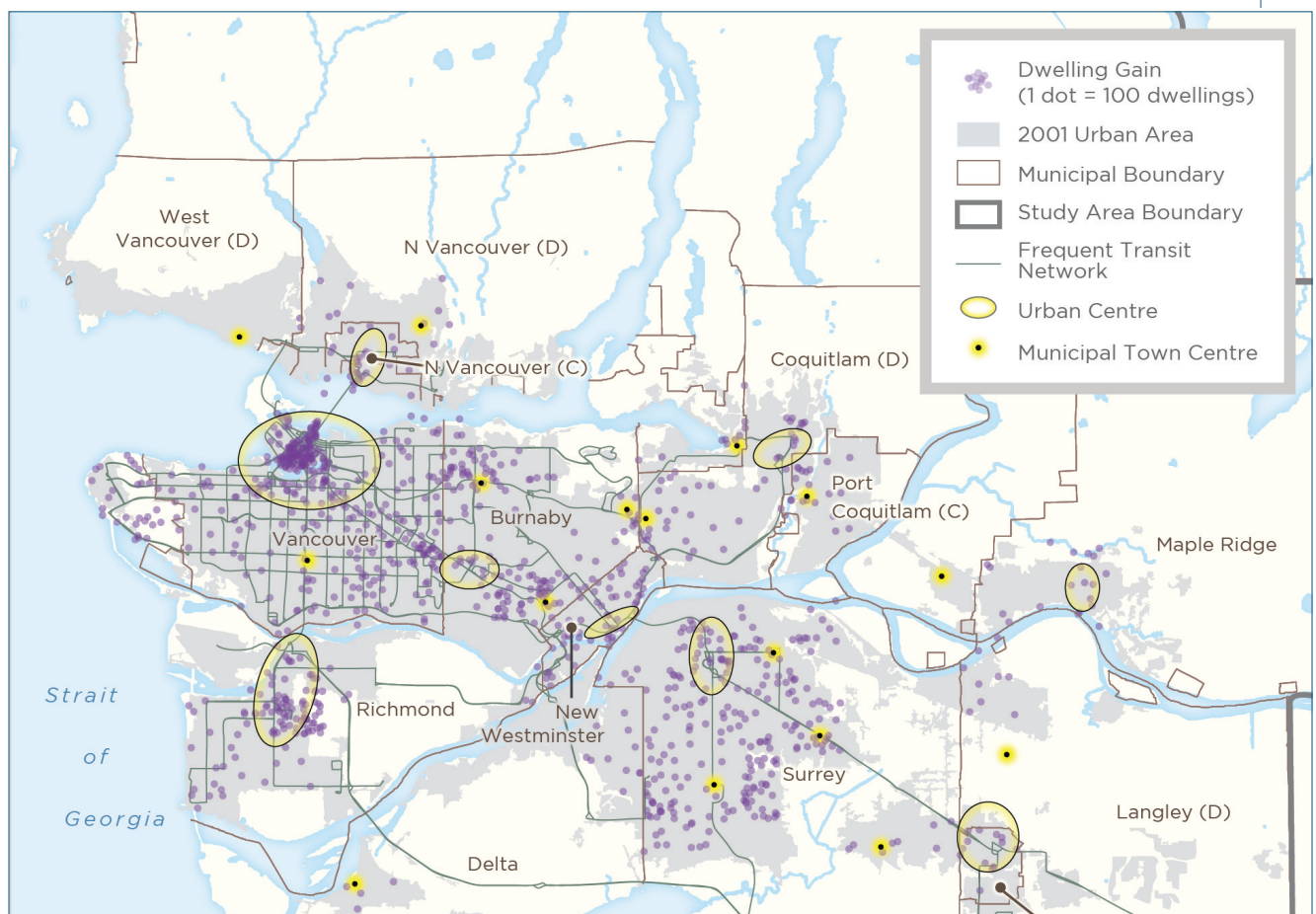
## DWELLING GAIN IN THE EXISTING URBAN AREA

Figure 20 shows that the spatial distribution of the net new dwellings absorbed into the existing urban area parallels the pattern of population gain in Figure 19. The same four municipalities (the Cities of Vancouver, Surrey, Richmond, and Burnaby) contributed to the majority of the region's net new dwellings added through intensification.

In the next section, we examine how much of the intensification went into urban centres and near frequent transit service in Metro Vancouver.

## DWELLINGS ADDED THROUGH INTENSIFICATION, METRO VANCOUVER, 2001-2011

NOTE: THE DOTS ON THE MAP REPRESENT APPROXIMATE LOCATIONS. THE MAP USES A DOT DENSITY TECHNIQUE TO ILLUSTRATE CLUSTERS OF DWELLINGS. THE DOTS HAVE BEEN PLACED RANDOMLY WITHIN CENSUS TRACTS, ALTHOUGH THE BOUNDARIES OF CENSUS TRACTS ARE NOT SHOWN IN ORDER TO ILLUSTRATE OTHER DATA LAYERS MORE CLEARLY.



>> METRO VANCOUVER'S GREENFIELD DEVELOPMENT AND INTENSIFICATION >>

	POPULATION 2001	DWELLINGS 2001	POPULATION 2011	DWELLINGS 2011	POPULATION CHANGE 2001-11	DWELLINGS CHANGE 2001-11
METRO CORE	135,690	89,810	170,620	108,990	34,930	19,180
SURREY METRO CENTRE	18,230	8,300	23,760	11,720	5,530	3,420
<b>REGIONAL CITY CENTRES</b>						
RICHMOND CITY CENTRE	36,320	15,720	54,340	24,280	18,020	8,560
METROTOWN	26,880	13,660	28,960	14,500	2,080	840
LONSDALE	26,040	14,000	28,890	16,310	2,850	2,310
LANGLEY TOWN CENTRE	17,380	8,490	27,950	13,250	10,570	4,760
COQUITLAM TOWN CENTRE	13,530	6,350	16,430	7,620	2,900	1,270
MAPLE RIDGE TOWN CENTRE	12,350	5,910	14,020	7,190	1,670	1,280
NEW WESTMINSTER DOWNTOWN	9,520	5,480	13,580	7,750	4,060	2,270
<b>MUNICIPAL TOWN CENTRES</b>						
EDMONDS	22,990	9,810	31,850	13,970	8,860	4,160
LOUGHEED BURNABY	13,630	6,340	16,140	7,440	2,510	1,100
GUILDFORD	11,250	5,160	14,180	6,260	2,930	1,100
AMBLESIDE	8,280	5,090	9,200	5,680	920	590
FLEETWOOD	8,010	2,920	13,640	4,630	5,630	1,710
PITT MEADOWS	7,730	3,110	7,930	3,430	200	320
NEWTON	7,610	3,060	7,810	3,220	200	160
PORT COQUITLAM	6,500	3,000	8,380	4,120	1,880	1,120
LOUGHEED COQUITLAM	6,330	2,720	7,150	3,250	820	530
SOUTH SURREY (SEMAHMOO)	6,120	3,160	6,850	3,600	730	440
OAKRIDGE	5,650	2,430	6,130	2,540	480	110
LYNN VALLEY	5,490	2,170	6,210	2,600	720	430
LADNER	5,300	2,280	5,540	2,450	240	170
BRENTWOOD	5,210	2,430	11,680	5,790	6,470	3,360
INLET CENTRE	4,410	1,670	5,440	2,350	1,030	680
ALDERGROVE	4,090	1,580	3,900	1,700	-190	120
CLOVERDALE	2,660	1,320	2,660	1,470	0	150
WHITE ROCK	2,150	1,550	2,770	1,990	620	440
WILLOUGHBY	1,190	410	930	350	-260	-60
<b>TOTALS</b>	<b>430,540</b>	<b>227,930</b>	<b>546,940</b>	<b>288,450</b>	<b>116,400</b>	<b>60,520</b>
<b>TOTALS (EXCEPT FOR MTCS)</b>	<b>295,940</b>	<b>167,720</b>	<b>378,550</b>	<b>211,610</b>	<b>82,610</b>	<b>43,890</b>

TABLE  
NO. 10

PROPORTION OF POPU- LATION CHANGE (%)	PROPORTION OF DWELL- INGS CHANGE (%)	PROPORTION OF POPU- LATION GROWTH IN ALL CEN- TRES (%)	PROPORTION OF GROWTH IN DWELL- INGS FOR ALL CEN- TRES (%)	PROPORTION OF METRO VANCOUVER POPULATION GROWTH (%)	PROPORTION OF METRO VANCOUVER GROWTH IN DWELL- INGS (%)	POPULATION AND DWELLING CHANGE, METRO VANCOUVER URBAN CENTRES, 2001-2011
26	21	30	32	11	12	
30	41	5	6	2	2	
50	54	15	14	6	5	
8	6	2	1	1	1	
11	17	2	4	1	1	
61	56	9	8	3	3	
21	20	2	2	1	1	
14	22	1	2	1	1	
43	41	3	4	1	1	
39	42	8	7	3	3	
18	17	2	2	1	1	
26	21	3	2	1	1	
11	12	1	1	<1	<1	
70	59	5	3	2	1	
3	10	<1	1	<1	<1	
3	5	<1	<1	<1	<1	
29	37	2	2	1	1	
13	19	1	1	<1	<1	
12	14	1	1	<1	<1	
8	5	<1	<1	<1	<1	
13	20	1	1	<1	<1	
5	7	<1	<1	<1	<1	
124	138	6	6	2	2	
23	41	1	1	<1	<1	
-5	8	0	<1	0	<1	
0	11	0	<1	0	<1	
29	28	1	1	<1	<1	
-22	-15	0	0	0	0	



## POPULATION AND DWELLING CHANGE IN URBAN CENTRES AND FREQUENT TRANSIT SERVICE AREAS

In 2011, Metro Vancouver's regional growth strategy introduced a hierarchy of urban centres. Eighteen municipal town centres (MTCs) were identified in addition to the nine regional town centres referenced in earlier regional plans, for a total of 27 centres. By 2041, 40% of the region's dwelling growth is expected to be directed to these centres, up from 26% as measured in 2006.

Our analysis estimates that 36% of the region's net new population and 27% of dwellings were absorbed in the 27 centres between 2001 and 2011. If we limit the analysis to the original nine centres as identified by the ovals in **Figures 19 and 20**, we find that these historical centres absorbed about one-quarter of the region's net new population and dwellings.

**Table 10** indicates that of the net new population and dwellings added to the region's 27 centres, the bulk of the growth went to Metro Core (30% of population and 32% of dwellings) in the City of Vancouver and Richmond Centre (15% of population and 14% of dwellings). These two centres alone absorbed about 17% of the Metro Vancouver's net new population and dwellings. Both centres are located on the Canada Line, a rapid transit line that opened in the summer of 2009 connecting Metro Core to the airport in Richmond. The municipality of Richmond has traditionally been a net importer of commuters (more daily commuters travel into the municipality than leave it), and in 2006, Richmond had a higher activity rate (ratio of jobs to population) than the regional average (0.71 versus 0.52). Increasing the population living along the Canada Line in Richmond would allow more residents better access to the employment opportunities in the region.

Langley Centre and the Municipal Town Centres of Brentwood and Fleetwood experienced the greatest change between 2001 and 2011, even though altogether they absorbed only slightly more than 6% of the region's population growth. The change indicates the region's success in encouraging suburban municipalities to direct growth more strategically into centres.

**Table 11** shows the number and percentage of the Vancouver region's net new dwellings and population located within walking distance of the Frequent Transit Network (FTN) in the region (see **Figure 3** for network).<sup>13</sup> Frequent service offers an attractive alternative to the automobile, since transit riders on these lines do not need to consult a schedule ahead of time, given the regular service and shorter wait times. From this total, we separately isolated the net new dwellings and population located within walking distance of the SkyTrain Stations, since this service is an attractive alternative to the car, given its speed and direct access, unimpeded by traffic congestion.

ABOUT 17% OF METRO  
VANCOUVER'S NET NEW  
POPULATION AND  
DWELLINGS WERE  
ACCOMMODATED IN THE  
CITY OF VANCOUVER AND  
RICHMOND CENTRES.

13 Although Metro Vancouver has its own frequent transit development area, the authors have calculated their own based on 2009 transit service schedules. The frequent transit network is defined as the transit lines (buses, subway, SkyTrain, light rail, streetcar, or bus rapid transit) running every 15 minutes or more frequently between 7 a.m. and 7 p.m. on weekdays.



TABLE  
NO. 11POPULATION AND DWELLINGS ADDED NEAR  
FREQUENT TRANSIT NETWORK (FTN) AND  
SKYTRAIN STATIONS, 2001-2011

	POPULATION AND DWELL- INGS ADDED NEAR FTN	% OF REGIONAL GROWTH	POPULATION AND DWELL- INGS ADDED NEAR SKYTRAIN STATIONS	% OF REGIONAL GROWTH
POPULATION	151,530	47	74,890	23
DWELLINGS	86,650	53	42,860	26

NOTE: TOTAL REGIONAL GROWTH IS GROWTH IN POPULATION AND DWELLINGS THROUGH INTENSIFICATION AND GREENFIELD DEVELOPMENT. GROWTH IN RURAL AREAS OF METRO VANCOUVER IS EXCLUDED FROM THIS CALCULATION.

Walking distance for the purpose of this study is defined as a 500-metre buffer area around local routes (buses and streetcars with stops relatively close together) and a 1,000-metre buffer area around rapid transit stations, such as SkyTrain stations.

In Metro Vancouver, more than half of all new dwellings and nearly half of the net new population were located within walking distance of a frequent transit station and one-quarter of the new growth was within walking distance of a SkyTrain Station. This finding indicates that the integration of the region's land use and transportation plans has encouraged more transit-oriented development in the region.

Metro Vancouver's regional growth strategy calls for approximately 68% of new dwellings by 2041 to be located near frequent transit, including both Urban Centres, which are served by the FTN and other areas accessible to frequent transit. Our findings show that the region is on its way to achieving this goal.

IN METRO VANCOUVER,  
NEARLY 50% OF NET  
NEW DWELLINGS AND  
POPULATION WERE  
LOCATED WITHIN  
WALKING DISTANCE OF  
THE FREQUENT TRANSIT  
NETWORK.

# SUMMARY OF FINDINGS

As they are two of Canada's largest and fastest-growing city-regions, it is important to understand the dynamics of residential growth in the Greater Toronto and Hamilton Area and Metro Vancouver and how these trends relate to growth management and transportation policies in each jurisdiction.

## THE TORONTO CITY-REGION

The GTHA experienced a tremendous amount of growth in the past 10 years (2001–2011), accommodating more than 1 million people and adding over 450,000 new dwellings. In this decade, growth was achieved by using land more efficiently than was the case in the 1990s. Our findings show that the market more than policy was responsible for this shift to higher-density greenfield development.

Although the dwelling growth was geographically split between the existing urban area and the new urban expansion areas, the vast majority of the net population growth was accommodated in single-detached homes through greenfield development. Greenfield development also accommodated larger households than those added to existing urban areas.

In keeping with Canada-wide trends, average household size continued to shrink in existing urban areas where apartments, which include condominiums, in buildings higher than five storeys continued to be the predominant housing form added through intensification.

Our findings show that the composition of the GTHA's dwelling stock has not changed much in the past 20 years. The largest proportion of its dwelling types remains single-detached homes, followed by high-rise apartments.

One major finding of this study is that although the GTHA experienced an overall gain in population and dwellings, certain established urban areas in Durham, Hamilton, and Halton and in the fast-growing municipality of Brampton experienced net population loss, even while they added population and dwellings in greenfield areas. The population loss contributed to a further decline in household size in the existing urban area, lowering the region's average household size between 2001 and 2011.

The good news story is that urban growth centres accommodated the vast majority of the GTHA's intensification-related population gain. Three-quarters of this population growth went to only three of the GTHA's 17 UGCs—the City of Toronto Downtown Core, North York Centre, and Mississauga City Centre. Markham and Scarborough centres, although relatively small, experienced the most significant transformations. But to put this growth into perspective, this intensification-related growth in UGCs accounted for only 13% of overall net new population gain in the GTHA.

Finally, very little of the region's population growth was located near frequent transit corridors or near GO train stations.

## VANCOUVER CITY-REGION

Growth continued in the Vancouver region, but slowed down between 2001 and 2011. Metro Vancouver maintained its goal of developing as a compact region by increasing its urban footprint by only 4% and directing 75% of new dwellings to the existing urban area.

Although Vancouver's average household size is declining, as it is across Canada, there is a greater balance of household size in new greenfield developments relative to the existing urban areas than observed in the GTHA, and there was much less population loss in existing urban areas. Metro Vancouver's housing stock composition has diversified over the last 20 years, reaching a greater balance between single detached dwellings, attached dwellings such as townhouses and semi-detached duplexes, and mid- and high-rise apartments and condos.

The Vancouver region's commitment to the integration of land use and transportation as part of its overall growth management strategy is evident by the amount of new population and dwellings locating near urban centres and frequent transit corridors.

**Table 12** provides a summary of our findings.

TABLE  
NO. 12COMPARISON OF  
GROWTH METRICS,  
GTHA AND METRO  
VANCOUVER, 2001-2011

REGION TOTALS	GREATER TORONTO AREA AND HAMILTON		METRO VANCOUVER	
Population change (%)	1,002,050 (18)		326,360 (16)	
Dwellings change (%)	461,590 (23)		163,290 (21)	
Urban Area change (ha) (%)	14,990 (10)		2,540 (4)	
SUB-REGIONAL TOTALS	INTENSIFICATION	GREENFIELD	INTENSIFICATION	GREENFIELD
	PROPORTION (%)	PROPORTION (%)	PROPORTION (%)	PROPORTION (%)
Population	142,250 (14)	857,870 (86)	223,800 (69)	101,730 (31)
Dwellings*	208,930 (46)	249,170 (54)	123,860 (76)	38,280 (24)
Detached	-42,860 (-)	152,670 (62)	-39,050 (-)	12,030 (37)
Attached	44,630 (22)	82,180 (34)	67,910 (50)	15,020 (46)
Less than 5 Storeys	63,030 (31)	4,330 (4)	30,810 (23)	4,260 (13)
5 or more Storeys	94,190 (46)	4,770 (4)	35,980 (27)	1,040 (3)
POLICY-AREA TOTALS	CHANGE (% OF REGIONAL GROWTH)		CHANGE (% OF REGIONAL GROWTH)	
URBAN CENTRES				
Population	134,560 (13)		82,610 (25**)	
Dwellings	91,620 (20)		43,890 (26**)	
FREQUENT TRANSIT NETWORK				
Population	181,390 (18)		151,530 (46)	
Dwellings	171,820 (37)		86,650 (53)	
TRANSIT STATIONS	GO STATIONS		SKYTRAIN STATIONS	
Population	104,600 (10)		74,890 (23)	
Dwellings	48,500 (11)		42,860 (26)	

\* TOTALS MAY DIFFER FROM EARLIER TOTALS DUE TO THE DWELLING TYPE DATA BREAKDOWN.

\*\* EXCLUDING MTCS.

# CONCLUSION

This comparison between the two city-regions of Toronto and Vancouver offers insights not only into housing trends and development patterns, but also into growth management efforts in the two jurisdictions.

Metro Vancouver, of course, had a head start on regional growth management relative to the Greater Toronto and Hamilton Area. Starting in the 1970s, the Vancouver region put in place strong protections for agricultural land and environmentally sensitive areas. With the creation of the Green Zone in 1996, it reinforced that protection, but also moved to consolidate growth in already urbanized areas and to minimize urban expansion outwards through generalized intensification policies.

The Vancouver city-region has seen positive results from its early growth management efforts, but it is not resting on its laurels. Metro Vancouver has kept its plans up to date, revising them in response to emerging trends and pressures. In 2011, at the end of the study period analysed in this paper, Metro Vancouver once again refined its plans into the regional growth strategy.

This document and its policies are appropriately named, since they are *strategic*, rather than generalized. The *Urban Containment Boundary* acts as a brake on outward development, but within that boundary, growth is targeted to urban centres, which are organized into a hierarchy according to regional and local roles, and to areas served by frequent transit networks.

In contrast, the Province of Ontario introduced its *Growth Plan for the Greater Golden Horseshoe* in 2006, and even today (spring 2015), the required elements of the plan are not fully in place everywhere in the region, as many municipal implementation efforts have been subject to Ontario Municipal Board appeals. The Growth Plan is very different from Metro Vancouver's regional growth strategy, but it resembles some of B.C.'s earlier efforts at growth management, with generalized intensification and greenfield development targets, applied broadly across the region.

The Growth Plan was a response to the type of development that prevailed in the 1990s, which clearly fit the classic definition of sprawl, as this research shows. In the 1990s, the rate at which land was urbanized outpaced the rate at which the region was adding population, at least in the GTHA (or Inner Ring). The following decade reversed this pattern, and the region is no longer sprawling in the classic definition, but new issues have emerged as some old ones remain. The Growth Plan in its current form remains focused on the problems of the 20<sup>th</sup> century, not those of the 21<sup>st</sup>.

For example, the Growth Plan is premised on the assumption that intensification—no matter where it is located inside the boundary of the urbanized area—will result in smarter growth, with the attendant benefits of reduced congestion, the efficient use of infrastructure, and more sustainable communities. This research shows, however, that generalized intensification alone may not achieve these goals, especially in the context of declining household sizes.

Instead, the changing geographies of growth and demographics in the GTHA are resulting in higher densities in new developments at the urban edge while many older, more central urban areas are losing population. Although downtown Toronto has experienced significant population growth, that growth represents only 5% of the GTHA's population growth between 2001 and 2011. As a few urban centres added more population and dwellings, many neighbourhoods in existing urban area experienced population loss. By comparison, the built-up parts of Metro Vancouver have not seen anything like the population loss apparent in the GTHA, from Hamilton to Brampton to central Toronto to Oshawa.

Moreover, relatively little growth is occurring in the GTHA in areas with rapid, frequent, all-day transit service. This finding indicates a need to better integrate *The Big Move* and the Growth Plan to ensure more transportation options than the automobile for the region's growing population.

Of course, the results here show only residential development, and do not indicate where jobs have been added or lost. Work on employment patterns is urgently needed to complete the picture. Still, it is clear that the Growth Plan's residential intensification policies are not on track to achieve their intended outcomes, as much of the development in the growing suburban municipalities around the City of Toronto continues to be focussed on greenfield development. The hard work lies ahead.

Given the “reality check” provided by this research, is it possible for the Province of Ontario to take a more strategic approach to growth management in the GTHA?

The question will be answered during 2015 and 2016 as the Province conducts its 10-year review of the Growth Plan and *The Big Move*.

Unfortunately, the Growth Plan as it is currently formulated “locks in” both population and employment projections, as well as the land budgets through which municipalities turn these projections into estimates of the amount of land needed for new development. Land once designated for growth cannot, it seems, be undesignated. Emulating Vancouver's more strategic policies of focusing on the *location* of the growth more than simply the *amount* of growth would require a change in provincial policy.

The GTHA also lacks the supportive structure of Metro Vancouver. This body regularly convenes elected representatives from municipalities throughout the Vancouver city-region to deal with matters such as extensions to urban boundaries and discrepancies between regional and local perspectives. The GTHA has no formal convening body that requires elected representatives of the upper- and single-tier municipalities to think and act as a region; municipalities tend to act in isolation from one another rather than working cooperatively to shape the future of the GTHA.

The GTHA could learn from Metro Vancouver's experience in linking transportation planning and land use planning. TransLink certainly plays a more direct role in planning the Vancouver region than its corresponding regional agency in the GTHA, Metrolinx. The Province of Ontario is preparing to spend billions of dollars on regional express rail, but these plans are not yet strongly or clearly linked to plans for targeted intensification. More strategic planning of growth will be necessary if the GTHA is to evolve into a polycentric region with concentrated employment and residential nodes across the region that facilitate more efficient use of the region's transit network.

The review of Metrolinx's regional transportation plan, *The Big Move*, is occurring at the same time but on a separate track from the review of the Growth Plan. It is

unclear how the outcome of one review will inform the other. In the Vancouver region, the roles and responsibilities of Metro Vancouver, municipalities, and TransLink are clearly articulated in the regional growth strategy. To date, Ontario's Growth Plan leaves many aspects of its implementation ambiguous, which has led to appeals and related delays in its implementation. It will be necessary to address this gap in the review of both plans.

Although the Toronto and Vancouver regions face growth planning challenges, both regions are successfully attracting new residents and employment. They frequently appear on lists of the most livable cities in the world. But with success come challenges that policy has been slow to address.

At the 2015 conference of the American Planning Association, housing affordability in successful and growing city-regions was a key issue discussed by attendees. Housing affordability is an ongoing problem in Metro Vancouver and a growing issue in the GTHA, particularly for single-family housing stock in desirable areas of each region (Flint 2015).

Issues related to housing affordability are not easily solved, and are exacerbated by the globalization of real estate investment, 15 years of low-interest borrowing, and shifting demographic trends. Nevertheless, policy makers can respond to rising prices by allowing the supply of housing to increase, and by creating incentives for the creation of a variety of housing types and tenures in areas that have capacity for growth.

THE GROWTH PLAN  
FOR THE GREATER  
GOLDEN HORSESHOE  
IN ITS CURRENT FORM  
REMAINS FOCUSED ON  
THE PROBLEMS OF THE  
20TH CENTURY, NOT  
THOSE OF THE 21ST.

Vancouver has diversified its portfolio of housing types by allowing secondary suites, laneway housing, and low- to mid-rise intensification in urban neighbourhoods. The GTHA, on the other hand, has not altered the overall balance of housing types: most construction takes the form of either detached houses or high-rise condos. Many municipalities have policies that protect “stable” neighbourhoods from any kind of intensification, which supports those who do not want to see their communities change. However, many of these neighbourhoods are far from stable, since they are experiencing population loss. Should municipalities consider policies for context-sensitive intensification in existing urban neighbourhoods? The City of Toronto has focused on mid-rise development on Avenues (arterial streets) to encourage more context-sensitive intensification, but should the city's policy go beyond Avenues?

Although Vancouver has managed to avoid widespread population loss in urban neighbourhoods, it has not escaped increases in housing prices. Both the Vancouver and Toronto city-regions could benefit from incentives that create or retain affordable housing forms near transit routes, starting with publicly owned parcels.

It is hoped that this research, analysis, and commentary will provide evidence of new population and housing patterns, particularly in the GTHA. As part of its 10-year review, the Province of Ontario should consider these patterns as they rethink current policies in the Growth Plan. It is no longer necessary to solve the problems of the 1990s, some of which have solved themselves. We are no longer “sprawling” according to the traditional definition of this term. However, the problems associated with “sprawl” remain, since the majority of the new population is being accommodated in automobile-dependent neighbourhoods.

Meanwhile, new problems have emerged: smaller households, older households, emptying neighbourhoods, unused infrastructure in some places and overused infrastructure in others. It is time for planning policy to evolve to address the growing pains of fast-growing city-regions. As an often-quoted saying has it: The future is not what it used to be.

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# APPENDIX A: METHODS

## OVERVIEW

First, we determined the urbanized area of each region in 1991, 2001, and 2011 from satellite imagery to calculate the amount and rate of urban area growth over 20 years. To measure growth in urban land, we delineated the built-up urban area in 1991 through the analysis of satellite imagery, which was subjected to a thorough visual inspection. We identified the expansion of this urban area between 1991 and 2001 using visual inspection of 2001 imagery and identified urban expansion from 2001 to 2011 using visual inspection of 2011 imagery.

This is a slightly different method from the one that was used in Taylor and Burchfield (2010), where the entire urban footprint was delineated for 1991 and for 2001 using a semi-automated method. The difference (subtraction) in the two urban footprints was used to calculate urban land growth between 2001 and 2011. The urban land increase (1991–2001) calculation in Taylor and Burchfield (2010) included new urban areas developed within the 1991 built-up area, or urban infill. In the current paper, our analysis of urban land growth focuses on the expansion area to calculate more precisely how much urban land growth is attributed to greenfield development.

Our subregional analysis focused on the decade of growth between 2001 and 2011. We used the 2001 urban area (the 1991 urban area plus the urban expansion area for 2001) to measure growth through intensification and the urban expansion area delineated from the 2011 imagery to measure growth through greenfield development.

Next, we overlaid 2001 and 2011 census dissemination area geography containing data on population and dwellings over the urbanized areas for the two years. By subtracting the number of people and dwellings in 2001 from the 2011 figures, we determined the net changes in population and dwellings over the decade.

We calculated average regional and subregional densities by dividing population or dwellings by the extent of the urbanized areas, and average regional and subregional household size by dividing population by the number of dwellings in an area.

In addition, we identified planning policy areas, such as major transit stations, urban growth centres, and frequent transit networks, to determine net changes in dwell-

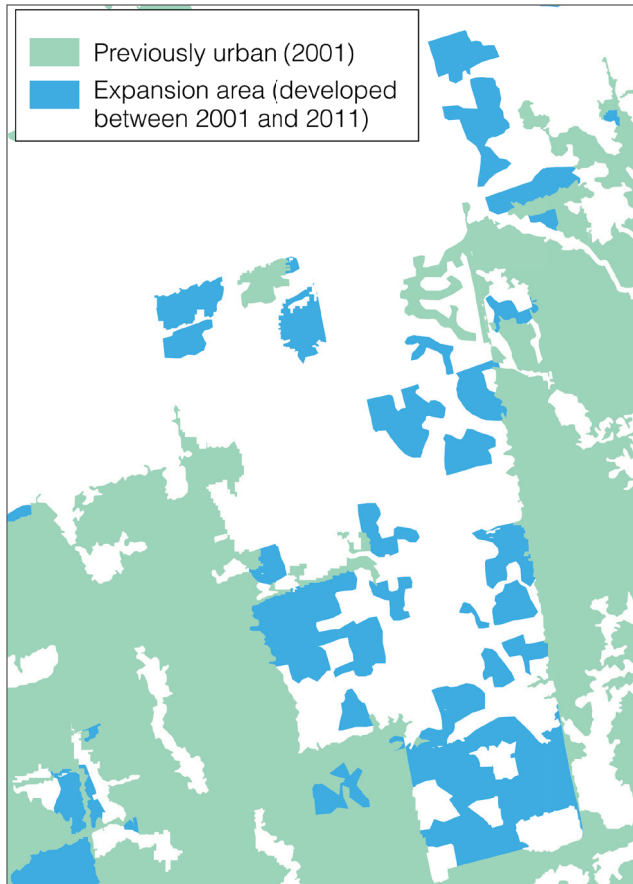
ings and population in these locations. We estimated the population and dwellings in these areas using census dissemination areas that intersected (overlapped) with the policy areas. In most cases, the census geography extended beyond the policy area boundaries, so in most cases the population and dwelling counts are an overestimate.

The spatial analysis methods used for the current report are similar to the spatial analysis methods used for *Growing Cities* by Taylor and Burchfield (2010), although there are some important differences. The original method (Du et al. 2007) used long-form census data from 2001, which includes a variable of the year of construction for residential units. This variable allowed the authors to identify units built in the decade between 1991 and 2001. However, the long-form census for 2011 has been replaced by the National Household Survey, which has been shown to yield less-than-accurate results for variables that are not part of the 2011 short-form census.

Therefore, we decided to limit ourselves to the short-form census. While the short-form census is a complete picture of population and dwelling type, it does not include the

date of construction for residential units. Instead, we subtracted the total number of people and dwelling units present in 2001 census dissemination area geography that coincided with the 2001 urban area from the census dissemination area geography from 2011 to arrive at a net change in population and dwellings for intensification. We performed the same analysis for the census dissemination geography that coincided with the 2011 urban expansion area. In some ways, this approach should be more accurate than the earlier method, because the short-form census attempts to survey the entire population, rather than a 20% sample. However, the subtraction method is more complex spatially, as we had to align two sets of census boundaries, some of which had changed over the decade in question.

By using the subtraction method, we can see both population loss and gains in different areas. A detailed description follows.



## STEP 1: MAP URBAN EXPANSION

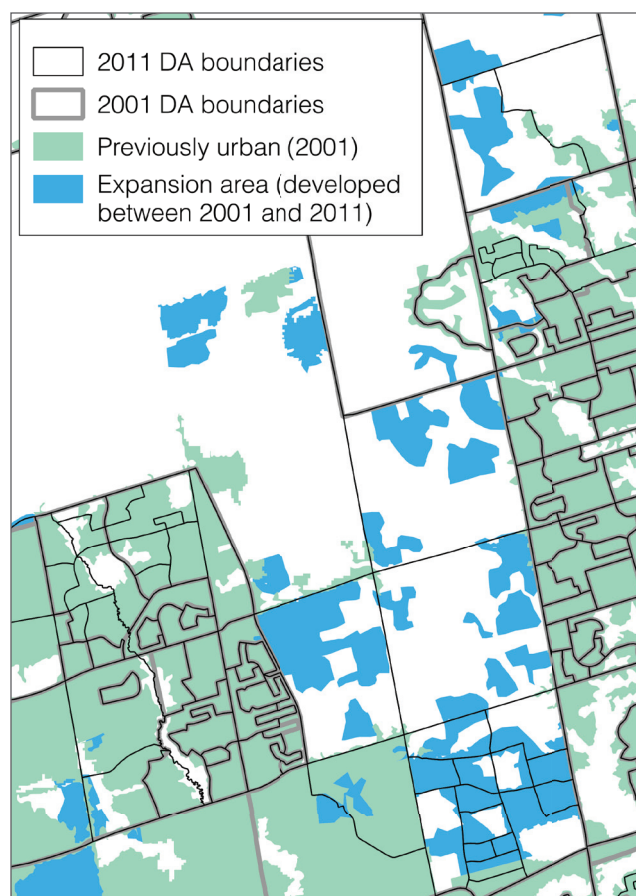
We used satellite imagery to map areas that were urbanized in 2001 and 2011. Urbanized areas are identified by the presence of hard surfaces (such as buildings or pavement), as found in residential, industrial, and commercial areas. They do not include large green spaces such as parks, golf courses, or rural areas containing farms.

Although we started with the 1991 and 2001 urban footprints, which had been mapped for the original Growing Cities report, we modified them to match our interest in capturing urban edge expansion so that we could identify greenfield development by removing rural hamlets from the data sets.

Satellite imagery was obtained from the United States Geological Survey (USGS), which takes regular satellite images of the earth at a resolution that allows us to differentiate urbanized areas from nonurban areas through colour spectral bands. Newly urbanized areas were identified visually. Where necessary, we confirmed urban classification through examining higher-resolution imagery from Google Earth.

In the original Growing Cities report, both footprints were created using a semi-automated process, which allows for a consistent and repeatable approach, but may include errors of classification. For this reason, we relied on manual visual identification and inspection using the satellite imagery in a GIS program. This approach allowed us to avoid the misclassification of areas that appear urbanized, but are actually not developed, for example, land cleared for construction, gravel pits, roads in rural areas, and trailer parks.

Once the 1991 and 2001 urban area data sets were finalized, we used the visual inspection method to identify urban expansion between 2001 and 2011.

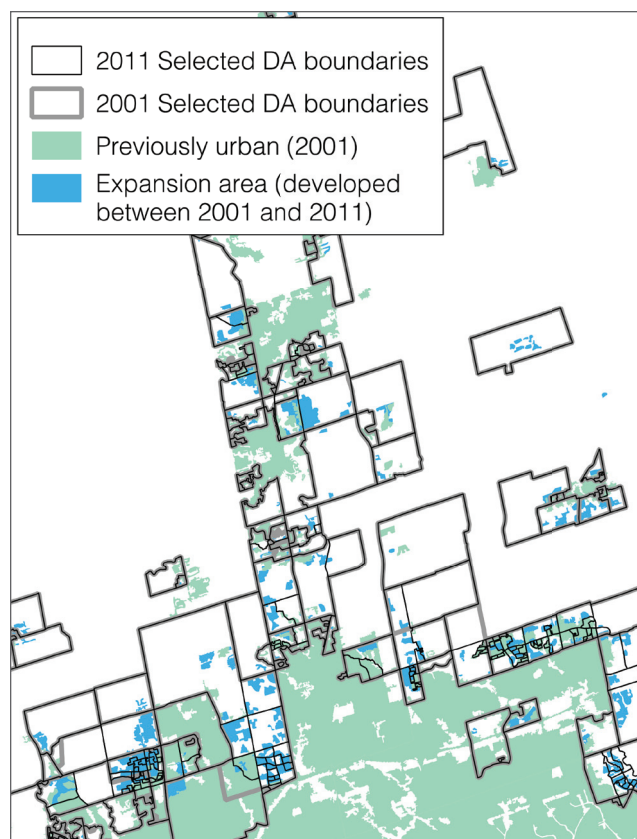


## STEP 2: OVERLAY CENSUS DATA

Once we had determined how the urban footprint had grown between 2001 and 2011, we used census data to track population and dwelling changes over this decade.

Using the smallest census areas available, called dissemination areas (DAs), we started by overlaying data from the 2001 Census. Then we added a layer of DAs from the 2011 Census and compared the boundaries of the two. In some cases, DAs had been added by splitting old DAs; this is common in areas of rapid growth, especially in urban edge areas where new dwellings have been constructed.

DA boundaries are chosen to capture approximately similar numbers of people in each area; therefore, large DAs typically contain lower-density development such as rural or industrial areas, while small DAs are found in high-density urban areas. Most DA boundaries in existing urban areas remained unchanged over the decade.



### STEP 3: RECONCILE GEOMETRIES IN THE EXPANSION AREA

The third step involves reconciling the census geography with the urbanized area geography. Urbanized area polygons have different shapes and boundaries from those of the dissemination areas (DAs), which in turn can change when their boundaries are redrawn between censuses. In this study, the area with the most complex geometric differences was the expansion area around the edge of the existing urban area.

We overlaid the 2001 and 2011 DAs on the 2011 urban expansion area to determine which dissemination areas overlapped with the 2011 urban expansion area. We selected all overlapping DAs. These two overlapping layers of census data would provide us with before-and-after numbers for population and dwelling units for the decade 2001 to 2011.

Subtracting the total population and dwellings in 2001 from the total in 2011 gave us the net difference in population and dwellings in the expansion area. In order for the calculation to be accurate, the area covered by the DAs need to be as closely matched as possible, given changes in DA area boundaries over time.

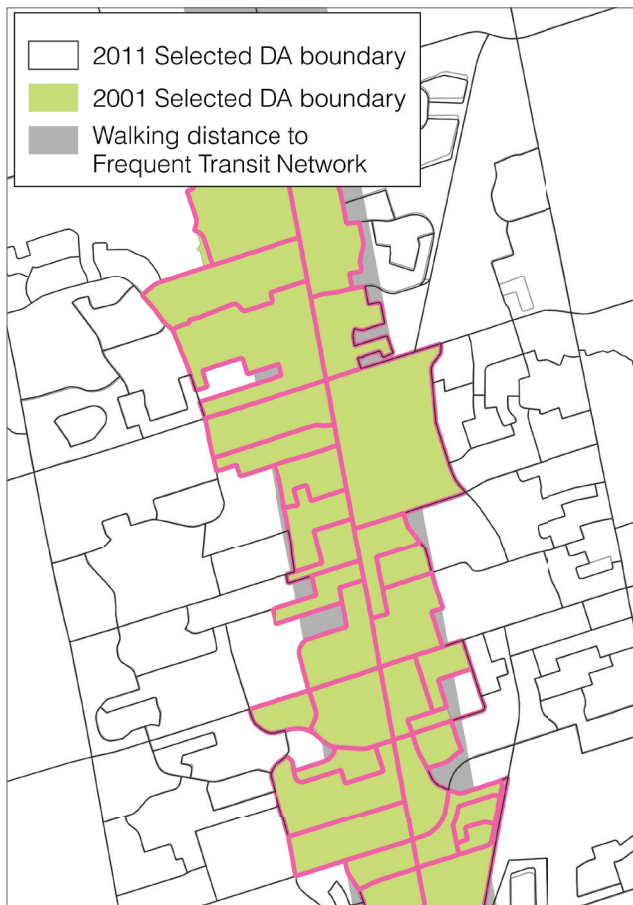
To reconcile these differences, we used an iterative process of adding and removing DAs from the selection to arrive at closely matched layers. In some cases we had to include parts of rural areas adjacent to the expansion areas that

had a few dwellings or population. Doing so helped us to match the geometries more closely. These selections were checked and double-checked repeatedly, by different people, to ensure the most accurate match possible.

In other cases, we needed to include areas along the edge of the 2001 urban area. Because we were subtracting existing 2001 populations and dwellings to arrive at net changes in population and dwellings, including these areas did not affect net population and dwelling counts for the expansion area, as we can assume that most new dwellings in the suburban edge areas would have occurred in greenfields. Previous Neptis studies have identified delayed greenfield development at the edge of the urban area whereby small pockets of undeveloped land at the edge were more accurately characterized as opportunities for greenfield development than intensification (Burchfield 2010).

The process of matching the two layers of DAs to represent the urban expansion area was complete when we had as close a match as possible and discrepancies were minimized.





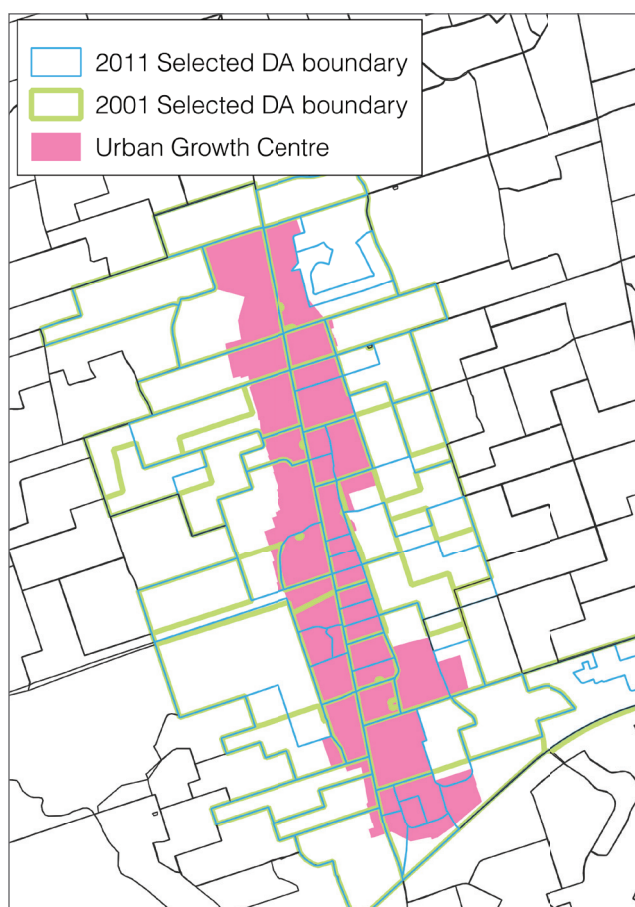
#### STEP 4: IDENTIFY AREAS WITHIN WALKING DISTANCE OF FREQUENT TRANSIT

We were also interested to find out how much growth was within walking distance of transit lines with frequent service. We defined walking distance as 500 metres to local bus or streetcar lines, or a 1-km radius of GO and subway stations. We included only routes that run frequently, every 15 minutes or less from 7 a.m. to 7 p.m. on weekdays. (GO train service does not yet fall within this frequency of service, but the Ontario government has plans to move to more frequent service.)

We identified census DAs the centre of which was within this walking distance, and labelled those DAs as being close to frequent transit (see Appendix 3 for DA selection for the FTN for each city-region).

We matched the geographies of the DAs over time using the same iterative process described in Step 3.



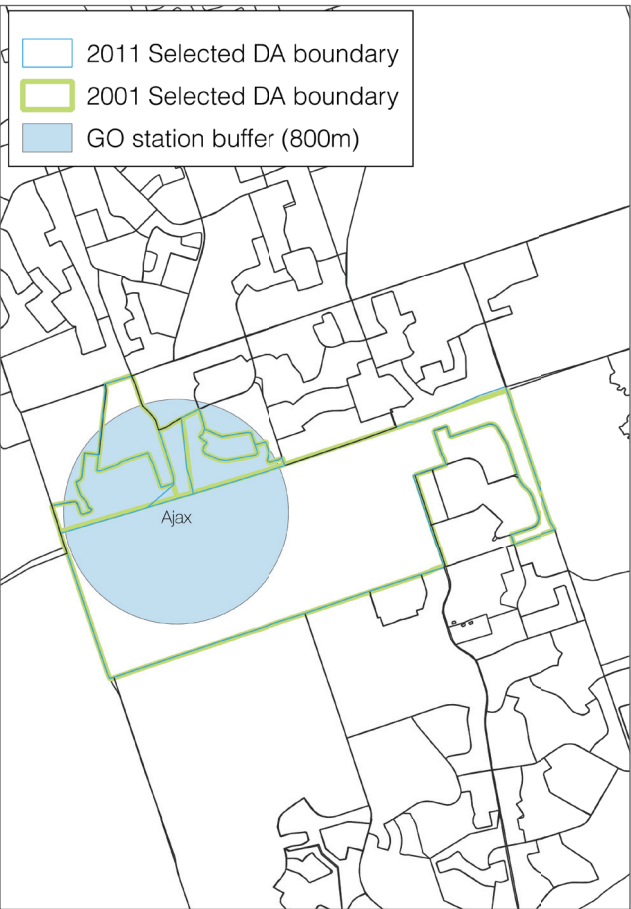


### STEP 5: IDENTIFY AREAS IN DESIGNATED URBAN GROWTH CENTRES

The *Growth Plan for the Greater Golden Horseshoe* identifies Urban Growth Centres (UGC)s as the focus of special intensification efforts in urban areas; Vancouver also has designated urban centres to focus development. We therefore identified which dissemination areas (DAs) overlapped with these centres. This step allowed us to calculate how much growth had taken place in these areas (see Appendix 3 for DA selection for UGCs for each city-region).

Some Urban Growth Centres had very complex boundaries, so we decided to include all the DAs that overlapped with UGC boundaries rather than just the ones with the centre inside the UGC as we did for the frequent transit network area.

The geographies of the DAs over time were matched using the iterative process described in Step 3. In Toronto, this sometimes meant that areas near the UGCs but not in them were included. In Vancouver, the urban centres' boundaries were close to DA boundaries, but the same iterative process was required to ensure consistency.



**STEP 6: IDENTIFY AREAS  
AROUND GO STATIONS**

Using an 800-metre radius, which is how Metrolinx defines its station areas, we selected the DAs the centres of which were within this area. In some cases, we extended the area to ensure the DA boundaries matched over time.

Large DAs are usually non-residential areas with few dwellings. DA boundaries are delineated by Statistics Canada to ensure a comparable number of people inside each boundary. Therefore large DAs in and around GO stations do not necessarily include many extra people.

The geographies of the dissemination areas over time were matched using the iterative process described in Step 3.

## STEP 7: EXTRACT THE DATA AND CALCULATE NET CHANGES IN POPULATION AND DWELLINGS OVER THE DECADE IN DIFFERENT AREAS

Once we had categorized each dissemination areas (DA) as being either inside the 2001 urban area or in the 2011 urban expansion, near transit or not, and overlapping an Urban Growth Centre or not, we imported the data into Excel spreadsheets and organized them using pivot tables.

The data are broken down by municipality, by location (in the expansion area or in an intensification area), and by proximity to transit or Urban Growth Centres. We can also break down the data by population, dwelling count, and dwelling type in four categories.

Using the numbers from the two censuses, we calculated the net changes in population and dwellings over time in different areas. To do this, we subtracted the total population and dwellings in 2001 from those in 2011 to arrive at the net difference.

This calculation showed how much growth occurred in the existing urban area compared with the expanded urban area, how much had occurred within walking distance of frequent and rapid transit, and how much in areas designated as Urban Growth Centres. We can also determine how much growth occurred in the metropolitan region as a whole, and within each municipality.

Additionally, the surface areas of the 2001 and 2011 urban footprints were extracted from the GIS software and organized using pivot tables. This step allowed us to calculate population and dwelling densities for subregional areas and the region as a whole.

All numbers in the report have been rounded to the nearest ten to avoid a false appearance of precision.

The spatial analysis methods have been peer-reviewed by academics and a representative from Statistics Canada.

# APPENDIX B: CHANGE BY LOWER-TIER MUNICIPALITIES, GTHA

**TABLE  
NO. B1**

>> APPENDIX B: CHANGE BY LOWER-TIER MUNICIPALITIES, GTHA >>

GREENFIELD GROWTH IN LOWER-TIER MUNICIPALITIES, GTHA

	DWELLINGS ADDED TO GREENFIELD AREA	PROPORTION OF ALL DWELLINGS ADDED IN UPPER-TIER MUNICIPAL- ITY (%)	% OF ALL GREENFIELD DWELLING GROWTH IN GTHA	POPULATION CHANGE IN GREENFIELD AREA	PROPORTION OF POPU- LATION GROWTH IN UPPER-TIER MUNICIPAL- ITY (%)	% OF GREENFIELD POPULATION IN GTHA	TOTAL URBAN EXPANSION (HECTARES)	PROPORTION OF URBAN EXPAN- SION IN UPPER-TIER MUNICIPAL- ITY (%)	% OF URBAN EXPANSION IN GTHA
<b>DURHAM REGION</b>									
AJAX	10,410	23	4	35,830	35	4	400	17	3
CLARINGTON	6,080	14	2	15,220	15	2	240	10	2
OSHAWA	6,460	14	3	18,620	18	2	350	7	2
PICKERING	1,150	3	<1	2,680	3	<1	110	4	1
SCUGOG	520	1	<1	1,470	1	<1	20	3	<1
UXBRIDGE	1,240	3	<1	3,080	3	<1	60	17	<1
WHITBY	10,290	23	4	33,040	33	4	380	10	3
<b>HALTON REGION</b>									
BURLINGTON	8,900	20	4	25,680	20	3	600	11	4
HALTON HILLS	3,300	7	1	10,440	8	1	200	14	1
MILTON	16,790	37	7	54,420	43	6	1,070	84	7
OAKVILLE	12,500	27	5	40,750	32	5	880	15	6
<b>CITY OF HAMILTON</b>									
HAMILTON	12,360	61	5	36,500	123	4	1,160	8	8
<b>PEEL REGION</b>									
BRAMPTON	49,990	48	20	200,440	65	23	3,130	32	21
CALEDON	2,060	2	1	7,190	2	1	240	19	2
MISSISSAUGA	23,310	23	9	86,140	28	10	1,670	8	11
<b>CITY OF TORONTO</b>									
TORONTO	7,570	5	3	25,540	19	3	300	1	2
<b>YORK REGION</b>									
AURORA	3,880	4	2	12,250	4	1	310	24	2
EAST GWILLIMBURY	930	1	<1	2,420	1	<1	70	10	<1
GEORGINA	1,630	2	1	4,810	2	1	70	4	<1
KING	60	<1	<1	120	<1	<1	130	32	1
MARKHAM	21,530	20	9	78,530	26	9	840	11	6
NEWMARKET	5,300	5	2	16,390	5	2	230	11	2
RICHMOND HILL	11,770	11	5	40,900	13	5	380	8	3
VAUGHAN	25,740	24	10	90,720	30	11	1,790	18	12
WHITCHURCH- STOUFFVILLE	5,400	5	2	14,720	5	2	340	61	2

TABLE  
NO. B2GROWTH THROUGH  
INTENSIFICATION  
IN LOWER-TIER  
MUNICIPALITIES, GTHA

	DWELLINGS ADDED TO INTENSIFICA- TION AREA	PROPORTION OF ALL DWELLINGS ADDED IN UPPER-TIER MUNICIPAL- ITY (%)	PROPORTION OF DWELL- INGS ADDED THROUGH INTENSIFI- CATION IN GTHA (%)	POPULATION CHANGE IN INTENSIFICA- TION AREA	PROPORTION OF POPU- LATION CHANGE IN UPPER-TIER MUNICIPAL- ITY (%)	% OF POPULATION CHANGE IN GTHA
<b>DURHAM REGION</b>						
AJAX	1,540	3	1	20	<1	<1
BROCK	120	<1	<1	-110	0	0
CLARINGTON	950	2	<1	40	<1	<1
OSHAWA	1,390	3	1	-8,420	0	0
PICKERING	1,610	4	1	-610	0	0
SCUGOG	-10	0	0	-370	0	0
UXBRIDGE	140	<1	<1	80	<1	<1
WHITBY	2,060	5	1	1,520	2	1
<b>HALTON REGION</b>						
BURLINGTON	1,900	4	1	-670	0	0
HALTON HILLS	610	1	<1	680	1	<1
MILTON	300	1	<1	-1,520	0	0
OAKVILLE	1,320	3	1	-3,210	0	0
<b>CITY OF HAMILTON</b>						
HAMILTON	260	<1	<1	192	<1	<1
<b>PEEL REGION</b>						
BRAMPTON	5,920	6	3	-1,860	0	0
CALEDON	260	<1	<1	190	<1	<1
MISSISSAUGA	21,000	20	10	14,380	5	10
<b>CITY OF TORONTO</b>						
TORONTO	134,730	95	64	108,030	81	76
<b>YORK REGION</b>						
AURORA	800	1	<1	780	6	1
EAST Gwillimbury	170	<1	<1	-320	0	0
Georgina	600	1	<1	-210	0	0
KING	-310	0	0	-1,170	0	0
MARKHAM	10,080	10	5	14,690	16	10
NEWMARKET	1,090	1	1	-2,200	0	0
RICHMOND HILL	6,400	6	3	12,560	23	9
VAUGHAN	8,130	8	4	15,360	14	11
WHITCHURCH-STOUFFVILLE	300	<1	<1	540	3	<1

# APPENDIX C: DISSEMINATION AREA SELECTION FOR GROWTH NEAR FREQUENT TRANSIT NETWORK AND URBAN CENTRES

FIGURE  
NO. C1

FREQUENT TRANSIT  
NETWORK IN THE GTHA





FIGURE  
NO. C2

FREQUENT TRANSIT  
NETWORK IN METRO  
VANCOUVER

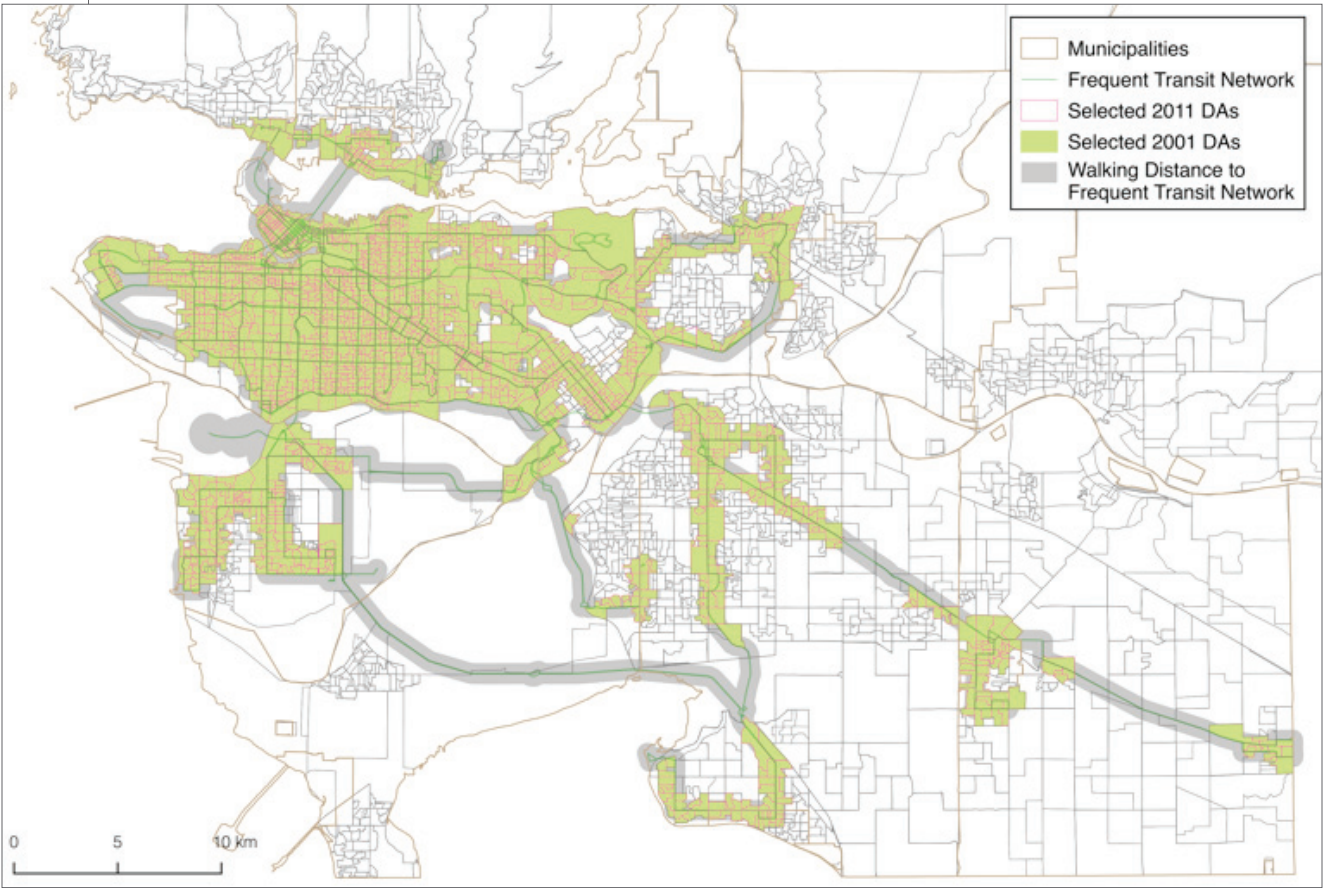


FIGURE  
NO. C3

URBAN GROWTH  
CENTRES IN THE GTHA



FIGURE  
NO. C4

URBAN CENTRES IN  
METRO VANCOUVER

