**Pamela Blais**

# The Growth Opportunity

## LEVERAGING NEW GROWTH TO MAXIMISE BENEFITS IN THE CENTRAL ONTARIO ZONE

**Issue Paper No. 5**

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THE ARCHITECTURE OF URBAN REGIONS

This is the fifth in a series of nine issue papers commissioned by the Neptis Foundation for consideration by the Central Ontario Smart Growth Panel established by the Government of Ontario.

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Describing growth as "a limited resource to be strategically deployed so as to create maximum benefit," Blais identifies locations in the Central Ontario Zone where growth could improve urban form, address social needs, improve livability, and reduce costs. A series of maps indicate areas to which growth could be directed: (1) areas of high social need, characterized by high levels of unemployment, lone-parent families, low educational attainment, low income, and government assistance; (2) areas in which increased density and a greater mix of land uses could support alternatives to automobile travel; (3) areas with low levels of traffic congestion and available capacity on transit lines and in schools. Areas in which several factors overlap would benefit in multiple ways from growth, and Blais recommends targeting growth to such areas.

*Pages 27-47 of this document are 11" x 17" maps, and may be downloaded as full-size format. If 8 1/2" x 11" format is preferred, then the option "Fit to page" must be selected within Adobe Reader.*

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Research for the series has been coordinated by Dr. Pamela Blais, of Metropole Consultants.

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## 1. Introduction

Growth of some three million new residents and two million jobs is anticipated in the Central Ontario Zone over the next thirty years. The sheer magnitude of this growth is both a testament and potential threat to the region's success. Cities and regions that are not experiencing growth will have a much more difficult time in making improvements to their quality of life. There is the opportunity – if not an imperative - to ensure that this growth improves the quality of life in the Zone.

**There is the opportunity – if not an imperative - to ensure that growth improves the quality of life in the Zone.**

How can this growth be used to improve the quality of life in the Central Ontario Zone? This opportunity will be realised when the positive opportunities associated with new growth are recognised and actively, deliberately, strategically pursued. This in turn requires treating growth as a limited resource to be strategically deployed so as to create maximum benefit. Not only will this approach provide the best chance of improving quality of life in the Zone, but it can help to improve the region's competitive advantage over other North American urban regions.

Growth provides the opportunity to bring about positive change. In particular, new growth provides opportunities:

**Growth must be treated as a limited resource to be strategically deployed so as to create maximum benefit.**

- To improve the performance of the urban form. It is well known by now that urban form shapes a number of important outcomes and conditions in the region, such as the amount of daily travel by car, the proportion of trips taken by transit and the cost of hard infrastructure such as roads, water and wastewater networks.
- To contribute to addressing areas of social need within the region, by improving the physical environment of areas in need for example.
- To make the region more efficient, and therefore more competitive. By reducing direct infrastructure costs associated with growth, this money can be reinvested in more productivity-or competitiveness-enhancing activities – or simply returned to the taxpayer or homebuyer.
- To improve livability and reduce indirect costs. Many of the factors mentioned above affect our daily lives. For example, the amount travelled by car affects how much free time we have, as well as the amount of emissions, which affect air quality.

This report presents a geographical analysis of some of the key indicators related to these considerations – relating to socio-economic factors, urban form, and existing infrastructure capacities.

**This report presents a geographical analysis of some of the key indicators related to socio-economic factors, urban form, and existing infrastructure capacities.**

The focus of this report is on the already-urbanised areas of the Zone, not on those areas that will be urbanised in the coming years, or on the form of development in those areas. In other words, this report is focussed on reurbanisation – adding new residential, employment and other uses to the already built-up portion of the Zone.

Reurbanisation has certain inherent benefits – by definition, it deflects new growth away from greenfields lands. In the case of the GTA, in which the urban fringe is largely comprised of prime agricultural lands, this helps to reduce pressure for development of the prime lands, or other environmentally sensitive areas.

**The focus of this report is on the already-urbanised areas of the Zone.**

This report goes further, to ask – where within the already-urbanised parts of the zone could new growth be directed to achieve the greatest positive impacts?

**Where within the already-urbanised parts of the zone could new growth be directed to achieve the greatest positive impacts?**

While the focus of this report is on reurbanisation, it is recognised that not all growth anticipated over the coming decades can be accommodated within the existing urbanised area. What is assumed, however, is that with a proper strategic focus and strong implementation, a much greater proportion of new growth can be accommodated within the existing urban envelope than is the case today. There is a vast supply of under-utilised land across the zone that can be taken advantage of, if the proper conditions are put in place to do so. This includes not only the large redevelopment areas, such as Downsview, but also the myriad smaller-scale opportunities that exist across the region, on main streets, former gas stations or industrial lands, low density retail strips, surface parking lots and the like.

**A much greater proportion of new growth can be accommodated within the existing urban envelope than is the case today.**

Most recent data for the GTA shows for example, that as of 2001, there were about 260,000 residential units in the development approvals process in the GTA [1]. Across the GTA, about 15% of these were slated to be developed on already-urbanised lands. However, the City of Toronto accounted for 81% of these units on reurbanised land. In the four regions surrounding the City, only

**Across the GTA, about 15% of new units are currently slated to be built on already-urbanised land, compared to only 3% in the four outer regions of the GTA.**

**1.** Source: Canada Mortgage and Housing Corporation and the Ontario Ministry of Municipal Affairs and Housing, The 2001 GTA Residential Land Inventory Survey. This data is only available for the GTA. Units include those in draft approved development plans and additional supply (i.e. lands under application but not yet draft approved).

3% of upcoming units will be built on already-urbanised land.
As the region matures, and the existing urbanised area continues to change, there will be many more opportunities for reurbanisation in areas outside the City of Toronto in the GTA. The Region of Peel, for example, has virtually no residential growth on already-urbanised land in the planning approvals process as of 2001. Given that the City of Mississuaga is now almost completely urbanised, and with many already mature areas, and the City of Brampton significantly urbanised, it can be expected that redevelopment opportunities will emerge in these cities in the coming years. There are also, of course, many opportunities for reurbanisation in surrounding cities and towns, such as Hamilton or St. Catherines.

This report focuses on opportunities for new growth, and identifying areas to which new growth could be directed to achieve positive benefits of various kinds. It should be noted that for a more complete geographical picture, this analysis should be complemented with identification of the areas where significant constraints exist, and which should be protected from new growth. This might include prime farmland, environmentally sensitive areas, green corridors or other open space of local and regional significance.

Section 2 of this report presents the maps illustrating social needs; Section 3 discusses urban form characteristics and Section 4 presents analysis of existing capacities across the Zone. Overall conclusions and implications are presented in Section 5. The maps are presented following Section 5. Detailed notes on the methodology used to create and map each measure are presented in Appendix A.

*Notes on reading the maps:*

1. With the exception of the schools capacity map (Figure 4.5), the other non-composite maps present data shown by either census tracts, enumeration areas or traffic zones. As a general rule, these units represent larger geographical areas as they get further away from the cores of urban centres. A highlighted area indicates a census tract, enumeration area or traffic zone that is at a higher or lower end of the distribution – a larger geographic area does not necessarily represent a higher number of cases. For example, on the High Unemployment map (Figure 2.1), a census tract barely larger than a dot in Toronto may actually represent more unemployed individuals than a much larger enumeration area in the north-eastern quadrant of the zone where, while the land area is larger, the total population is much

lower. The Reference Map (Figure 1.1) illustrates the size differences of census tracts and enumeration areas across the Zone.

2. In some cases data is not available across the entire Zone. The inset maps in the top-right corner of each map page show the areas for which data is available for that particular indicator.

3. The Reference map also shows the extent of the urbanised area and the difference between the Central Ontario Smart Growth Zone and IBI's "Business-as-Usual" study area [2]. The Business-as-Usual study was the basis for some of the data presented, with respect to transportation capacities.

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## 2. Identifying areas of social need

**While not providing a solution to social problems, directing growth to areas with higher social needs can make a positive contribution.**

While obviously not providing a solution to social problems, directing growth to areas with higher social needs can make a positive contribution. Undertaken sensitively and strategically, new growth can help to:

- improve the quality of the local physical environment
- introduce new services (such as retail or personal services)
- bring jobs closer to local residents, and
- realise improvements to public infrastructure, such as community centres or better public transportation.

In other words, a Smart Growth strategy can play a role in addressing areas of social need.

A range of key social indicators was used to identify areas of social need in the Central Zone, as shown in Figures 2.1 through 2.5. In particular, these maps show the areas in which incidence of these indicators has been found to be significantly higher than the average values observed across the Zone [3]. While the indicators are inter-related, each tells a slightly different story and contributes to a sharper picture of the Zone's areas of need.

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**2.** Toronto-Related Region Futures Study, Draft Interim Report: Implications of Business-as-Usual Development, prepared for the Neptis Foundation by IBI Group in association with Dillon Consulting Ltd., June, 2002.

**3.** For details on the methodology used, see Appendix A.

### *High Incidence of Unemployment*

As shown on Figure 2.1, many older urban areas in the Zone display a high incidence of unemployment, including Toronto, Hamilton, Oshawa and Niagara Falls. But unemployment is not limited to cities. Rural areas closer to the Zone's borders, such as Haliburton, Simcoe and Kawartha Lakes also exhibit above average levels of unemployment. Notably spared is the entire Greater Toronto Area outside of Toronto and Oshawa.

### *High Incidence of Lone-Parent Families*

As shown on Figure 2.2, areas demonstrating a relatively high incidence of lone-parent families occur primarily in the Zone's urban areas. There are concentrations in the City of Toronto, particularly in the east, west, and south areas of the City. Other areas demonstrating relative concentrations include Hamilton, St. Catherines, Niagara Falls and Oshawa. Some sporadic cases also occur in the Zone's rural areas, such as Haliburton, Kawartha Lakes and Simcoe County.

### *High Incidence of Low Educational Attainment*

Low educational attainment is observed in many of the same areas as the previous indicators (Figure 2.3). However, some additional areas display high concentrations, such as the areas in Waterloo and Wellington, and in the City of Vaughan. In the City of Toronto, instances of concentrations are confined mostly to the western and southern portions of the city.

### *High Incidence of Low Income*

Figure 2.4 shows areas with high incidence of low income, based on Statistics Canada's Low Income Cut Off (LICO). Like the previous indicators, low-income areas tend to be found in the older urban centres, such as Toronto, Hamilton, Oshawa and Niagara.

### *High Government Assistance to Households*

This measure reflects the percentage of the combined income of all households

**4.** Defined by Statistics Canada in the 1996 Census Dictionary, Cat. No. 92-351-UIE: Refers to total income from all transfer payments received from federal, provincial or municipal governments during calendar year 1995.

within a census tract attributed to government transfers [4]. Included is income from: Old Age Security pension and Guaranteed Income Supplement, benefits from Canada or Quebec Pension Plan, benefits from Unemployment Insurance, federal Child Tax benefits, and other income from government sources.

Again, areas in the more mature urban centres are especially dependent on government transfers. As with the measure of educational attainment, however, Scarborough does not appear, as it does for some of the other social indicators.

***Areas of Social Need***

The composite maps show areas in which several indicators of social need are present. Figure 2.6.1 is based on a composite of the five preceding indicators. The area covered in the map is the census tract study area, which represents the area for which we have data for all of the five indicators.

**The areas of concern are primarily a U-shaped area within the City of Toronto; older parts of Hamilton and Oshawa; smaller centres such as Kitchener/Waterloo or St. Catherines; and rural areas, including parts of Haliburton, Kawartha Lakes, the Georgian Bay shoreline, Waterloo and Wellington.**

Figure 2.6.2 presents a composite of the three social indicators for which we have data across the entire Zone.

Within the urban areas of the Zone, both composite maps suggest the same pattern of social need. The areas of concern are primarily a U-shaped area within the City of Toronto, as well as the older parts of Hamilton and Oshawa, and smaller centres such as Kitchener/Waterloo, St. Catherines, Niagara Falls, Brantford and Orillia. Rural areas also show concentrations of social need, as indicated on Figure 2.6.1, including parts of Haliburton, Kawartha Lakes, the Georgian Bay shoreline, Waterloo and Wellington.

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**3. Urban form**

The form and structure of an urbanised area (including its density, the degree to which residential and employment uses are mixed, and the presence or absence of centres) has important impacts on the quality of life and competitiveness of the Zone.

**In the outer suburbs daily distances travelled are over three times greater than in the core of the region.**

Urban form has a clear relationship with daily distances travelled, especially by car (see Table 1). In the outer suburbs daily distances travelled are over three times greater than in the core of the region. This is because lower densities mean that on average, origins (say a home) and destinations (say a place of work or shopping) are simply farther apart.

**Distances travelled have important implications for the demand for road infrastructure.**

Distances travelled have important implications for the demand for road infrastructure. Not only is more length of road required to serve the longer distances in low density areas, but more lanes and capacity are also required. This is because longer average trips mean that travellers tend to spend more time on the road per trip, in turn meaning that there are more cars on the road at any one time. Indeed, the amount of lane-kilometres per capita is indeed much higher in low density areas. Research has shown for example, that in the core of Toronto, there are 1.7 metres of road per person, compared to 3.6 in the inner suburbs, and 5.5 in the outer suburbs [5]. Thus greater demand for travel translates into increased infrastructure costs.

**Greater demand for travel translates into increased infrastructure costs.**

Because of increased distances, other modes of travel are also less viable in low density, single use areas, such as transit, walking and cycling. Urban form has a clear relationship with the propensity to take transit (see Table 1). This has to do in part with the available supply of transit services - it is much harder to make transit economically viable in areas with lower density development, and to provide the high levels of transit service that attract riders.

**Table 1: Travel characteristics by urban zone, Toronto area, 1996**

| Area | Percentage of households with no car | Daily km per person by car | Daily km per person by transit | % daily trips by transit walking or or cycling |
|---|---|---|---|---|
| Core | 51.9 | 6.8 | 3.6 | 60 |
| Core Ring | 31.5 | 10.2 | 3.9 | 37 |
| Inner Suburbs | 17.4 | 13.4 | 4.0 | 24 |
| Outer Suburbs | 5.8 | 23.2 | 2.5 | 12 |

Source: Data from the Transportation Tomorrow Survey, 1996, prepared by the Centre for Sustainable Transportation.

Both of the above factors (distance travelled and mode of travel) naturally affect the amount of emissions related to passenger travel. Emissions are directly related to amount travelled – the more kilometres travelled by car, the greater the amount of pollutants emitted into the air. Walking and cycling are much more viable in denser, mixed use environments. These zero emission modes can

**5.** Urban Travel and Sustainable Development The Canadian Experience, prepared for the Canada Mortgage and Housing Corporation by IBI Group, 1993.

and do account for a substantial share of trips in denser, mixed use areas – representing one-third of all trips in the core of Toronto, for example.

Directing new growth to compact, mixed use areas can help to reduce car travel and support increased transit ridership.

**Directing new growth to compact, mixed use areas can help to reduce car travel and support increased transit ridership.**

There are also urban areas within the Zone that at present are not mixed-use or whose densities are not particularly efficient. These areas could benefit from an improved mix of uses and more effective density levels. This structural retrofitting can be achieved by strategically directing some of the anticipated growth in the Zone to those areas.

Directing new growth to these areas can also improve the level of amenities, services and shops accessible to residents. It can help to diversify the local housing stock, and provide, for example, apartment or condominium options for older households who wish to downsize but remain in their neighbourhoods, or provide opportunities for first-time homebuyers to stay in their communities.

***Walk-to-Work Areas***

Figure 3.1 shows those areas with relatively high incidence of walking to work. Areas where walking to work is possible tend to be mixed use (i.e. they must contain the residence and place of work in close proximity – walking distance), and higher density. As a rule, these tend to be the older, pre- and early post-war urban areas within the Zone. This is confirmed by Figure 3.1, which shows the central areas of mature cities such as Niagara Falls, St. Catherines, Hamilton, Oakville, Kitchener-Waterloo, Guelph and Toronto having a relatively high incidence of walking to work. Inner and outer suburban areas (with the exception of the North York City Centre and York University areas) do not exhibit high incidence of walking to work [6].

The areas identified on the map are areas in which the introduction of new residential and/or employment-related development can result in lower than average demand for auto travel and support existing transit routes, amongst other benefits.

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**6.** In fact, the North York City Centre provides a good example of how urban retrofitting works. While capitalising on the embedded subway infrastructure, new development resulted in higher levels of walking to work, diversification of the local housing stock, and brought new services and amenities to the area.

### *Single Use Areas*

**Anticipated growth provides the opportunity to improve the performance of large areas that are relatively single-use in nature, or have densities that are close to being efficient.**

The walk-to-work areas are areas that are already performing well – in terms of providing a mix of employment and residential uses, efficient densities, and reduced auto travel. Other areas are lacking some of these qualities. However, anticipated growth in the Zone provides the opportunity to improve the performance of large areas that are relatively single-use in nature, or have densities that are close to being efficient (in terms of supporting economically viable transit, for example).

Figure 3.2 highlights "single use areas", that is, areas that are predominantly residential (shown in green) or predominantly employment-oriented (shown in brown). Other areas (shown in yellow) exhibit a reasonable mix of jobs and residents.

**The predominantly single use areas tend to represent newer development.**

The map indicates that many areas have a mix of residential and employment uses. The predominantly single use areas tend to represent newer development, at or near the urban fringe across the urban portion of the Zone. Some of these single use areas are very large. Older pre- and early post-war areas tend to be more mixed. The single use areas could benefit the introduction of complementary uses: adding employment uses in primarily residential areas and residential development in areas currently dominated by employment uses. Main streets or large underutilised properties may provide opportunities for this kind of diversification. This could help to reduce commuting distances, as well as improve the range of services and amenities within single use areas.

**Single use areas could benefit from the introduction of complementary uses.**

### *Borderline Transit Supportive Density*

The cost-effectiveness of transit systems has been clearly linked with achieving certain minimum densities of development. Denser development delivers the critical mass of riders needed to make transit economically viable. Indeed, research has identified certain minimum density levels necessary to support various levels of transit service efficiently [7]. A minimum level of 4,000 persons

**7.** For example, see Berridge Lewinberg Greenberg Ltd., Guidelines for the Reurbanisation of Metropolitan Toronto, prepared for the Municipality of Metropolitan Toronto, 1991; IBI Group, Transit Supportive Land Use Planning Guidelines, Ontario MMAH/MTO, April, 1992; Pushkarev, Boris S. and Zupan, Jeffrey M. Public Transportation and Land Use Policy, Indiana University Press, Bloomington and London, 1977; Fischler R., Forme urbaine, développement métropolitain et mobilité des personnes (urban form, metropolitan development and personal mobility in the Montréal region) Report submitted to the Commission de Consultation sur l'Amélioration de la Mobilité entre Montréal et la Rive-Sud. Montréal: Ministère des Transports du Québec, 2002.

per square kilometre is often taken as a threshold for providing a basic level of transit service cost-effectively.

Figure 3.3 shows areas in which this threshold density has been reached (pale green) and where densities are just below this threshold (dark green).

Although the map shows that transit-supportive areas are mostly found in and around the City of Toronto, other areas such as parts of Brampton, Mississauga, the Highway 7 corridor, Hamilton and a number of smaller areas between Toronto and Oshawa are also highlighted.

Directing growth to the areas highlighted will help support the cost effectiveness of transit in these areas. By increasing the number of potential riders, it could also allow for improved levels of service, which in turn could attract still more riders. Where investments in new transit routes are contemplated, the map can help to indicate areas in which these new investments might be most successful.

**Directing growth to the areas highlighted will support the cost effectiveness of transit in these areas, and/or improved service.**

### *Urban Form Opportunity Areas*

Figure 3.4 overlays the three urban form indicators described above. The central areas of the City of Toronto, Niagara Falls, Hamilton, Kitchener-Waterloo and Guelph are primarily the walk-to-work areas. These areas already exhibit a mix of uses and compact development. Directing new growth to these areas would result in continued benefits, including lower levels of auto travel and emissions per household, and support for transit.

**The central areas of the City of Toronto, Niagara Falls, Hamilton, Kitchener-Waterloo and Guelph already exhibit a mix of uses and compact development. Directing new growth to these areas would result in continued benefits, including lower levels of auto travel and emissions, and support for transit.**

Outside of these cores, the remaining highlighted areas are primarily those that might deliver particular benefits if new growth were strategically directed to them. These are the areas of single-use and borderline transit-supportive density. Where the large circles are shown, both these conditions exist, suggesting areas where new growth of the right type (i.e residential development in employment areas and employment growth in residential areas) might deliver both mixed use and transit-supportive densities. Such areas tend to occur in pockets within the inner suburbs of the GTA, and Hamilton.

Retrofitting and improving these areas by adding complementary uses would simultaneously improve the job-housing mix in the area and add the density necessary to make transit a more viable proposition.

**Retrofitting and improving highlighted areas outside of these cores by adding complementary uses could improve jobs-housing mix, reduce travel distances, and make transit more viable.**

### 4. Areas with existing infrastructure capacities

**If new growth can be directed to areas with existing infrastucture capacities, then the cost of accommodating growth can be significantly lower than the greenfields alternative.**

As noted earlier, there are many areas within the already-urbanised portion of the Zone where excess infrastructure capacities of various kinds exist. If new growth can be directed to these areas to make use of these capacities, then the cost of accommodating this growth can be significantly lower than the greenfields alternative. For the purposes of this analysis, existing road, transit and school capacities have been analysed [8].

#### *Auto Travel: Low Delay by Area of Trip Origin*

Congestion delays deprive commuters of leisure, rest and family time. Congestion also costs the Central Zone's businesses billions of dollars every year as critical shipments and workers are delayed [9]. But not all areas within the Zone experience the same levels of traffic flow and delay. Some areas are relatively easily reached or travelled from, suggesting ability to handle new development. Travel to or from other areas can involve delays.

Figure 4.1 shows the areas from which drivers experience relatively low levels of delay. In other words, for a morning peak hour auto trip originating in a highlighted area, below-average delays can be expected. The average delay across the area studied was 0.23 minutes per kilometre. The areas highlighted demonstrated an average delay of 0.14 minutes per kilometre or less.

In general, road congestion appears to be much less severe outisde the GTA, e.g. in Hamilton, Niagara Region and smaller towns and cities. A large area subject to below-average congestion is found around Lester B. Pearson International Airport, including adjacent portions of Mississauga, Brampton and Vaughan. This may reflect the fact that relatively fewer trips originate from this area in the morning peak period, because it is primarily an employment area, such that those trips that do originate here do not tend to experience delays. A similar rationale explains why the downtown core of the City of Toronto is highlighted.

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**8.** An attempt was also made to also identify locations where existing capacities in the water and wastewater system resided. However, obtaining information at an appropriate level of geographic detail across the Zone was not possible within the scope of this project.

**9.** Over the period 1977-1986, it was estimated that the annual cost of congestion to businesses amounted to $1.9 billion, just in the Greater Toronto Area. These costs have obviously increased since then as the economy has grown faster than road capacity. See Toronto Board of Trade, A Strategy for Rail-Based Transit in the GTA, prepared in collaboration with the Toronto Atmospheric Fund, July 2001, p. 33

The outer zones and the fringe of the GTA tend – by virtue of being on the fringe – to have less through travel.

**A Smart Growth strategy could direct additional residential development to the areas highlighted on Figure 4.1, to allow development to take place without overtaxing existing road networks.**

In order to exploit these existing road capacities, and accommodate growth with minimal new infrastructure requirements, the Smart Growth strategy could direct additional residential development to the areas highlighted on the map. Locating additional homes in areas from which significant delays exist can allow development to take place without overtaxing existing road networks.

### *Auto Travel: Low Delay by Area of Trip Destination*

Figure 4.2 shows the areas to which drivers experience relatively low levels of delay. In other words, for a morning peak hour auto trip destined to a highlighted area, below-average delays can be expected [10].

**A Smart Growth strategy could direct additional employment development to the areas highlighted on Figure 4.2, to allow development to take place without overtaxing existing road networks.**

Travellers destined to Hamilton, Niagara Region and the fringe of the GTA experience relatively low delays during the morning peak period. Some of the smaller towns outside the GTA also have relatively low auto travel delays, such as Cambridge, Barrie or Peterborough.

Again, fringe areas do not tend to experience the volumes that the rest of the GTA does, by virtue primarily of being on the fringe. As the fringe expands outward, however, increased delays can be expected in these areas. Other areas are both outside the high demand areas of the GTA, and have lower levels of economic activity, which can also translate into reduced travel demand.

In order to exploit these existing road capacities, and accommodate growth with minimal new infrastructure requirements, the Smart Growth strategy could direct additional employment-related development to the areas highlighted on the map. Locating additional offices, stores or institutions in areas to which relatively low auto delays exist can allow development to take place without overtaxing existing road networks and minimising demand for new roads.

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**10.** The average of average delay across the area studied is the same 0.23 minutes per kilometre as for the origin areas analysis. The areas highlighted demonstrated an average delay of 0.14 minutes per kilometre or less.

### *Transit Capacity by Area of Trip Origin*

**Transit trips tend to occur in the same direction at the same time of day, with considerable counter-commuting capacity - a condition that represents underutilisation of an important and expensive resource**

Transit trips in the Zone, and the City of Toronto in particular (which accounts for the liion's share of all transit trips in the region), tend to be very uni-directional. This means that in the morning, the vast majority of trips on any route are in one direction, toward the location of jobs, while the counter-commuting direction on the same route might have significant capacities. This is particularly true with respect to travel by subway to the downtown core. Trains heading into the downtown in the morning peak period are overcrowded, while trains returning from the core northwards are often very sparsely used.

This condition represents underutilisation of an important and expensive resource. New growth can be strategically directed to take advantage of these existing capacities. This means being able to accommodate new growth in a setting that offers a high level of transit service at low to no cost.

In order to identify where these opportunities may exist, an analysis was undertaken to identify existing transit capacity in the Zone. Based on the assumption that excess transit capacity in the peak direction does not exist at present, only capacity in the counter-commuting direction was considered.

**Trip origin areas with transit capacity in the counter-commuting direction are found across the City of Toronto, extending into Mississauga, parts of York Region, and Pickering.**

The results of this analysis are presented on Figure 4.3. The areas (traffic zones) highlighted in green show areas of trip origin in which there is capacity of a minimum of 300 trips in the counter-commuting direction. Adding residential development to these locations can contribute to transit ridership that takes advantage of these capacities.

These areas are found across the City of Toronto but extending across its boundaries into Mississauga, parts of York Region, and Pickering. Areas not highlighted on this map either do not provide extensive transit services (and thus have no capacity) or have transit without significant additional capacity.

### *Transit Capacity by Area of Trip Destination*

**The transit capacity pattern is similar when looked at by place of trip destination. Outside the GTA, capacity can also be found in Kitchener-Waterloo and Guelph.**

Figure 4.4 shows areas with existing transit capacity in the counter-commuting direction, in this case by the area of trip destination. In other words, for transit travel in the counter-commuting direction to these areas, there is existing capacity of at least 300 trips per traffic zone.

While more fragmented than the origins map, the pattern is similar. Most high-

lighted areas are located in the City of Toronto, extending into Mississauga. Outside the GTA, capacity can also be found in Kitchener-Waterloo and Guelph.

Destination areas with significant transit capacity in the counter-commuting direction are appropriate locations for additional employment development. Although Hamilton and Niagara Region appear to have significant road capacity (Figures 4.1 and 4.2), they do not display transit capacity – either by area of origin or destination. Directing new growth to these areas will therefore not likely result in increased transit ridership in the absence of expanded transit service.

Where the areas highlighted in green on the transit capacity maps coincide with the areas shown on Figure 4.1 subject to longer road delays (i.e. the yellow areas on Figure 4.1), it suggests that there is capacity in the transit system currently to accommodate a switch to transit by drivers travelling in the counter-commuting direction.

### *School Capacity*

**School capacity exists in downtown and western Toronto, as well as some small towns and cities across the Zone.**

While dozens of new schools are being built in new suburban areas within the Zone, many schools in older urban areas have significant capacity, due to demographic changes such as aging of the resident population and a drop in the school-age population. Some schools operate with existing capacity available, while others are "mothballed" entirely – closed or leased to other users. Figure 4.5 shows vacant seats in schools with a minimum of 100 vacancies, in the Zone's open and mothballed schools [11].

Downtown and western Toronto show a large number of vacant school seats, while schools with spare capacity appear to be scarce in the rest of the GTA. Small towns and cities across the Zone also exhibit some spare capacity, including Hamilton, St. Catherines, Niagara Falls and Kitchener-Waterloo.

In newer communities dots outlined in red likely represent newly constructed schools about to open [12]. In more mature areas, schools outlined in red can in

**11.** A mothballed school is a school that has been closed by the school board but retained for potential future use.

**12.** Schools represented by dots outlined in red are those schools where the total capacity is the same as the number of vacant seats. This can imply either a mothballed school or a recently completed but not yet operating school. The data source does not allow us to differentiate the two types, but typically the former will be found in the older urban areas and the latter in newer suburban areas.

fact be mothballed, i.e. decommissioned, schools.

In new communities, the construction of a large number of new homes triggers the need to transport children over long distances at first and is ultimately followed by the construction of new local schools.

Directing new residential development to communities where school capacities currently exist can result in significant savings as the construction of new school buildings is avoided. As an illustration, the York Region District School Board alone is proposing to spend $350.1 million to build 24,900 school seats between 2002 and 2005, while it is estimated that the two Toronto school boards had 54,253 vacancies during the 2002-2003 school year [13].

**The York Region District School Board alone is to spend $350 million to build 25,000 school seats, while it is estimated that the two Toronto school boards had over 50,000 vacant places during the 2002-2003 school year.**

***Identifying areas with existing infrastructure capacity***

Figure 4.6 presents a composite of school vacancies, transit capacity by trip origin and areas with low auto travel delay by area of trip origin. It suggests existing school and transportation infrastructure capacities coexist in a few key areas in the Zone. Downtown Toronto, extending north and west, shows significant concentrations of these infrastructure capacities, as does the older part of Hamilton. Other, primarily transit or road capacities, exist throughout a significant part of the GTA. Other clusters of capacities exist in some of the towns around the GTA, including St. Catherines, Niagara Falls, Welland, Peterborough, and Kitchener-Waterloo.

**Figure 4.6 suggests areas to which new growth could be directed while incurring reduced infrastructure costs.**

The map suggests areas to which new growth could be directed while incurring reduced infrastructure costs, compared to accommodating new growth on greenfields lands. In the locations shown on Figure 4.6, existing school and transportation infrastructure can support additional growth. Figure 4.6 shows areas of transportation capacity by area of trip origin – suggesting potential for residential development [14]. A similar composite showing areas with transporta-

**13.** Total of (capacity-enrolment) for all schools. Overflow in schools over capacity was deducted from total (e.g. portables). Source: Ministry of Education, personal communication (capacities) and York Region 2002-2005 Capital Project List.

**14.** Because morning peak travel was analysed, the origins tend to be residential areas, and the destinations employment-oriented. In order to take advantage of the existing capacity, the right kind of development must be encouraged in the right place – residential in the places of origin with capacity, and employment-oriented development in the places of destination with capacity. There are some areas that have capacities as both origins and destinations – in these areas either residential or employment-oriented development would be able to capitalise on existing capacities.

tion capacity by trip destination would suggest areas appropriate for non-residential development.

In areas with significant spare capacity, new growth is able to take advantage of existing capacities in transportation and school systems and lead to reduced marginal infrastructure costs and increased travel by transit. In new communities, every new home, office, factory or store requires the construction of new infrastructure – schools, roads, transit facilities and equipment, water and wastewater systems, fire stations, community centres, etc. In fact, this situation is partially reflected in the differentials in development charges levied by each jurisdiction. In new communities, development charges are often many times higher than in mature municipalities, in an attempt to pay for the higher costs of providing new infrastructure.

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**5. Conclusions**

Each of the three composite maps presented above has been graphically simplified, and is presented in Figures 5.1, 5.2 and 5.3.

**Directing new growth to areas highlighted in Figure 5.1 can contribute to their socio-economic regeneration.**

Figure 5.1 highlights areas that show above average incidence of a range of socio-economic indicators – in other words, areas of particular social need. Directing new growth to these areas can contribute to the socio-economic regeneration of these areas, by improving the quality of the physical environment, or increasing the range of services or employment opportunities, for example. A Smart Growth strategy for the Central Ontario Zone may also include an explicit social component, which focuses more comprehensively on addressing socio-economic issues in these areas.

**Directing growth to areas highlighted on Figure 5.2 could improve their performance - making them more transit-supportive and mixed.**

Figure 5.2 shows areas with particular urban form conditions. The purple areas are those that already contain a mix of employment and residential uses, and are relatively dense. These are areas to which new growth could be directed to continue to support these attributes, resulting in lower than average car travel, higher incidence of walking, lower infrastructure costs, and other positive outcomes.

The pink areas, on the other hand, are those in which urban form suffers from either being single-use, or exhibits densities that are borderline transit-supportive. The performance of these areas could be improved, and these areas made more efficient, transit-supportive and mixed by directing new growth here. The

areas of darker pink show places in which this is particularly true – that is, areas that have both borderline densities and single uses. Directing growth to these areas will be especially beneficial, addressing both these issues at the same time.

Figure 5.3 shows areas within the Central Zone where there are existing infrastructure capacities – particularly with respect to transit [15], walk to work and school capacity. Most of the established, existing built-up areas of the GTA show some potential, particularly with respect to school capacity. Areas with particular concentrations of existing capacity, however, can be found in the older parts of the region (as shown by the darker colouring) – in the core of the City of Toronto, and in older outlying centres such as Kitchener-Waterloo, Guelph, or Hamilton.

**Areas with particular concentrations of existing capacity can be found in the core of the City of Toronto, and in older outlying centres such as Kitchener-Waterloo, Guelph, or Hamilton. These areas can accommodate new residential growth at low marginal costs.**

These areas can accommodate new residential growth at low marginal costs, particularly in comparison to greenfield locations, where the full range of new infrastructure must be provided from scratch [16]. Other benefits can also result, such as increased transit ridership on existing services, improved local services and amenities, a more diversified local housing stock, and reduced pressure for development on agricultural lands or natural areas. Naturally, new development in these areas would have to be proactively planned for on appropriate sites, and be compatible with existing development.

In places where there is overlap on the three summary maps, it suggests that new growth in these locations can accomplish a range of positive social, urban form and infrastructure cost minimisation benefits. These areas include: Niagara Falls, St. Catherines, Hamilton, Kitchener-Waterloo, Oshawa, and the core of the City of Toronto. There is therefore a strong rationale for directing growth to these locations, and for these places to play a key role in a Smart Growth strategy for the zone, and for appropriate implementing policies and practices to be put in place to see this happen.

**In places where there is overlap on the three summary maps, new growth can accomplish a range of positive social, urban form and infrastructure cost minimisation benefits. There is a strong rationale for directing growth to Niagara Falls, St. Catherines, Hamilton, Kitchener-Waterloo, Oshawa, and the core of the City of Toronto, and for these places to play a key role in a Smart Growth strategy.**

To a lesser extent there is overlap (of urban form and capacities) in a band stretching from Oakville through Toronto's inner suburbs. Strategically deployed, directing growth to these locations can also bring about significant benefits.

**13.** In the case of Map 5.3, for transit capacity in the counter-commuting direction, by area of origin and destination. See discussion of Maps 4.3, 4.4 and 4.6, above, for details.

**14.** A companion map showing areas of trip destination with capacity suggest locations appropriate for employment-oriented development – see discussion of Map 4.6, above.

In short, the summary maps identify places to which new growth can be directed in order to realise a range of benefits – in other words, in order to use the substantial new growth anticipated in the Central Zone in the smartest, most strategic way possible.

**If smart growth indeed means being smarter about growth, then "growth management" must be taken to the next level in the region.**

While in some respects we have not been doing badly in the region in managing growth, there is still much room for improvement. There are ways to be a lot smarter about growth and leverage it to its maximum potential benefit and competitive advantage.

If smart growth indeed means being smarter about growth, then "growth management" must be taken to the next level in the region. Greater attention needs to be paid to where the growth should go, and what kinds of growth should go where. Proactive strategies for retrofitting and accommodating growth in the already-urbanised areas are needed. It means being much more strategic about dealing with growth, treating it as the powerful resource that it can be if managed effectively and intelligently.

This inevitably means a change to the "business as usual" development patterns we have seen in the zone, and that will continue to emerge unless proactive measures are undertaken to create a smarter, more efficient development pattern. Truly smart growth can result in a more cost effective, environmentally sustainable and competitive region that can deliver tangible benefits to current and future residents of the Zone.

**This inevitably means a change to the "business as usual" development patterns we have seen in the Zone, and that will continue to emerge unless proactive measures are undertaken.**

**Acknowledgements**

This report could not have been prepared without the generous support of the Neptis Foundation. The expert mapping was undertaken by the Cartography Office at the University of Toronto, in particular Byron Moldofsky and Andrew Boan, with additional expertise provided by Marcy Burchfield of the Neptis Foundation.

## Appendix A: Notes on Data Sources and Methodology

### *Context*

Figure 1.1: Reference Map
Source: Statistics Canada, 1996 Census
This map shows the areas for which census tract and enumeration area data are available. It also shows the Central Zone boundaries, and the boundaries of the "Business-as-Usual" study area.
Other data sources: York Region--Geomatics Division, Ontario Ministry of Transportation, Natural Resources Canada.

### *Social Needs*

Figure 2.1: High Incidence of Unemployment
Source: Statistics Canada, 1996 Census
Unit of analysis: Census tracts where available, enumeration areas elsewhere
Measure: Percentage of unemployed individuals over the total labour force aged 15 years and over.
Methodology: The mean and standard deviation were calculated for the Zone. Mean: 9.2%, standard deviation: 4%. All census tracts and enumeration areas where the percentage described above exceeded 13.2% - one standard deviation above the mean - were highlighted.

Figure 2.2: High Incidence of Lone-Parent Families
Source: Statistics Canada, 1996 Census
Unit of analysis: Census tracts where available, enumeration areas elsewhere
Measure: Percentage of families headed by one parent over the total number of families.
Methodology: The mean and standard deviation were calculated for the Zone. Mean 15.4%, standard deviation: 6.8%. All census tracts and enumeration areas where the percentage described above exceeded 22.2% - one standard deviation above the mean - were highlighted.

Figure 2.3: High Incidence of Low Educational Attainment
Source: Statistics Canada, 1996 Census
Unit of analysis: Census tracts where available, enumeration areas elsewhere
Measure: Individuals with less than a Grade 9 education as a percentage of the total population aged 15 years and over
Methodology: The mean and standard deviation were calculated for the Zone. Mean: 10.2 %, standard deviation: 6.7%. All census tracts where the percentage described above exceeded 17.0% - one standard deviation above the mean - were highlighted.

Figure 2.4: High Incidence of Low Income
Source: Statistics Canada, 1996 Census
Unit of analysis: Census tracts (data not available at the enumeration area level).
Measure: Low-income families as a percentage of the total number of census families. Statistics Canada's "Low Income Cut-Off" is used to determine belonging to the low-income group. For more information on Low Income Cut-off: http://www.statcan.ca/english/Pgdb/deffamil60b.htm
Methodology: The mean and standard deviation were calculated for the Region covered by census tracts. Mean: 19.3%, standard deviation: 12.2%.
All census tracts where the percentage described above exceeded 31.5% - one standard deviation above the mean - were highlighted.

Figure 2.5: High Government Assistance to Households
Source: Statistics Canada, 1996 Census
Unit of analysis: Census tracts (data not available at the enumeration area level).
Measure: Percentage of combined family incomes in the census tract provided by government transfers.

"Government Transfer Payments: refers to total income from all transfer payments received from federal, provincial or municipal governments during calendar year 1995. This variable is derived by summing the amounts reported in:
- The Old Age Security pension and Guaranteed Income Supplement;
- Benefits from Canada or Quebec Pension Plan;
- Benefits from Unemployment Insurance; federal Child Tax benefits;
- Other income from government sources." (Statistics Canada "1996 Census Dictionary).
1996 Census Variable: "Income: Government Transfer Payments"
Methodology: The mean and standard deviation were calculated for that part of the Zone covered by census tracts. Mean: 13.0%, standard deviation: 6.4%. All census tracts where the percentage of total income in the census tract provided by governments exceeded 19.4% - one standard deviation above the mean - were highlighted.

Figure 2.6.1: Composite Map: Areas of Social Need (5 Indicators)
The five-indicator social needs composite map is composed of the following indicators:
- High Incidence of Unemployment
- High Incidence of Low Income
- High Government Assistance to Households
- High Incidence of Lone-Parent Families
- High Incidence of Low Educational Attainment
Methodology: The five-indicator social needs map was produced using the census tract unit of geography. The census tract unit of geography is only available for urbanised areas (corresponding with Statistics Canada's definition of census metropolitan areas and census agglomerations), and as a result applies to only a subset of the entire Zone. An overlay procedure was performed using each indicator to produce a five-value composite index. In each census tract, a dot of varying size and colour shows the number of measures occurring in a given census unit.

Figure 2.6.2: Composite Map: Areas of Social Need (3 Indicators)
The three-indicator social needs composite map is composed of the following indicators:
- High Incidence of Unemployment
- High Incidence of Lone-Parent Families
- High Incidence of Low Educational Attainment
Methodology: The three-indicator social needs map uses an overlay procedure similar to the five-indicator map, but uses a combination of both census tract and enumeration area units. Combining the two units of geography allows the entire Zone to be included in the analysis. A dot of varying size and colour shows the number of measures occurring in a given census tract or enumeration area.

***Urban Form***

Figure 3.1: Walk to Work Areas
Source: Statistics Canada, 1996 Census
Unit of analysis: Census tracts
Measure: Percentage of people in the labour force aged 15 years or older who walk to work. People who work at home or live and work on the same farm are not included.
Methodology: The mean and standard deviation were calculated for the that part of the Zone covered by census tracts. Mean: 5.4%, standard deviation: 6.2%.
All census tracts and enumeration areas where the ratio described above exceeded 11.5% - one standard deviation above the mean - were highlighted.

Figure 3.2: Single Use Areas
Source: IBI Group, 2000
Unit of analysis: Traffic zones
Measure: Ratio of jobs to population and ratio of population to jobs.
Methodology: All traffic zones in which the ratio of employment to population exceeds 2.5 to 1 were highlighted.

All traffic zones in which the ratio of population to employment exceeds 10 to 1 were highlighted as well. (This measure did not exhibit a normal distribution, so the standard deviation method used elsewhere could not be applied here.)

Figure 3.3: Borderline Transit Supportive Density
Source: Statistics Canada, 1996 Census
Unit of analysis: Census tracts
Measure: Density – census tract population divided by the census tract area.
Methodology: The density necessary to support an efficient and regular bus-based transit service was assumed to be approximately 4,000 people per square kilometre, or 40 people per hectare. Such areas were highlighted in light green.
A density between 3,000 and 4,000 people per square kilometre was assumed to border on supporting an efficient and regular bus-based transit service. Such areas were also highlighted, but in dark green.

Figure 3.4: Composite: Urban Form Opportunity Areas
The urban form composite map uses colour and graduated circles to show occurrences of one or more urban form measures for the urbanised area within the Zone:
- walk-to-work areas
- borderline transit supportive density
- single-use areas
Methodology: The urban form opportunity areas map was produced using census tract and traffic zone units of geography. The area of analysis was limited to the 2000 urbanised area. An overlay procedure was performed using each indicator to produce a three-value composite index. The overlay procedure resulted in a number of sliver polygons being generated because the units of geography were not the same shape, or in some cases did not coincide. This was corrected by removing sliver polygons (based upon their area) during post-processing. A dot of varying size and colour shows the number of measures occurring in a given census tract / traffic zone area.

***Capacities***

Figure 4.1: Auto Travel: Low Delay by Area of Origin
Source: IBI Group, 2000
Unit of analysis: Traffic zones.
Measure: Average delay per kilometre for traffic zones from which trips originate, morning peak period. "The delay per km was calculated as the difference between the free and the congested travel times, divided by the average travel distance, weighted by the number of trips for each origin-destination pair. Then the average delay was calculated for trips originating from and trips destined to each zone. These two resulting vectors were plotted using thematic maps of MapInfo. [...] It should be noted that this average delay is an average for trips to/from all other zones and therefore may not reflect congestion occurring in the peak direction for some destinations. For example, a zone located at Highway 404 and Major Mackenzie showing available capacity for trips originating there may have no additional capacity available for southbound trips in the AM peak but considerable capacity available for trips in other directions."
Methodology: Traffic zones from which delay exceeded 0.14 minutes per kilometre were highlighted.

Figure 4.2: Auto Travel: Low Delay by Area of Destination
Source: IBI Group, 2000
Unit of analysis: Traffic zones.
Measure: Average delay per kilometre for traffic zones from which trips originate, morning peak period. See Auto Travel: Low Delay Origin Areas for details.
Methodology: Traffic zones to which delay exceeded 0.14 minutes per kilometre were highlighted.
Figure 4.3: Transit Capacity Origin Areas
Source: IBI Group, 2000
Unit of analysis: Traffic Zones.
Measure: Transit capacity in the counter-commuting direction by place of trip origin. "In order to calculate the

available transit capacity, it was assumed that the transit system is operating at full capacity in the peak direction and that the transit system provides the same level of service in the off peak direction. Therefore, the difference between the number of transit trips travelling in the peak direction and the number of trips travelling in the off-peak direction is the available capacity. A sum of these trips was calculated for trips originating in each zone and for trips destined to each zone, respectively. These two resulting vectors were plotted using thematic maps of MapInfo. It should be noted that for some routes, the bus schedule is such that there are fewer buses in the off peak direction. Nevertheless, it is possible to adjust the schedule to provide the same level of service in both directions with a minimal increase in the number of buses required, and the analysis assumed this."
Methodology: Traffic zones from which over 300 transit trips were available in the counter-commuting direction during the morning peak period were highlighted.

Figure 4.4: Transit Capacity Destination Areas
Source: IBI Group 2000
Unit of analysis: Traffic Zones.
Measure: Transit capacity in the counter-commuting direction by place of trip destination. See Transit Capacity Origin Areas for details.
Methodology: Traffic zones to which over 300 transit trips were available in the counter-commuting direction during the morning peak period were highlighted.

Figure 4.5: Spare Capacity in Schools
Source: Ontario Ministry of Education, 2002
Unit of analysis: Individual schools
Measure: Vacancies in schools.
Methodology: The vacancy measure was obtained by subtracting the current enrolment from the school's capacity. It should be noted that some schools showing significant capacity may be "mothballed" - that is decommissioned but not demolished - or alternatively, newly completed schools that are not yet open to students.

Figure 4.6: Composite: Areas with Capacity
The capacity composite map is composed of the following indicators:
- spare capacity in schools (over 300 spaces total, from any of the 4 categories of school)
- transit capacity by trip origin
- auto travel - low delay origin areas
Methodology: The capacity map was produced using the traffic zone unit of geography. The area of analysis was limited to the 2000 urbanised area. The point data representing spare capacity in schools was integrated with the traffic zone unit of geography using the following methodology:
(1) Thiessen polygons were generated for each of the four school categories (Elementary Catholic, Elementary Public, Secondary Catholic, Secondary Public).
(2) Thiessen polygons were clipped to the urbanised area boundary.
(3) Density measures were calculated for seat vacancies for each of the four school categories for urbanised areas (seat vacancies / area = vacancy density).
(4) A union operation was performed between each of the four school categories and the transportation zones.
(5) Seat vacancies were apportioned to a new geography (Thiessen polygons for each school category and transportation zone) by multiplying density values by area (vacancy density * area = vacancy number).
(6) Polygons were dissolved based upon traffic zone ID, and then vacancy numbers were tabulated.
(7) Each of the four school categories were added together to create a composite map of school vacancies.
(8) The Traffic Zone polygons were then symbolised using dots of varying size and colour to show the composite index.

Summary Maps

Figures 5.1, 5.2 and 5.3 are more simple graphic representations of the composite maps described above. Figure 5.1 is based both on the five indicator and three indicator composite maps. Figure 5.3 includes walk to work areas, transit capacity by area of trip destination, and school capacity.

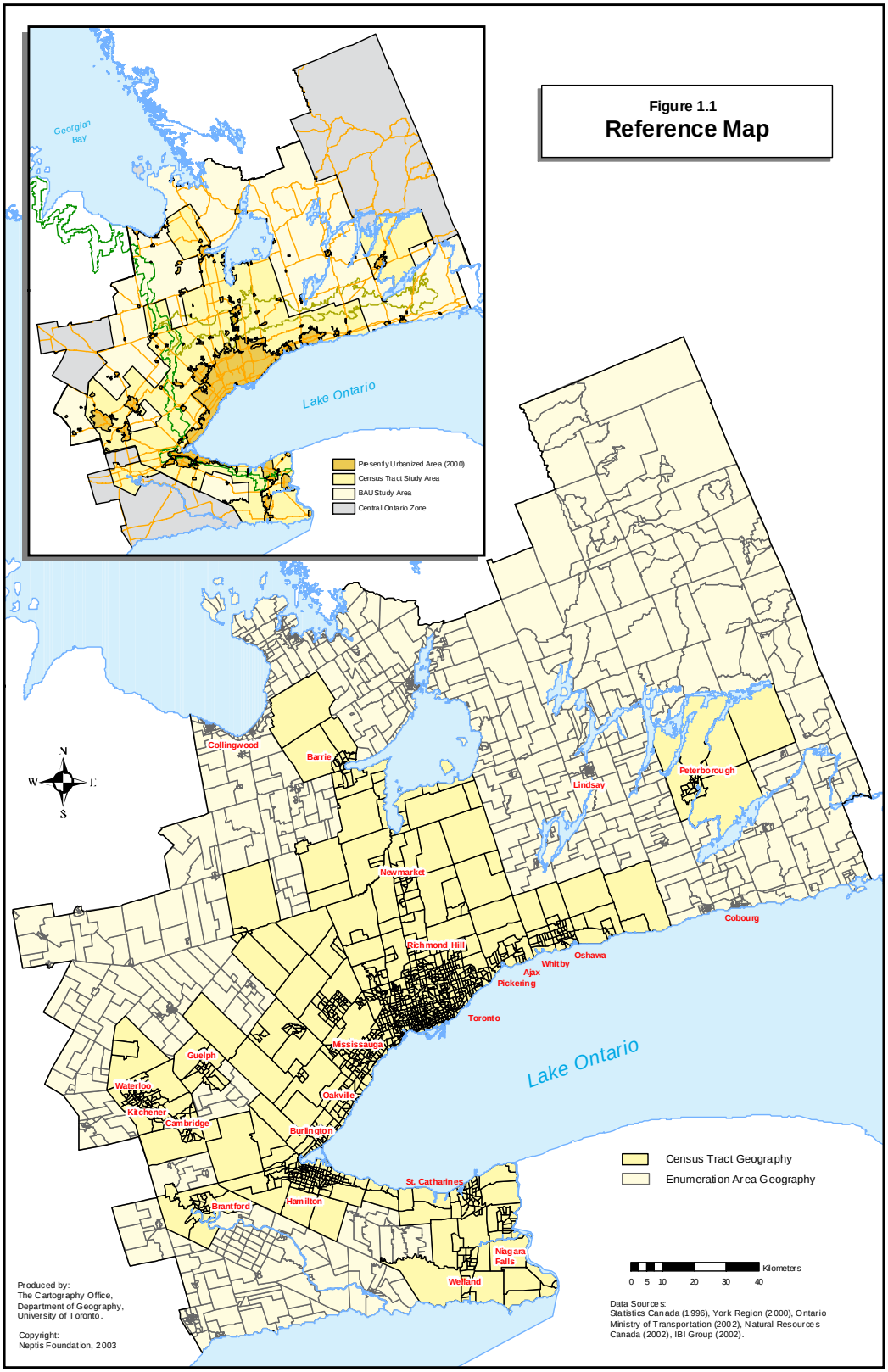


Figure 1.1
Reference Map
Georgian Bay
Lake Ontario
Presently Urbanized Area (2000)
Census Tract Study Area
BAU Study Area
Central Ontario Zone
N
W
E
S
Collingwood
Barrie
Lindsay
Peterborough
Newmarket
Cobourg
Richmond Hill
Whitby
Oshawa
Ajax
Pickering
Toronto
Mississauga
Guelph
Waterloo
Kitchener
Cambridge
Oakville
Burlington
St. Catharines
Hamilton
Brantford
Niagara Falls
Welland
Lake Ontario
Census Tract Geography
Enumeration Area Geography
Kilometers
0 5 10 20 30 40
Produced by:
The Cartography Office,
Department of Geography,
University of Toronto.
Copyright:
Neptis Foundation, 2003
Data Sources:
Statistics Canada (1996), York Region (2000), Ontario Ministry of Transportation (2002), Natural Resources Canada (2002), IBI Group (2002).

Figure 2.1

## High Incidence of Unemployment

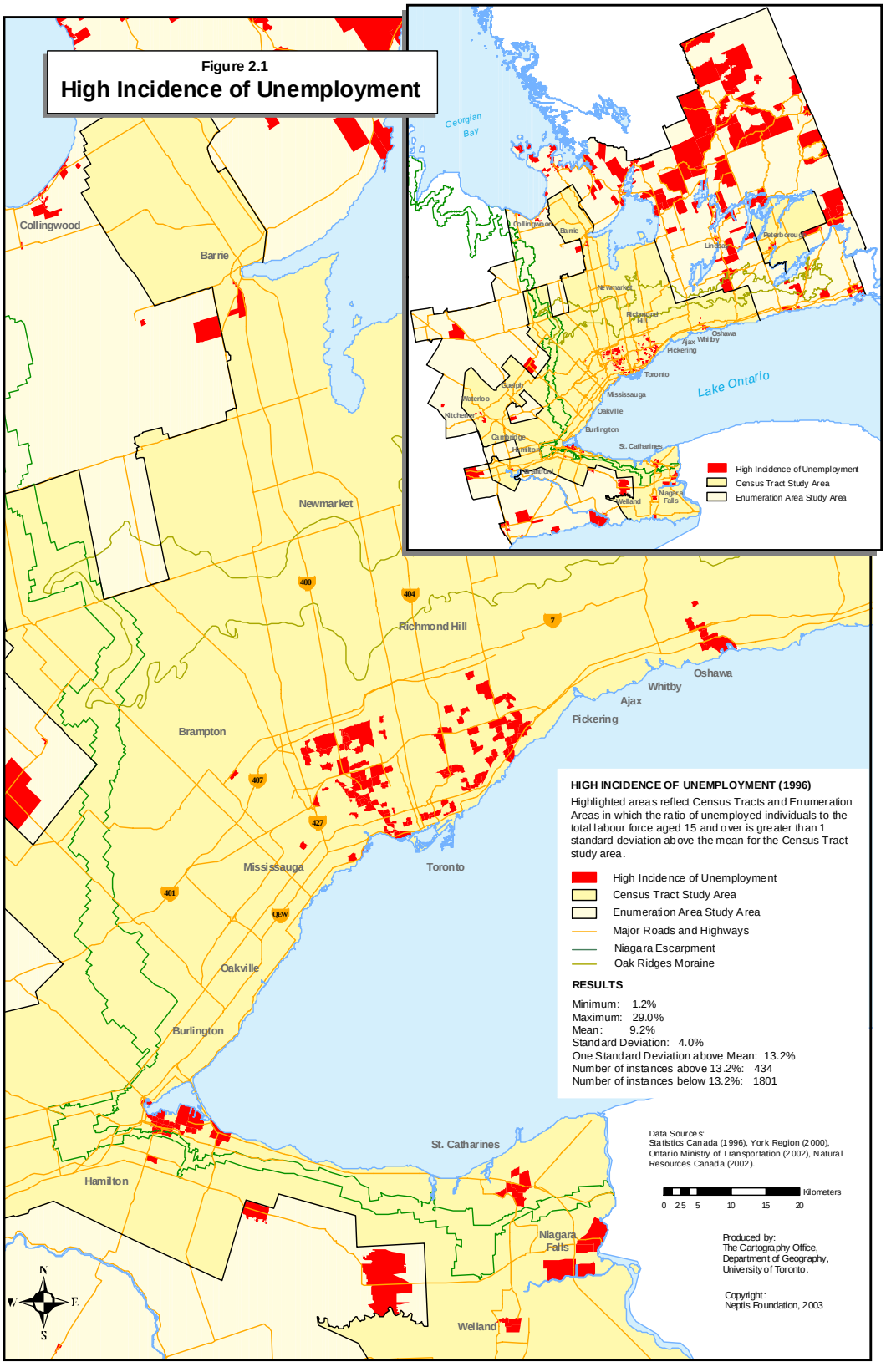


Figure 2.2

## High Incidence of Lone-Parent Families

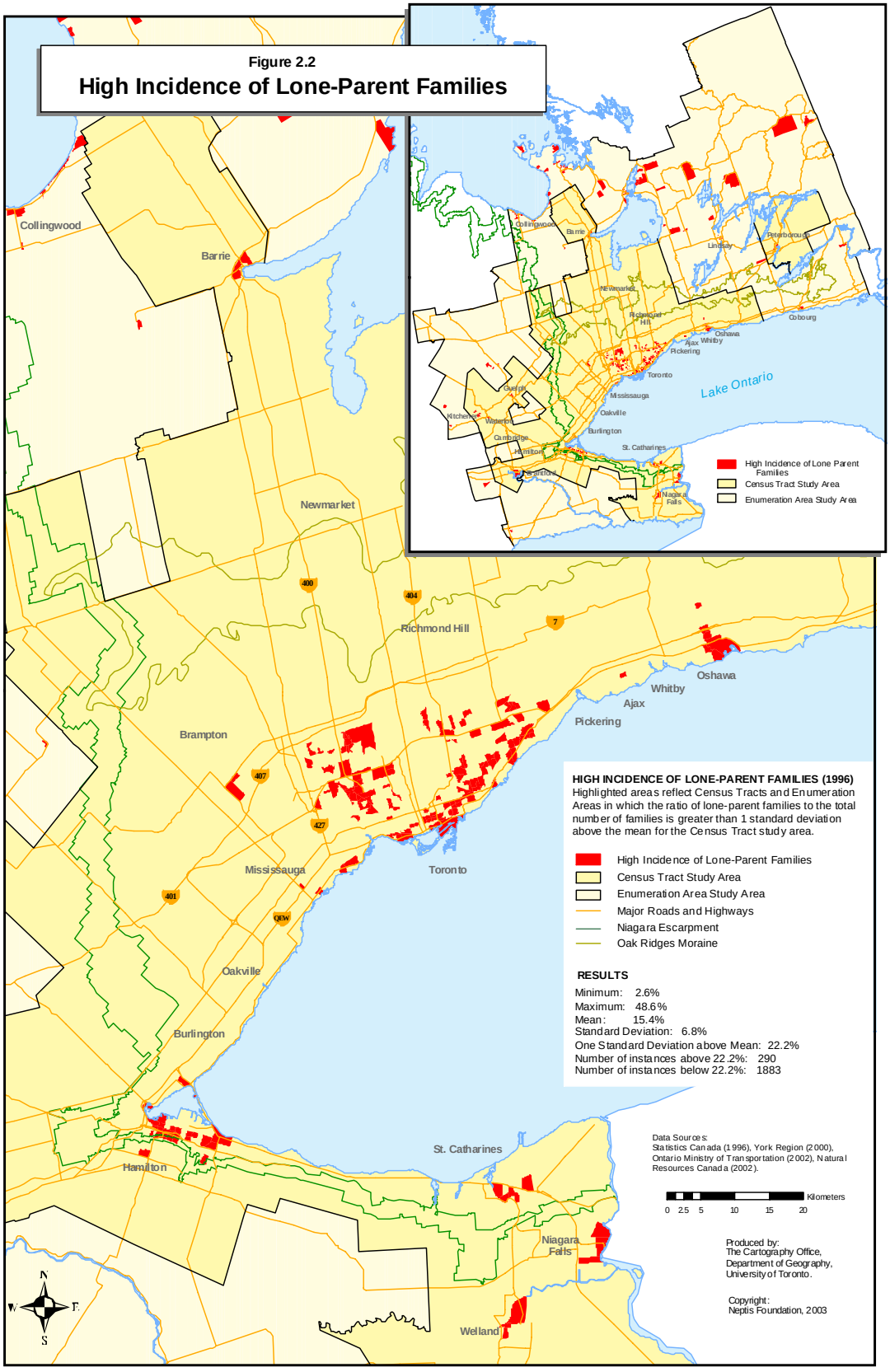


Figure 2.3

## High Incidence of Low Educational Attainment

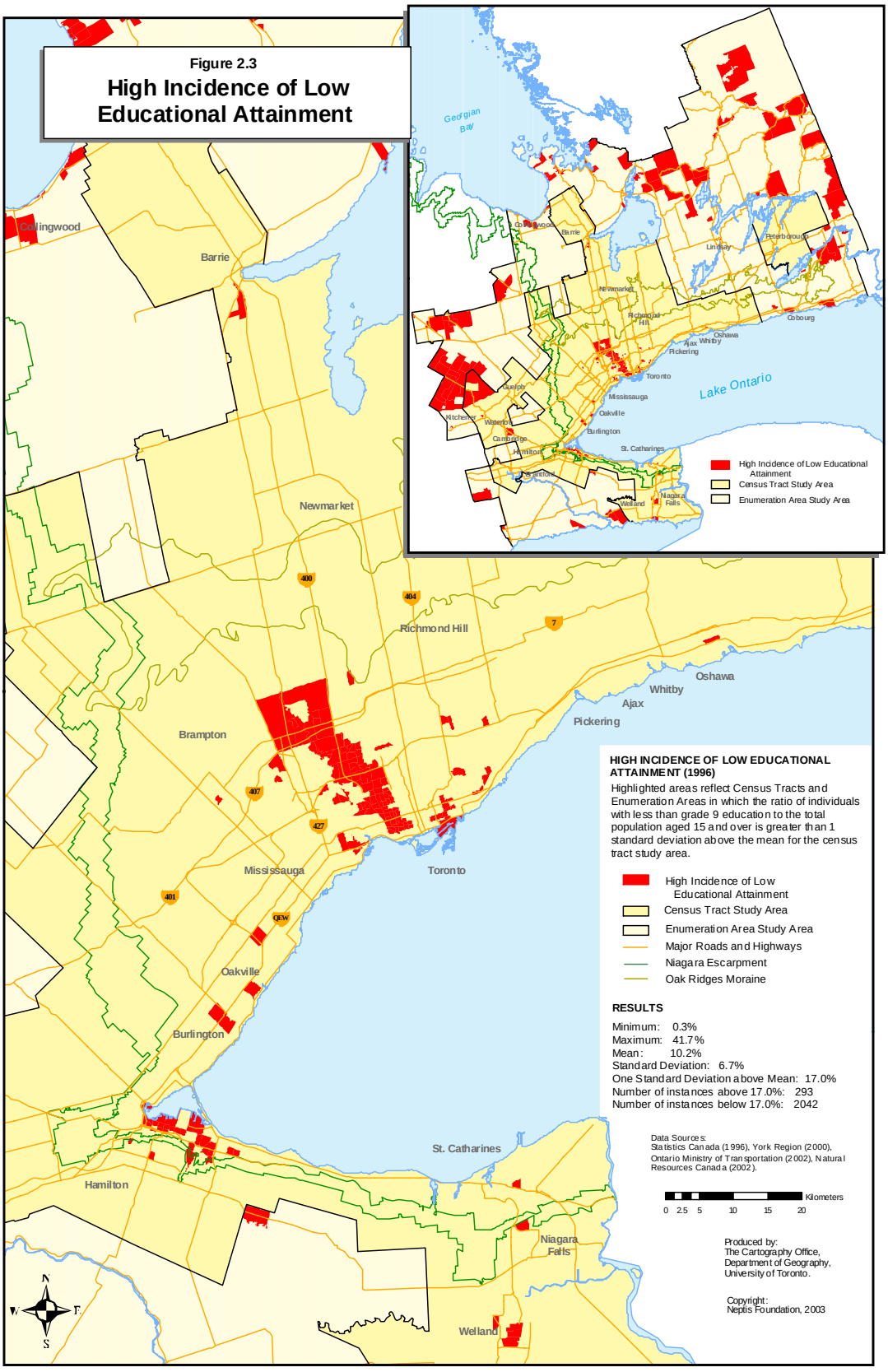


Figure 2.4
## High Incidence of Low Income

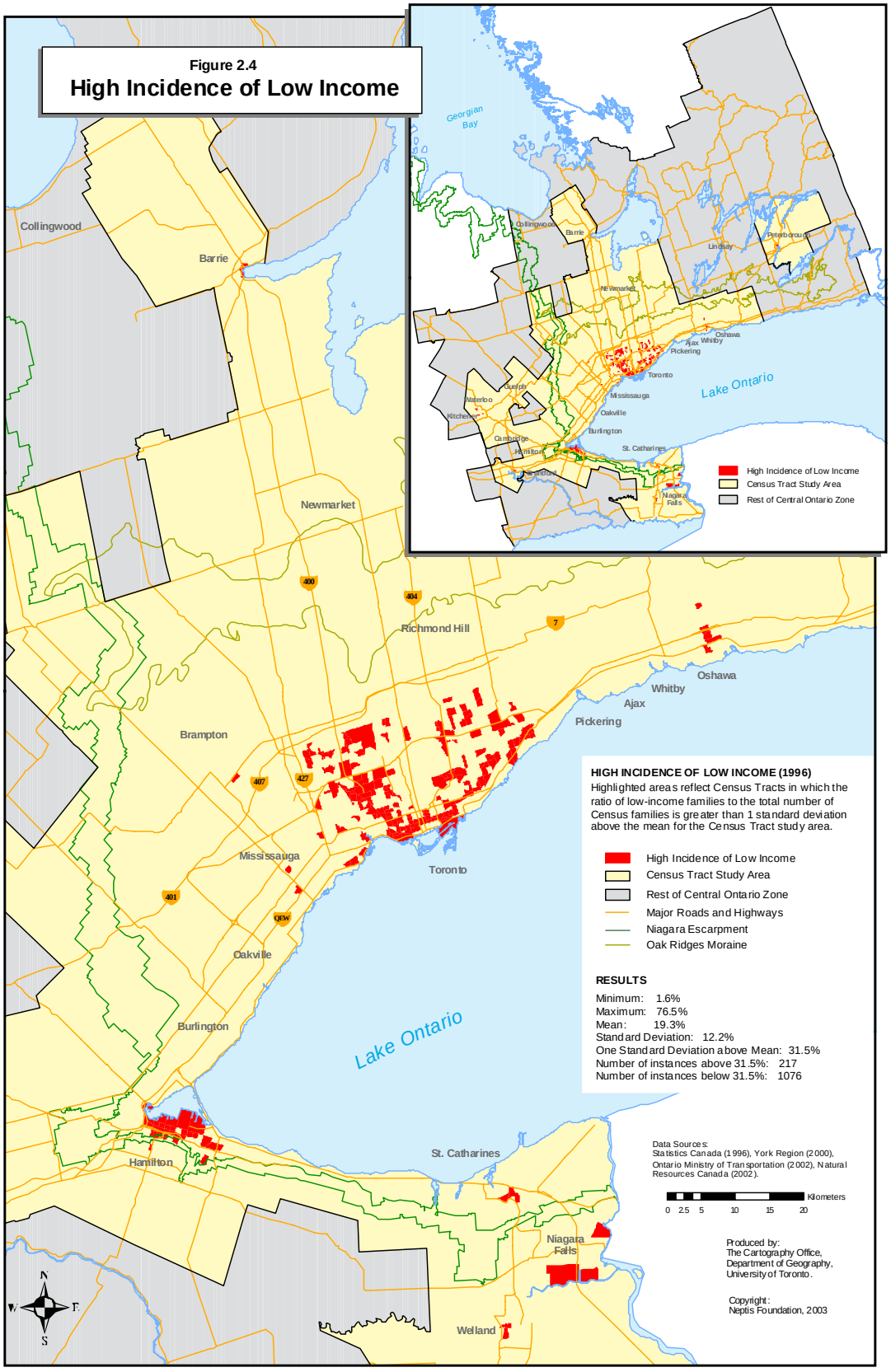


Figure 2.5

## High Government Assistance to Households

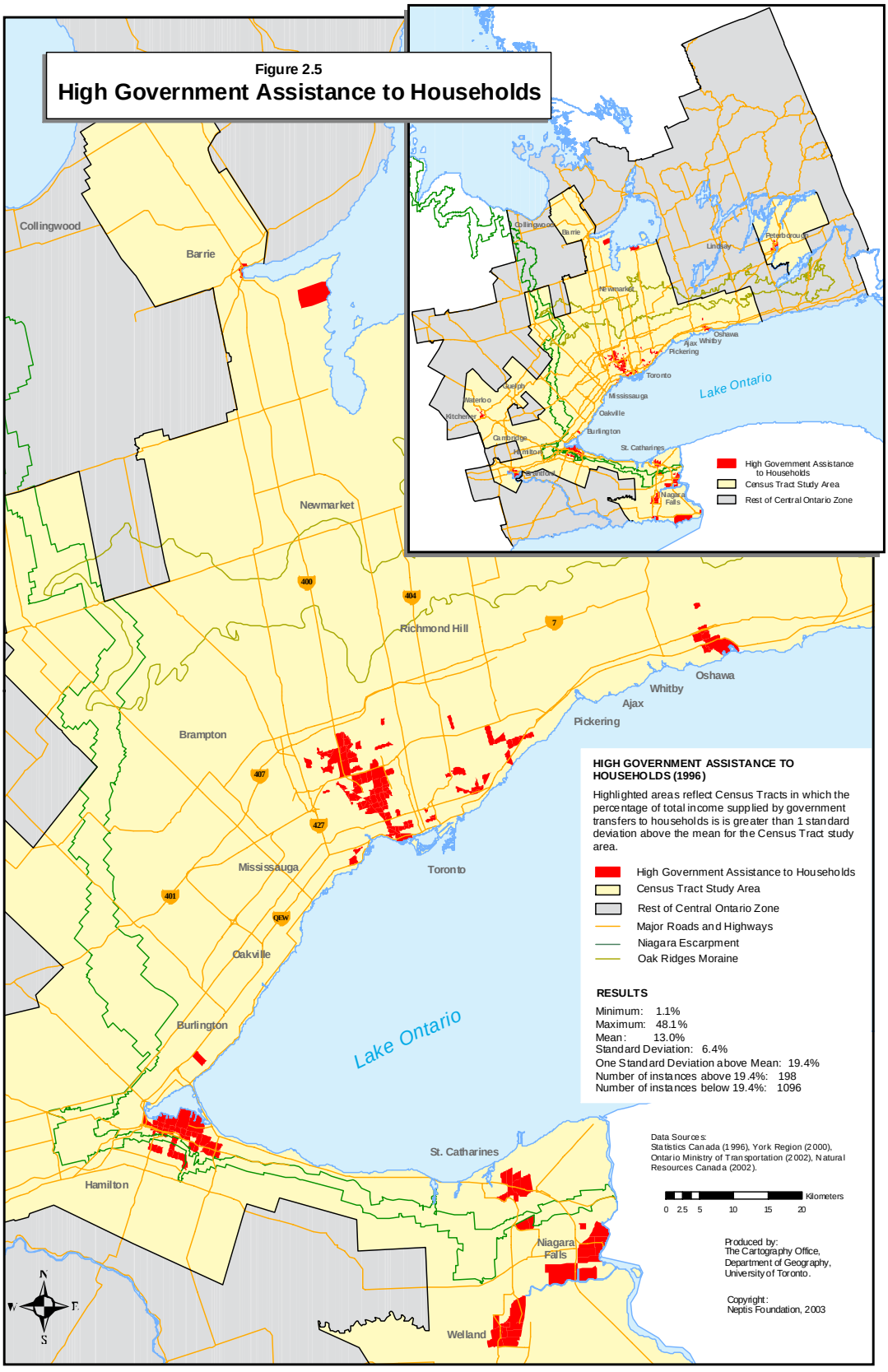
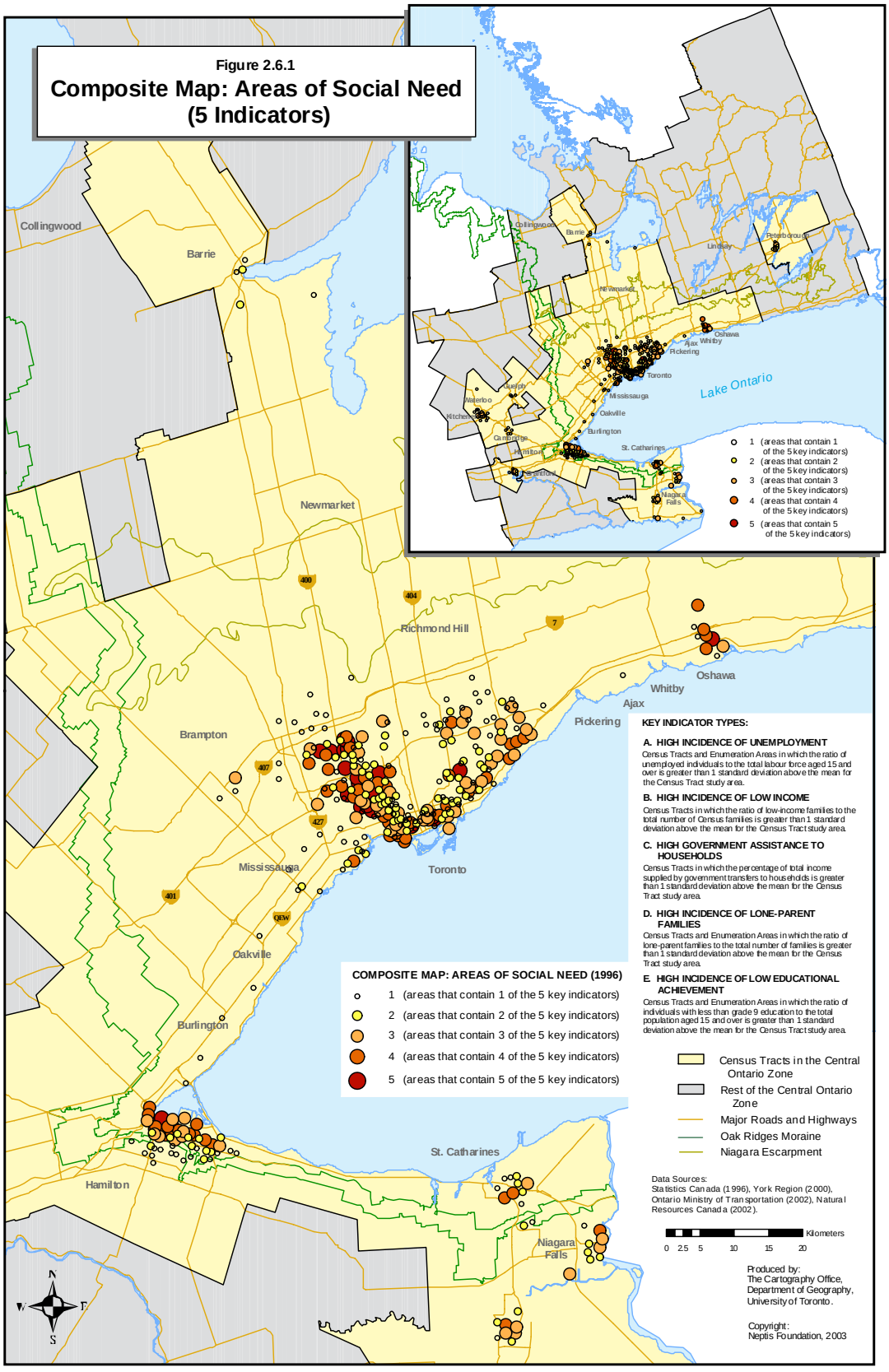


Figure 2.6.1

## Composite Map: Areas of Social Need (5 Indicators)



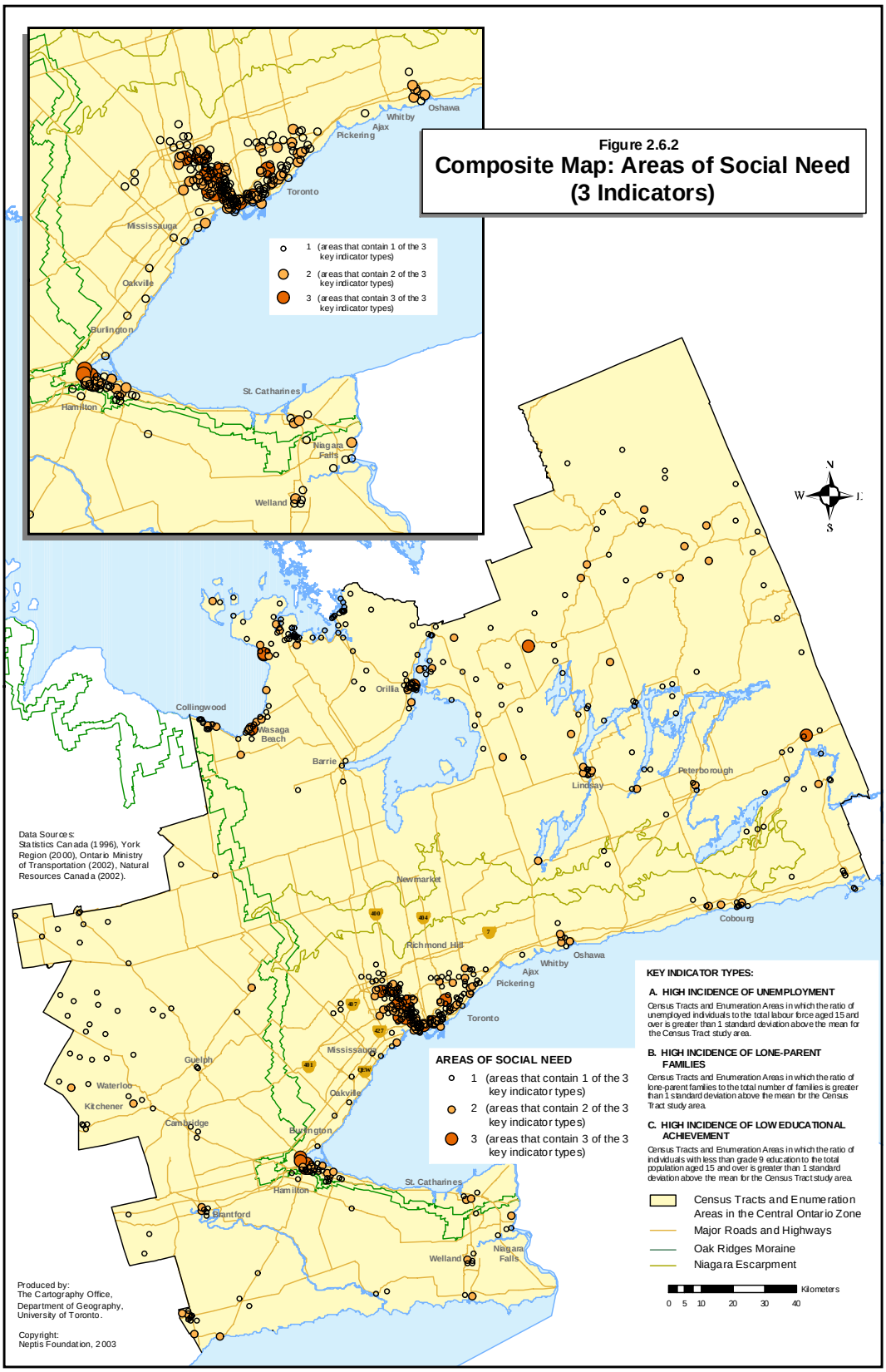
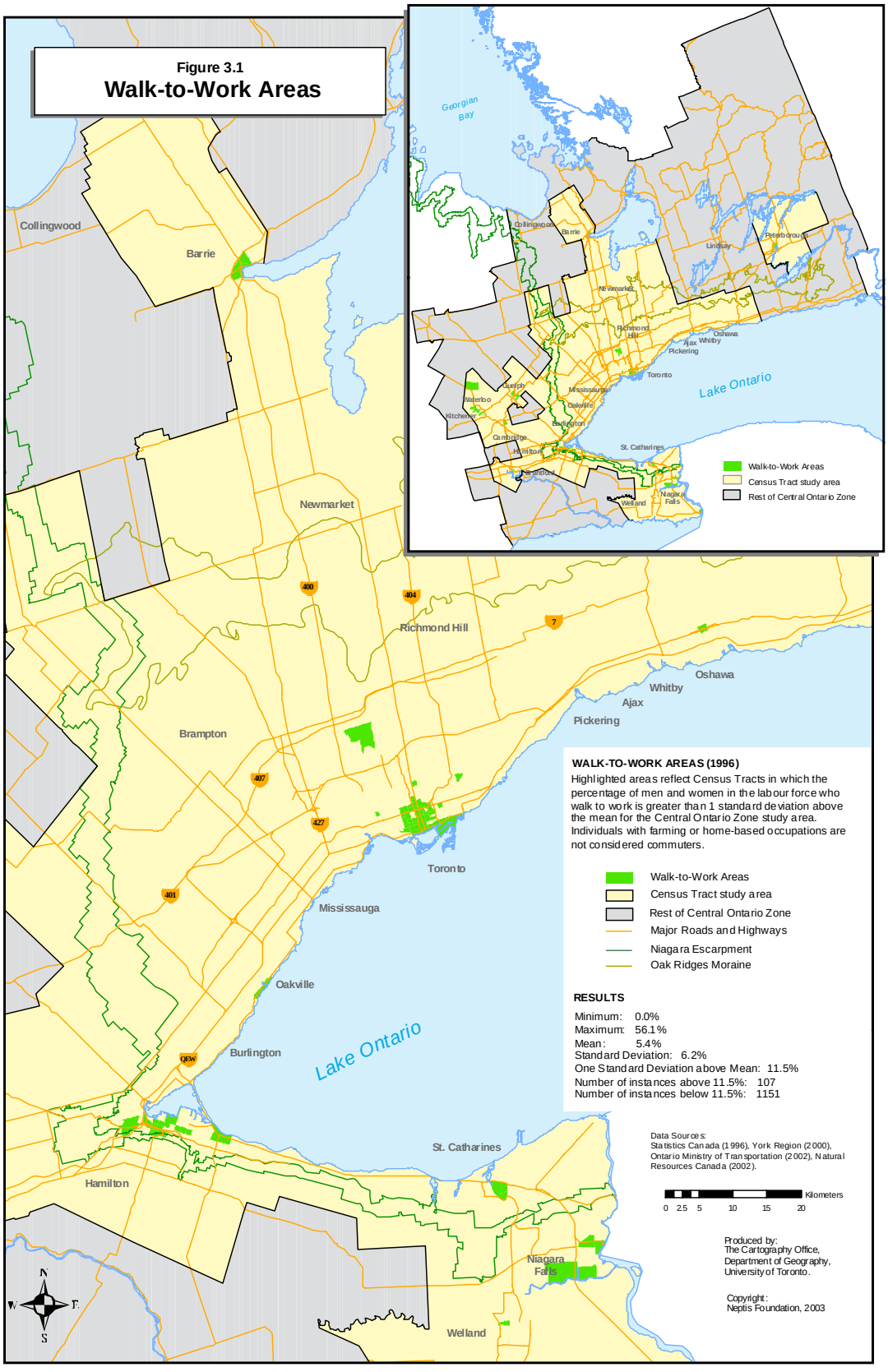


Figure 2.6.2
Composite Map: Areas of Social Need
(3 Indicators)
1 (areas that contain 1 of the 3 key indicator types)
2 (areas that contain 2 of the 3 key indicator types)
3 (areas that contain 3 of the 3 key indicator types)
Oshawa
Whitby
Ajax
Pickering
Toronto
Mississauga
Oakville
Burlington
Hamilton
St. Catharines
Niagara Falls
Welland
N
W
E
S
Collingwood
Wasaga Beach
Barrie
Orillia
Lindsay
Peterborough
Cobourg
Newmarket
Richmond Hill
Guelph
Waterloo
Kitchener
Cambridge
Brantford
Data Sources:
Statistics Canada (1996), York Region (2000), Ontario Ministry of Transportation (2002), Natural Resources Canada (2002).
AREAS OF SOCIAL NEED
1 (areas that contain 1 of the 3 key indicator types)
2 (areas that contain 2 of the 3 key indicator types)
3 (areas that contain 3 of the 3 key indicator types)
KEY INDICATOR TYPES:
A. HIGH INCIDENCE OF UNEMPLOYMENT
Census Tracts and Enumeration Areas in which the ratio of unemployed individuals to the total labour force aged 15 and over is greater than 1 standard deviation above the mean for the Census Tract study area.
B. HIGH INCIDENCE OF LONE-PARENT FAMILIES
Census Tracts and Enumeration Areas in which the ratio of lone-parent families to the total number of families is greater than 1 standard deviation above the mean for the Census Tract study area.
C. HIGH INCIDENCE OF LOW EDUCATIONAL ACHIEVEMENT
Census Tracts and Enumeration Areas in which the ratio of individuals with less than grade 9 education to the total population aged 15 and over is greater than 1 standard deviation above the mean for the Census Tract study area.
Census Tracts and Enumeration Areas in the Central Ontario Zone
Major Roads and Highways
Oak Ridges Moraine
Niagara Escarpment
Kilometers
0 5 10 20 30 40
Produced by:
The Cartography Office,
Department of Geography,
University of Toronto.
Copyright:
Neptis Foundation, 2003

Figure 3.1
## Walk-to-Work Areas



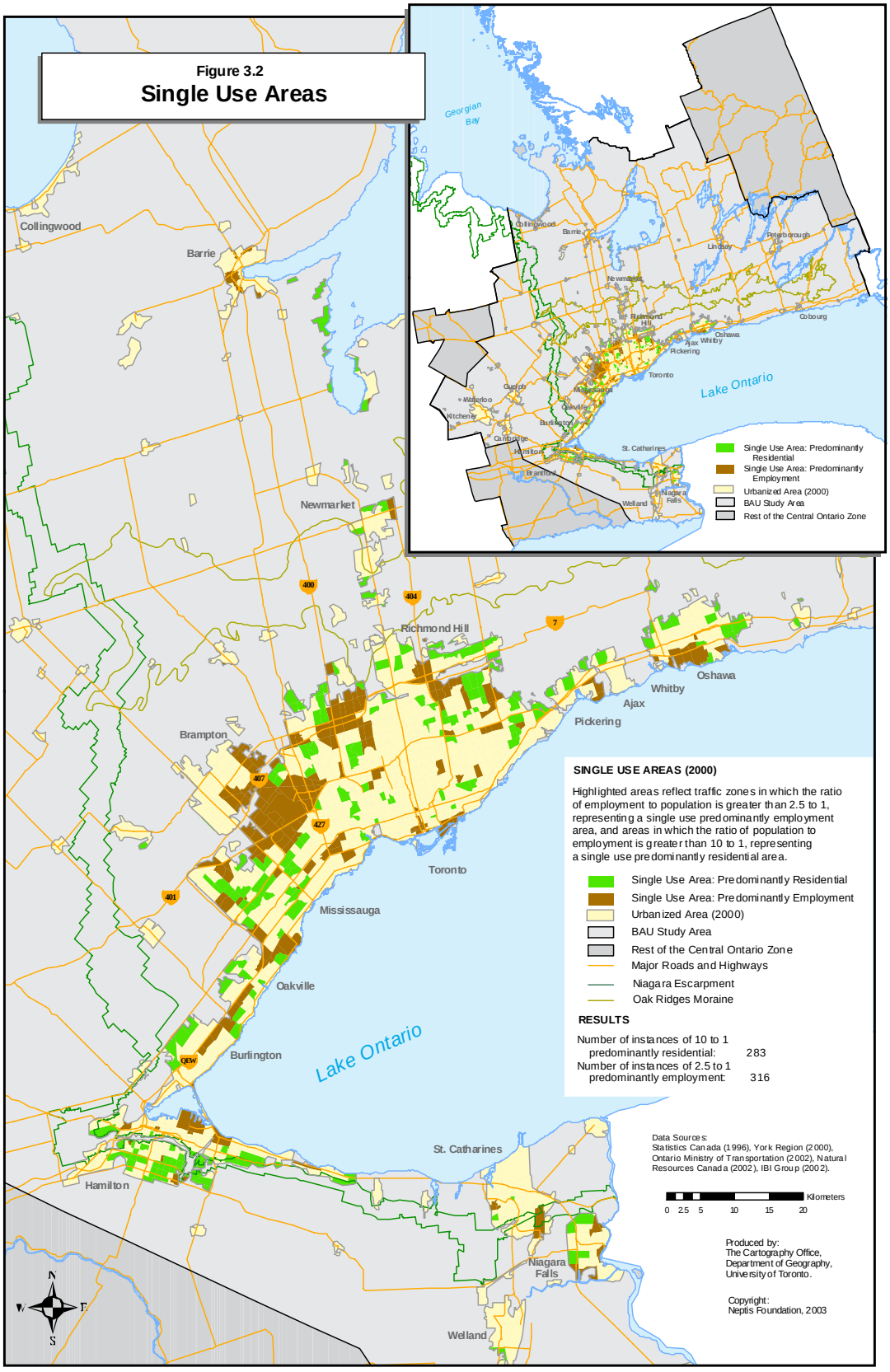


Figure 3.2
Single Use Areas
Georgian Bay
Lake Ontario
Collingwood
Barrie
Newmarket
Richmond Hill
Oshawa
Whitby
Ajax
Pickering
Brampton
Toronto
Mississauga
Oakville
Burlington
Hamilton
St. Catharines
Niagara Falls
Welland
Single Use Area: Predominantly Residential
Single Use Area: Predominantly Employment
Urbanized Area (2000)
BAU Study Area
Rest of the Central Ontario Zone
SINGLE USE AREAS (2000)
Highlighted areas reflect traffic zones in which the ratio of employment to population is greater than 2.5 to 1, representing a single use predominantly employment area, and areas in which the ratio of population to employment is greater than 10 to 1, representing a single use predominantly residential area.
Major Roads and Highways
Niagara Escarpment
Oak Ridges Moraine
RESULTS
Number of instances of 10 to 1 predominantly residential: 283
Number of instances of 2.5 to 1 predominantly employment: 316
Data Sources:
Statistics Canada (1996), York Region (2000), Ontario Ministry of Transportation (2002), Natural Resources Canada (2002), IBI Group (2002).
Kilometers
0 2.5 5 10 15 20
Produced by:
The Cartography Office,
Department of Geography,
University of Toronto.
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Neptis Foundation, 2003

Figure 3.3

## Borderline Transit Supportive Density

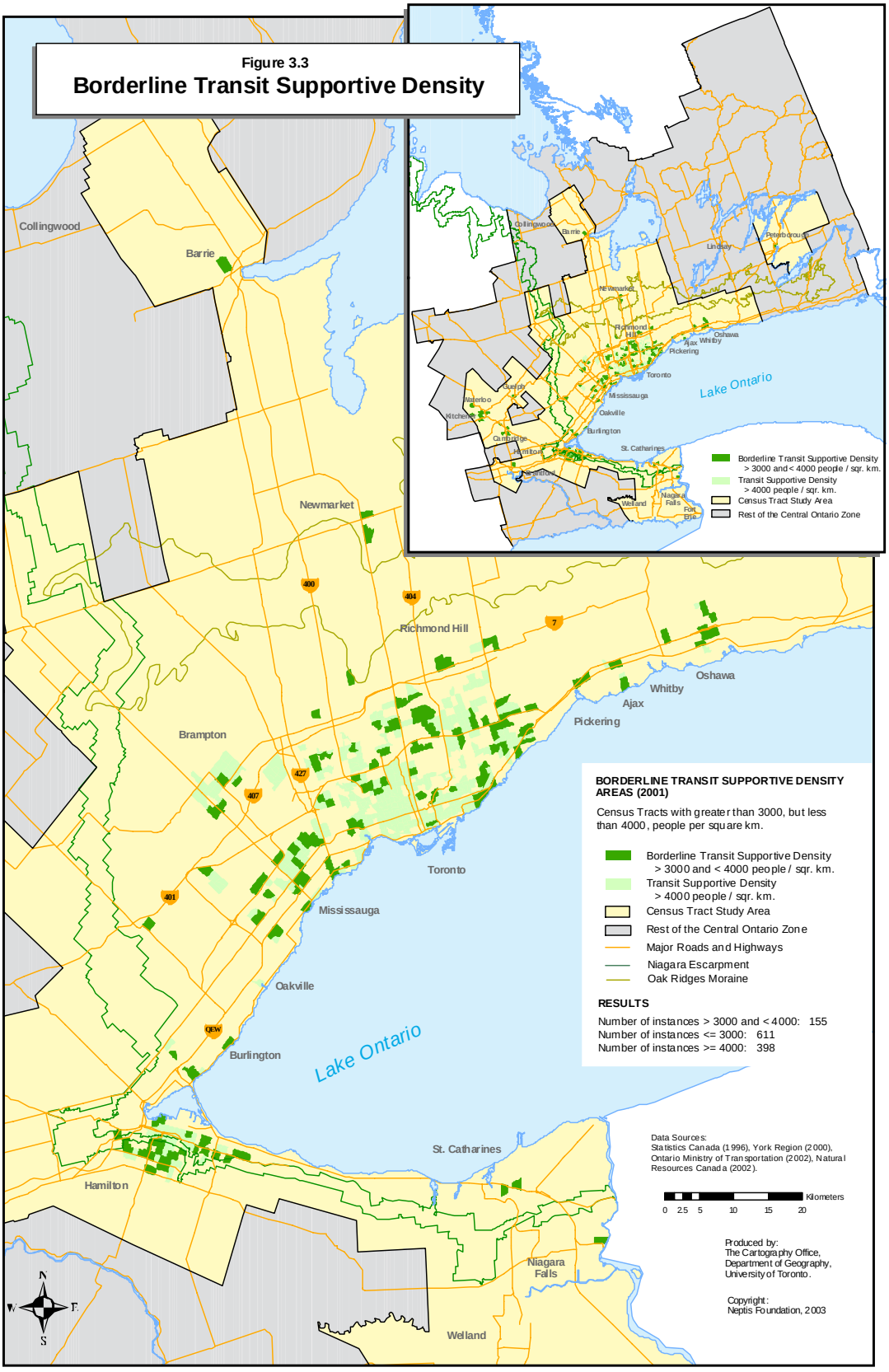


**Figure 3.4**

## Composite Map: Urban Form Opportunity Areas

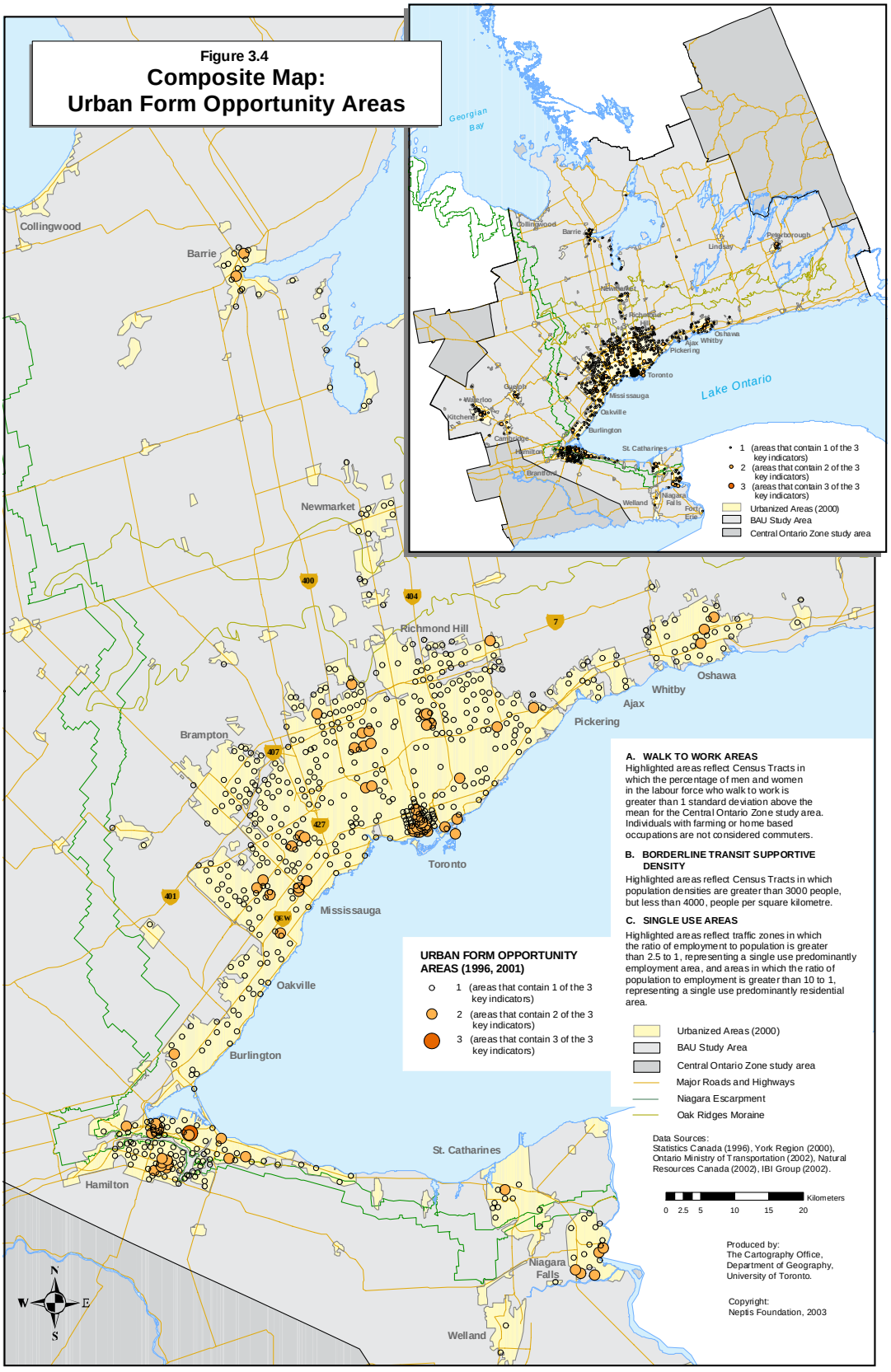


Figure 4.1

## Auto Travel: Low Delay by Area of Origin

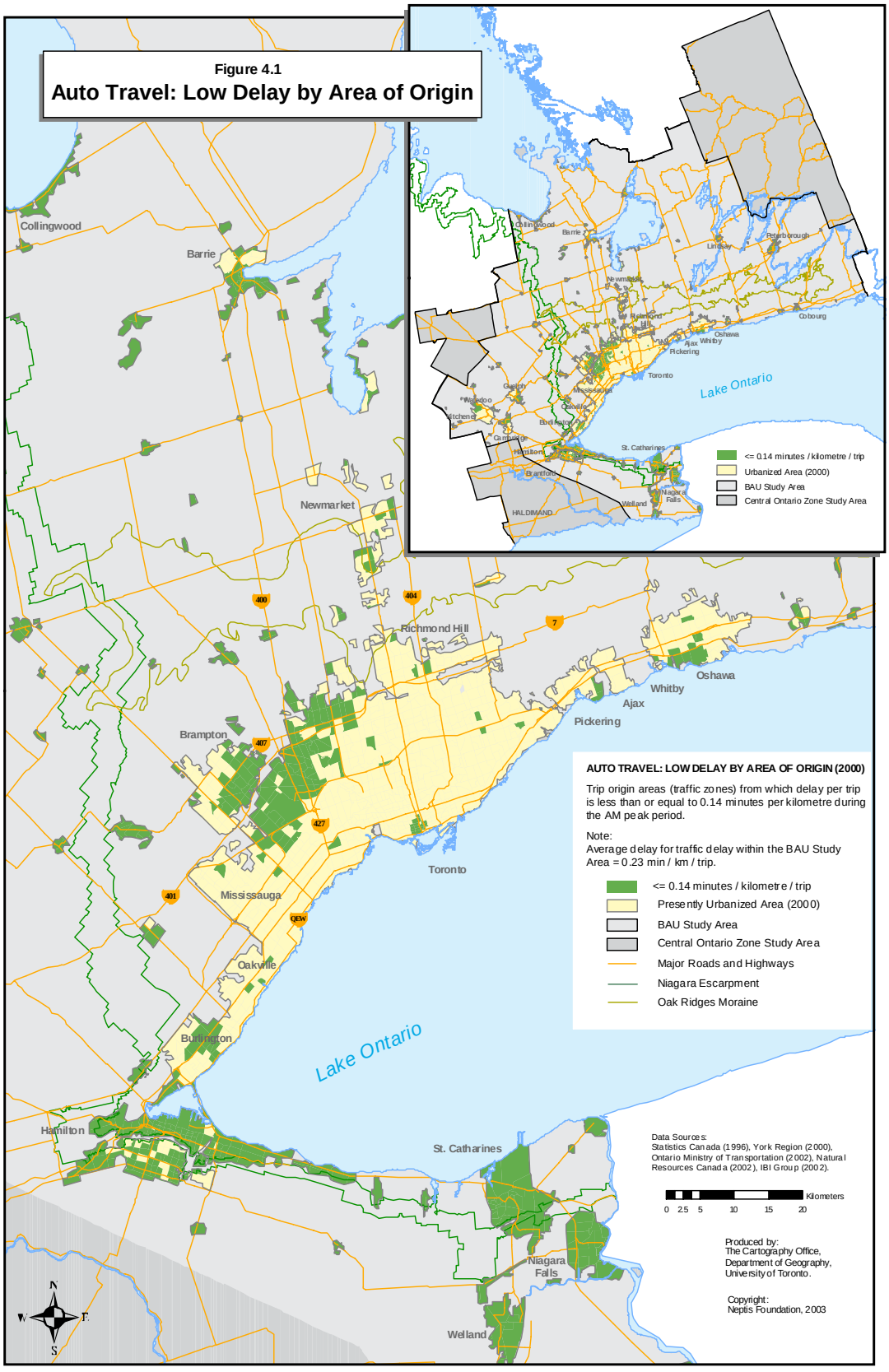
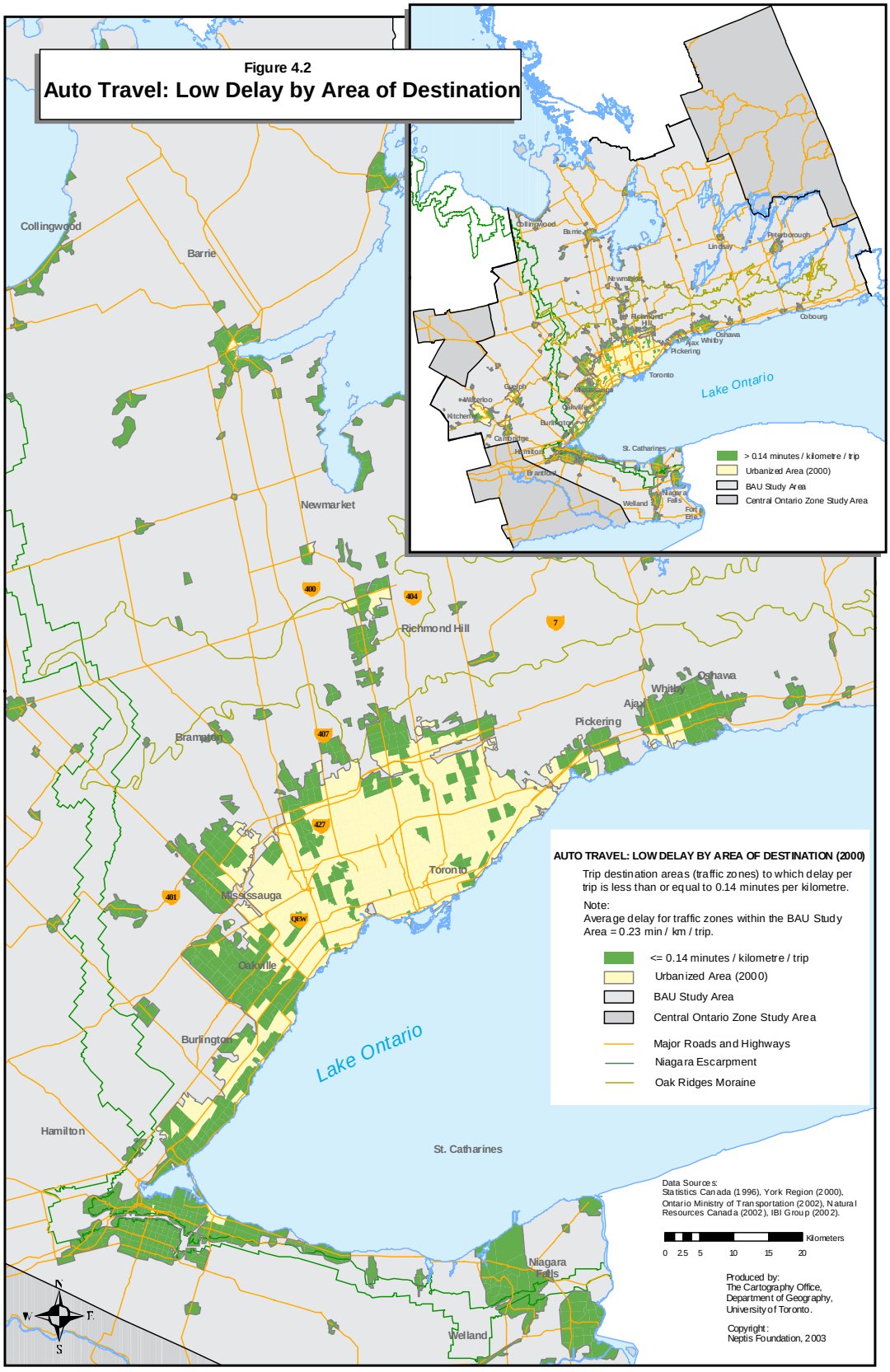


Figure 4.2

## Auto Travel: Low Delay by Area of Destination



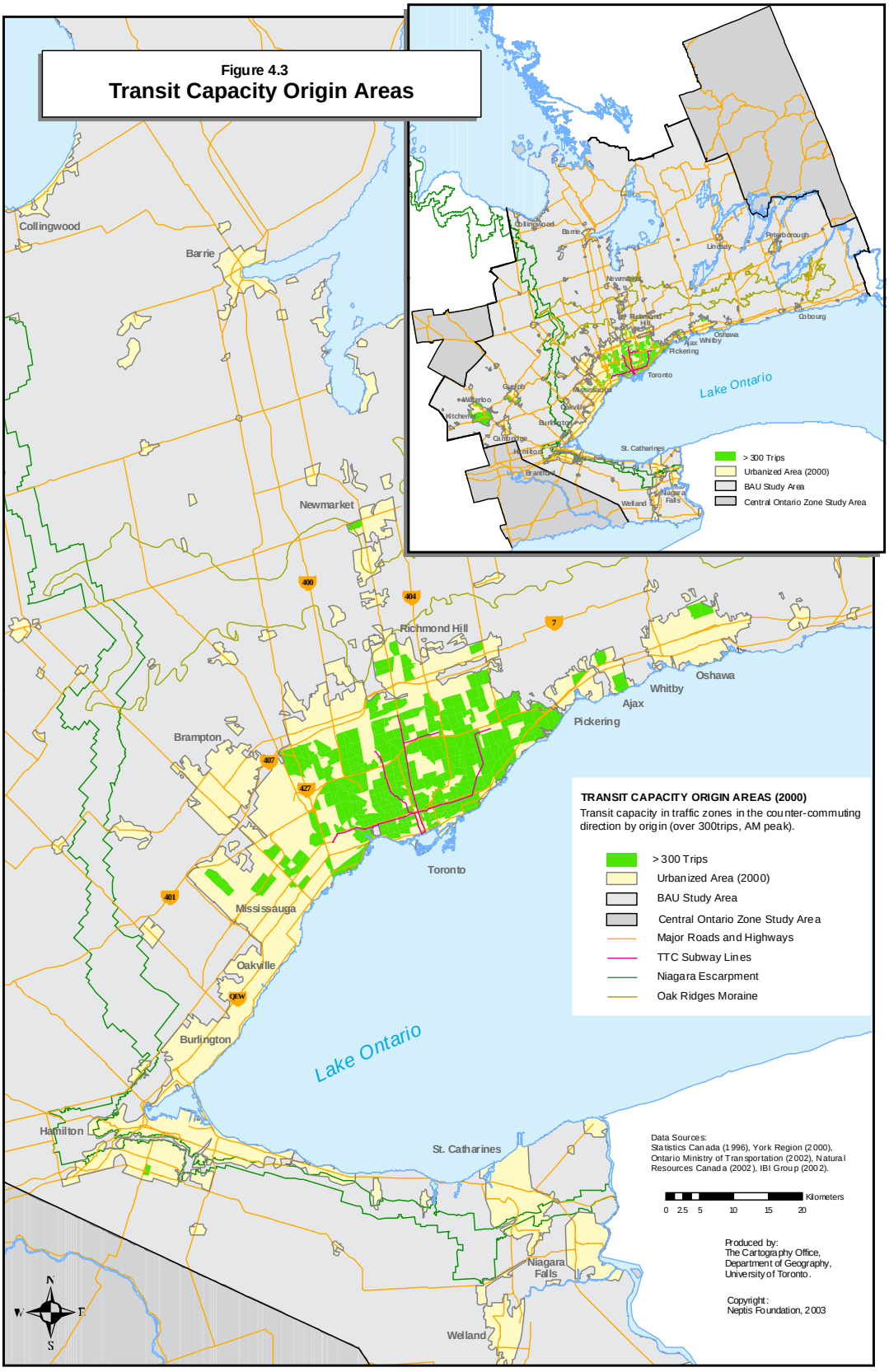
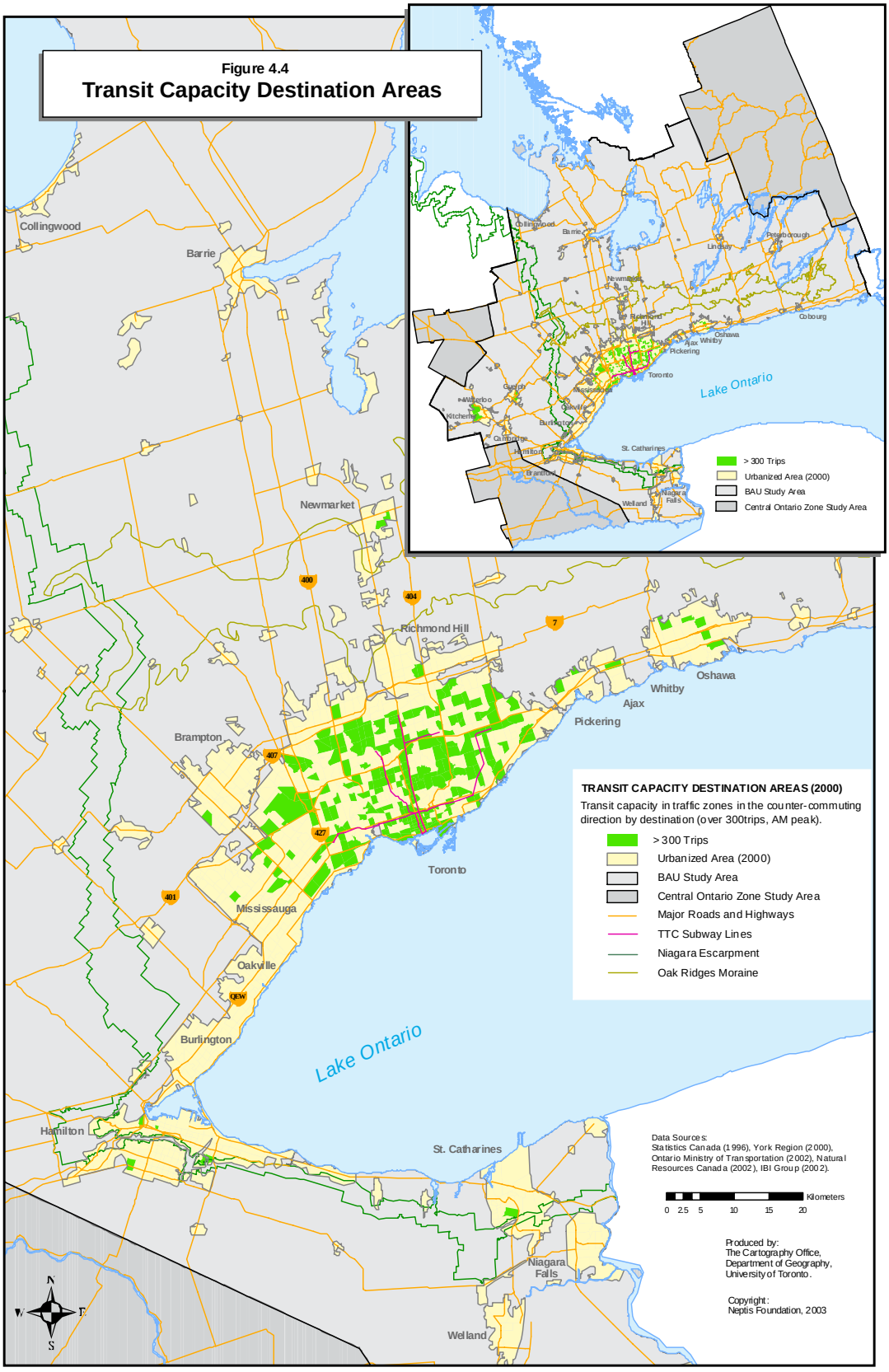


Figure 4.3
Transit Capacity Origin Areas
Collingwood
Barrie
Newmarket
Richmond Hill
Oshawa
Whitby
Ajax
Pickering
Brampton
Toronto
Mississauga
Oakville
Burlington
Hamilton
St. Catharines
Niagara Falls
Welland
Lake Ontario
400
404
7
407
427
401
QEW
TRANSIT CAPACITY ORIGIN AREAS (2000)
Transit capacity in traffic zones in the counter-commuting direction by origin (over 300trips, AM peak).
> 300 Trips
Urbanized Area (2000)
BAU Study Area
Central Ontario Zone Study Area
Major Roads and Highways
TTC Subway Lines
Niagara Escarpment
Oak Ridges Moraine
Data Sources:
Statistics Canada (1996), York Region (2000), Ontario Ministry of Transportation (2002), Natural Resources Canada (2002), IBI Group (2002).
Kilometers
0 2.5 5 10 15 20
Produced by:
The Cartography Office,
Department of Geography,
University of Toronto.
Copyright:
Neptis Foundation, 2003
N
W
E
S

**Figure 4.4**
## Transit Capacity Destination Areas



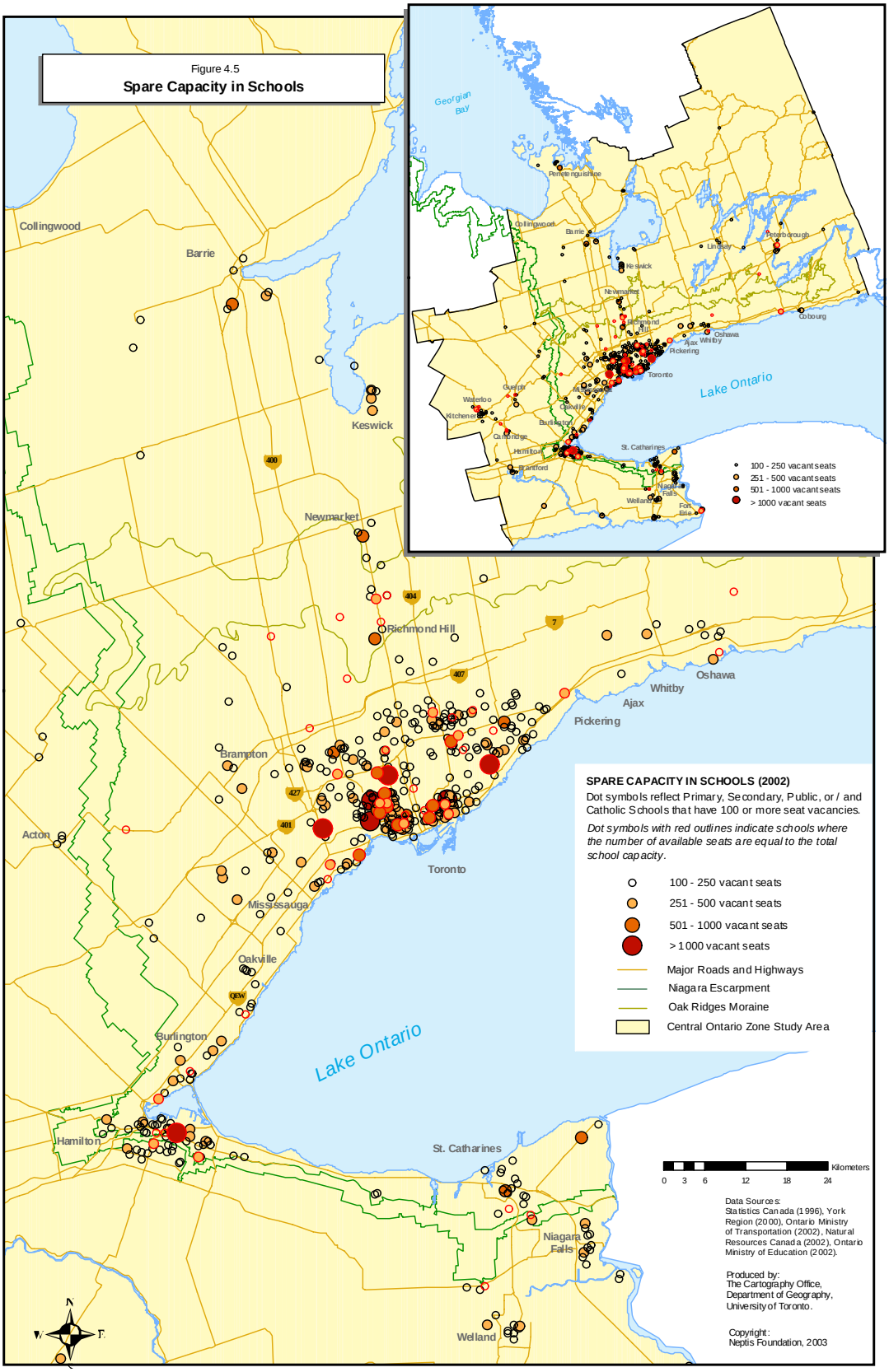


Figure 4.5
Spare Capacity in Schools
Georgian Bay
Lake Ontario
Collingwood
Barrie
Keswick
Newmarket
Richmond Hill
Oshawa
Whitby
Ajax
Pickering
Brampton
Acton
Toronto
Mississauga
Oakville
Burlington
Hamilton
St. Catharines
Niagara Falls
Welland
400
404
407
7
427
401
QEW
100 - 250 vacant seats
251 - 500 vacant seats
501 - 1000 vacant seats
> 1000 vacant seats
SPARE CAPACITY IN SCHOOLS (2002)
Dot symbols reflect Primary, Secondary, Public, or / and Catholic Schools that have 100 or more seat vacancies.
Dot symbols with red outlines indicate schools where the number of available seats are equal to the total school capacity.
Major Roads and Highways
Niagara Escarpment
Oak Ridges Moraine
Central Ontario Zone Study Area
Kilometers
0 3 6 12 18 24
Data Sources:
Statistics Canada (1996), York Region (2000), Ontario Ministry of Transportation (2002), Natural Resources Canada (2002), Ontario Ministry of Education (2002).
Produced by:
The Cartography Office, Department of Geography, University of Toronto.
Copyright:
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N
W
E

Figure 4.6

## Composite Map: Areas With Capacity

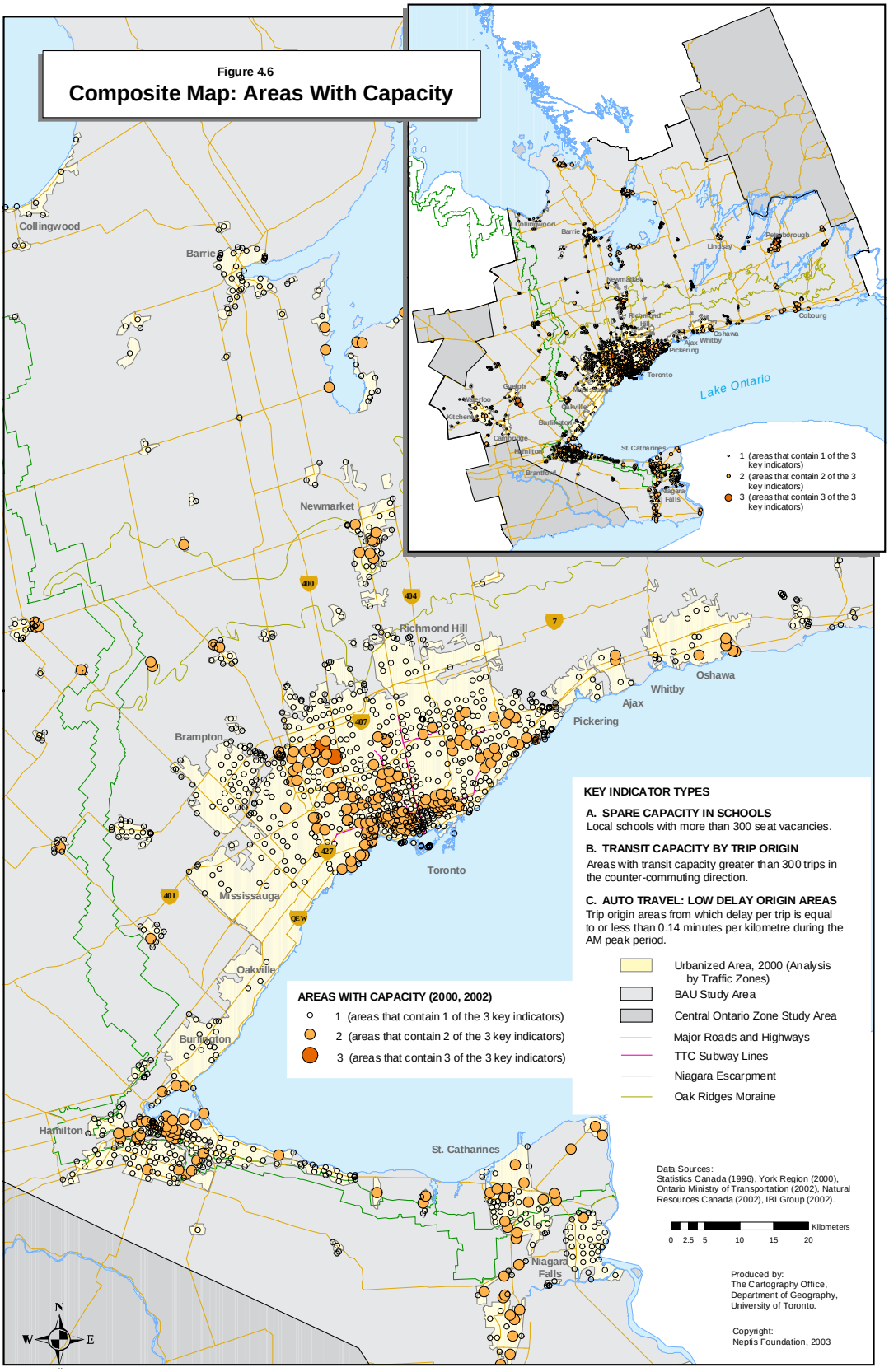

Figure 5.1

## Social Needs Analysis

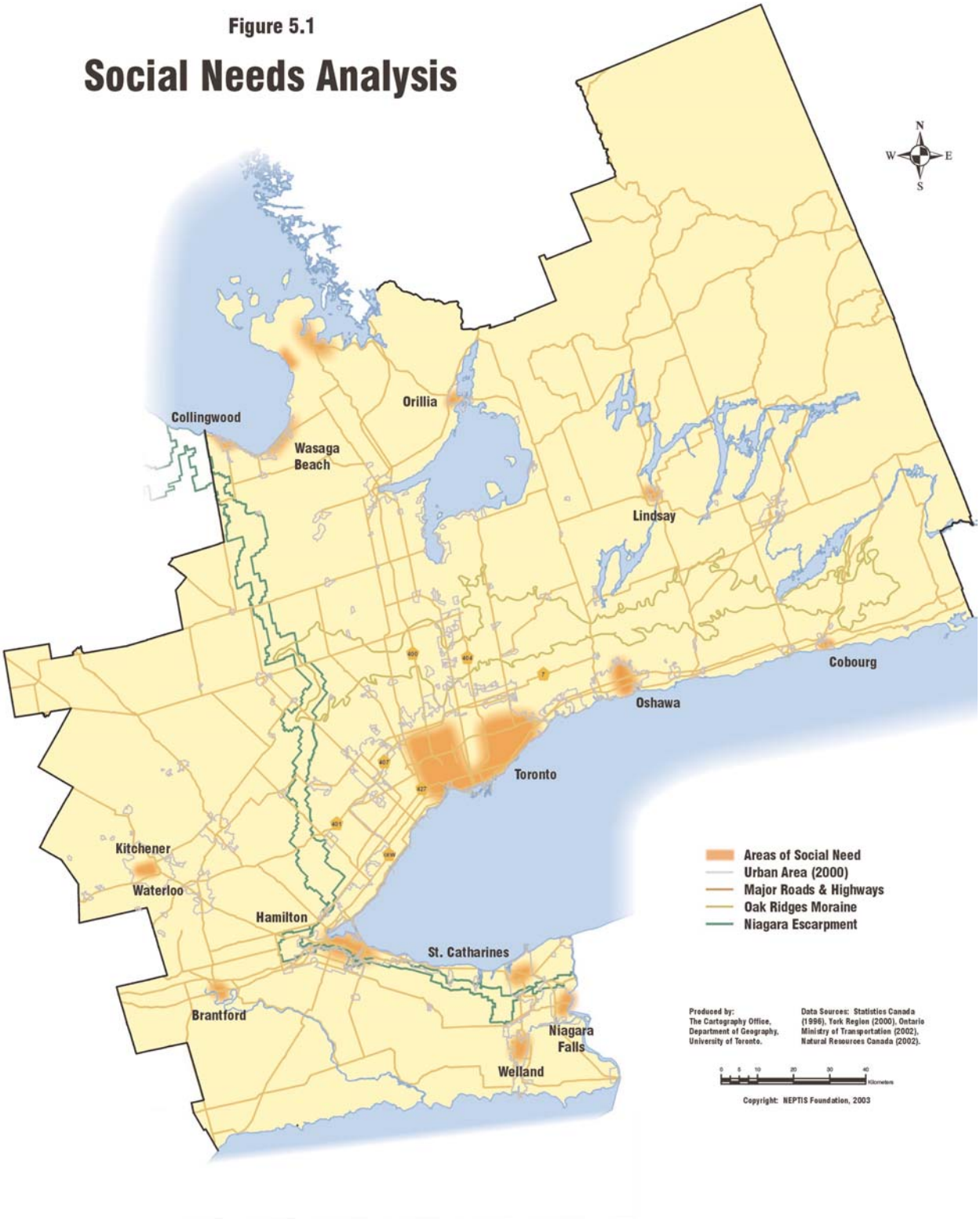

Figure 5.2

# Urban Form Analysis

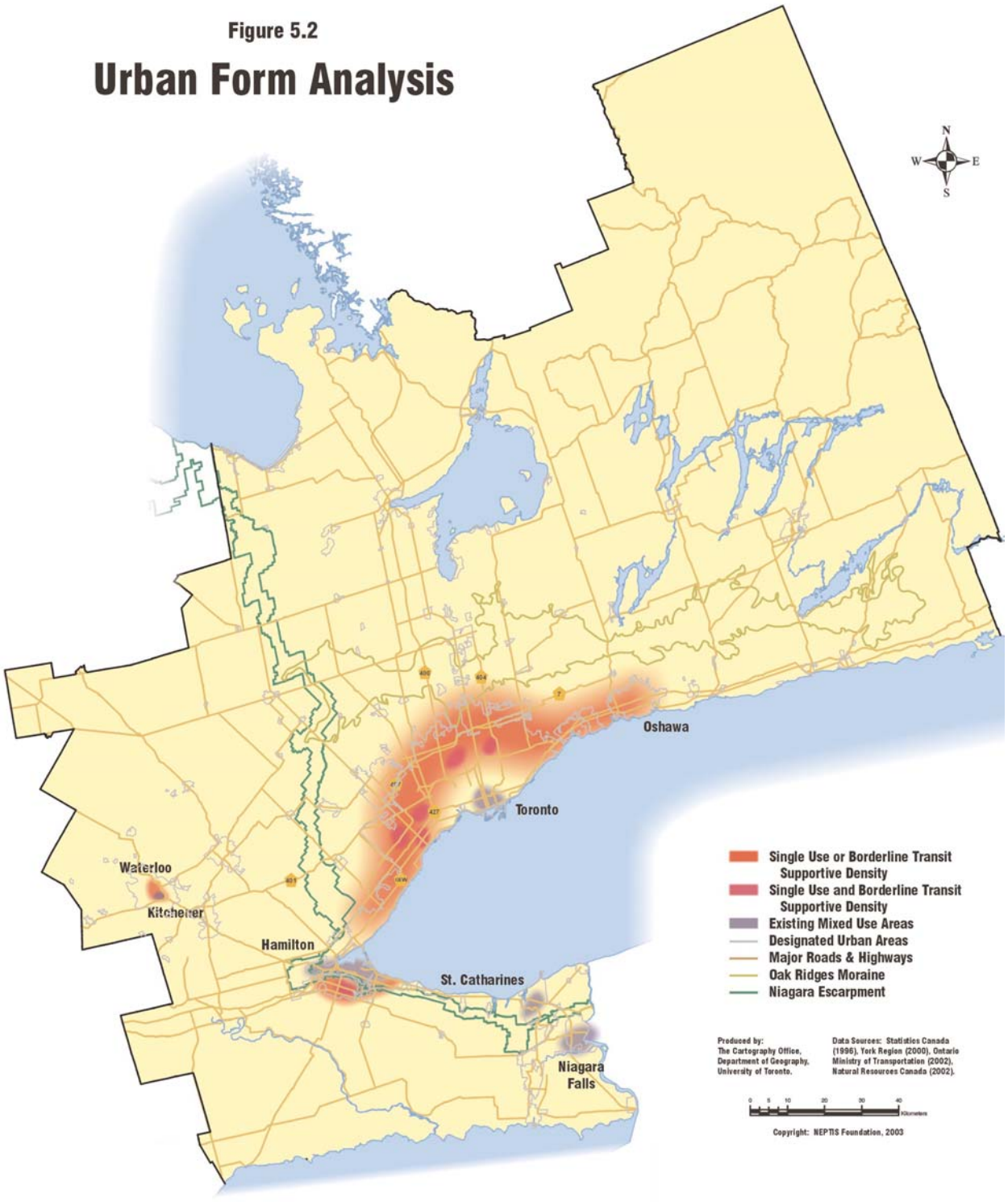

Figure 5.3

# Existing Capacity Analysis