



FORECAST FOR FAILURE

HOW A BROKEN FORECASTING SYSTEM IS AT THE ROOT OF THE GTA'S HOUSING SHORTAGE AND HOW IT CAN BE FIXED

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**Smart Prosperity
Institute**

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Executive summary

This report tells a simple but important story, which can be summarized as follows:

The population forecasts underpinning Ontario's Growth Plan for the Greater Golden Horseshoe substantially underestimated population growth since 2016 from international sources, specifically immigration and international students, particularly in the Greater Toronto Area and Hamilton (GTAH) region. In just five years, Ontario's population of adults grew by several hundred thousand more than forecasted, each of whom needs a place to call home.

Despite the population growing more rapidly than forecasted, the housing stock in 2021 in most GTAH communities fell short of the forecasts made in 2012.

The underproduction of new housing supply coupled with population growth exceeding forecasts created excess demand for housing in the GTAH. This imbalance between housing demand and supply contributed to high housing prices and the migration of young families out of the GTAH to other parts of the province that occurred well before the pandemic. In each of the three years before the pandemic, over 40,000 persons, on net, moved out of the GTAH to other parts of the province, over double the pre-2014 average. Despite Ontario's booming population growth, the GTAH's population grew slower than forecast due to out-migration from a lack of building homes.

There is a genuine (and we would argue quite likely) possibility that the future may look a great deal like the past and that current forecasts are underestimating population growth and overestimating future housing completions. Past forecasts underestimated GTAH population growth from international sources by roughly 120,000 persons from 2016-21 while overestimating the size of the housing stock by approximately 26,000 units, contributing to the excess demand for housing.

Two plausible scenarios could cause population growth from international sources to be approximately 120,000 persons higher than currently forecasted in 2021-26. In one scenario, GTAH population growth through immigration is 20% higher than forecasted; in the other, the boom in net non-permanent residents lasts five years longer than currently forecasted. In the former scenario, the excess demand for housing in the GTAH from 2021-26 is roughly 36,000 units; in the latter, housing demand grows more slowly as the new population is primarily students who live in more crowded conditions. However, as those students age and form families, their housing needs match the immigration scenario.

In general, population forecasts (and by extension, housing demand forecasts) are *highly* sensitive to the assumptions made on future immigration targets and international student trends, and thus housing demand forecasts for the GTAH could be off by over a hundred thousand units a decade. Similarly, housing completion forecasts can also be off by as much as a hundred thousand units in a decade. As such, planners should consider a range of potential scenarios rather than assuming current forecasts will necessarily prove accurate. We provide ten recommendations to improve forecasting and planning, including creating annual population, employment, and housing forecasts.

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Ten key points from this report

1. The Growth Plan for the Greater Golden Horseshoe (GGH) and the municipal plans built on that plan are grounded in housing and population forecasts. These forecasts become stale quickly, as populations grow faster than anticipated, as forecasts do not anticipate policy changes that lead to faster population growth. Municipal plans are not revised to reflect the new reality despite forecasts rapidly becoming outdated.
2. Housing shortages occurred in the GTA (Greater Toronto Area and Hamilton), partly because populations grew faster than forecast and partly because housing completions in municipalities did not hit the (already too low) minimums set out in the Growth Plan.
3. Relative to a 2012 forecast, the GTA's population growth from 2016-21 from international sources was over 120,000 more than forecast, yet it currently has 26,000 fewer housing units than forecasted in 2012.
4. The lack of housing causes a significant and unforecasted exodus of young families out of the GTA who *drive until they qualify* to other parts of the province. In 2012, it was forecasted that, on net, 36,000 people would move out of the GGH to other parts of the province from 2016-21. The actual number was over 100,000. This exodus caused the housing shortage to spread across Southern Ontario, leading to one of the planet's least affordable real estate markets.
5. This lack of housing also acts as a drag on the economy of the GTA, as workers are priced out of working in the region (since they cannot afford to live there) and are forced to work lower-wage, lower-productivity jobs in other parts of the country.
6. These trends will continue unless more housing is built across Ontario. The report *Baby Needs a New Home* examines Ministry of Finance population projections to estimate the number of new homes needed in each of Ontario's 49 census divisions, taking into account generational 'turnover' of housing. It finds that, on net, the province will need one million net new homes in the next ten years, with over half of those in the GTA.
7. This report builds on *Baby Needs a New Home* by examining Hemson's housing and population forecasts, which inform the Growth Plan and asks *what happens if those forecasts are wrong?* By performing a series of sensitivity analyses, we find that if current population growth forecasts from international migration are as off as past ones, the GTA could require over 100,000 additional housing units over the next decade.
8. The distinction between Hemson's population forecasts and the Ministry of Finance's projections is crucial as they have significant differences. Finance projects the GTA's population to grow by over 700,000 between 2021-26, whereas Hemson's forecast is less than 600,000. Much of this difference can be explained by the continued growth of the international student population, as the Ministry of Finance is projecting much higher growth in international students than Hemson forecasts. That the two come to substantially different conclusions illustrates the importance of sensitivity analyses and building contingency slack into plans.
9. The province has a population forecast and a population projection that make substantially different predictions which exemplifies the lack of coordination and data at the core of Ontario's housing shortages. To address how Ontario has *forecast for failure*, we provide ten

recommendations, one of which is that Ontario should prepare a population, employment, and housing stock forecast, released annually, which would adopt the best elements of both the existing forecasts and the Ministry of Finance population projections. This would create a unified set of numbers to replace the existing Ministry of Finance population projections.

10. It is vital to continue to attract international talent to the GTAH to support the economic growth, quality of life and cultural diversity of Canada's economic heartland. Ensuring adequate housing supply for existing and future residents should be core to the region's economic and social policy objectives. Cooling demand by slowing population growth is not the solution to the region's housing shortages.

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Introduction: Housing shortages are likely to persist in the GTAH unless we change how we plan and forecast

Even before the beginning of the pandemic, southern Ontario experienced high and rising home prices and a substantial number of families leaving the Greater Toronto Area and Hamilton (GTAH) in search of available and attainable housing, in a phenomenon known as *drive until you qualify*¹. These trends, which accelerated in 2016, can be traced back to high demand levels due to unanticipated population growth and low supply levels due to housing completions falling somewhat short of forecasts.

Two causes of post-2016 housing shortages in the GTAH and southern Ontario

Cause 1 of the housing shortage – Population growth since 2016 has been consistently higher than past forecasts: Past projections and forecasts have underestimated Ontario's population growth rate from international sources, and they may do so again in the future. In 2005, Hemson Consulting Ltd. (Hemson) forecasted that 2016-21 GTAH population growth from international sources would be under 400,000 persons. In 2012, this forecast was increased to 480,000, and by 2020, the forecast stood at 607,000. Despite immigration targets continuing to rise, the continued reliance of Ontario colleges and universities on growth from international students, and advocacy from groups that recognize the need to attract global talent, current Ontario population growth forecasts show little change to growth levels from international sources. This unforecasted population growth causes a shortage of housing, as official plans underestimate housing demand as they are based on population forecasts that are too low.

Cause 2 of the housing shortage – Housing completions underperformed forecasts: Past housing projections have overestimated increases in the housing stock. There is a real risk that this will continue in the future. Despite accelerated population growth, Hemson's forecasted 2021 housing stock for the GTAH was smaller in the 2020 forecast relative to the one made in 2012.

In short, if population growth in the GTAH continues to be higher than forecast, then housing demand will grow faster than planned. If housing completions in the GTAH continue to be lower than forecast, the housing supply will grow slower than planned. This mismatch between demand growth and supply growth will further exacerbate existing housing issues in the GTAH, causing cascading shortages and high prices across southern Ontario.

Accelerated population growth combined with a smaller housing stock than forecast causes excess demand for housing in the GTAH. This excess demand can be resolved in several ways, including families moving out of the GTAH and adults under 35 living with their parents at increased rates. The report *Baby Needs a New Home*² found that nearly 65,000 fewer housing units (of all types) were built between 2016 and 2021 than were needed to support population growth across Ontario. This *excess demand* for housing will continue if the province underestimates future population growth and overestimates future housing completions.

¹ As explained by CMHC (2019), “The expression drive until you qualify has become popular in recent years. It refers to the response households have had to rising home prices. Because of rising prices, many households can’t afford to buy homes in the urban, central sectors of their cities. Households therefore drive further and further... until they find housing they can afford (and a mortgage they can qualify for).”

² Moffatt (2021a)

Past housing shortages naturally lead to the question, *how much larger could the excess demand for housing get if we continue on our current path?*

Estimating past excess demand for housing in the GTAH

To answer our question, we start by estimating excess demand in past years by considering the number of individuals moving out of the GTAH to other parts of the province. This estimate helps us understand how many additional units the GTAH would have needed to build to have prevented the exodus of young families out of the region. It also allows us to forecast how many extra housing units would need to be built to prevent the current exodus from escalating. Our method of estimating excess demand provides a highly conservative estimate, as it excludes the other channels through which excess demand can be resolved, such as adults continuing to live with their parents rather than moving out and beginning new families.

Our interest is in conducting a sensitivity analysis to determine what impact this excess demand may have had at a local level for six census divisions: Durham, Halton, Peel, Simcoe, Toronto, and York. A complicating factor is that much of the current forecasts are at the GTAH level, which includes Hamilton but excludes Simcoe. When examining the performance of past forecasts, we will primarily be examining the GTAH. We will add Simcoe into our sensitivity analysis while retaining Hamilton when conducting that analysis.

In the nine years from 2006-07 to 2014-15, on average, just over 15,000 people, on net, moved out of the GTAH to other parts of the province. Using a methodology adapted from the report *Baby Needs a New Home*³, we find that those 15,000 people could expect to occupy 4,366 ground-level housing units and 1,662 apartment units, which we can use as our conservative estimate of GTAH-level excess demand in the pre-2015 period.

In the five years from 2015-16 to 2019-20, the yearly average net intraprovincial⁴ out-migration from the GTAH increased to 42,749 persons. Our yearly excess demand estimates rise to 10,893 ground-level units and 4,742 apartment units, respectively. Unexpectedly high population growth, coupled with housing completions under forecast, caused excess demand for housing to nearly triple after 2015.

Creating a baseline projection for future excess demand for housing in the GTAH and conducting a scenario analysis

To apply a similar method to estimate future excess demand in the GTAH, we require a population projection or forecast of net intraprovincial out-migration from the GTAH by year and age. Unfortunately, while Ontario has both a set of population forecasts, prepared by Hemson Consulting Ltd⁵, and a set of population projections, prepared by the Ontario Ministry of Finance⁶, neither contains this information. The Hemson numbers include five-year forecasts of net intraprovincial migration from the GTAH. Still, it lacks information on their ages and detailed population estimates by age and gender for the census divisions that make up the GTAH. The Ministry of Finance population projections, on the

³ Moffatt (2021)

⁴ Intraprovincial migration refers to persons moving from one part of Ontario to another. Interprovincial migration, in contrast, refers to people moving to (or from) Ontario from (or to) another province.

⁵ Hemson (2020b)

⁶ Ontario Ministry of Finance (2021)

other hand, do include complete population pyramids, by year, for each of Ontario's 49 census divisions. However, they lack information on intraprovincial migration. Furthermore, Hemson's population forecasts and the Ministry's population projections differ substantially at a local level, as Hemson's forecasts consider supply-side constraints (making them forecasts rather than projections). In contrast, the ones from the Ministry of Finance do not.

To address this problem, we create a demographic model that incorporates elements from both Hemson's forecast and the Ministry's projections, along with past intraprovincial migration trends. A demographic model allows us to create a projection of future net intraprovincial out-migration from the GTA by age and a rough estimate of population pyramids based on the Hemson population forecast. We find that both population and housing demand estimates are very sensitive to the assumptions made. Minor changes compound over time, leading to exponentially increasing (or decreasing) housing demand. Furthermore, the source of unexpected population growth matters; immigration-based population growth tends to be clustered in a few centres and immediately increases the need for housing. An increase in the international student population tends to delay the need for family-sized housing as the population is relatively young. However, after graduating, those students often stay in Canada, eventually gaining permanent residency and forming families, creating demand for family-friendly housing in the GTA.

Our analysis constructs a series of scenarios involving net immigration and net non-permanent⁷ populations being higher than forecast, along with housing completions being lower than forecast. Given that past forecasts have underestimated population growth and overestimated the size of the housing stock, we believe such an analysis is both prudent and necessary. The analysis shows that excess housing demand could be over 100,000 units more than forecast under plausible conditions for any given five-year period.

Our purpose for conducting these scenario analyses is not to improve Hemson's forecast. Rather, it is to show that there is a range of possible outcomes for population growth and housing completions. There is a genuine possibility that Ontario's Growth Plan, which uses Hemson's forecasts as a foundation, could be creating the conditions for the GTA's existing housing shortage to persist. Because the future contains many unknowns, and because the economic, social, and environmental costs of underbuilding housing in the GTA are so high, we believe policymakers must be humble and incorporate contingency buffers into their planning processes, rather than assuming forecasts will be perfectly accurate.

In the conclusion of this paper, we provide ten recommendations to improve forecasting, data, and policy coherence in planning. The first two recommendations are of particular importance:

Recommendation 1: Ontario should prepare a population, employment, and housing stock forecast, released annually, which would adopt the best elements of both the existing forecasts

⁷ Included in the category of non-permanent residents are “persons with a usual place of residence in Canada who are claiming refugee status and the family members living with them”, “persons with a usual place of residence in Canada who hold study permits and the family members living with them”, and “persons with a usual place of residence in Canada who hold work permits and the family members living with them.” As shown in Moffatt (2021a), the overwhelming majority of new non-permanent residents in Ontario are individuals holding study permits (and their family members) and former holders of study permits who now hold work permits under the post-graduation work permit program. The term non-permanent should not be taken too literally, as many non-permanent residents eventually become permanent ones.

and the Ministry of Finance population projections. This would create a unified set of numbers to replace the existing Ministry of Finance population projections.

Recommendation 2: Growth plans should be set to population estimates that are higher than forecast to allow for unavoidable errors in forecasting. Just as government budgets typically have contingency buffers to accommodate unplanned events, so too should growth plans.

Tackling the GTAH and Simcoe's housing shortages will take concerted action from all three levels of government. As such, our recommendations include actions that each can undertake.

Housing shortages have plagued Southern Ontario. Why did they happen, and can we expect more of the same?

The core question that underlies this report can be summarized as follows:

Past forecasts have overestimated future housing completions and underestimated future population growth, contributing to regional housing shortages. Why did this happen, and what will happen if this continues to occur in the future?

Although skyrocketing home prices across Ontario during the pandemic have captured Canada's (and the world's) attention, the province's housing supply issues predate the pandemic. Since approximately 2015, the GTAH has experienced high excess demand for housing, leading to high home prices and out-migration of young families from the region to other parts of Ontario⁸. This excess demand can be traced to unusually rapid (and unexpected) population growth, coupled with housing completions falling under forecasts.

To understand how the future may be like the past, we examine the linkages between existing housing shortages, forecasts, and growth planning. As we will see, the forecasts are essential, as they are not simply predictions, but they are used as a foundation for public policy.

Population and housing forecasts, projections, and why they matter

To inform regional planning, the Province of Ontario tasks the private-sector firm *Hemson Consulting Limited* with developing a technical report, which contains a set of growth forecasts for the Greater Golden Horseshoe region. The most recent technical report, published on August 26, 2020, titled *Greater Golden Horseshoe: Growth Forecasts to 2051*⁹, provides a background on the purpose of their forecasts:

This report presents long-term growth forecasts for the Greater Golden Horseshoe (GGH)...[which] form part of a review of population and employment forecasts contained in Schedule 3 of the Provincial plan *A Place to Grow: Growth Plan for the Greater Golden Horseshoe, 2019* (A Place to Grow or APTG).

⁸ Moffatt (2021a) provides an in-depth analysis to the scope and causes of outmigration from the GTAH.

⁹ Hemson (2020b)

For the last 15 years, the Government of Ontario has been implementing policy changes that will fundamentally affect the way in which the GGH will develop. A key component of the changes is A Place to Grow, which, together with other provincial plans, sets the framework for planning and managing growth in the region. Conformity with A Place to Grow is a statutory requirement and municipalities in the GGH have revised land use, housing, employment, infrastructure, and financial plans accordingly...

Two broad regions within the GGH are defined:

- The Greater Toronto Area and Hamilton (GTAH), incorporating the Cities of Toronto and Hamilton and the Regions of Halton, Peel, York, and Durham; and
- The Outer Ring, surrounding the GTAH, containing the Regions of Niagara and Waterloo, the Counties of Northumberland, Peterborough, Simcoe, Dufferin, Wellington, Brant, and Haldimand, and the Cities of Peterborough, Kawartha Lakes, Barrie, Orillia, Guelph, and Brantford.

The population growth and accompanying housing demand forecasts inform the growth plan, though it is important to note that "policies of [the growth plan] represent minimum standards. Within the framework of the provincial policy-led planning system, decision-makers are encouraged to go beyond these minimum standards to address matters of importance."¹⁰

In 2015, the Ontario government tasked David Crombie with assembling an expert panel to conduct a coordinated review of the Growth Plan. Their findings, published in late 2015 under the title *Planning for Health, Prosperity and Growth*, was unequivocal about the importance of forecasting in municipal planning and the Growth Plan:

Forecasts are fundamental to the Growth Plan and essential to its effectiveness because they enable municipalities to plan for and manage the growth that is coming, and to assess whether they have enough land to accommodate forecast growth within existing settlement areas.¹¹

Given the importance of these forecasts to the planning process, their predictions must be accurate as possible. To analyze their accuracy, we examine three sets of past Hemson forecasts:

- *The Growth Outlook for the Greater Golden Horseshoe*, published in January 2005. We will refer to this as Hemson-05.¹² This set of forecasts, which covered 2001-31, served as the foundation for the *Growth Plan for the Greater Golden Horseshoe 2006*.¹³
- *Greater Golden Horseshoe Growth Forecasts to 2041*, published in November 2012. We will refer to this as Hemson-12.¹⁴ There was a minor addendum to this report, published in June 2013.¹⁵ This set of forecasts, which extended through 2041, served as the foundation for the

¹⁰ Government of Ontario (2020)

¹¹ Government of Ontario (2015)

¹² Hemson (2005)

¹³ Government of Ontario (2006)

¹⁴ Hemson (2012)

¹⁵ Hemson (2013)

- Growth Plan for the Greater Golden Horseshoe 2017*.¹⁶ Despite this Growth Plan going into effect on July 1, 2017, it relied on forecasts from 2012-13.
- *Greater Golden Horseshoe: Growth Forecasts to 2051*, published in August 2020. We will refer to this as Hemson-20.¹⁷ This is an update of a June 2020 release.¹⁸ This set of forecasts, which covered 2021-51, served as the foundation for the *Growth Plan for the Greater Golden Horseshoe 2019 and Amendment 1 (2020) to the Growth Plan for the*
 - *Greater Golden Horseshoe 2019*.¹⁹

The purpose of this examination is not to audit Hemson's performance as a forecaster. Instead, it shows that predictions of population growth are inherently tricky, as they are highly dependent on future policy changes, such as changes to immigration targets or international student policies, which are unknowable to forecasters. As such, it is essential that we recognize the limits of forecasting, that our forecasts be updated frequently and be based on easily accessible data, and that housing policy builds in a contingency buffer for unanticipated population growth. This report makes ten recommendations to help improve planning and avoid housing shortages in the future.

The Hemson forecasts are not the only predictions for future population growth. Once a year, the Ontario Ministry of Finance releases population projections for each of Ontario's 49 census divisions for the next 25 years.²⁰ They were used as the basis for the Smart Prosperity Institute report, *Baby Needs a New Home*²¹, which estimated that the province needs to build one million net new homes between 2021 and 2031, to support future population growth and address existing housing shortfalls.

Examining the three sets of Hemson releases sheds light on two causes of the housing shortage plaguing Southern Ontario.

Cause 1: Population growth from international sources has been higher than past forecasts

Between 2006-07 and 2013-14, the GTAH's net population growth from international sources, including permanent and non-permanent residents, was consistently between 80,000 and 100,000 persons per year, as shown by Figure 1. This dipped in 2014-15, only to heavily rebound in the following years. In the ten years of 2007-16, the GTAH's population growth from international sources grew by less than 85,000 persons per year. In the four years that followed, it averaged over 130,000. The other two regions of Ontario (the GGH's Outer Ring and the rest of Ontario outside the GGH) saw their average yearly population growth from international sources triple between the two periods, albeit from a much lower base.

¹⁶ Government of Ontario (2017)

¹⁷ Hemson (2020b)

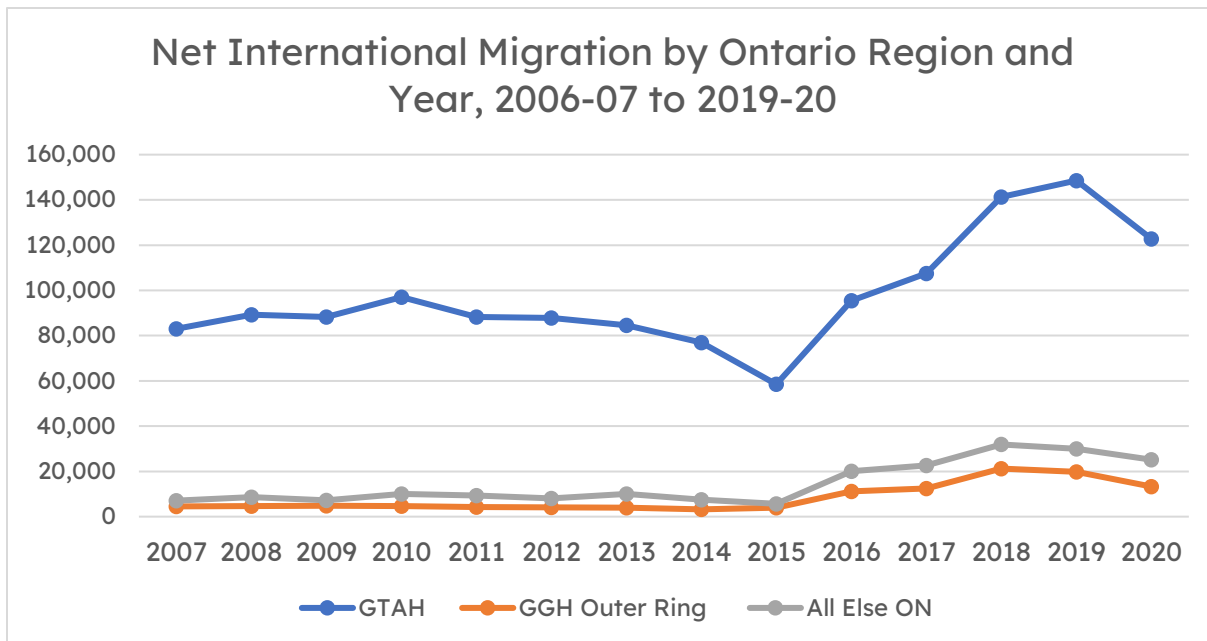
¹⁸ Hemson (2020a)

¹⁹ Government of Ontario (2020)

²⁰ Ontario Ministry of Finance (2021)

²¹ Moffatt (2021a)

Figure 1: Net International Migration by Ontario Region and Year, 2006-07 to 2019-20.²²

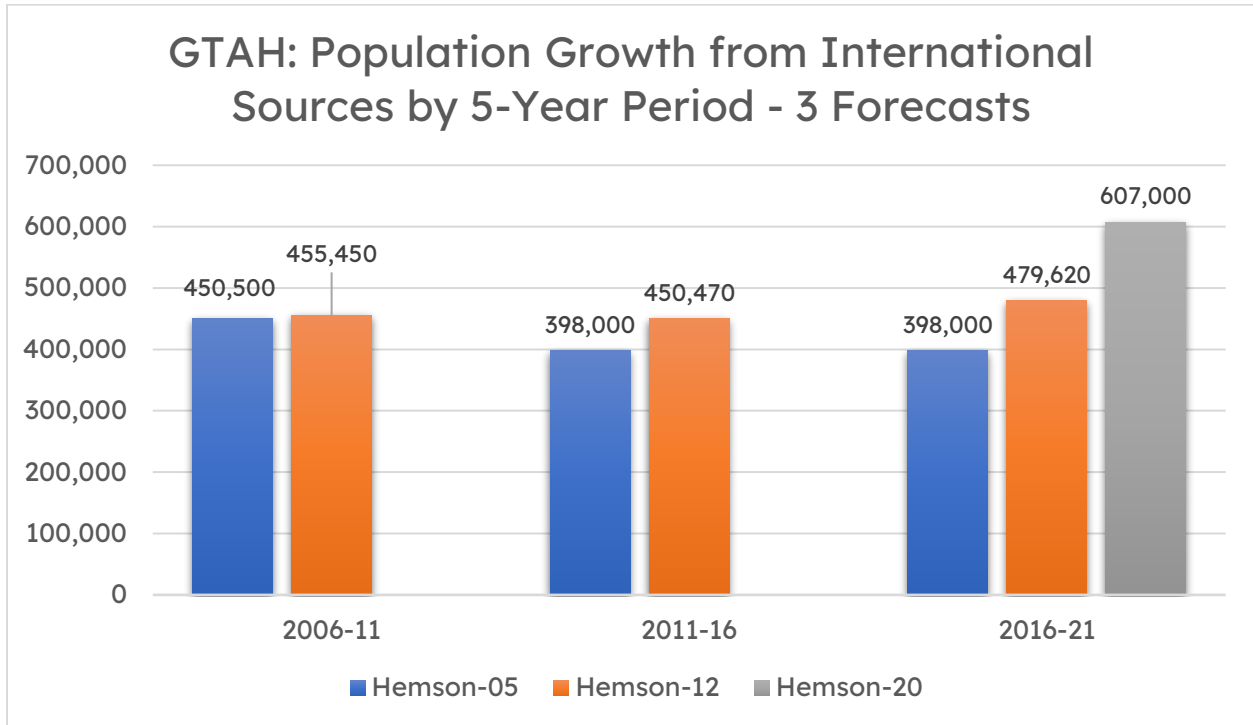


This rapid population growth from international sources was not anticipated, which is reflected in Hemson's population forecasts. Hemson's 2005 forecast (Hemson-05) expected that population growth from international sources would be 398,000 in each of the five-year periods of 2011-16 and 2016-21. These estimates were revised upwards in the 2012 forecast release (Hemson-12) to 450,470²³ and 479,620. As shown in Figure 2, Hemson's 2020 forecast (Hemson-20) for 2016-21 was revised substantially upward to 607,000, an increase of over 120,000 from Hemson-12 and over 200,000 from Hemson-05.

²² Data Source: Statistics Canada Table 17-10-0140-01. Populations (and changes) measured from July 1 of each year, so on the above graph '2020' refers to the changes that occurred between July 1, 2019 and July 1, 2020.

²³ Due to the one-year dip in the 2014-15 numbers, the Hemson-12 forecast for 2011-16 was an instance where population growth was over, rather than under, estimated.

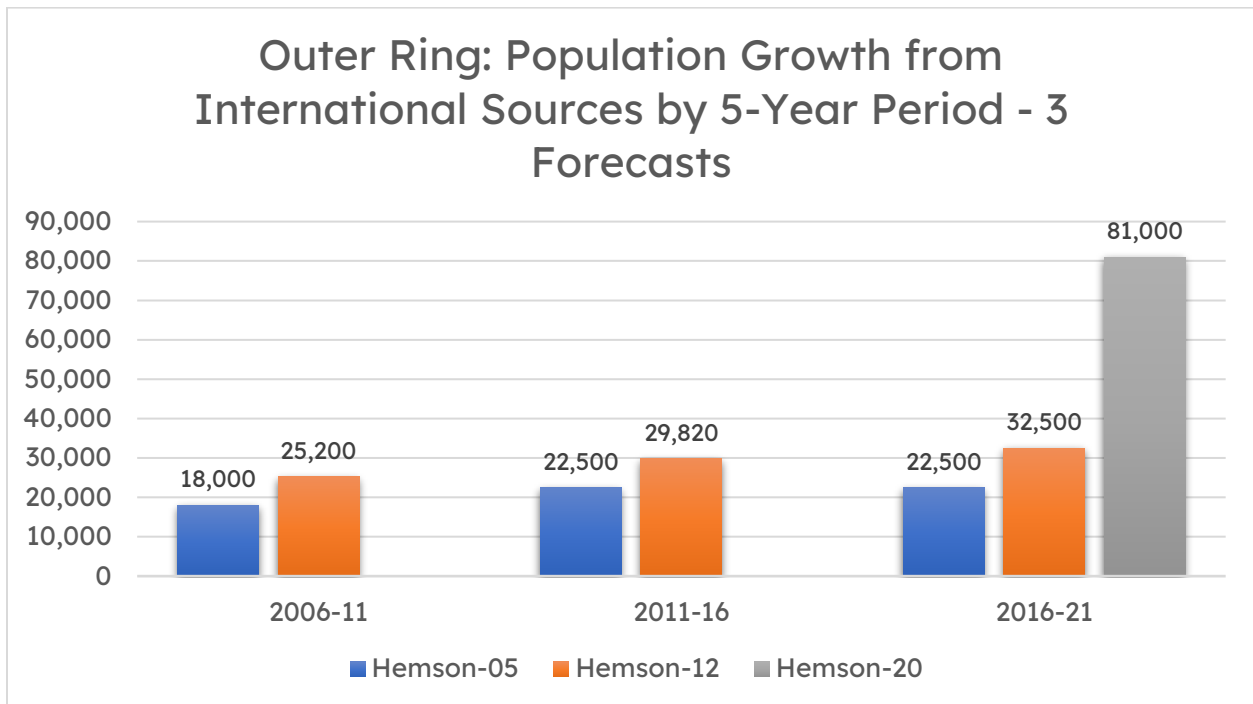
Figure 2: Population Growth from International Sources by 5-Year Period, for the GTAH, from Hemson's 2005, 2012 and 2020 Forecasts.²⁴



The Greater Golden Horseshoe's (GGH) Outer Ring forecasts illustrate a similar dynamic. As Figure 3 shows, the population growth forecasts were revised upward from Hemson-05 to Hemson-12, then again in Hemson-20. The 2016-21 international population growth figures were revised from 22,500 to 32,500 in 2012, jumping to a whopping 81,000 in 2020.

²⁴ Data Sources: Hemson (2005), Hemson (2012), and Hemson (2020b). Populations (and changes) measured from July 1 of each year, so on the above graph '2016-21' refers to the changes that occurred between July 1, 2016 and July 1, 2021.

Figure 3: Population Growth from International Sources by 5-Year Period, for the Greater Golden Horseshoe's Outer Ring, from Hemson's 2005, 2012 and 2020 Forecasts.²⁵



More homes must be built to accommodate population growth higher than forecast. Unfortunately, the housing stock for most communities in the GTAH was lower in 2020 than what was forecasted in Hemson-12.

²⁵ Data Sources: Hemson (2005), Hemson (2012), and Hemson (2020b). Populations (and changes) measured from July 1 of each year, so on the above graph '2016-21' refers to the changes that occurred between July 1, 2016 and July 1, 2021.

Cause 2: GTAH housing completions have been lower than forecasts

Hemson's outlook reports provide forecasts on population, employment, and the future size of the housing stock. They have used different ways to categorize housing into types; for example, the August 2020 report²⁶ breaks housing into four classifications: single and semi-detached houses, rowhouses, accessory units, and apartment units. For simplicity, this report will adopt the approach of Hemson's July 2020 report²⁷, which classifies housing into apartment units and ground-level units, which are simply all housing types that are not apartments.

Comparing housing forecasts across reports is difficult due to the changing housing classifications, particularly regarding accessory units. Figure 4 provides details on the classification systems used in the four Hemson reports and how to reconcile them:

Figure 4: Housing Classification Types in Hemson Outlook Reports²⁸

Report	Classification Types	Treatment of Accessory Units
Hemson, 2005	Four categories: Single-Detached, Semi-Detached, Rows, and Apartments.	Both the accessory unit and the house containing the unit are treated as apartments: "Single, semi and row units generally follow the common usage definition of these units, though none of these definitions allow for stacking of units. Stacked rowhouses or singles/semis with accessory units become apartments (e.g. a house with a basement suite is counted as two duplex apartment units)."
Hemson, 2012	Four categories: Single-Detached, Semi-Detached, Rows, and Apartments	No indication in the report of how accessory units are treated. It appears they are treated identically to Hemson 2012.
Hemson, July 2020	Two categories: Ground-related and apartments.	No indication in the report of how accessory units are treated. Apartments are now defined as units in "apartment buildings." Accessory units and the houses that contain them are now not considered apartments but are instead

²⁶ Hemson (2020b)

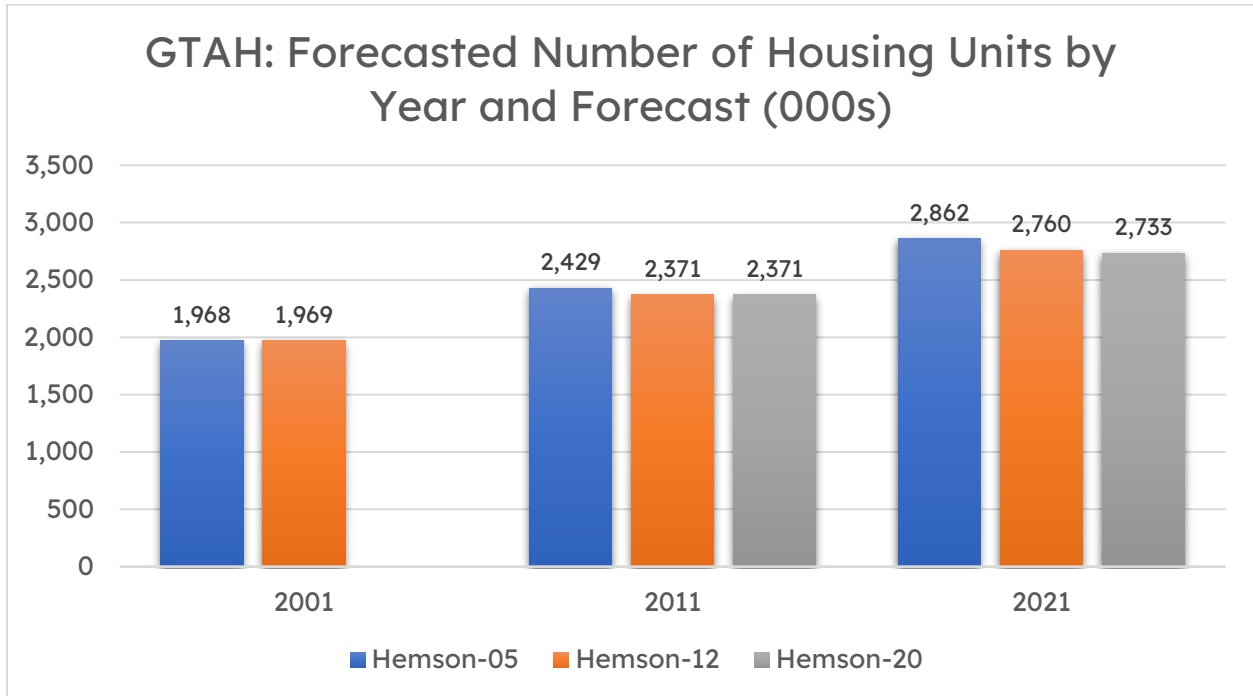
²⁷ Hemson (2020a)

²⁸ Hemson (2005, 2012, 2020a, 2020b)

		considered ground-level housing.
Hemson, August 2020	Four categories: Singles/ Semi-Detached, Rows, and Apartments	Single-Detached and Semi-Detached are now combined as a category. Accessory units were introduced as a separate category.
Our report	Two categories: Ground Level and Apartments	Treatment identical to Hemson 2012. Accessory units and the homes they contained were both treated as ground-level units. "Singles/Semis also includes existing houses where an accessory unit has been added... Accessory Units are apartments added to an existing single-detached or semi-detached house. Apartments comprise all apartment buildings, whether greater than or less than 5 storeys."

Because of the changing categorizations across forecasts, we will limit our cross-forecast comparisons to a single category of 'housing units.' In 2005, Hemson forecasted that the GTAH would have 2,862,000 housing units in 2021. By 2012, this forecast had been lowered by 102,000 units to 2.76 million, then was downgraded again by an additional 27,000 units to 2,733,000 housing units, as shown by Figure 5.

Figure 5: Forecasted Number of Housing Units by Year for the GTAH in Three Hemson Forecasts: 2005, 2012, and 2020.²⁹

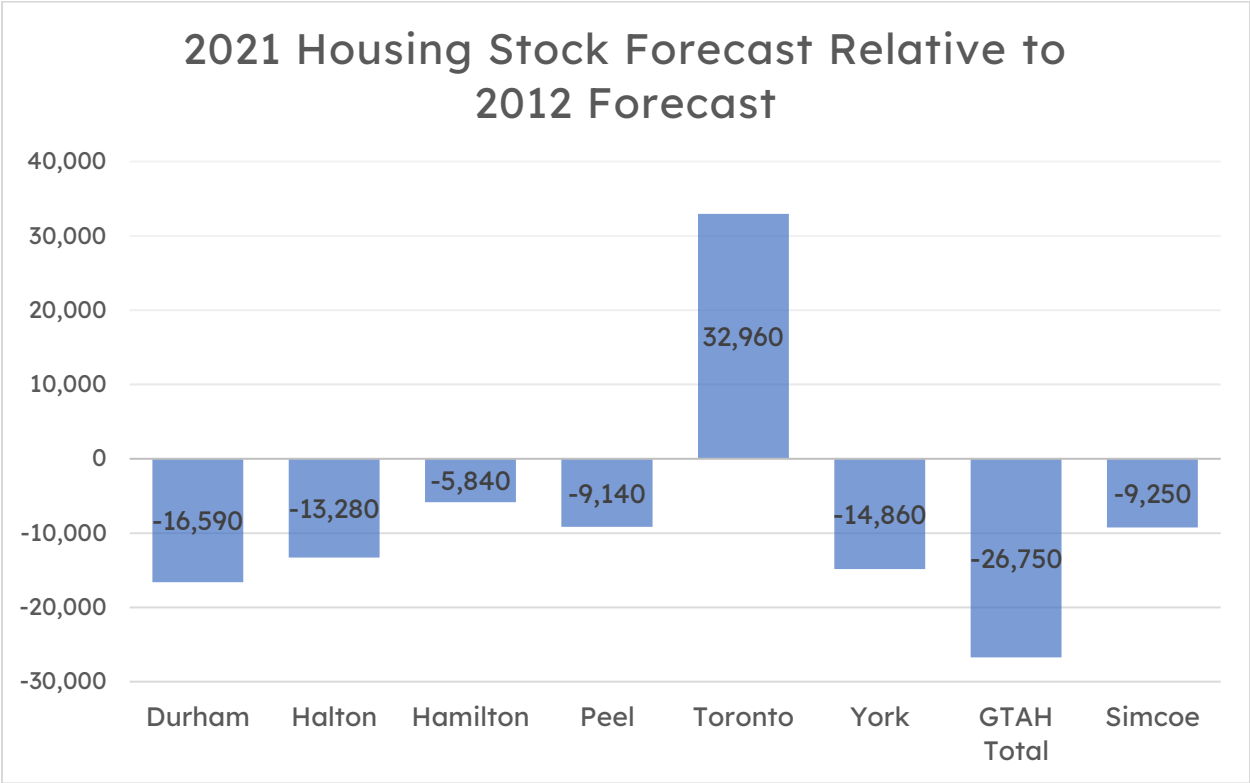


When breaking the GTAH data down by census division, we see that only one of the six communities (Toronto) did the 2021 housing stock forecast in 2020 exceed that in 2012, as shown by Figure 6. Although final 2021 housing stock numbers were not in when Hemson published the forecast in August 2020, it is almost certainly likely that five of the six census divisions will have underbuilt homes compared to their 2012 forecasts. In Figure 7, we have also included data for the Simcoe Census division, which also experienced a reduction in the forecasted size of the housing stock.³⁰

²⁹ Data Sources: Hemson (2005), Hemson (2012), and Hemson (2020b).

³⁰ Hemson-20 lowered the forecasted size of the housing stock, relative to Hemson-12 by 440 in Simcoe county, 810 units in Barrie, and 640 in Orillia.

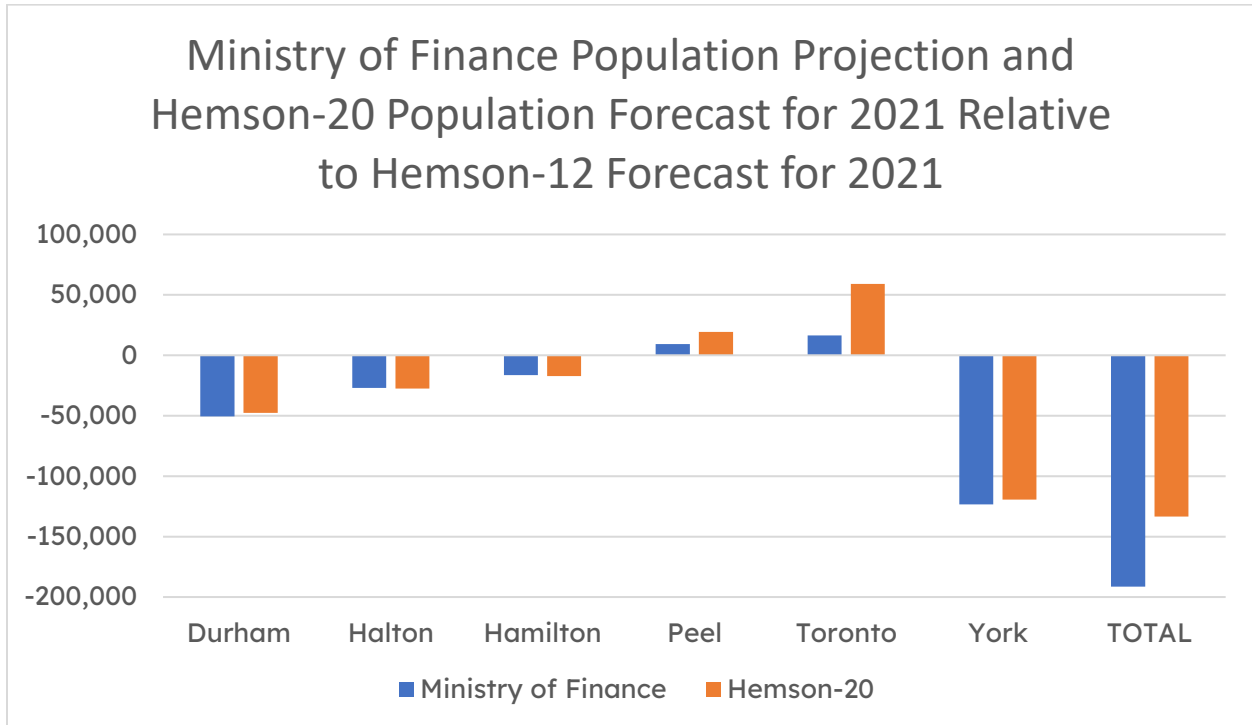
Figure 6: Change in Total Housing Stock Forecast, for each GTA/Census Division, between Hemson's 2020 and 2012 Forecasts.³¹



Not surprisingly, when communities build less housing than forecast, their populations rise less than forecast. We do not currently have final population numbers for 2021, but we do have Hemson's population forecast, along with the population projections from the Ontario Ministry of Finance. Although there are significant differences between Finance's projections and Hemson's forecasts (likely due to differences in assumptions regarding the return of international students during the pandemic), both show that in four of the six Census Divisions that comprise the GTA, the population grew slower than forecast in 2016-21, with total GTA population falling over 100,000 persons short of projections (refer to Figure 7).

³¹ Data Sources: Hemson (2012) and Hemson (2020b).

Figure 7: Ministry of Finance Population Projection and Hemson's 2020 Population Forecast for 2021 Relative to Hemson's 2012 Forecast for 2021.³²



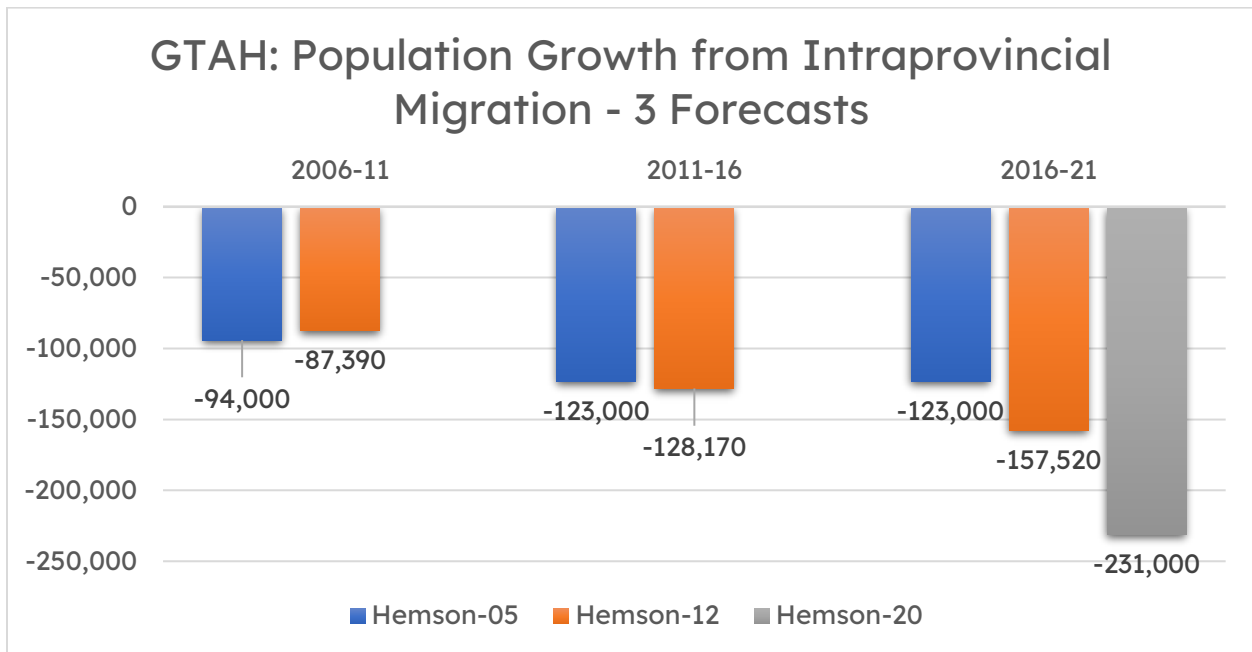
The total population for the GTA for the year 2021 was substantially revised in Hemson's 2020 forecast relative to Hemson-12. Specifically, the 2020 forecast projected 120,000 fewer individuals in 2021 compared to the forecasting exercise conducted in 2012. However, Hemson-20 also forecasted immigration from international sources to be 120,000 persons *higher* in 2016-21 than in Hemson-12. Despite the higher-than-expected population growth in the GTA from international sources, the overall population increase was offset by people out-migrating to other parts of the province due to housing shortages.

The Exodus from the GTA

Per the 2005 Hemson forecasts, the GTA was set to experience a net out-migration of 123,000 individuals from 2016-2021 to the rest of the province. By 2012, that forecast was increased to 157,250; it was further increased by 231,000 in 2020 (see Figure 8).

³² Data Sources: Hemson (2012), Hemson (2020b), Ontario Ministry of Finance (2021).

Figure 8: Forecasted Net Intraprovincial Migration for the GTAH by Five-Year Period in Three Hemson Forecasts: 2005, 2012, and 2020.³³

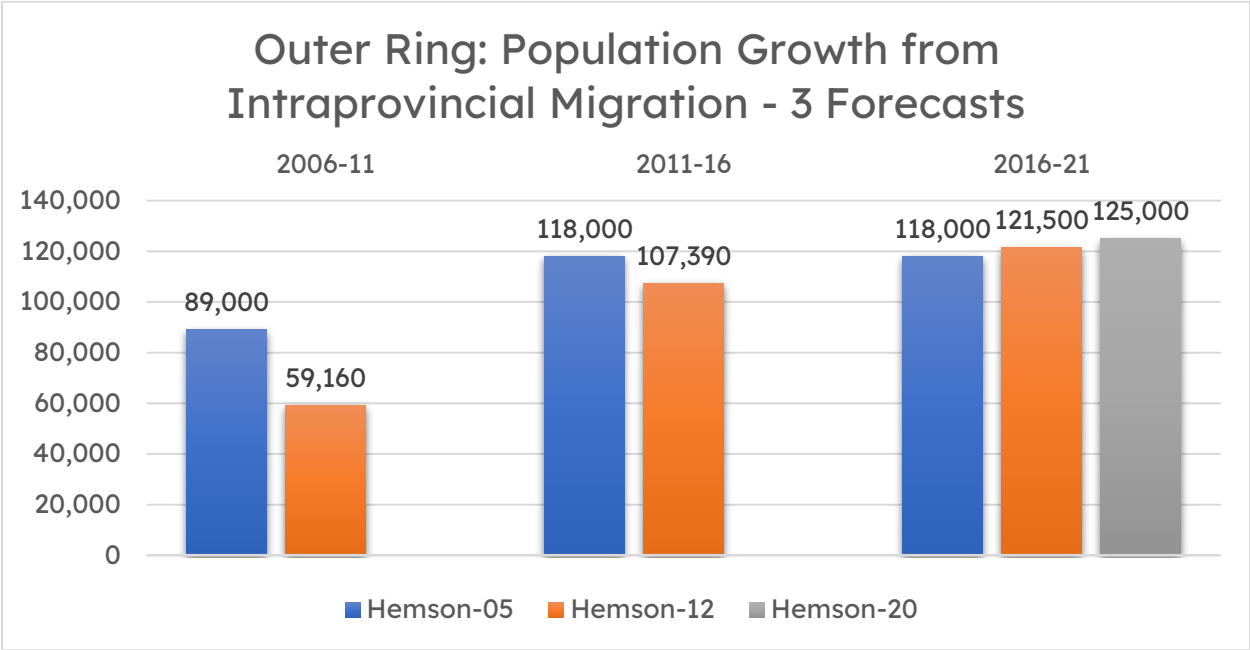


Some of these individuals were migrating out of the GTAH area into the outer ring of the Greater Golden Horseshoe.³⁴ Specifically, this intraprovincial migration for the 2016-2021 period was forecasted to be 118,000 in 2005, 121,500 in 2012, and 125,000 in 2020, as shown by Figure 9.

³³ Data Sources: Hemson (2005), Hemson (2012), and Hemson (2020b). Populations (and changes) measured from July 1 of each year, so on the above graph '2016-21' refers to the changes that occurred between July 1, 2016 and July 1, 2021.

³⁴ The Outer Ring, surrounding the GTAH, containing the Regions of Niagara and Waterloo, the Counties of Northumberland, Peterborough, Simcoe, Dufferin, Wellington, Brant, and Haldimand, and the Cities of Peterborough, Kawartha Lakes, Barrie, Orillia, Guelph, and Brantford.

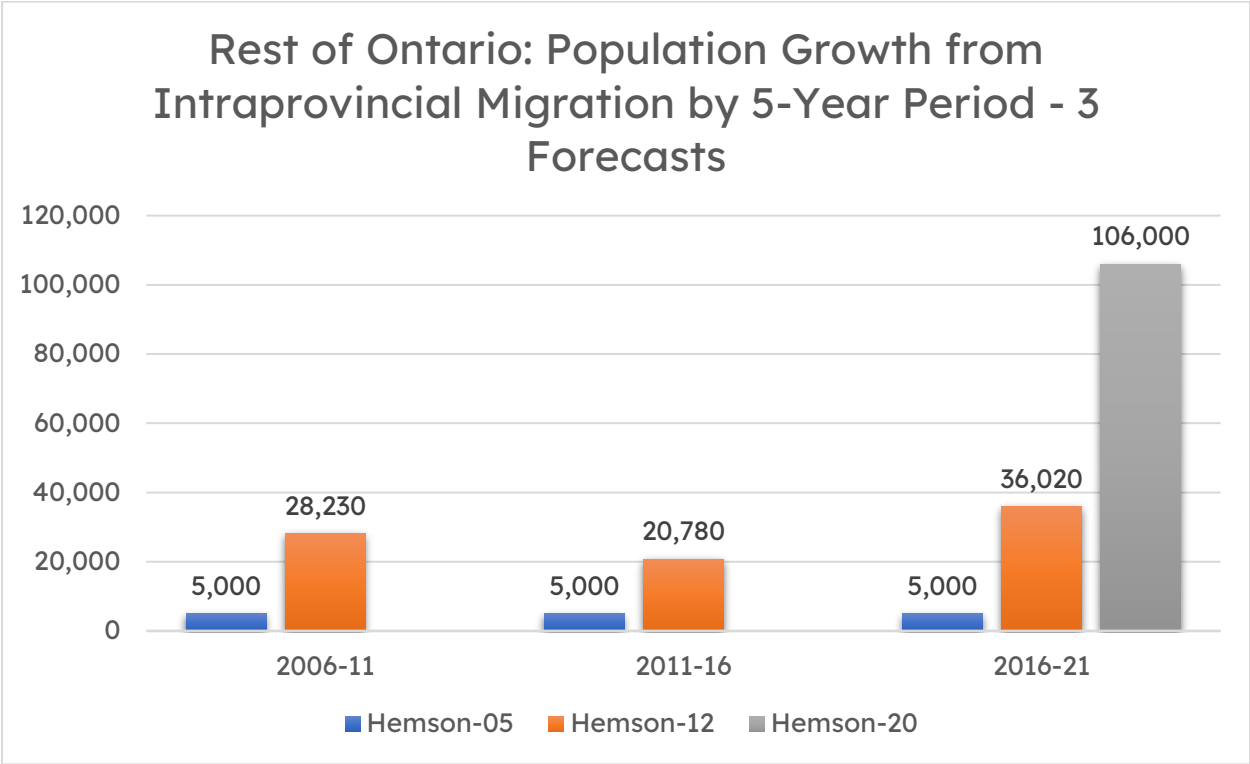
Figure 9: Forecasted Net Intraprovincial Migration for the Greater Golden Horseshoe's Outer Ring by Five-Year Period in Three Hemson Forecasts: 2005, 2012, and 2020.³⁵



Beyond these patterns, the most significant change was the forecasts of net intraprovincial migration to the rest of the province over the 2016-2021 period. Specifically, around 5,000 people were forecasted to move from the GGH to other parts of Ontario in Hemson-05. This forecast jumped to 36,020 in Hemson-12 and to 106,000 in Hemson-20, a 21-fold increase from 2005's forecast (see Figure 10).

³⁵ Data Sources: Hemson (2005), Hemson (2012), and Hemson (2020b). Populations (and changes) measured from July 1 of each year, so on the above graph '2016-21' refers to the changes that occurred between July 1, 2016 and July 1, 2021.

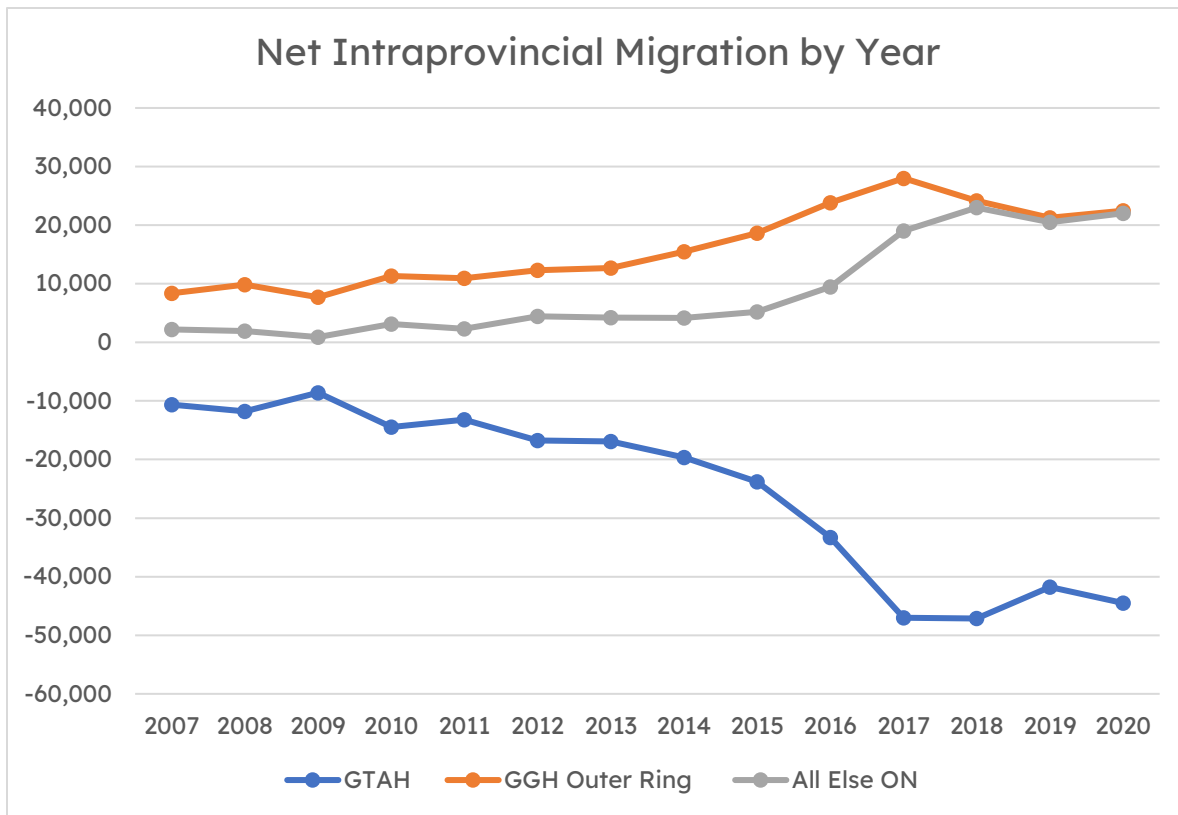
Figure 10: Forecasted Net Intraprovincial Migration for the Rest of Ontario (outside the Greater Golden Horseshoe) by Five-Year Period in Three Hemson Forecasts: 2005, 2012, and 2020.³⁶



These migration patterns highlight that the failure to build enough housing in the GTA/H creates real estate demand spillovers to the rest of the province. As shown by Figure 11, net population out-migration from the GTA/H was consistently under 20,000 persons a year until 2014-15. By 2016-17, that figure reached nearly 50,000 and stayed at that level. At the GGH level, only a marginal number of people were migrating out of the GGH to other parts of Ontario until 2015-16; by 2017-18, more than 20,000 persons, on net, per year were doing so.

³⁶ Data Sources: Hemson (2005), Hemson (2012), and Hemson (2020b). Populations (and changes) measured from July 1 of each year, so on the above graph '2016-21' refers to the changes that occurred between July 1, 2016 and July 1, 2021.

Figure 11: Net International Migration by Ontario Region and Year, 2006-07 to 2019-20.³⁷



The population pyramid in Figure 12 shows the level of out-migration from the GTAH, by age and sex, for two five-year periods: 2010-15 and 2015-20. In 2010-15, people in almost every age group moved out of the GTAH to other parts of the province. The only exception was 20-to-24-year-olds, who were more likely to move to the GTAH than from it³⁸. These trends changed in 2015-20, with all age groups, on net, moving out of the GTAH area, with the most significant changes experienced by three groups: Children under the age of five and adults between the ages of 25-29 and 30-34.

³⁷ Data Source: Statistics Canada Table 17-10-0140-01. Populations (and changes) measured from July 1 of each year, so on the above graph '2020' refers to the changes that occurred between July 1, 2019 and July 1, 2020.

³⁸ Mostly due to students from other parts of the province moving to the GTAH for post-secondary educational opportunities.

Figure 12: Net Intraprovincial Population Loss by Age and Sex for the GTAH by two Five Year Periods, 2010-15 to 2015-20.³⁹

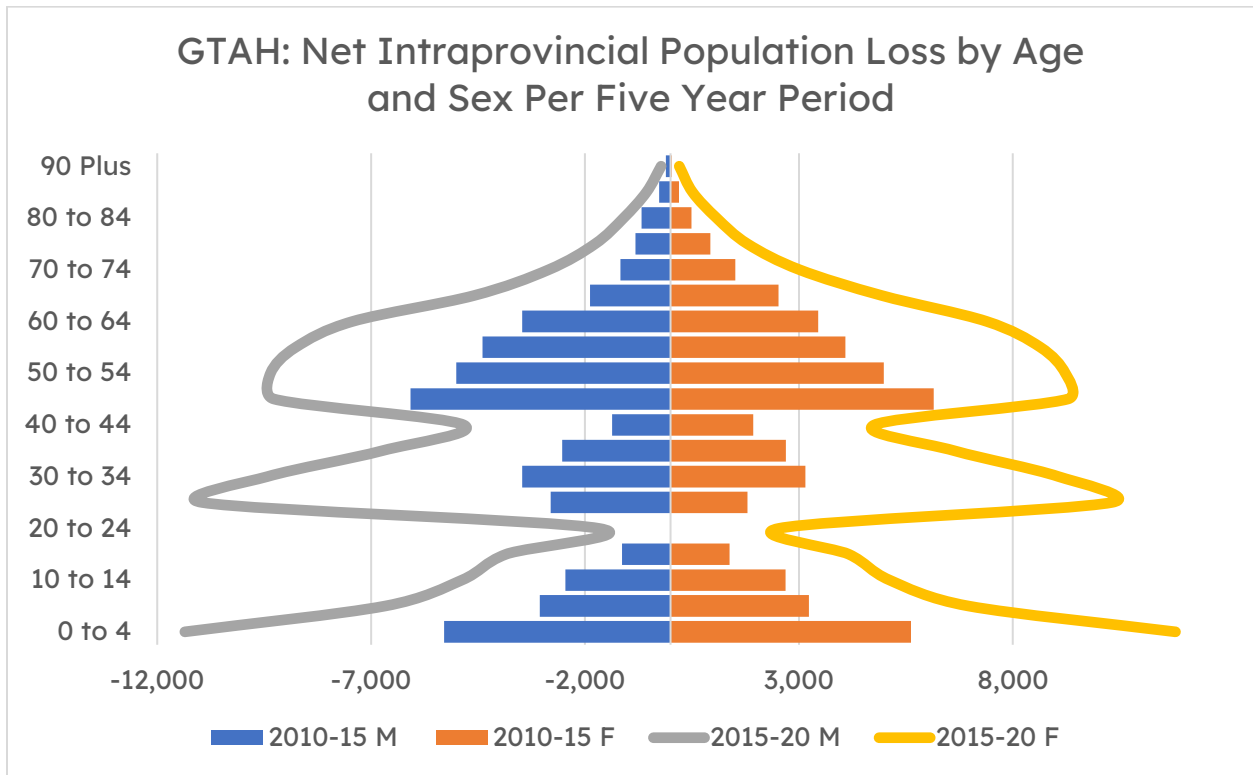


Figure 13 illustrates these movement patterns by examining the five age categories with the most significant net intraprovincial out-migration. In 2010-15, the list was dominated by 45-to-64-year-olds. By 2015-20, 25–34-year-olds were near the top spots.

Figure 13: Net Intraprovincial Population Loss by Age and Sex, Ranked in Order of Largest Net Out-migration, for the GTAH by two Five Year Periods, 2010-15 to 2015-20.⁴⁰

Rank	2010-15 Group	2010-15 #	2015-20 Group	2015-20 #
#1	45-to-49	12,237	0-to-4	23,160
#2	0-to-4	10,913	25-to-29	21,257
#3	50-to-54	9,994	50-to-54	18,581
#4	55-to-59	8,481	45-to-49	18,559
#5	60-to-64	6,924	30-to-34	18,503

In other words, both the amount and the composition of intraprovincial out-migration from the GTAH changed after 2015. Before 2015, it was dominated by middle-aged adults. After 2015, mostly younger

³⁹ Data Source: Statistics Canada Table 17-10-0140-01. Populations (and changes) measured from July 1 of each year, so on the above graph '2015-20' refers to the changes that occurred between July 1, 2015 and July 1, 2020.

⁴⁰ Data Source: Statistics Canada Table 17-10-0140-01. Populations (and changes) measured from July 1 of each year, so on the above graph '2015-20' refers to the changes that occurred between July 1, 2015 and July 1, 2020.

people, specifically young parents and their preschool-aged children, moved out of the GTA. This group's lack of housing options caused them to *drive until they qualify* to other parts of the province, often out of the Greater Golden Horseshoe area entirely to elsewhere in Ontario.

Why did population growth from international sources accelerate, and why did our forecasts miss it?

Ours is not the first report to raise concerns about the harms caused by Ontario population forecasts that miss the mark. In 2015 David Crombie's expert panel flagged this issue, though their concern was that population forecasts were *overestimating* population growth.⁴¹

In addition, many municipalities have indicated that both the population and employment forecasts in the Growth Plan appear to be too high or anticipate growth too early in most areas of the GGH (outside the City of Toronto). As a result, there are concerns that, if the forecasted growth does not materialize, municipalities may be in a situation where they have built more infrastructure than needed and are forced to carry infrastructure-related debt for longer than anticipated because development charges and tax revenues are not available at the right time. There is also potential to designate more land for development than will actually be required to meet Growth Plan forecasts.

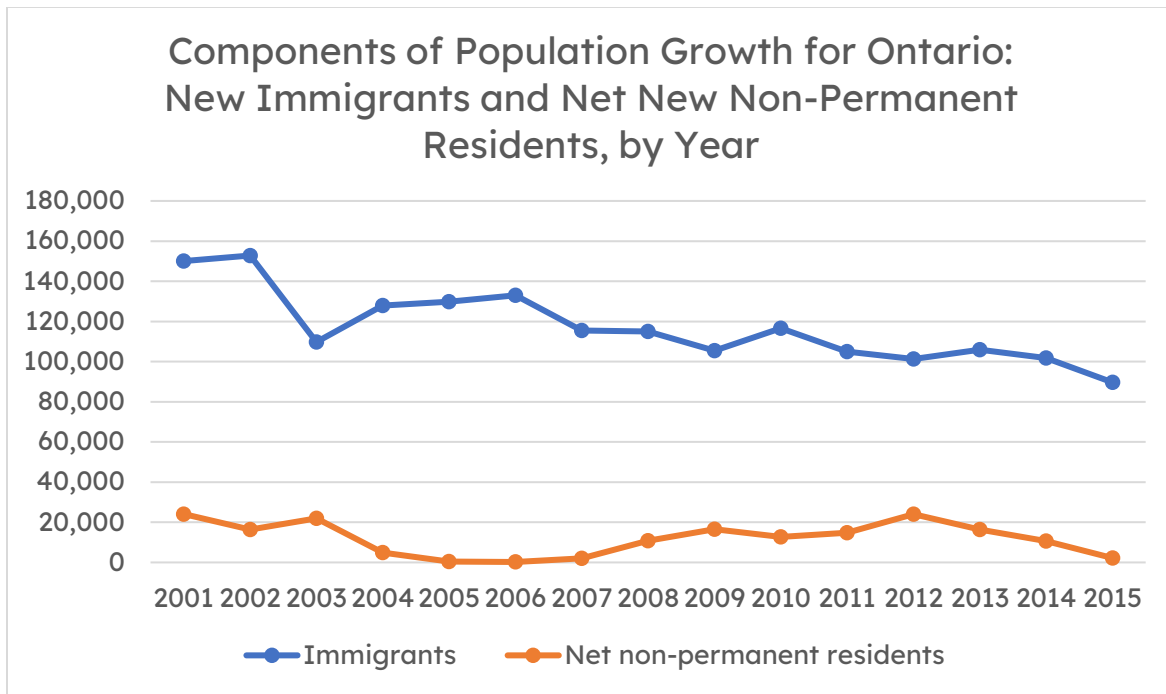
The Crombie panel also noted the disconnect between the Ministry of Finance's population projections and the Growth Plan's population forecasts:

These concerns about the Growth Plan forecasts stem in part from the latest population projections from the Ministry of Finance (MOF) that show slower growth for most of the province. MOF produces annual population projections for the entire Province of Ontario and reviews the demographic assumptions underlying its projections every year. With each successive update, MOF projections have been lowered based on the latest demographic data available, which show slower immigration and lower fertility than anticipated in 2013 when the Growth Plan was amended.

Their concerns become understandable when examining population growth data from 2001 to 2015. Figure 14 provides Ontario-wide population growth figures for immigrants and net non-permanent residents. They show a secular decline in immigration from 2005-06 to 2014-15, and a small boom in new non-permanent residents, which had peaked in 2011-12 and was heading to zero.

⁴¹ Government of Ontario (2015)

Figure 14: Immigrants and Net Non-Permanent Residents in Ontario, by Year.⁴²

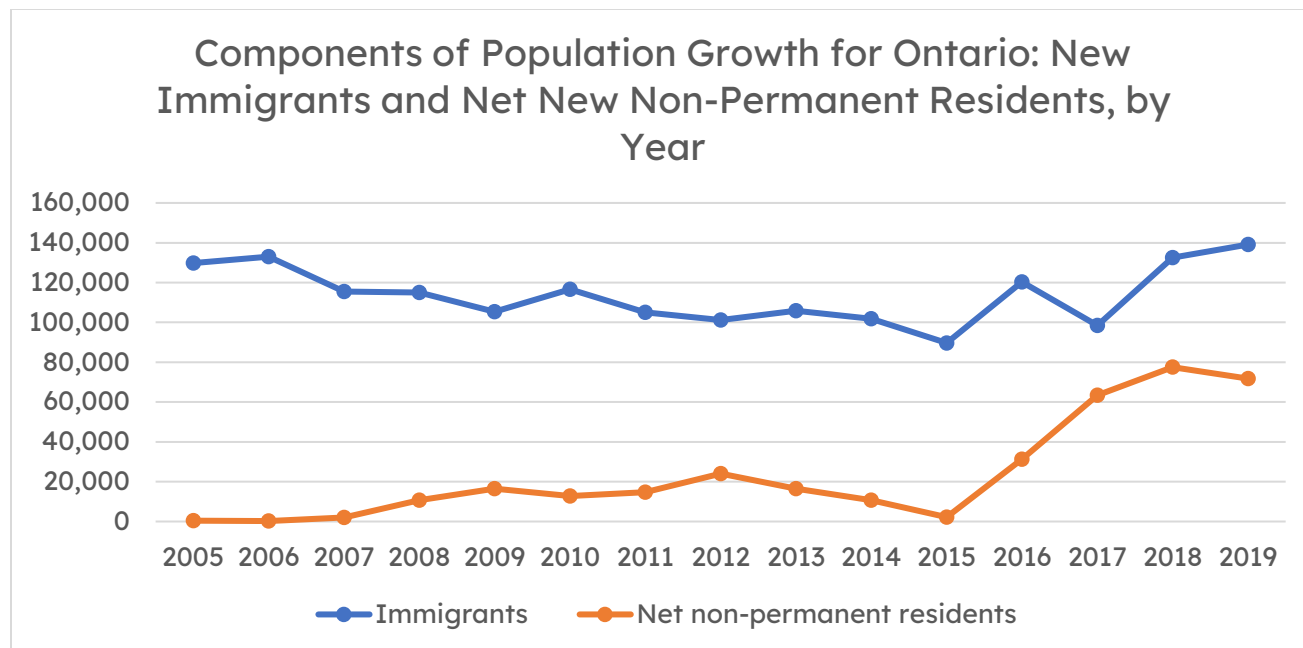


These trends, however, would suddenly reverse course. In Figure 15, we see that both the number of new immigrants and non-permanent residents to Ontario increased substantially from 2015-16 to 2018-19.⁴³

⁴² Data Source: Statistics Canada Table 17-10-0140-01. Populations (and changes) measured from July 1 of each year, so on the above graph '2015' refers to the changes that occurred between July 1, 2014 and July 1, 2015.

⁴³ The year 2018-19 is the last full non-pandemic year.

Figure 15: Immigrants and Net Non-Permanent Residents in Ontario, by Year.⁴⁴



However, despite this rapid change in population dynamics in 2015-16, the 2017 Growth Plan continued to rely on population projections from 2012-13, which pre-dated the rapid growth in international students.

Hemson-20 provides insights on why the immigration and net non-permanent resident numbers suddenly rose after 2014-15 and why their 2012 forecast missed the mark. On immigration, they note that changes to federal immigration targets played a key role, stating that the Canada-wide "immigration target for 2019 was 330,800, with a plan for 341,000 in 2020 and 350,000 in 2021... [t]his represents a significant increase from the target range of 240,000 to 265,000 in 2012". They also note that Ontario's proportion of new immigrants rose after the "introduction of the Express Entry system for skilled workers in 2015."⁴⁵

The sudden increase in net non-permanent residents is due to a rapid increase in the number of international students studying in Ontario. Hemson notes that the term *non-permanent resident* is a bit of a misnomer, as studying in Canada is a gateway to permanent residency. In their words:

Non-permanent residents (NPRs) from another country who had a work or study permit, or who were refugee claimants at the time of the Census, as well as family members living with them in Canada, are counted in the Census. As such, NPRs are included in the base population for all data used in the Schedule 3 forecasts, such as households, housing and labour force activity.

⁴⁴ Data Source: Statistics Canada Table 17-10-0140-01. Populations (and changes) measured from July 1 of each year, so on the above graph '2015' refers to the changes that occurred between July 1, 2019 and July 1, 2015.

⁴⁵ Hemson (2020b)

Prior to 2013, the NPR population in Ontario had never exceeded 300,000; it is currently about 580,000.

Much of the recent growth in NPRs is due to international students and their families settling in the GGH. Canada's stable immigration system, which offers an easy pathway to employment and permanent residency after graduation, together with successful recruiting strategies by public and private colleges and universities, have made the GGH very attractive for international students.

Although the majority of these students become permanent residents, information about where they ultimately settle is limited. Consistent with the Ministry of Finance Population Projections, the Schedule 3 forecasts assume that the number of NPR students will remain high even as the rate of NPR student growth slows.⁴⁶

Several federal policy changes have made post-secondary education a more attractive pathway to permanent residency. There were many significant changes, including the introduction of the Express Entry system. However, there are two that stand out as being particularly important:

- Introduction of the Canadian Experience Class (CEC) in 2008, which provides a pathway for international students to obtain permanent residency. Included in the reforms were rules that allowed international students to obtain a 3-year work permit after graduation, up from the previous 1-2 years.⁴⁷
- Reforms that allow international students to work off-campus, for 20 hours a week during study terms, and full-time during regularly scheduled breaks, without applying for a work permit. These reforms went into effect on July 1, 2014, making it easier for international students to finance their studies and accommodations.⁴⁸

It is important to note that these reforms were designed to have post-secondary education be an ever-increasing path to permanent residency. In 2008, then Minister of Citizenship and Immigration, Diane Finley indicated that the federal reforms "will help create a pool of individuals who, with work experience, will find it easier to apply to immigrate to Canada... our ability to retain international graduates with Canadian qualifications, work experience and familiarity with Canadian society, will help increase our competitiveness and benefit Canada as a whole."⁴⁹

In retrospect, the reforms of 2008 and 2014 were more transformative than Ontario policymakers and forecasters recognized at the time. Ministry of Finance population projections did not anticipate population growth driven by international students, nor did Hemson's 2012 population forecasts. The Crombie report of 2015 was (understandably) concerned about falling, rather than rising, population growth from international sources. The report makes no mention of international students at all. The 2017 Growth Plan was not updated to reflect the changes in international student rules in 2014, and the introduction of Express Entry in 2015, choosing to instead to use population forecasts from 2012-13, which predate those reforms. And these trends are still poorly understood today, with a December 2021

⁴⁶ Hemson (2020b)

⁴⁷ CanadaVisa (2021)

⁴⁸ Government of Canada (2021)

⁴⁹ Government of Canada (2008)

Auditor General's report (correctly) acknowledging the difficulty in making population forecasts but framing the discussion of immigration forecasts being too high rather than too low:⁵⁰

The gap between actual and forecast growth can be due to a number of factors that are beyond municipalities' control, such as an erroneous methodology or assumptions in calculating growth forecasts, a prolonged economic downturn, restrictive immigration policies and people's preferences about where to live.

For Hemson to have accurately forecasted population growth from international sources in 2012, they would have needed to anticipate the 2014 reforms to off-campus work rules for international students, the introduction of the Express Entry system, and then estimate the impact those would have on population growth. That is an exceptionally tall order, particularly considering that the effects of *past* policy changes are still poorly understood, as shown by the Auditor General's report. Developing accurate long-run forecasts in an environment of rapid policy changes is a Herculean task. It illustrates the need for more regularly updated forecasting, along with uncertainty built into existing forecasts.

These out-of-date forecasts underestimated the need for housing within the GTA, leading to an accelerated exodus of young families to the Outer Ring of the GGH and out of the GGH entirely. This exodus created lasting economic harm to the GTA.

The economic burden of the GTA's housing shortages

A lack of housing options and an exodus of young families from the GTA have negative economic consequences. In a 2021 report titled *The Cost of Inaction*, the Toronto Region Board of Trade (TRBOT) estimated the housing "affordability crisis" due to a shortage of housing costs the GTA⁵¹ between \$5.88 and \$7.98 billion per year. These costs come from various sources, including families *driving until they qualify* out of the GTA. The breakdown of estimated costs are as follows:

- \$3.05 billion in lost economic output due to workers *driving until they qualify* outside of the GTA.
- \$2.0-2.8 billion in additional wages paid to existing GTA workers to compensate for higher regional housing costs.
- \$0.18 billion in additional costs due to the need for increased employer recruitment to hire workers lost to *drive until you qualify*.
- \$0.65-\$1.95 billion in lost productivity from workers commuting longer distances from home to work due to a lack of local housing.

These costs are likely underestimated, as additional costs are not considered in this analysis, such as the additional greenhouse gas emissions from those longer commutes and the loss of farmland and wetlands. And those economic costs will rise in the future; a second TRBOT report, titled *Priced Out*⁵², examines the jobs likely to be created in the warehousing, distribution, and cleantech manufacturing industries in the GTA that may go unfilled due to a lack of housing. The region must have an adequate

⁵⁰ Office of the Auditor General of Ontario (2021)

⁵¹ Which TROBOT defines as the Toronto CMA (Census Metropolitan Area)

⁵² Moffatt, Atiq, and Islam (2021)

supply of housing to attract and retain talent, including the skilled trades workers needed to build that necessary housing.

The issue is a lack of policy coherence, not immigration

Given the housing shortage, we do not doubt that some will conclude that the problem is that immigration levels are too high. They will argue that the GTAH could solve the housing supply issue by simply reducing immigration targets. We believe this is a gross misreading of the situation and would cause substantial economic harm. It misses the mark for four reasons:

1. Increased immigration targets did not primarily cause Ontario's increased population growth. There were several causes, the largest and most important of which was a series of federal policy changes that increased the number of international students and graduates residing in Canada.
2. There are substantial benefits to having international talent obtain their credentials in Canada before gaining immigration status due to difficulties assessing the value of foreign credentials.
3. Ontario's Growth Plan is built on a population growth forecast, and that forecast did not account for increased population growth. Had Ontario's Growth Plan anticipated higher levels of population growth or had a contingency buffer, an adequate supply of housing could have been built in the GTAH to accommodate this growth.⁵³
4. Immigration is necessary for the competitiveness of the GTAH and to ensure an adequate supply of skilled labour to offset population ageing.

Offsetting population ageing is particularly important to Canada's economy. A 2019 study by the Conference Board of Canada⁵⁴ estimates that between 2018 and 2040, 13.4 million workers will leave the Canadian labour force due to population ageing, but only 11.8 million Canadians will leave school and join the labour force, a gap of 2.2 million workers. The report suggests that gradually increasing Canada's immigration rate to 1 percent of the population (from the current 0.8 percent level) would "contribute some 5.3 million workers to the labour force and one-third of the economic growth rate between 2018 and 2040."

Immigration also plays a crucial role in innovation. A December 2021 report by Canada's Century Initiative⁵⁵ finds that despite immigrants making up only 22 percent of Canada's population, they are founders or co-founders of one-third of Canada's high-growth private tech companies. Given the importance of the tech industry to the prosperity of the GTAH, trying to solve the housing shortage through reduced immigration would be simply trading one problem for another. Instead, the solution

⁵³ A counter argument to this point is that the Growth Plan, and the population forecasts that underpin it, play no role in the amount of housing that actually gets built in the GTAH, and that higher population forecasts would not have had a meaningful effect in changing the amount of housing that was built. We share the viewpoint of the Crombie panel of the importance of these forecasts and that they do play a meaningful role. With that in mind, we do believe it is worth examining the utility that population forecasts play in planning, to determine their usefulness.

⁵⁴ McArthur-Gupta, El-Assal, and Bajwa (2019)

⁵⁵ Century Initiative (2021)

should be to find ways to improve our forecasting and planning processes to accommodate higher population growth rates.

Drive until you qualify: Quantifying the role the housing shortage played in the exodus from the GTAH

The narrative so far in this report can be summarized as follows:

1. Between 2016 and 2021, the population grew faster than forecast due to higher growth from international sources than in 2012's forecast.
2. Despite this rapid population growth, the number of housing units in the GTAH is below 2012's forecasts.
3. Increased population growth coupled with a smaller than forecasted housing stock caused existing GTAH residents to *drive until you qualify* to other parts of the province.

The data heavily support this narrative. Figure 16 summarizes a few data points from Hemson's 2012 forecasts for the GTAH with those made in 2020, for 2016-21. Despite the GTAH adding over 120,000 extra persons (above forecast) from international sources between 2016 and 2021⁵⁶, the number of housing units built was 27,000 under forecast⁵⁷. In response, over 73,000 more Ontarians than forecast moved outside the GTAH in 2016-21, searching for housing. Many of those were young families about to have their first child, partly explaining natural⁵⁸ population growth falling well under forecast.

Figure 16: 2016-21 Components of Population Growth and Housing Stock Forecasts made by Hemson for the GTAH in 2012 and 2020, respectively.⁵⁹

Source of Growth	Hemson-12	Hemson-20	Difference (Abs)	Difference (%)
Population Growth from International Sources - GTAH	479,620	607,000	127,380	26.6%
Net Interprovincial Migration - GTAH	-4,870	22,000	26,870	
Net Natural Population Increase	211,560	169,000	-42,560	-20.1%
Net Intraprovincial Migration - GTAH	-157,520	-231,000	-73,480	46.6%
TOTAL	528,790	567,000	38,210	7.2%
Net New Housing Stock - GTAH	389,000	362,000	-27,000	-6.9%

The out-migration to the rest of Ontario is a clear indication of the excess demand for housing in the GTAH. The numbers outlining this migration pattern can be used to estimate the extent of that excess housing demand. In Figure 17, we see that international migration to the Outer Ring of the GGH in 2016-

⁵⁶ This 120,000 figure assumes that Hemson's 2020 forecast on international migration is correct; official figures have yet to be released. Migration from other provinces, known as *interprovincial* migration, was up as well, due to Ontario's relatively strong economy in 2016-19, relative to the rest of the country. A substantial number of these interprovincial migrants were former Ontarians moving back to the province after the oil price crash of 2015.

⁵⁷ This 27,000 figure assumes that Hemson's 2020 housing stock forecast is correct; official figures have yet to be released.

⁵⁸ Defined as births minus deaths

⁵⁹ Data Sources: Hemson (2012) and Hemson (2020b).

21 was 150% higher than forecast, and migration out of the GGH to the rest of the province was almost 200% higher than forecast.

Figure 17: 2016-21 Components of Population Growth made by Hemson for the GTAH in 2012 and 2020, respectively.⁶⁰

Source of Growth	Hemson-12	Hemson-20	Difference (Abs)	Difference (%)
Population Growth from International Sources - Outer Ring	32,500	81,000	48,500	149.2%
Net Intraprovincial Migration - Outer Ring	121,500	125,000	3,500	2.9%
Net Intraprovincial Migration - Rest of Ontario	36,020	106,000	69,980	194.3%

Unfortunately, Hemson-12 does not break down forecasted population growth into immigration and non-permanent residents. This matters as the age and location profiles of the two groups differ, which affects the demand for housing in terms of quantities and locations. Arriving non-permanent residents are primarily international students in their late teens and early twenties and tend to live in proximity to a college or university. Immigrants have a much more diverse age profile, with the largest groups being in their late 20s and early 30s.

While this lack of data and disclosure does pose limitations, with the information that is provided, we can estimate excess demand for housing in the GTAH.

Estimating past excess demand for housing in the GTAH

Excess demand for housing can be resolved in several ways, including out-migration to other parts of the province, particularly unforecasted out-migration. We can use out-migration data, particularly out-migration that was higher than forecast, to provide a conservative estimate for the excess demand for housing in the GTAH.

This intraprovincial out-migration data provides us with a place to start creating *excess demand* estimates for the GTAH by asking: How many homes would we need for out-migration from the GTAH to return to historical norms?

To create an estimate of excess demand, we need a methodology to convert population estimates into estimates of the number of households (and, by extension, the number of housing units). As described in *Baby Needs a New Home*, there is not a simple formula to do so, as housing needs are highly dependent on the age of the persons being added to the population:⁶¹

The relationship between population growth and household formation (and thereby housing demand) is not straightforward. A family having a second child adds to the province's population, though it does not change the number of households in the province, whereas a person moving out of their parents' house into their first apartment in the same city does not raise the province's population, but it increases the number of households by one. And finally,

⁶⁰ Data Sources: Hemson (2012) and Hemson (2020b).

⁶¹ Moffatt (2021a)

the expectation of a family's first child may not change the number of households but does change the type of home in which they wish to live.

To estimate the number of *households* leaving the GTAH, and by extension, the number of housing units that would have been required for them to stay, we adapt the methodology used in *Baby Needs a New Home*.⁶² Using data from Census 2016, we calculate what percentage of the population for Ontario as a whole, by age, is the primary household maintainer (PHM) for two types of properties: apartments and 'ground level' units (defined as anything that is not an apartment). Since every household has exactly one PHM, we can convert the number of persons into households by applying these percentages. The PHM rates applied are shown in Figure 18:

Figure 18: Primary Household Maintainer (PHM) proportions for Ontario, 2016 Census⁶³

Age Category	Ground Level Housing PHM Rate	Apartment Unit PHM Rate
0 to 14 years	0.00%	0.00%
15 to 24 years	2.32%	5.25%
25 to 34 years	19.24%	17.05%
35 to 44 years	34.93%	13.92%
45 to 54 years	41.51%	13.19%
55 to 64 years	42.63%	13.55%
65 to 74 years	42.40%	15.56%
75 to 84 years	40.81%	19.71%
85 years and over	32.08%	20.05%

These percentages are then applied to net migration figures per year to estimate *household* out-migration by preferred housing type. Figure 19 provides the calculation to estimate the out-migration of families seeking ground-level housing in 2013-14.

⁶² Moffatt (2021a). This approach shares similarities to the one used by Hemson, as detailed in their August 2020 report: “The first step in the distribution process is the translation of the population forecast into a forecast of households based on age specific household formation rates (or headship rates). These rates reflect the propensity of different household and family types to occupy different housing by type.”

⁶³ Data Source: Age of Primary Household Maintainer (9), Tenure (4), Structural Type of Dwelling (10) and Household Type Including Census Family Structure (9) for Private Households of Canada, Provinces and Territories, Census Divisions and Census Subdivisions, 2016 Census - 25% Sample Data, Statistics Canada

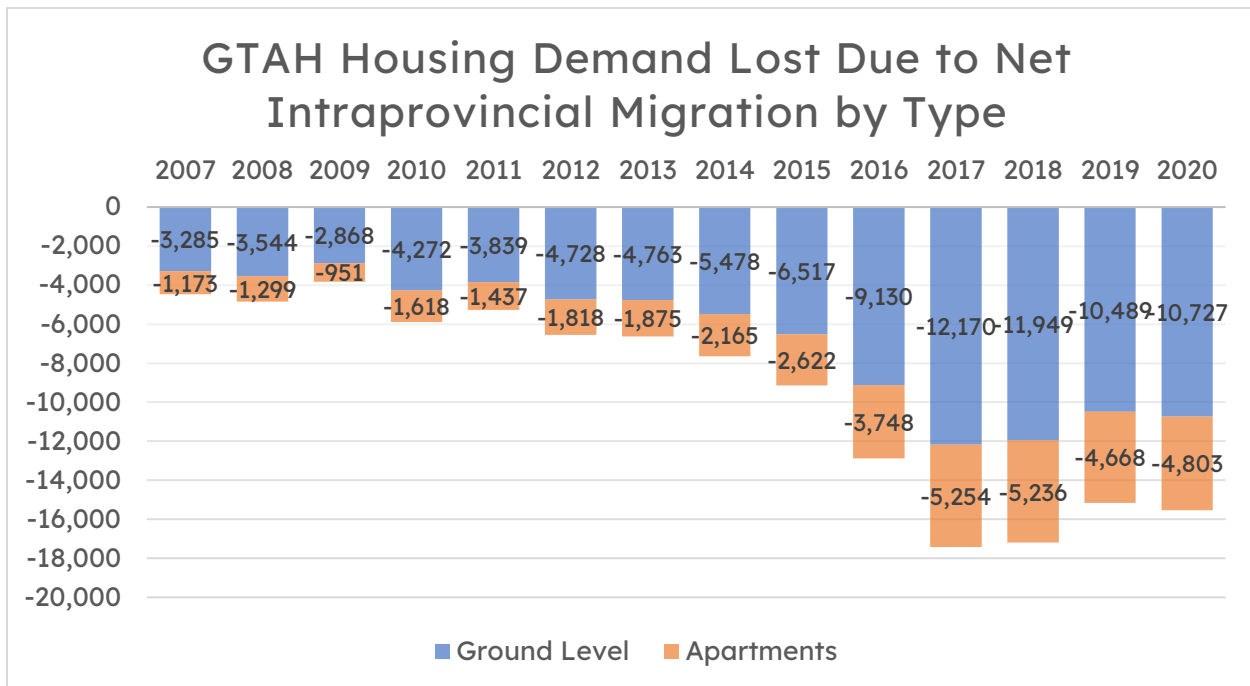
Figure 19: Estimated Net Number of Net Intraprovincial Outmigrating Ground-Level Housing Households from the GTAH, 2013-14.⁶⁴

Age Category	Ground Level Housing PHM Rate	Net Migration (Individuals)	Number of Households for Ground Level Housing
15 to 24 years	2.32%	-247	-6
25 to 34 years	19.24%	-2,530	-487
35 to 44 years	34.93%	-1,832	-640
45 to 54 years	41.51%	-4,770	-1,980
55 to 64 years	42.63%	-3,339	-1,423
65 to 74 years	42.40%	-1,558	-661
75 to 84 years	40.81%	-590	-241
85 years and over	32.08%	-128	-41
TOTAL			-5,478

Our estimates for the number of *households* out-migrating from the GTAH to other parts of the province are contained in Figure 20. From 2006-07 to 2014-15, an average of 6,000 households left the GTAH for other parts of Ontario, occupying 4,366 ground-level housing units and 1,662 apartment units. In the five years between 2015-16 to 2019-20, the average increased to over 15,000 households, with an estimated 10,893 of those households occupying ground-level units and an additional 4,742 occupying apartment units.

⁶⁴ Data Source: Author's Calculation

Figure 20: Excess Demand for Housing, by Housing Type and Year, for the GTAH.⁶⁵



This report will use this estimate of household out-migration as a proxy for excess demand for the GTAH. That is, we estimate that in 2019-20, 15,503 households, on net, left the GTAH to move to other parts of the province; thus, our estimate for the excess of demand for housing in 2019-20 is 15,503.

The concept of *excess demand* is inherently subjective because the term *excess* is a relative one, and the choice of the baseline is inherently subjective. This paper will only examine excess demand *above that already forecasted*. We will only be considering excess demand for housing above the baseline established in Hemson-20.

Taken as a whole, this method of estimating excess demand is inherently conservative, as it ignores the other ways excess demand could manifest itself. Instead of moving out of the GTAH, a lack of housing could cause younger people to live with family members longer than create new households or live in overcrowded conditions. Out-migration, however, is significant due to the economic consequences of *drive until you qualify*.

⁶⁵ Data Source: Author's Calculation. Populations (and changes) measured from July 1 of each year, so on the above graph '2015' refers to the changes that occurred between July 1, 2014 and July 1, 2015.

⁶⁵ Hemson (2020b)

How can we avoid future housing shortages?

To avoid future housing shortages, the housing supply must keep up with population growth and make up for past housing shortfalls. The Smart Prosperity Institute report, *Baby Needs a New Home*⁶⁶, provides housing demand projections based on Ministry of Finance population projections by age and sex. It finds that nearly 1,000,000 net new homes will need to be built in the next ten years across Ontario to keep up with net new household formations and pent-up demand, as shown by Figure 21:

Figure 21: Projected Housing Demand in Ontario, 2021-2031⁶⁷

Years	Projected Net New Household Formations	New Housing Completions (As of July 1, 2021)	Difference
2016-21	413,753	349,039	64,714
2021-26	489,947		489,947
2026-31	421,400		421,400
TOTAL	1,325,100	349,039	976,061

It is important to note that these are *net* new households, so they include generational housing turnover, as shown by Figure 22. The report projects that 1.48 million new households will be formed by families where the head-of-household is currently under the age of 55, which will be offset by a loss of approximately 570,000 households where the current head-of-household is over the age of 55.

Figure 22: Projected Household Formation in Ontario: 2021 to 2031

Age	TOTAL
Net New Households (Under 55)	1,480,644
Net New Households (55+)	-569,297
Total Net New	911,347

The net new household formation estimates (and thus the housing demand estimates) were calculated for each of Ontario's 49 Census Divisions in five-year periods between 2016 and 2046. Figure 23 gives the estimates for the GTAH along with Simcoe Census Division.

⁶⁶ Moffatt (2021a).

⁶⁷ Moffatt (2021a)

Figure 23: Net New Households by Census Division⁶⁸

Census Division	2016-21	2021-26	2026-31	2031-36	2036-41	2041-46
Toronto	82,107	115,711	87,243	81,155	73,005	67,553
Durham	21,361	21,492	21,688	21,232	20,113	18,592
Halton	20,681	23,914	25,747	26,254	25,943	24,951
Peel	45,036	59,573	55,809	55,409	53,639	51,956
York	29,207	30,951	31,317	29,977	28,505	26,353
Hamilton	14,797	17,337	16,207	16,102	15,874	15,202
Simcoe	22,119	21,980	19,712	18,542	17,182	15,729

Although planning is based on Hemson population forecasts, the *Baby Needs a New Home* report used Ministry of Finance population estimates to construct housing demand projections. The choice to use Ministry population estimates was due to data availability; the Ministry of Finance publicly discloses the population estimates, by age and sex, necessary for this analysis, whereas Hemson does not. Using Finance data was necessary, but it was not ideal, as the Growth Plan is based on the Hemson numbers. The report acknowledges this and discusses the differences that using Ministry of Finance numbers causes⁶⁹:

The Ministry of Finance sees a much faster rise in population growth in Toronto and Peel, whereas Hemson, which considers housing supply, sees much higher growth occurring on the periphery of the GTA, due, in part, to drive until you qualify. The total population growth for the Greater Golden Horseshoe region in the Hemson report is 210,008 lower than in the Ministry of Finance numbers, likely due to families *driving until they qualify* to other parts of the province.

Despite the slower population growth in the Greater Golden Horseshoe, Hemson forecasts the supply of units to be 27,977 higher than the projected demand. The mismatch is due to the *type* of units being produced. Hemson's forecasts involve the construction of smaller, one-person units to be built.

This difference in the type of units is clearly illustrated by the difference in net new people per new unit. Hemson forecasts that there will be 2.18 people per new unit, while the supply projection indicates that the demand is for 2.59 people per new unit. In Hemson's forecast, new households in the Greater Golden Horseshoe (GGH) area are smaller, due to a combination of individuals living in smaller units (rather than coming together as a single household in a larger unit) and families with children having to *drive until they qualify* to other parts of the province to find family-friendly housing.

This report builds on *Baby Needs a New Home* and seeks to address the issues caused by using Ministry of Finance projections by constructing a demographic model for the GTA, based on Hemson's population forecasts, to allow us to create housing demand forecasts that align with the assumptions underpinning the Growth Plan. Furthermore, we go a step further than *Baby Needs a New Home* by

⁶⁸ Moffatt (2021a)

⁶⁹ Moffatt (2021a)

conducting sensitivity analyses. The earlier report assumed that the Ministry of Finance population projections would hold.

Beyond Baby Needs a New Home: Creating a baseline projection for future excess demand – constructing a demographic model

To illustrate the sensitivity of housing demand forecasts to the underlying assumptions in models, we construct a set of scenarios to see how this projection changes with changes to the underlying assumptions. For example, if the GTAH were to have higher levels of immigration than currently projected, how would that affect the demand (and excess demand) for housing?

The calculations to construct a baseline estimate for excess housing GTAH are relatively straightforward, provided the following three elements are available:

1. A population projection/forecast by year, at the census division level, broken down by age (and ideally sex).
2. At the census division level, a housing stock projection/forecast by year, broken down by age (and ideally sex).
3. An intraprovincial migration projection/forecast by year, at the census division level, broken down by age (and ideally sex).

Unfortunately, while Ontario has both a set of population (and housing) forecasts provided by Hemson, and a set of population projections from the Ontario Ministry of Finance, neither publicly contains the complete set of this information, though they do contain some elements of each, as shown by Figure 24:

Figure 24: Necessary Elements for Creating a Model to Estimate the Excess Demand for Housing.⁷⁰

Necessary Elements for Excess Demand Model	Hemson (2020)	Ministry of Finance (2021)
Population forecasts by age at CD level.	No. Past Hemson reports, such as Hemson's 2012 release, contained some information.	Yes
Housing stock projections at CD level.	Yes	No
Intraprovincial migration forecasts by age at CD level.	No, though intraprovincial migration information is included at the GTA and Outer Ring levels.	No

We must construct our demographic model to establish this baseline and perform scenario analyses. We will use both the Hemson forecasts and Ontario Ministry of Finance estimates to calibrate our model, to ensure, as much as possible, that our estimates are not due to differences in underlying assumptions in our demographic model and those of Hemson's and the Ministry of Finance.

⁷⁰ Data Sources: Hemson (2020b), Ministry of Finance (2021).

To calibrate our model, we incorporate elements from both Hemson's population (and housing) forecast and the Ontario Ministry of Finance's population projections, along with past migration trends. In practice, reconciling the two is quite difficult for two reasons. The first is that Hemson's numbers are a forecast, which incorporates restrictions on housing construction, such as the availability of land. In contrast, the Ontario Ministry of Finance numbers project past trends into the future and do not apply housing constraints. Secondly, the two make very different assumptions regarding population growth.

These differences become apparent when examining overall population levels for the GTAH. As shown by Figure 25, the 2026-46 population projections from the Ministry of Finance for the GTAH are consistently higher than the forecasts provided by Hemson.

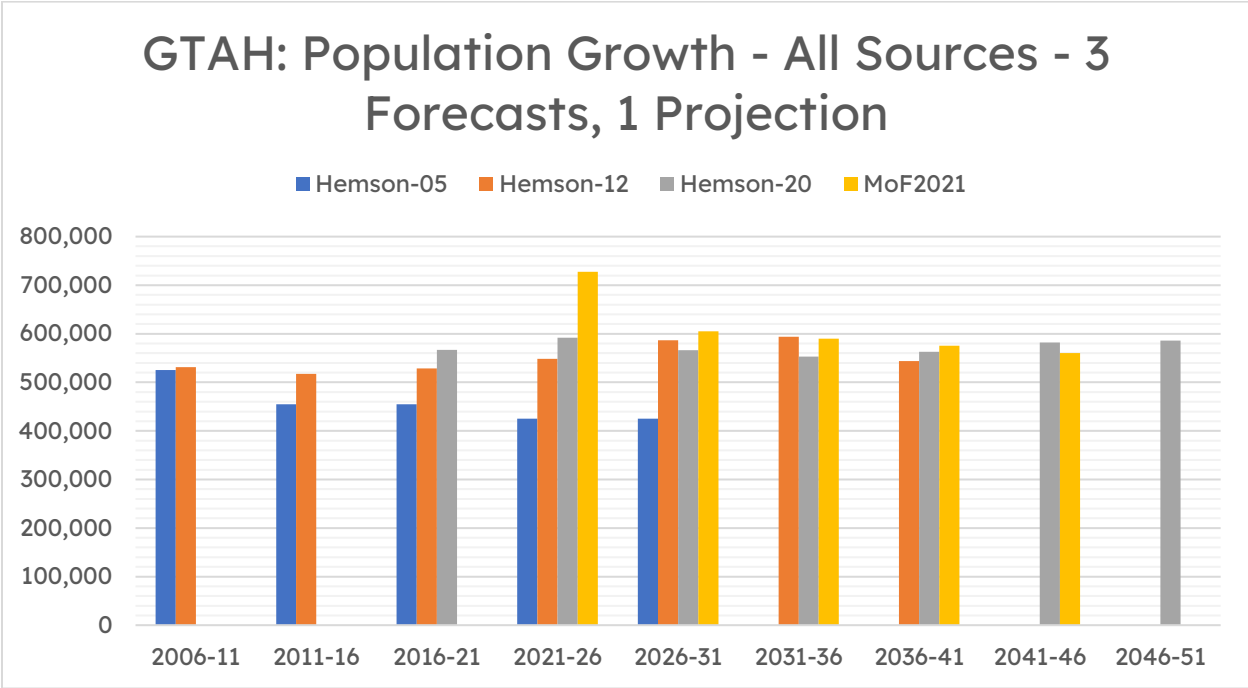
Figure 25: Population Forecasts for the GTAH, Ministry of Finance's 2021 Population Projection and Hemson's 2020 Forecast⁷¹

Year	Ministry of Finance	Hemson-20	Difference
2026	8,416,709	8,332,000	84,709
2031	9,021,605	8,882,000	139,605
2036	9,611,504	9,437,000	174,504
2041	10,186,892	10,003,000	183,892
2046	10,747,394	10,588,000	159,394

Until 2041, the Ontario Ministry of Finance projects higher population growth, in terms of absolute numbers, than Hemson, with the most significant differences between the two arising in the 2021-26 period, as shown by Figure 26.

⁷¹ Data Sources: Ontario Ministry of Finance (2021) and Hemson (2020b).

Figure 26: Population Growth for the GTAH by Five-Year Period, Hemson Forecasts from 2005, 2012, and 2021 and Ministry of Finance Population Projection from 2021.⁷²



Some of the differences in population projections can be explained by assumptions on supply constraints on housing that lead to intraprovincial migration. The importance of land constraints becomes apparent when comparing the Hemson population forecasts for the City of Toronto, relative to the Ministry of Finance population projections, as shown in Figure 27. Given Toronto's lack of available greenfield land, it is the census division in Ontario in which supply constraints would naturally be the most binding.

Figure 27: Population Forecasts for the City of Toronto, Ministry of Finance's 2021 Population Projection and Hemson's 2020 Forecast⁷³

Year	Ministry of Finance	Hemson	Difference
2026	3,266,675	3,193,000	73,675
2031	3,460,604	3,287,000	173,604
2036	3,637,226	3,378,000	259,226
2041	3,799,642	3,465,000	334,642
2046	3,954,378	3,651,000	303,378

⁷² Data Sources: Ontario Ministry of Finance (2021), Hemson (2005), Hemson (2012), and Hemson (2020b). Populations (and changes) measured from July 1 of each year, so on the above graph '2016-21' refers to the changes that occurred between July 1, 2016 and July 1, 2021.

⁷³ Data Sources: Ontario Ministry of Finance (2021) and Hemson (2020b).

The distinction between a *projection* and a *forecast* is essential here. The Ontario Ministry of Finance numbers takes existing population trends and *projects* them into the future. Hemson, on the other hand, incorporates a broader set of variables to create a forecast. Hemson (2020) describes the difference as follows⁷⁴:

[M]ethodological differences result in somewhat different population outlooks in some parts of the [Greater Golden Horseshoe] GGH. The key difference is that the Ministry of Finance projections assume that population growth will reflect recent migration trends and the continuing evolution of long-term fertility and mortality patterns. They do not explicitly account for long-term structural changes in the economy, housing market demand, and Provincial policies, plans, and investment that seek to influence the form and location of development in the GGH.

The different approach explains why, for example, Ministry of Finance projections for Peel Region, which has a relative shortage of land for new housing, are typically higher than the [Hemson-based] Schedule 3 forecasts. Similarly, the Schedule 3 employment forecasts for Durham Region, where A Place to Grow policies seek to increase the mix of people and jobs and significant investment in Federal, Provincial, and municipal infrastructure is planned, tend to be higher than Ministry of Finance projections.

The Hemson figures are likely assuming higher levels of out-migration from the GTA/H than the Ontario Ministry of Finance.⁷⁵

Another likely source of differences is the future path of net international migration. A direct head-to-head comparison is impossible, as Hemson only publishes net international migration forecasts at the GTA/H and Outer Ring levels. In contrast, the Ontario Ministry of Finance only publishes net international migration forecasts at the province-wide level. While an apples-to-apples comparison is impossible, it is noteworthy that the Hemson numbers show international migration rising after 2031. In contrast, the Ontario Ministry of Finance does not, as shown in Figure 28.

Figure 28 Population Growth through International Migration, Five-Year Periods, Hemson's 2020 Forecast and Ontario Ministry of Finance's 2021 Projection.⁷⁶

Period	Hemson - GTA/H	Hemson - Outer Ring	Ministry of Finance - Ontario-Wide	Ontario Minus Hemson (Total)
2021-26	639,000	47,000	1,093,656	407,656
2026-31	600,000	35,000	851,716	216,716
2031-36	628,000	38,000	845,209	179,209
2036-41	662,000	40,000	847,289	145,289
2041-46	695,000	42,000	846,697	109,697

⁷⁴ Hemson (2020b)

⁷⁵ The Ontario Ministry of Finance does not release intraprovincial migration projections.

⁷⁶ Data Sources: Ontario Ministry of Finance (2021) and Hemson (2020b).

These numbers are a bit of an apples-to-oranges comparison since the Ontario Ministry of Finance numbers include parts of Ontario outside of the Greater Golden Horseshoe. In contrast, the Ontario Ministry of Finance does not. However, for these numbers not to be contradictory, it would require the rest of Ontario to experience a rapid secular decline in international in-migration. There is no reason why this should be true. Instead, the differences appear to stem from Hemson assuming immigration targets will continue to rise over time and the Ontario Ministry of Finance keeping immigration targets at existing levels.

The significant discrepancy for the international migration numbers in 2021-26 appears to be due to differences in assumptions around the growth in the number of international students. In the 2021-26 period, Finance is projecting that net non-permanent residents (primarily international students) will grow by roughly 340,000 persons. Historically, 50-60% of Ontario's non-permanent residents settle in the GTA, giving an estimate of between 170,000 and 204,000 net new non-permanent residents to the region. However, Hemson is forecasting the GTA population to grow by roughly 100,000 during that period, a difference of roughly 100,000 persons. The disconnect between the Ministry of Finance population projections and Hemson population forecasts is not new. In 2015, the Crombie report acknowledged how the two often diverge and recommended they be better aligned.⁷⁷

These details illustrate the difficulty in creating population projections and forecasts and the need to build contingency buffers into housing plans. If the Ministry of Finance's projections prove prescient, and in 2026 the GTA has 100,000 more international students than forecasted by Hemson, then additional housing will be required. Given that this housing cannot be built overnight, it is prudent to incorporate contingencies into the planning process.

How much larger could the housing shortages become? Constructing our sensitivity analyses

Because of the economic, social, and environmental costs of not building enough housing in the GTA and Simcoe census division, we believe it is necessary to conduct a set of scenario analyses to show a range of potential futures. We are not suggesting that these scenarios are necessarily more likely than Hemson's baseline forecast; simply that these are highly plausible and should be considered by planners. Government budgets build in contingency margins and conduct sensitivity analyses on questions such as *What if interest rates are higher than forecast?* We believe planning processes should also build in contingency and conduct sensitivity analyses, whether in the Growth Plan or the municipal level.

There are two broad ways that forecasts could be 'off' leading to an increase in excess demand for housing. Either housing completions are lower than forecast, or population growth is higher. There are several plausible ways that the population of the GTA and Simcoe could grow faster than current forecasts. These include, but are not limited to:

⁷⁷ Government of Ontario (2015)

- An influx of residents due to climate change, which could include, but is not limited to, new residents moving in from British Columbia to escape wildfires, as well as increased numbers of refugees from outside of Canada.
- An increase in the number of Canadians moving to Ontario for economic reasons.
- An increase in life expectancy.
- Reduced net out-migration to the rest of Ontario.
- An increase in the birth rate.

Policymakers should be aware of these possibilities when planning. There are two sets of scenarios that we believe warrant particular consideration as they have a high probability of occurring:

1. Canada's immigration targets have risen over time, and Ontario's share of immigrants has risen in recent years, causing immigration to Ontario to rise faster than previous trends. What if this continues?
2. Ontario has experienced a boom in international students, causing the population of net non-permanent residents to rise. Eventually, the number of non-permanent residents will reach a critical mass where the number of new international students plateaus and the number of international students entering the system is close to the number of leaving the system, causing overall net growth to be near zero. There is a disagreement between Hemson's population forecast and the Ministry of Finance's population projection on how big the international student population will get and how long it will take to plateau, with the Ministry of Finance projecting a higher level of growth from net non-permanent residents. What if the international student boom lasts longer than Hemson forecasts?

These two sets of scenarios differ in some critical ways. In the immigration scenarios, additional persons are added to the population each year for the next 30 years, causing yearly population growth to be consistently higher than current forecasts. In the international student scenarios, most of the additional population growth happens over the next decade. However, the population continues to rise somewhat after that, as the new residents form families and have children.

The two sets of scenarios also differ in the composition of new arrivals, with international student growth skewing younger, as most are in their late teens or early 20s. This affects the form and amount of housing demand, as students typically live in more crowded conditions. It also affects the timing of forming new households and having children. These details illustrate why it is not simply enough to have *high* and *low* population forecasts (to accompany the reference forecast) as Hemson does. We need to know the demographic composition of the additional residents to estimate their demand for housing over time.

The type of additional population growth also affects where in the GTA/H the additional demand will be. Figure 29 provides data for the five-year 2015-20 period on the proportion of immigrants and non-permanent residents that settle in each census division.

Figure 29: Proportion of immigrants and non-permanent residents (NPRs) that settle in each census division, as a percentage of Ontario as a whole.⁷⁸

Census Division	Immigration Proportion	NPR Proportion
Durham	2.32%	1.73%
Halton	3.97%	1.60%
Hamilton	2.49%	3.42%
Toronto	38.25%	25.62%
Peel	24.75%	21.07%
York	8.75%	4.46%
GTAH Total	80.53%	57.92%
Simcoe	0.82%	2.07%
Rest of Ontario (excl. GTAH and Simcoe)	18.64%	40.01%

To know more about the additional residents in our set of scenarios, we construct a demographic model using the publicly available information from the Hemson-20 forecast. We can use this model to construct population pyramids for each of the GTAH's six census divisions and Simcoe census division and forecast excess housing demand.

We can then conduct a sensitivity analysis to address population growth from immigration and international students and housing completions falling under forecast with our baseline established. We believe these are reasonable questions to ask, given that for the 2016-21 period, international population growth was 27% higher, and net new housing stock was 7% lower in Hemson-20 relative to Hemson-12. Furthermore, the Ministry of Finance projects that the GTAH's population in 2021-26 will grow by nearly 730,000 persons, while Hemson's forecast pegs the difference at under 600,000, a difference of 23 percent.⁷⁹ As such, we believe that a sensitivity analysis is not just prudent but necessary.

In our first set of sensitivity analyses, we ponder the question, "what if immigration is higher than existing forecasts?"

Sensitivity analysis: Immigration higher than forecast

To answer this question, we first need the current immigration forecasts. Unfortunately, Hemson-20 does not provide numerical values for net international migration to the GTAH, broken down by immigration and non-permanent residents. Fortunately, however, they provide a small bar graph with these details on page 11 of their report, which allows for a visual estimation. Based on that graph, we

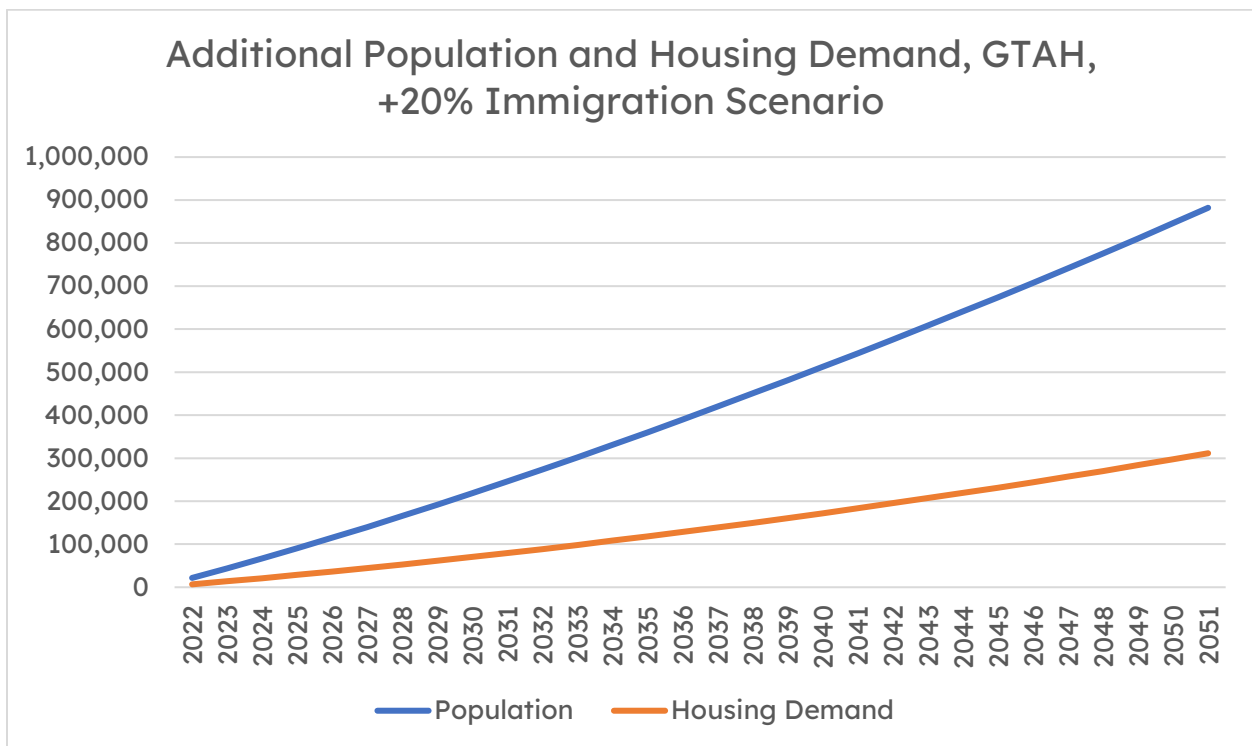
⁷⁸ Data Source: Statistics Canada Table 17-10-0140-01.

⁷⁹ While the 2021-26 growth figures differ by more than 130,000 it is noteworthy that the Ministry of Finance's 2026 total population projection for the GTAH is only 84,709 persons higher than that forecast in Hemson-20. This is due to differences in estimates of the population growth of the GTAH in 2020-21. Not only do the two differ on what will happen in the future, they also differ on what happened in the past.

estimate they are forecasting the number of net new immigrants to be 106,000 in 2021-22 and rise by 1,000 per year, every year, reaching 135,000 by 2050-51.

We increase these figures by a fixed percentage to conduct our sensitivity analysis. For example, if the GTAH were to attract 20% more immigrants than forecasted, this would add 21,691 new residents to the GTAH in 2021-22, rising to 35,586 by 2050-51. In an immigration 20% higher than forecasted scenario, if the new GTAH residents were to stay in the region, raise families, and have children, it would add 880,000 residents and create the need for 310,000 additional housing units by 2051, as shown in Figure 30:

Figure 30: Additional Population and Housing Demand in the GTAH in the +20% Immigration Scenario⁸⁰



As shown by Figure 31, this scenario adds over 240,000 persons between 2021-31, nearly 300,000 between 2031-41, and nearly 340,000 between 2041-51. This includes the new immigrants and the additional children born in the region.⁸¹

⁸⁰ Data Source: Author’s Calculation

⁸¹ While also subtracting out the additional deaths associated with a larger population.

Figure 31: Additional Population Growth in the GTAH in the +20% Immigration Scenario⁸²

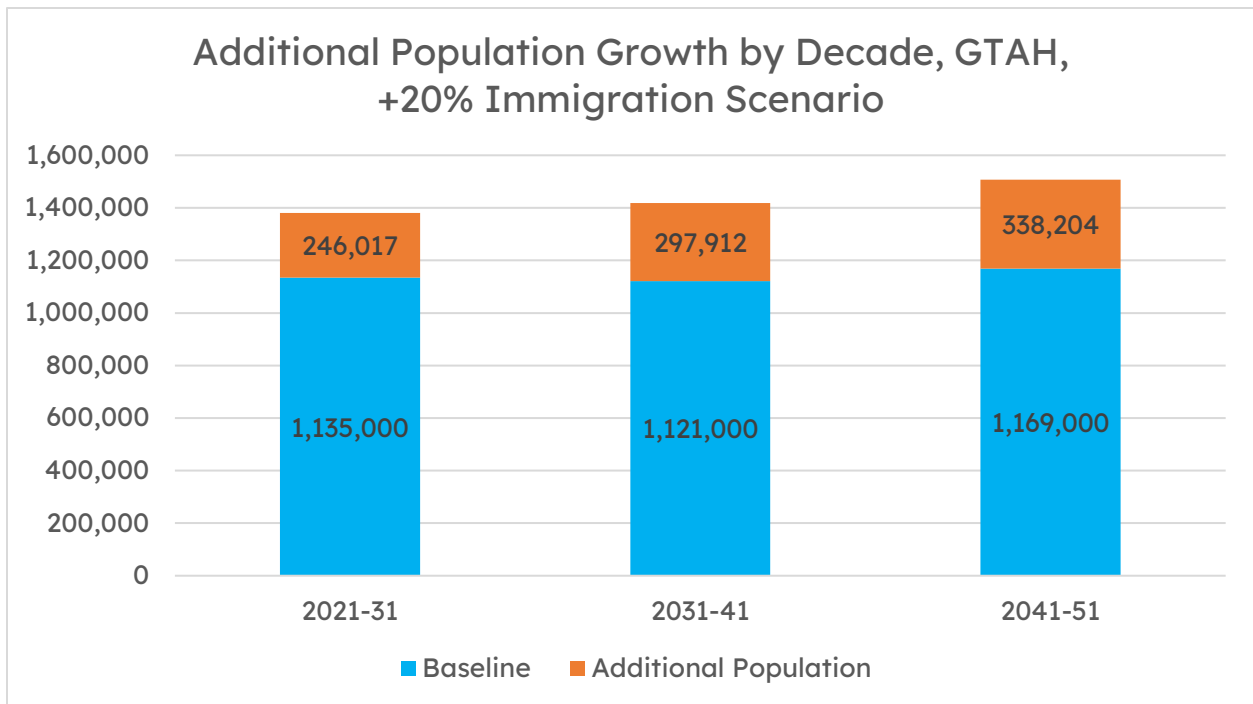


Figure 32 shows a range of potential increased immigration scenarios, from being 1% higher than forecast to 40% higher. Immigration levels that are one percentage point above the baseline cause the GTAH’s population to grow by 5,755 persons more than the baseline in 2021-26, leading to the GTAH’s population being 44,107 persons higher than the baseline by 2051. If immigration rates are 40% higher than the baseline, the GTAH’s 2051 population will be over 1.7 million persons higher than the baseline.

⁸² Data Source: Author’s Calculation

Figure 32: Population Growth, Relative to Baseline, in the GTAH, by 5-Year Periods, for Higher Levels of Immigration⁸³

Scenario	2021-26	2026-31	2031-36	2036-41	2041-46	2046-51	2051 Population Relative to Baseline
1% Higher	5,755	6,546	7,193	7,702	8,184	8,726	44,107
5% Higher	28,776	32,728	35,966	38,512	40,921	43,630	220,533
10% Higher	57,552	65,456	71,933	77,023	81,842	87,260	441,066
20% Higher	115,105	130,912	143,865	154,047	163,684	174,521	882,133
40% Higher	230,209	261,824	287,731	308,093	327,367	349,042	1,764,266

The 20% higher scenario is particularly noteworthy, as it leads to an additional 115,105 persons being added to the GTAH in the next five years. In the 2016-21 period, population growth in the GTAH from international sources was approximately 120,000 persons higher than the baseline projection set in Hemson-12. Furthermore, this gap is roughly the same size as the difference between Hemson-20's population forecast and the Ministry of Finance's population projection for 2021-26⁸⁴. In short, there is precedent for a miss of this magnitude.

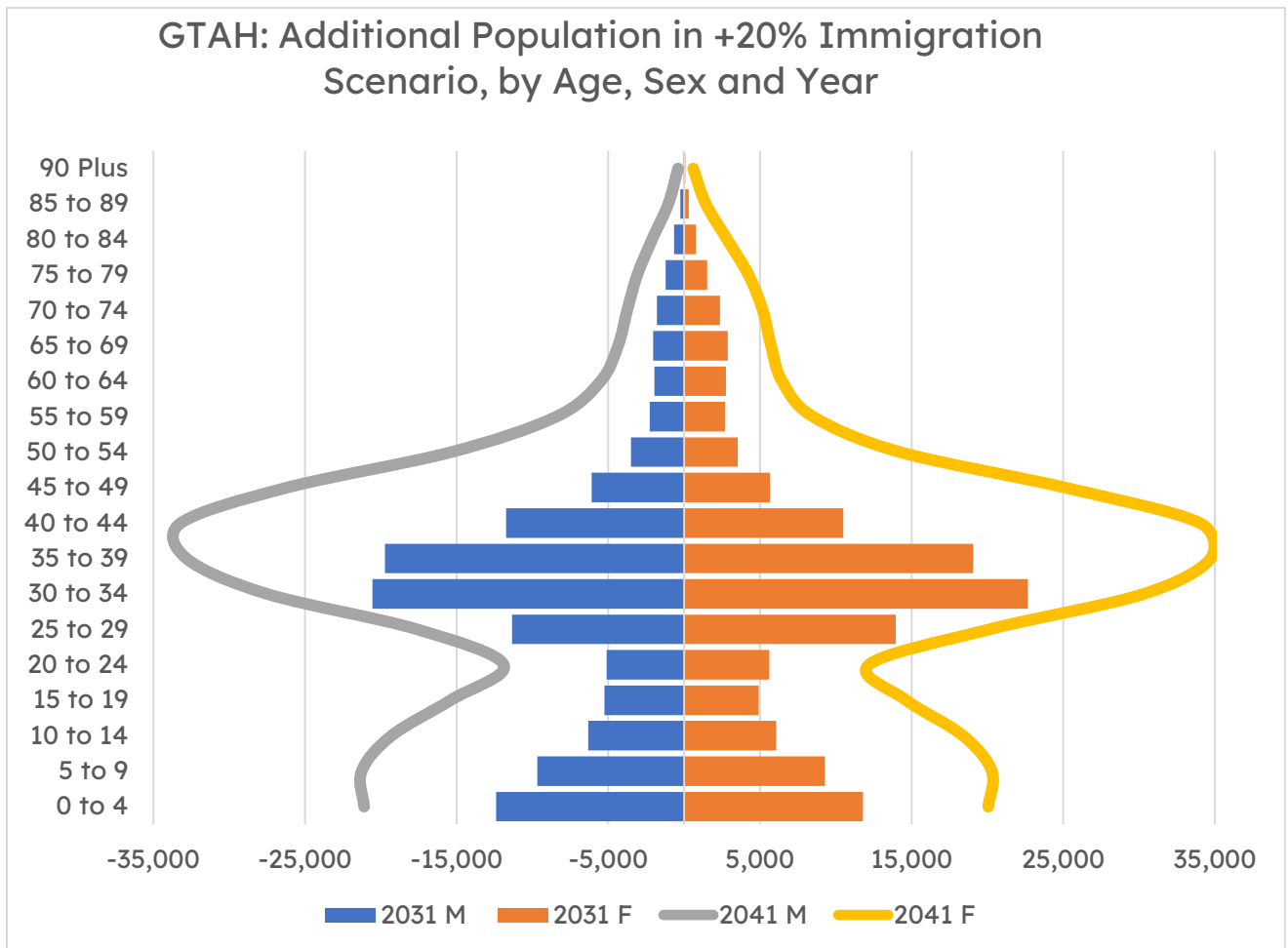
It is important to note that not all of this population growth comes directly from the immigrants themselves, as an increased population also leads to increased births and deaths. The increased births play a non-trivial role in the population increase (above baseline) in the GTAH. The population pyramids of Figure 33 show the increase in the preschool-aged population to be quite substantial in both 2031 and 2041.⁸⁵

⁸³ Data Source: Author's Calculation

⁸⁴ Though the difference between Hemson-20 and the Ministry of Finance is caused more by differences in assumptions involving non-permanent residents than immigrants.

⁸⁵ In our demographic model, we have assumed that the fertility rates of the new Ontarians are identical to that of existing residents.

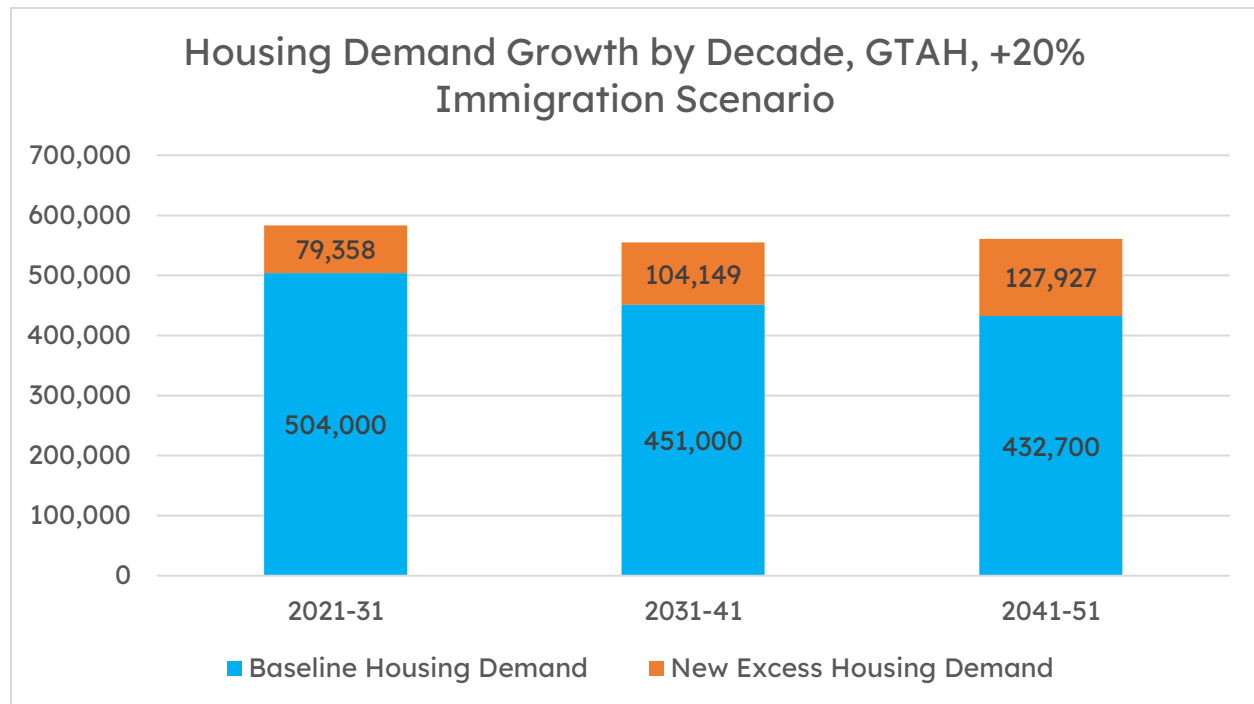
Figure 33: Population Pyramids, Relative to Baseline, in the GTAH in the +20% Immigration Scenario⁸⁶



The increase in the number of families leads to increased demand for homes. Using the methodology described earlier in the paper, we find that if the GTAH attracts 20% more immigrants each year, relative to the baseline forecast, then by 2051, housing demand should be over 310,000 units higher than baseline as shown by Figure 34.

⁸⁶ Data Source: Author's Calculation

Figure 34: Housing Demand Growth in the GTAH in the +20% Immigration Scenario⁸⁷



Returning to our range of scenarios, Figure 35 provides housing demand estimates, by five-year periods, for five different immigration-boosted scenarios. A small bump in immigration only leads to excess housing demand increasing by a few thousand units per five-year period, whereas in the 40% scenario, the figure can be over 100,000.

Figure 35: Excess Housing Demand over Baseline, 5 Year Periods, GTAH.⁸⁸

Scenario	2021-26	2026-31	2031-36	2036-41	2041-46	2046-51	Total 2021-51
1% Higher	1,819	2,149	2,459	2,749	3,035	3,362	15,572
5% Higher	9,094	10,746	12,295	13,743	15,173	16,809	77,859
10% Higher	18,188	21,491	24,589	27,485	30,347	33,617	155,718
20% Higher	36,376	42,982	49,179	54,970	60,693	67,234	311,435
40% Higher	72,753	85,964	98,358	109,941	121,387	134,468	622,870

We also need to consider where in the GTAH this excess demand for housing is likely to occur, noting that with *drive until you qualify*, excess demand is not particularly localized, as it spills into the surrounding region. Keeping that in mind, we estimate the population increase in each of the six census divisions of the GTAH by considering their share of GTAH immigration from 2015-20. We also add Simcoe into our analysis. In the 2015-20 period, Simcoe’s immigration levels were just over 1% of the

⁸⁷ Data Source: Author’s Calculation

⁸⁸ Data Source: Author’s Calculation

GTAH's, so we use this to inform our estimate. As Figure 36 shows, the bulk of the excess demand for housing occurs in the City of Toronto and the Peel region over the next decade.

Figure 36: 2021-31 Excess Housing Demand Above Baseline, Five Immigration Scenarios, for the 6 GTHA Census Divisions and Simcoe Census Division⁸⁹

Scenario	Durham	Halton	Hamilton	Peel	Toronto	York	Simcoe
1% Higher	114	196	123	1,219	1,885	431	40
5% Higher	572	978	613	6,097	9,423	2,156	202
10% Higher	1,143	1,956	1,227	12,195	18,847	4,311	404
20% Higher	2,286	3,912	2,454	24,390	37,694	8,623	808
40% Higher	4,572	7,824	4,908	48,780	75,387	17,245	1,616

Finally, we should consider what happens if additional housing is not built to keep up with the new demand created by immigration levels that are higher than forecast. As in 2016-21, we expect excess demand to be transmitted to other parts of the province through *drive until you qualify*. Figure 37 considers where the GTAH's excess demand may spill over by projecting 2015-20's intraprovincial migration patterns forward. Ultimately, the excess demand will go to where housing is built; if additional housing is built in Oxford, then that is where the excess demand will settle. As Figure 37 shows, if population growth is underestimated, Simcoe's additional housing demand will primarily come from spillover demand from the GTAH.

Figure 37: Excess Housing Demand Spillover if GTAH Builds to Baseline, for Selected Census Divisions, 2021-31⁹⁰

Scenario	Simcoe	Niagara	Middlesex	Waterloo	Wellington	Oxford	Rest non-GTHA
1% Higher	838	329	208	170	163	143	2,117
5% Higher	4,191	1,644	1,039	848	816	715	10,587
10% Higher	8,382	3,288	2,078	1,696	1,631	1,431	21,174
20% Higher	16,763	6,576	4,155	3,392	3,262	2,861	42,347
40% Higher	33,526	13,153	8,311	6,785	6,525	5,723	84,695

In a higher than anticipated growth through immigration scenario, areas outside the GTAH experience increased housing demand from two sources. First, they experience direct housing demand from the new immigrants locating to the region. Second, they see an increase in *drive until you qualify* families due to the housing supply within the GTAH not keeping up with the increased population. For a place such as Simcoe, the excess housing demand from an increased number of *drive until you qualify* families is almost certainly higher than the direct impact from higher growth due to immigration. A lack of housing supply causes the excess demand for housing to transmit across Ontario.

As the immigration scenarios show, the excess demand estimates are highly sensitive to the underlying assumptions. The same will hold for non-permanent residents, though there are significant differences in the timing of housing demand and the location.

⁸⁹ Data Source: Author's Calculation

⁹⁰ Data Source: Author's Calculation

Sensitivity analysis: Non-Permanent higher than forecast

In our non-permanent resident (NPR) scenarios, we examine a set of potential futures where the number of international students moving to the GTA and Simcoe and settling there after graduation is more extensive than forecasted by Hemson. These are highly plausible scenarios, as past Hemson forecasts underestimated population growth from this cohort and the current Hemson forecasts are below the Ministry of Finance projections for population growth from non-permanent residents. When alternate forecasts and past performance suggest that current forecasts may be too low, it is prudent to consider this possibility.

Although both the higher immigration and higher non-permanent resident sets of scenarios involve the population of the GTA growing faster than expected, they differ in three important ways:

1. Our immigration scenarios examine possible futures where immigration levels to Ontario are permanently higher; that is, in every year, immigration is higher than in the Hemson forecast. For international students, high levels of growth continuing in perpetuity is unlikely. There almost certainly is a point where the population of international students hits a critical mass. Instead, the uncertainty is when this population growth will begin to plateau and how large it will get when it does.
2. The age distribution of this group is, on average, younger than the immigrant group and is primarily made up of 17–24-year-olds. This affects the type and size of housing required and the timing of family formation and children's birth. This scenario considers the new students and graduates and the children born here from the formed families.
3. Within the GTA and Simcoe, the location of the net non-permanent residents. Relative to the immigration scenario, they are more likely to reside in Hamilton, Peel, Simcoe, and Toronto and less likely to reside in Halton and York.

The two scenarios we will examine in this section have the international student boom lasting an additional 5 and 10 years, respectively. Figure 38 shows the additional net new non-permanent residents (international students), relative to baseline, by year, for the GTA, in the two scenarios.

Figure 38: Additional Net New Non-Permanent Residents (International Students), Relative to Baseline, by Year, for the GTA, in the Two Scenarios

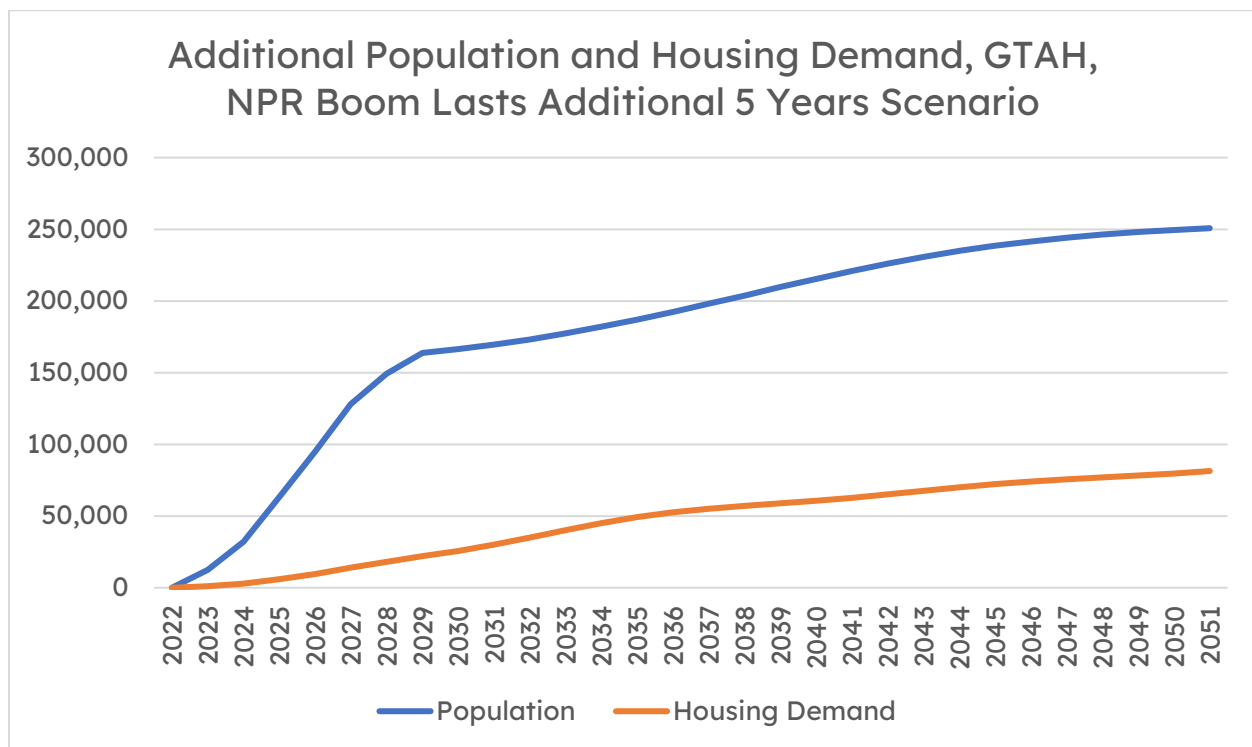
Year	5 Extra Years	10 Extra Years
2022-23	12,000	12,000
2023-24	19,000	19,000
2024-25	30,000	30,000
2025-26	30,000	30,000
2026-27	31,000	31,000
2027-28	19,000	31,000
2028-29	12,000	31,000
2029-30	0	31,000
2030-31	0	31,000
2031-32	0	31,000
2032-33	0	18,500

2033-34	0	11,500
2034-35	0	0

We assume that these net new non-permanent residents eventually become permanent residents in these scenarios. Note that the net population growth continues after 2034-35, as a large population leads to an increased number of births.

Figure 39 contains a forecast of the additional population, over baseline, and increased excess housing demand for the scenario where the international student boom lasts an additional five years. By 2029, the population of the GTAH will be roughly 170,000 persons higher than in the Hemson forecast. Although the population of non-permanent residents plateaus then, the additional population over baseline increases to 250,000 by 2050. The excess demand for housing is slower to grow, as students typically occupy more crowded living conditions. However, by 2035, the excess demand for housing in the GTAH will reach 50,000 units.

Figure 39: Additional Population and Housing Demand in the GTAH in the NPR Boom Lasts An Additional 5 Years Scenario⁹¹



This is further illustrated by Figure 40, which shows the population growth dynamics for the ten-year periods of 2021-31, 2031-41, and 2041-51. While the bulk of the additional population growth is in

⁹¹ Data Source: Author's Calculation

2021-31, the increase in the population (over baseline) continues past the end of the international student boom in 2029 due to increased births.

Figure 40: Additional Population Growth in the GTAH in the NPR Boom Lasts an Additional 5 Years Scenario⁹²

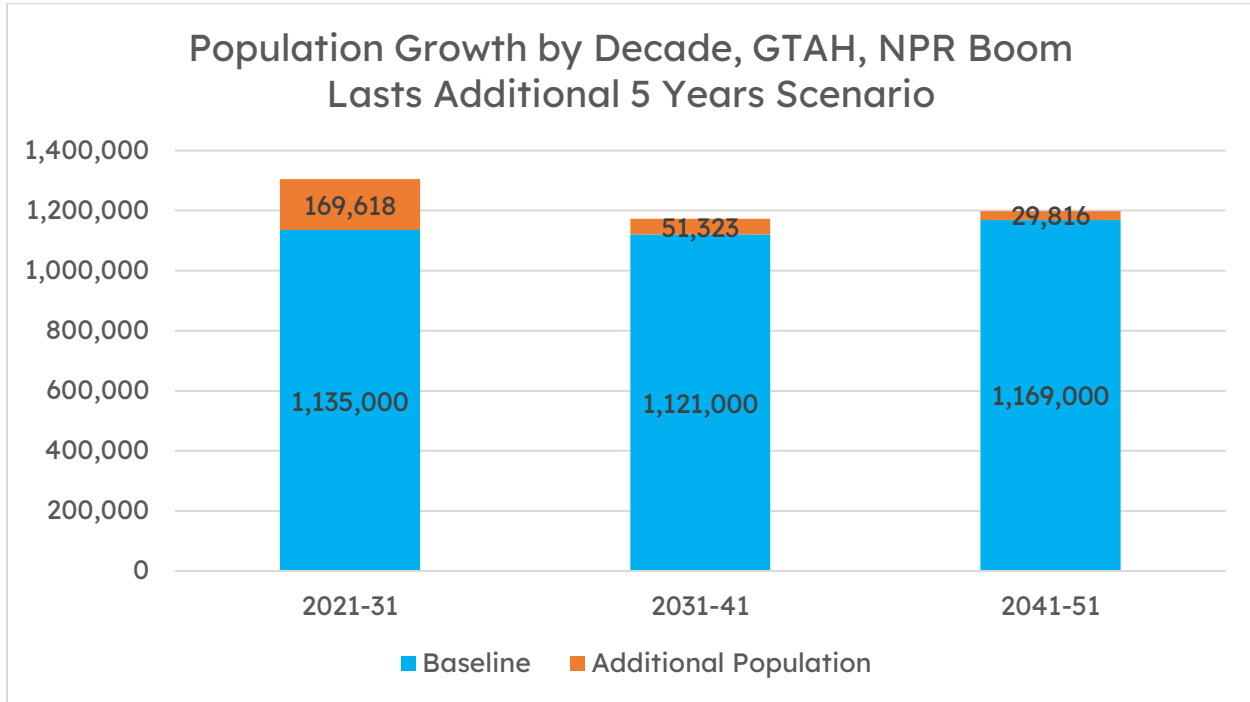


Figure 41 shows the population increase over baseline for two scenarios; one where the international student boom lasts an additional five years, and one where it lasts an additional ten. In both cases, population growth continues to be higher than baseline, even when the number of international students plateaus due to increased births from a larger population. The 10-year scenario sees exceptionally high levels of population growth at this end of the decade.

Figure 41: Population Growth, Relative to Baseline, in the GTAH, by 5-year periods, for Two Net Non-Permanent Population Growth Scenarios⁹³

Scenario	2021-26	2026-31	2031-36	2036-41	2041-46	2046-51	Total 2021-51
5 Years	95,017	74,601	22,802	28,521	20,595	9,221	250,758
10 Years	95,017	168,722	88,694	39,230	36,852	22,182	450,698

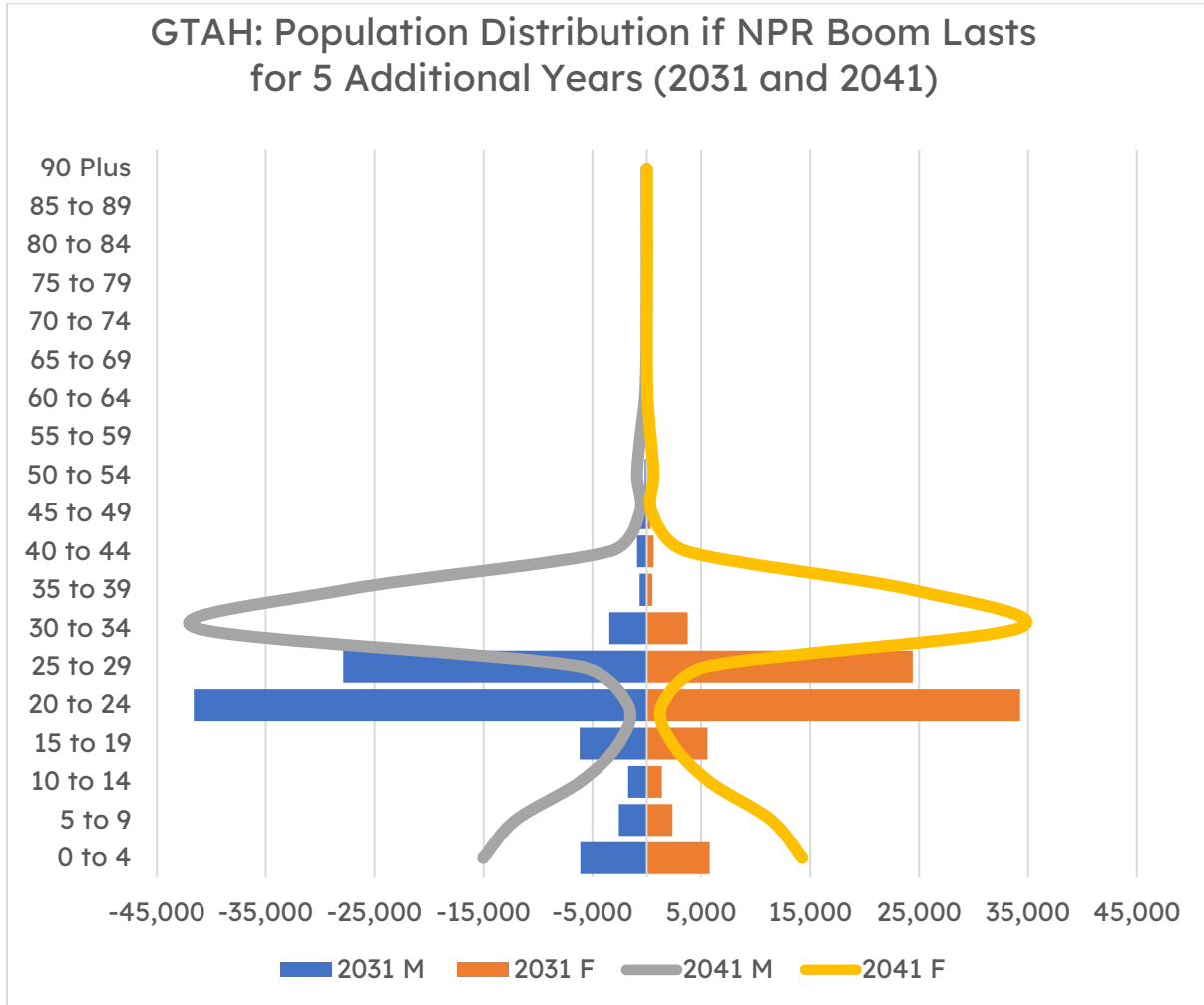
Because our net non-permanent residents are overwhelmingly international students, the population pyramid of the additional population is highly concentrated in a few age groups. Figure 42 provides population pyramids for the *boom lasts an additional five years* scenario. We see by 2031 a high number

⁹² Data Source: Author's Calculation

⁹³ Data Source: Author's Calculation

of individuals in their 20s, along with some children being born. By 2041, this population has reached their 30s, and the number of pre-school-aged children has increased substantially.

Figure 42: Population Pyramids, Relative to Baseline, in the NPR Boom Lasts Additional 5 Years Scenario⁹⁴



As with our immigration scenarios, an increase in non-permanent residents leads to an increase in the demand for housing. However, there are some critical differences between the net non-permanent residents and immigration scenarios. The largest of them is the timing of the increased demand for housing. Because students are often more willing and able to live in more dense housing forms, the initial increase in the excess demand for housing is relatively modest. As the students graduate, get jobs, and start to form families, the demand for housing increases. Figure 43 illustrates that the net new increased demand for housing, in the 5-year boom scenario, is higher in 2031-41, after the student boom ends, than in 2021-31.

⁹⁴ Data Source: Author's Calculation

Figure 43: Housing Demand Growth in the GTAH in the NPR Boom Lasts Additional 5 Years Scenario⁹⁵

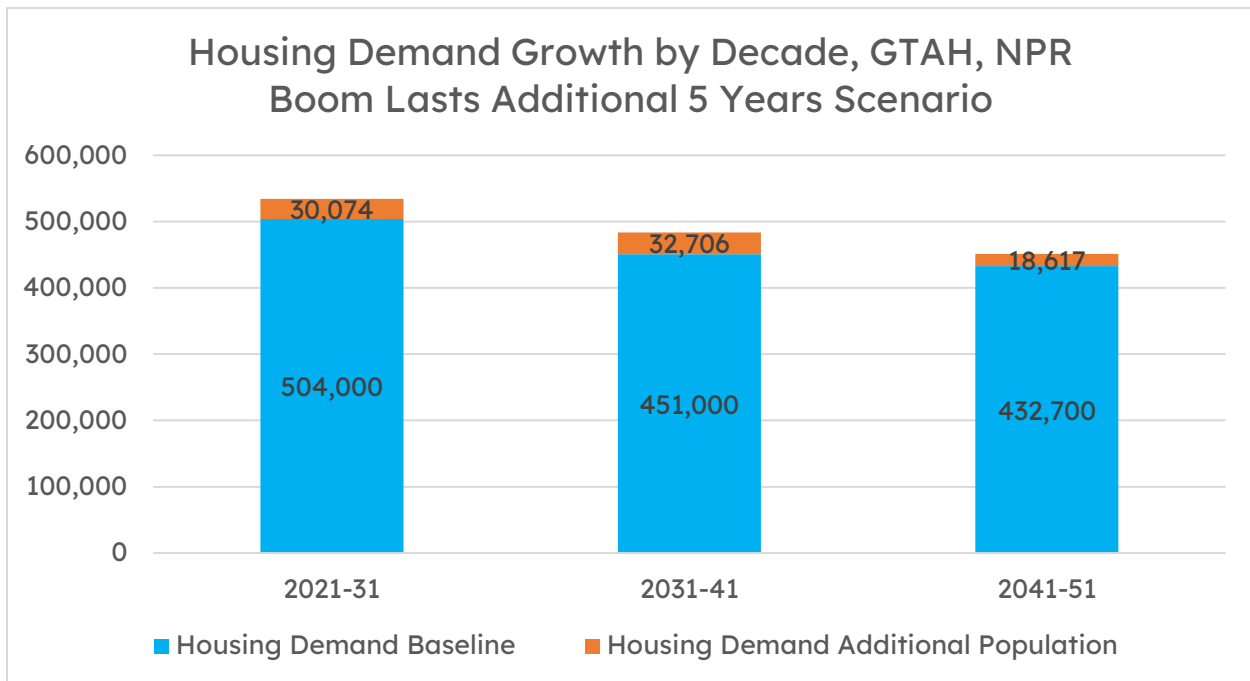


Figure 44 provides housing demand estimates, by five-year periods, for our two scenarios: one where the international student boom lasts an additional five years, and a second where it lasts an additional ten. The most significant increase in housing demand occurs when international students graduate and form families in both scenarios.

Figure 44: Excess Housing Demand over Baseline, 2 NPR Scenarios, 5 Year Periods, GTAH.⁹⁶

Scenario	2021-26	2026-31	2031-36	2036-41	2041-46	2046-51	Total 2021-51
5 Years	9,638	20,437	22,644	10,062	11,334	7,284	81,397
10 Years	9,638	30,261	43,162	32,844	21,243	18,001	155,148

As in our immigration scenarios, we will then consider where this excess demand is likely to originate, noting that demand for housing spills over through a *drive until you qualify* process. Figure 45 provides the net new excess demand for housing estimates for our seven census divisions, in both the five-year and ten-year NPR boom scenarios, for the 2021-31 period.

⁹⁵ Data Source: Author's Calculation

⁹⁶ Data Source: Author's Calculation

Figure 45: 2021-31 Excess Housing Demand Above Baseline, 2 NPR Scenarios, for the 6 GTHA Census Divisions and Simcoe Census Division⁹⁷

Scenario	Durham	Halton	Hamilton	Peel	Toronto	York	Simcoe
5 Years	898	831	1,776	10,940	13,303	2,316	1,075
10 Years	2,010	1,859	3,973	24,475	29,760	5,181	2,405

History suggests that there is a real possibility that the GTA (and Simcoe census division) would not see an increase in housing completions in response to the increased population growth. This, in turn, would cause an increase in housing demand in surrounding census divisions through *drive until you qualify*.

Figure 46 estimates where that demand is likely to be transmitted to, based on 2015-20 migration trends. In this eventuality, Simcoe experiences far higher net new demand from *drive until you qualify* from the GTA than they do from the direct increase in demand from the increased population of international students.

Figure 46: Excess Housing Demand Spillover if GTA Builds to Baseline, for Selected Census Divisions, 2021-31⁹⁸

Scenario	Simcoe	Niagara	Middlesex	Waterloo	Wellington	Oxford	Rest non-GTA
5 Years	6,353	2,492	1,575	1,286	1,236	1,084	16,048
10 Years	14,212	5,575	3,523	2,876	2,766	2,426	35,902

Overall, scenarios where population growth comes from an increase in the number of international students and graduates, rather than immigration, are somewhat more forgiving, as a young population tends to live in more dense housing forms. This does not decrease the demand for housing so much as delay it, so policymakers must still ensure that housing completions rise in proportion with an increased number of international students and graduates.

When it comes to population growth and housing demand, the details matter. Not just on the size of the population growth, but also the type. This becomes particularly apparent when comparing across scenarios.

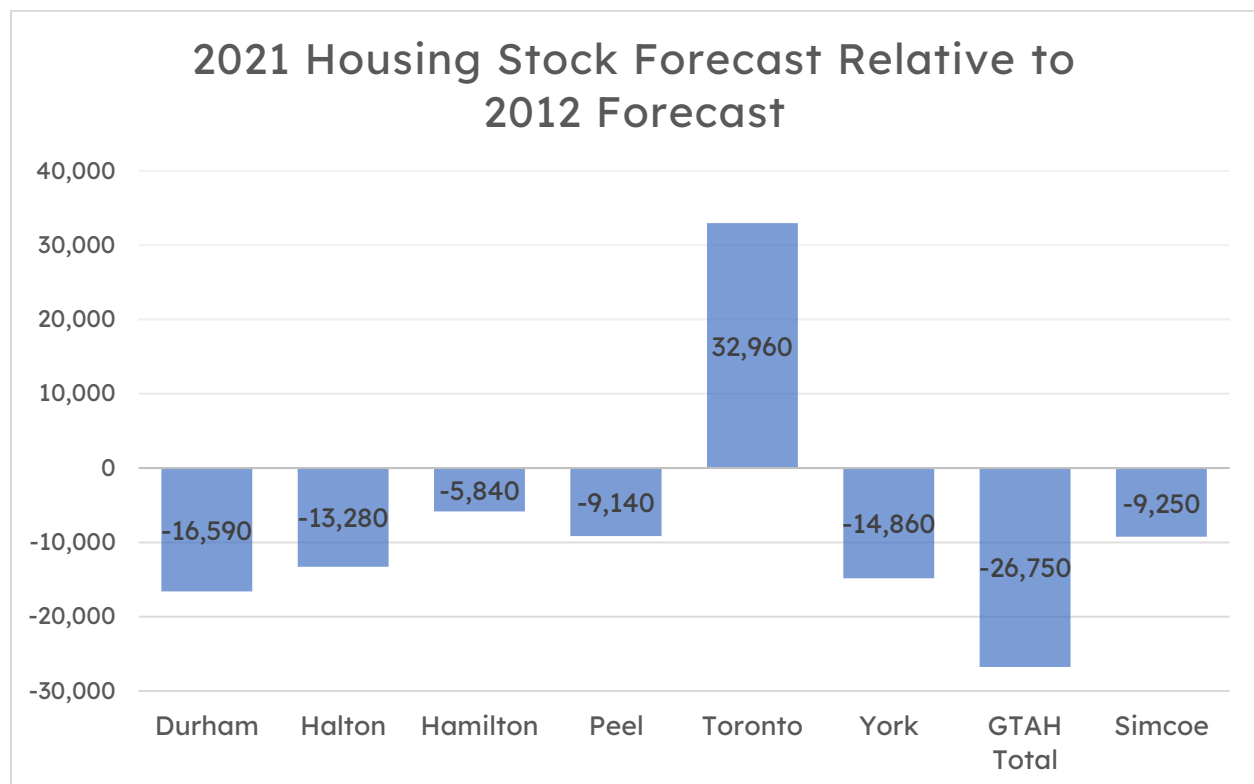
⁹⁷ Data Source: Author's Calculation

⁹⁸ Data Source: Author's Calculation

Unless we change how we forecast and plan, housing completions could lag demand by tens of thousands of units each year

In the previous two sections, we have analyzed seven scenarios; five where immigration levels are higher than forecast, and two where the international student boom lasts longer than Hemson forecasts. We also need to consider that current forecasts of housing completions may also be off. Figure 47 reintroduces the data showing that the Hemson-20 forecast of the 2021 housing stock was downgraded from the Hemson-12 forecast in six of our seven census divisions.

Figure 47: Change in Total Housing Stock Forecast, for each GTAH Census Division and Simcoe Census Division, between Hemson’s 2020 and 2012 Forecasts.⁹⁹



We need to consider that this may occur again. In Figure 48, we include a *housing completions continue to be revised downwards* scenario to our existing scenarios estimating excess housing demand from higher than forecasted levels of population growth.¹⁰⁰ For Durham, Halton, and Simcoe, the excess demand for housing in the underbuild scenarios is far more extensive than in the population growth scenarios.¹⁰¹

⁹⁹ Data Sources: Hemson (2012) and Hemson (2020b).

¹⁰⁰ The City of Toronto is left out of the analysis, as the size of the housing stock was revised *upwards* in Hemson-20 relative to Hemson-12.

¹⁰¹ Noting that Durham, Halton, and Simcoe would also receive significant additional excess demand for housing in the population growth scenarios due to spillover demand and *drive until you qualify*.

Figure 48: 2021-31 Excess Housing Demand Above Baseline, Eight Scenarios, for the 6 GTHA Census Divisions and Simcoe Census Division¹⁰²

Scenario	Durham	Halton	Hamilton	Peel	Toronto	York	Simcoe	Total
Immigration 1% Higher	114	196	123	1,219	1,885	431	40	4,008
Immigration 5% Higher	572	978	613	6,097	9,423	2,156	202	20,042
Immigration 10% Higher	1,143	1,956	1,227	12,195	18,847	4,311	404	40,083
Immigration 20% Higher	2,286	3,912	2,454	24,390	37,694	8,623	808	80,167
Immigration 40% Higher	4,572	7,824	4,908	48,780	75,387	17,245	1,616	160,333
NPR Boom +5 Years	898	831	1,776	10,940	13,303	2,316	1,075	31,139
NPR Boom +10 Years	2,010	1,859	3,973	24,475	29,760	5,181	2,405	69,661
Reduction in Housing Completion Forecasts to Match 2016- 21 Downward Revision	16,590	13,280	5,840	9,140		14,860	9,250	68,960

These scenarios are not mutually exclusive; the 2015-20 period experienced an increase in the excess demand for housing from higher population growth and a downward revision in housing stock forecasts. Excess demand for housing can grow particularly large if non-permanent residents and immigration rise faster than forecast while housing completions underperform.

The overall differences in the numbers across scenarios are substantial, illustrating how housing demand forecasts are highly sensitive to assumptions on population growth and housing completions. This inherent uncertainty must affect how Ontario plans for growth to address the housing shortages plaguing southern Ontario. Forecasts must be updated frequently, and plans should be forgiving to accommodate inevitable forecast errors.

¹⁰² Author's Calculation.

Conclusion and recommendations

While population and housing forecasts that missed the mark are not the sole factors in Southern Ontario's housing shortage, they played a contributing role and may well do so in the future. The province saw a mass and unforeseen exodus of young families from the GGH due to a lack of housing. When forecasts on the size of the current housing stock fall and forecasts of the population growth from international sources increase by over one hundred thousand individuals in five years, you have the recipe for too few homes to support the local population. Given the importance of immigration to the innovation economy of the GTA, and given the value of having global talent acquire their credentials in Canada *before* they gain permanent residency status, the solution should not be to look to reduce population growth. The underlying issue is not population growth but rather an inflexible planning and forecasting system that underestimates that growth level. It lacks a corrective mechanism to accommodate forecast errors.

Ontario's housing shortages could have been reduced with a more agile forecasting process and contingency buffers built into the Growth Plan so unanticipated increases in population could be housed. Things may have been different had the Ontario government not used population forecasts from 2012-13, which predated transformative changes to international student and immigration policies in 2014 and 2015, in the 2017 Growth Plan. A lack of policy coherence led Ontario to forecast to failure.

When providing policy recommendations, it is crucial never to lose sight of the question *what problem(s) are you trying to solve?* The problems identified in this report can be divided into two categories: how forecasts are conducted in growth planning and the lack of a contingency buffer in growth planning to accommodate unavoidable forecast errors.

Identified issues with the forecasts underpinning the Growth Plan

Ontario's Growth Plan forecasting issues summarized:

1. The population, employment, and housing stock forecasts used in planning are only updated every seven to eight years and quickly become stale due to changes in policy and other external factors.
2. The population forecasts used in planning do not disclose critical information for planners and analysts, such as forecasted migration patterns between census divisions and complete population pyramids.
3. A population forecast and a population projection, which provide conflicting predictions, creates confusion for policymakers, planners, and analysts.

To address these issues, we make the following recommendation:

Recommendation 1: Ontario should prepare a population, employment, and housing stock forecast, released annually, which would adopt the best elements of both the existing forecasts and the Ministry of Finance population projections. This would create a unified set of numbers to replace the existing Ministry of Finance population projections.

These unified should retain essential features from the existing forecasts, including being released annually providing province-wide coverage at the census division level, including full yearly population

projections, by age and sex. It would also retain critical elements of the Hemson forecasts, including consideration of land availability and other constraints, making them forecasts rather than projections. Like the existing Hemson approach, it would include forecasts on employment and the size of the housing stock, not just population. They should also include elements not currently found in either the Ministry of Finance or Hemson releases, such as yearly forecasts of the various components of population growth at the census division level.

Identified issues with the lack of a contingency buffer in the Growth Plan

Even the best forecasts will not be perfect. Forecasts can underestimate population growth or overestimate housing completions, which is problematic as the social, economic, and environmental costs of failing to build enough housing to support population growth are high.

Recommendation 2: Growth plans should be set to population estimates that are higher than forecast to allow for unavoidable errors in forecasting. Just as government budgets typically have contingency buffers to accommodate unplanned events, so too should growth plans.

These reforms are needed to ensure there is a place for every Ontarian to call home. We believe adopting these recommendations will address most of the issues identified in this report. But they alone are not enough, as there is also a need for better policy coordination, better data and better tools. We offer the following secondary recommendations to address those three betters:

Better policy coordination

Recommendation 3: The federal government should set immigration targets five years in advance to give provinces and municipalities enough time to ensure the housing stock can support the additional population. The timing of updates to growth plans should be synchronized with the release of immigration targets.

Recommendation 4: Federal policies affecting population growth, such as rules governing international students, should be designed through coordination and consultation across all three levels of government. While the federal government ultimately sets federal policies, increased consultation can lead to enhanced policy coherence across levels of government.

Recommendation 5: If significant changes are made to programs that affect the size of the population, such as policies governing international students, new sets of population forecasts should be generated immediately, and growth plans altered as needed.

Recommendation 6: Each Ontario post-secondary institution should issue five-year targets for international student growth, and these targets should be incorporated into population growth forecasts and growth plans.

Better data

Recommendation 7: Statistics Canada should include housing starts and completion data at a municipal level, not just CMA level.

Recommendation 8: Statistics Canada should create a one-stop portal for municipal-level data relevant to housing. At a minimum, this should include draft plan approved and zoned units, registered units, and residential building permits issued.

Recommendation 9: The Statistics Canada series *Interprovincial and intraprovincial migrants, by census metropolitan area and census agglomeration of origin and destination* should be expanded to include data at the census division level.

Better tools

Recommendation 10: Ontario should create an open-access online population and housing model, accessible to all, which would allow users to ‘stress test’ the assumptions underlying growth plans which would allow municipalities to better contingency plan. This would allow policymakers to quickly determine the impact on housing demand from a change to immigration targets, an increase in the birth rate, or other factors that could impact the size of the local population.

A better Ontario is possible, where every family has an available and attainable home. The future is not just something we forecast but rather something we create through our collective actions.

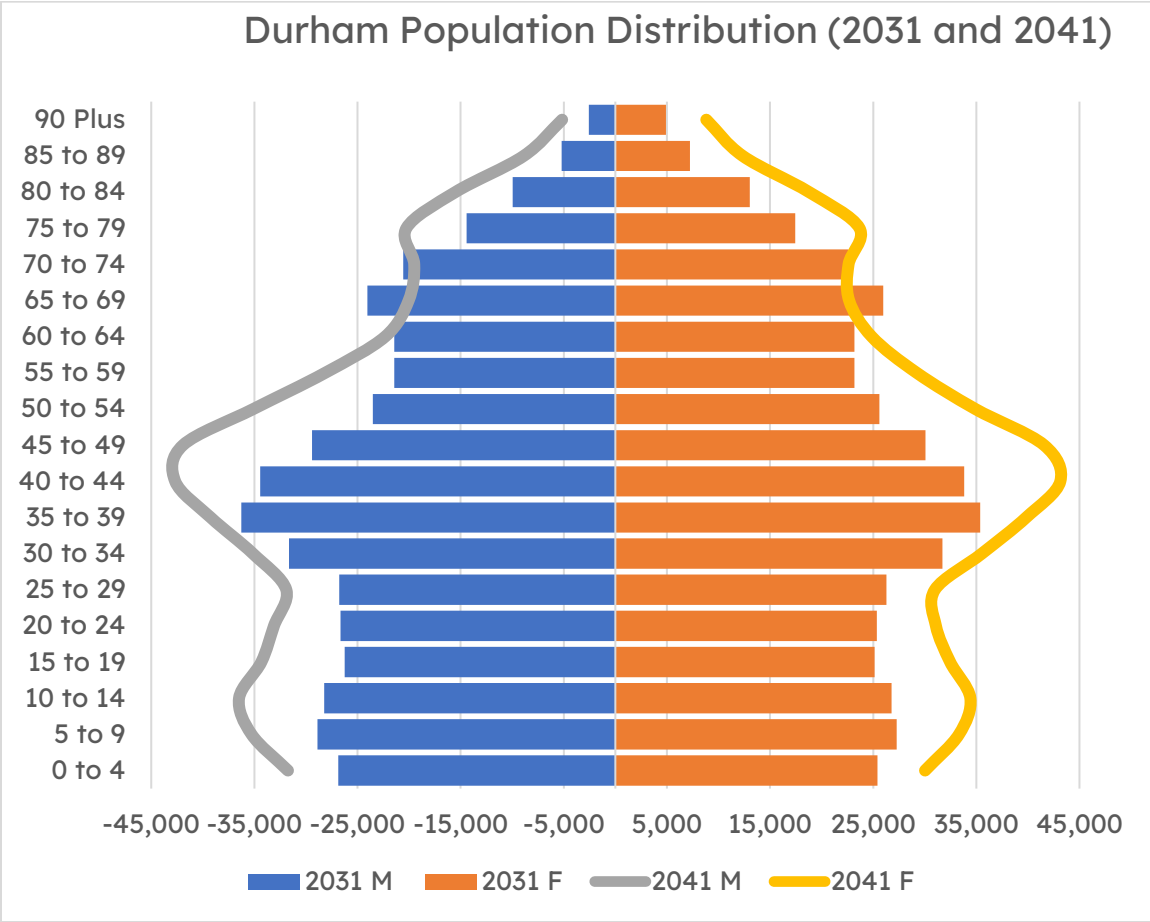
Appendix I: Baseline population forecast for Durham

Population forecast, total population, by age cohort for Durham

Year	Total	0 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 +
2022	736,900	85,100	89,300	97,200	102,600	96,700	98,800	87,800	52,400	21,900	5,100
2023	752,100	87,500	90,700	97,900	106,800	98,800	96,300	91,000	54,700	23,000	5,400
2024	766,900	89,700	92,000	98,500	110,700	101,400	93,900	94,000	57,200	23,900	5,600
2025	782,100	91,900	93,700	98,800	114,500	104,100	92,300	96,200	59,700	25,000	5,900
2026	797,100	94,000	95,400	98,900	118,300	107,200	91,200	97,600	62,100	26,300	6,100
2027	815,200	97,100	97,300	100,000	122,700	110,500	90,800	98,000	64,100	28,400	6,300
2028	833,800	100,200	99,300	101,300	126,700	114,200	91,100	97,800	66,400	30,300	6,500
2029	852,200	103,200	101,500	102,400	130,100	118,400	91,700	97,000	69,100	32,000	6,800
2030	870,600	105,900	103,800	103,600	132,900	123,000	92,500	96,000	72,000	33,700	7,200
2031	889,100	108,500	106,400	105,000	135,000	127,800	93,700	94,600	75,100	35,500	7,500
2032	908,400	111,300	109,000	106,700	137,100	132,800	95,500	93,000	78,000	37,200	7,800
2033	927,800	113,800	112,100	108,500	138,700	137,600	97,700	91,100	81,000	39,000	8,300
2034	947,200	116,100	115,200	110,300	140,200	142,400	100,300	89,200	83,800	40,900	8,800
2035	966,500	118,300	118,400	112,300	141,200	147,200	103,200	87,900	85,800	42,900	9,300
2036	985,900	120,400	121,600	114,500	142,000	151,900	106,500	87,100	87,200	44,800	9,900
2037	1,006,000	122,500	125,000	116,700	143,500	156,300	109,900	86,900	87,700	46,600	10,900
2038	1,026,600	124,500	128,400	119,000	145,200	160,400	113,700	87,300	87,800	48,500	11,800
2039	1,046,600	126,500	131,600	121,500	146,700	163,900	117,900	87,900	87,400	50,700	12,500
2040	1,066,800	128,400	134,800	124,100	148,200	166,900	122,600	88,700	86,900	53,000	13,200
2041	1,087,200	130,400	137,700	127,100	149,800	169,300	127,400	89,900	86,100	55,500	14,000
2042	1,108,200	132,600	140,700	130,200	151,900	171,500	132,200	91,600	84,900	57,900	14,700

2043	1,129,400	134,800	143,500	133,500	154,000	173,400	137,000	93,800	83,600	60,300	15,500
2044	1,150,700	137,100	146,100	137,000	156,100	175,000	141,700	96,400	82,300	62,600	16,400
2045	1,171,800	139,400	148,600	140,500	158,400	176,300	146,400	99,200	81,400	64,300	17,300
2046	1,193,100	141,700	151,000	144,100	160,700	177,400	151,000	102,500	81,000	65,500	18,200
2047	1,213,600	144,500	153,500	148,100	162,800	179,400	154,800	105,100	81,300	65,000	19,100
2048	1,234,100	146,800	155,700	151,800	164,800	181,100	158,600	108,700	81,400	65,100	20,100
2049	1,254,800	149,100	157,900	155,400	166,900	182,800	161,900	112,700	81,700	65,200	21,200
2050	1,275,300	151,400	160,100	158,800	169,100	184,400	164,700	117,100	82,200	65,200	22,300
2051	1,296,000	153,700	162,200	161,900	171,800	186,100	167,000	121,600	83,000	65,200	23,500

Population pyramid for Durham, by age and sex, for 2031 and 2041



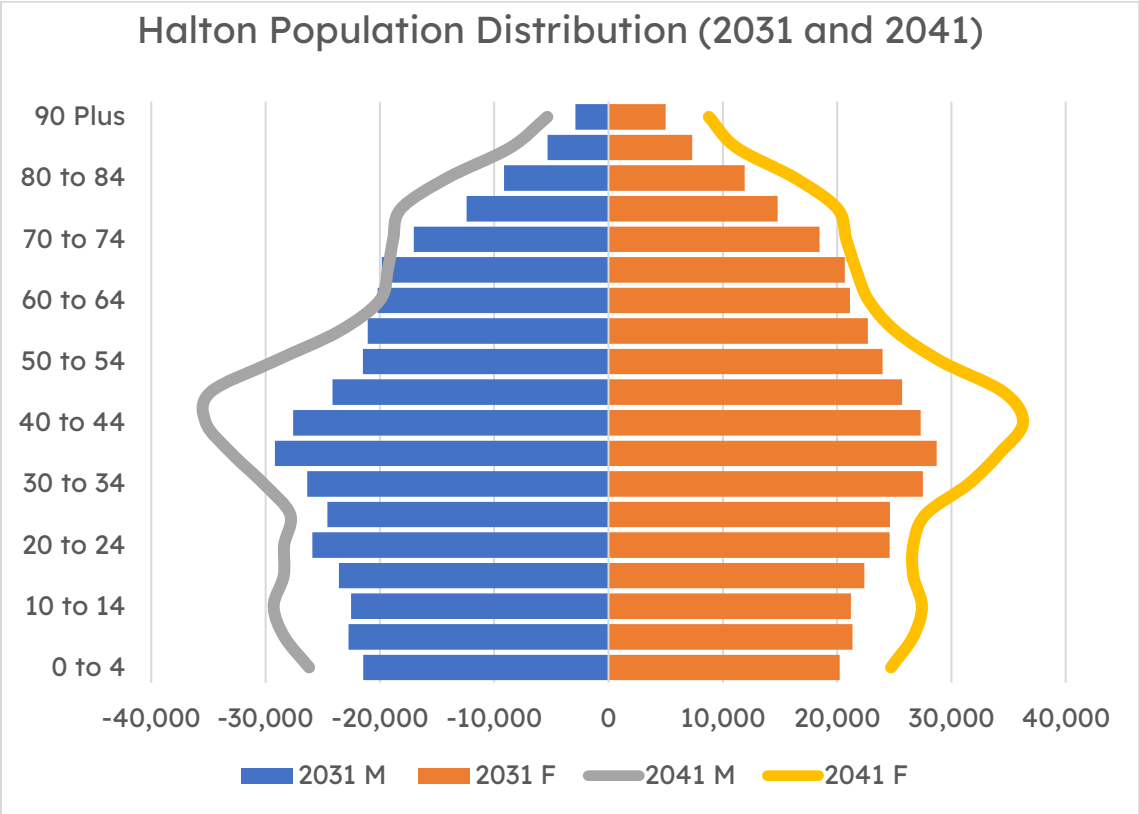
Appendix II: Baseline population forecast for Halton

Population forecast, total population, by age cohort for Halton

Year	Total	0 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 +
2022	626,900	66,300	85,600	79,200	77,300	90,200	88,200	67,700	45,500	21,500	5,400
2023	642,000	67,600	86,200	82,700	81,000	90,400	88,300	70,500	47,000	22,600	5,700
2024	657,100	69,000	86,700	86,000	85,000	90,800	88,200	73,100	48,700	23,700	5,900
2025	672,100	70,800	87,100	88,500	89,200	91,300	88,300	75,400	50,600	24,800	6,100
2026	687,000	72,600	87,500	90,800	93,300	92,400	88,500	77,200	52,400	26,000	6,300
2027	703,000	74,900	87,800	93,200	97,700	93,900	88,700	78,600	53,700	27,900	6,600
2028	719,100	77,700	87,900	95,200	102,000	95,800	88,900	79,700	55,500	29,500	6,900
2029	735,200	80,400	88,200	97,000	105,800	98,200	89,200	80,500	57,700	31,000	7,200
2030	750,900	83,000	88,900	98,400	109,000	101,300	89,100	81,300	60,000	32,400	7,500
2031	766,900	85,800	89,700	99,700	111,700	104,700	89,200	81,800	62,700	33,700	7,900
2032	783,300	88,300	91,000	100,900	114,300	108,600	89,400	82,300	65,200	35,000	8,300
2033	799,400	90,600	92,700	102,000	116,500	112,400	90,100	82,200	67,700	36,400	8,800
2034	815,600	92,800	94,500	103,000	118,500	116,500	91,100	82,000	70,100	37,800	9,300
2035	831,900	94,900	96,600	103,900	120,100	120,600	92,100	82,100	72,200	39,500	9,900
2036	847,900	96,800	98,700	105,000	121,500	124,600	93,700	82,300	73,800	41,100	10,400
2037	864,500	98,800	101,100	106,000	123,100	128,600	95,500	82,600	75,000	42,400	11,400
2038	881,300	100,700	103,800	106,800	124,700	132,400	97,700	82,900	76,000	44,100	12,200
2039	898,000	102,500	106,500	107,900	126,100	135,700	100,400	83,300	76,700	46,000	12,900
2040	914,400	104,200	109,100	109,200	127,400	138,500	103,700	83,400	77,400	48,000	13,500
2041	931,000	105,900	111,800	110,600	128,800	140,900	107,100	83,800	77,800	50,200	14,100
2042	948,400	107,800	114,300	112,600	130,400	143,000	110,800	84,300	78,200	52,300	14,700

2043	965,900	109,700	116,600	114,800	132,000	144,900	114,500	85,300	78,200	54,500	15,400
2044	983,100	111,600	118,800	117,100	133,500	146,700	118,300	86,500	78,000	56,500	16,100
2045	1,000,700	113,400	121,000	119,700	135,100	148,100	122,100	87,800	78,200	58,300	17,000
2046	1,018,000	115,200	123,000	122,400	136,700	149,400	125,900	89,500	78,400	59,700	17,800
2047	1,035,100	120,500	124,200	126,000	141,500	148,700	126,400	92,800	77,100	59,000	18,900
2048	1,052,100	123,400	126,100	128,400	144,000	150,000	128,700	95,300	77,200	59,100	19,900
2049	1,068,900	126,200	128,100	130,500	146,600	151,500	130,400	98,000	77,500	59,200	20,900
2050	1,086,000	129,000	130,100	132,600	149,400	153,000	131,800	100,900	77,900	59,200	22,100
2051	1,103,100	131,700	132,200	134,700	152,100	154,700	132,800	103,900	78,600	59,200	23,200

Population pyramid for Halton, by age and sex, for 2031 and 2041



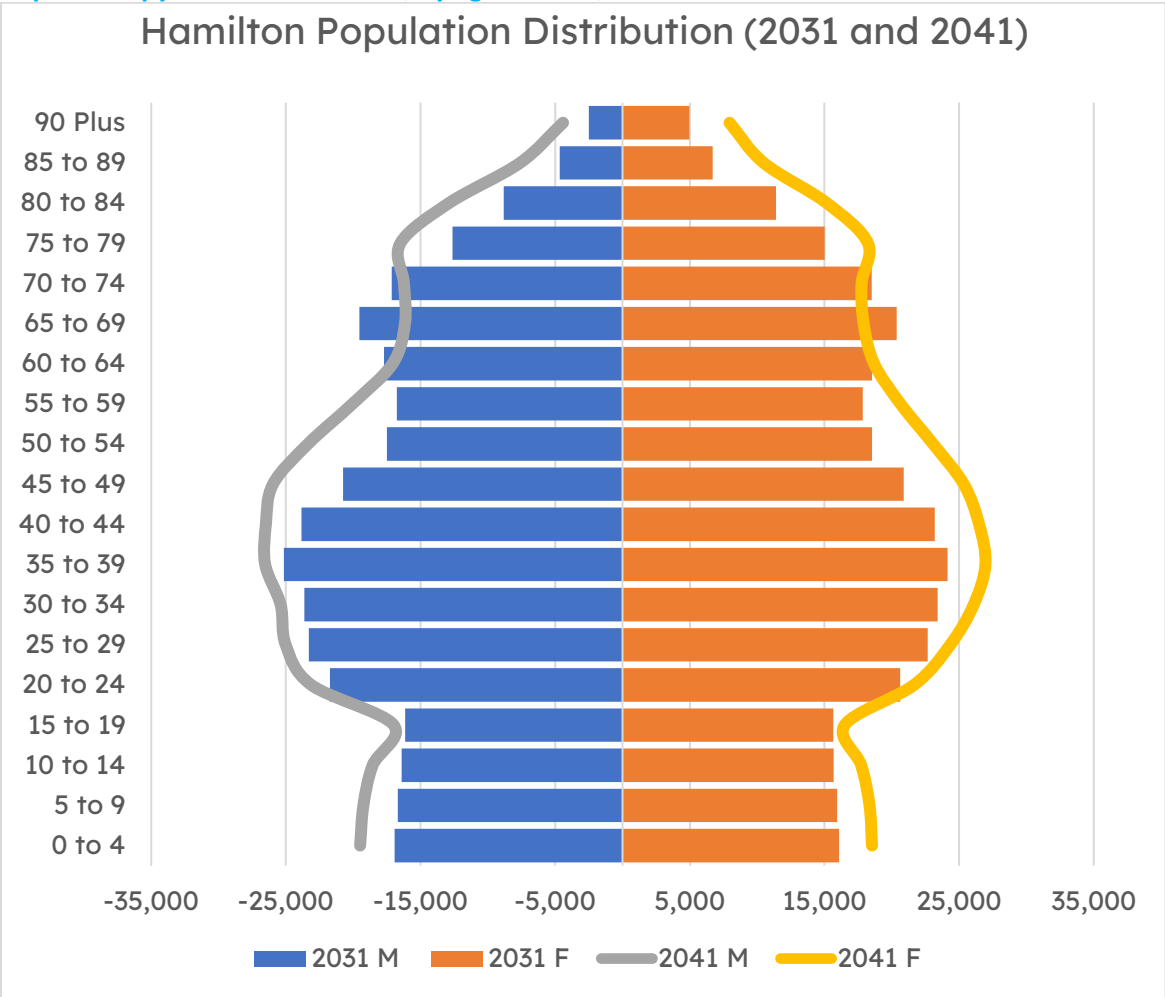
Appendix III: Baseline population forecast for Hamilton

Population forecast, total population, by age cohort for Hamilton

Year	Total	0 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 +
2022	589,600	60,300	64,000	81,700	84,500	72,000	77,000	74,200	47,500	22,100	6,300
2023	596,100	60,700	63,800	82,700	86,200	73,200	75,300	76,000	49,000	22,800	6,400
2024	602,800	61,000	63,800	83,600	87,800	74,700	73,500	77,700	50,800	23,400	6,500
2025	609,400	61,400	63,800	84,400	89,300	76,200	72,100	78,700	52,900	24,000	6,600
2026	615,900	61,800	63,900	85,000	90,600	78,000	71,200	79,100	54,800	24,800	6,700
2027	623,200	62,500	63,800	86,000	91,900	79,900	70,700	79,100	56,100	26,400	6,800
2028	630,300	63,200	63,700	86,800	93,300	81,900	70,500	78,500	57,600	27,800	7,000
2029	637,500	64,000	63,700	87,400	94,500	84,100	70,400	77,800	59,400	29,100	7,100
2030	644,600	64,800	63,700	87,900	95,400	86,500	70,400	77,100	61,300	30,300	7,200
2031	651,800	65,600	63,900	88,300	96,300	88,700	70,600	76,100	63,300	31,600	7,400
2032	659,900	66,600	64,000	88,800	97,400	91,100	71,400	74,800	65,200	32,900	7,700
2033	667,500	67,600	64,500	89,300	98,200	93,000	72,500	73,300	66,900	34,100	8,100
2034	675,500	68,600	64,900	89,900	99,000	94,900	73,800	71,900	68,500	35,600	8,400
2035	683,100	69,500	65,300	90,500	99,700	96,700	75,200	70,700	69,600	37,200	8,700
2036	691,100	70,500	65,900	91,200	100,300	98,200	76,900	70,000	70,200	38,700	9,200
2037	699,500	71,500	66,600	91,800	101,400	99,600	78,600	69,700	70,400	39,900	10,000
2038	707,800	72,500	67,300	92,300	102,500	101,100	80,500	69,500	70,100	41,300	10,700
2039	716,000	73,500	68,100	92,800	103,400	102,300	82,600	69,500	69,700	42,900	11,200
2040	724,500	74,600	68,900	93,400	104,300	103,300	84,900	69,500	69,300	44,500	11,800
2041	733,000	75,600	69,800	94,100	105,000	104,300	87,100	69,800	68,700	46,200	12,400
2042	742,000	76,700	70,800	94,900	105,700	105,300	89,400	70,600	67,800	47,800	13,000

2043	750,700	77,700	71,800	95,800	106,500	106,200	91,400	71,700	66,700	49,300	13,600
2044	759,300	78,800	72,700	96,600	107,200	107,100	93,300	72,900	65,700	50,700	14,300
2045	768,200	79,800	73,700	97,600	108,000	107,900	95,200	74,300	64,900	51,800	15,000
2046	777,100	80,900	74,800	98,600	108,700	108,700	96,800	75,900	64,500	52,400	15,800
2047	786,300	81,800	75,400	100,500	109,900	109,100	98,600	77,100	64,600	52,700	16,600
2048	795,400	82,800	76,200	101,900	110,700	110,100	100,000	78,800	64,600	52,800	17,500
2049	804,400	83,900	77,100	103,300	111,400	111,000	101,200	80,700	64,600	52,800	18,400
2050	813,700	85,000	78,000	104,600	112,300	111,800	102,200	82,900	64,700	52,800	19,400
2051	823,000	86,100	78,900	105,800	113,400	112,700	102,900	85,000	64,900	52,800	20,500

Population pyramid for Hamilton, by age and sex, for 2031 and 2041



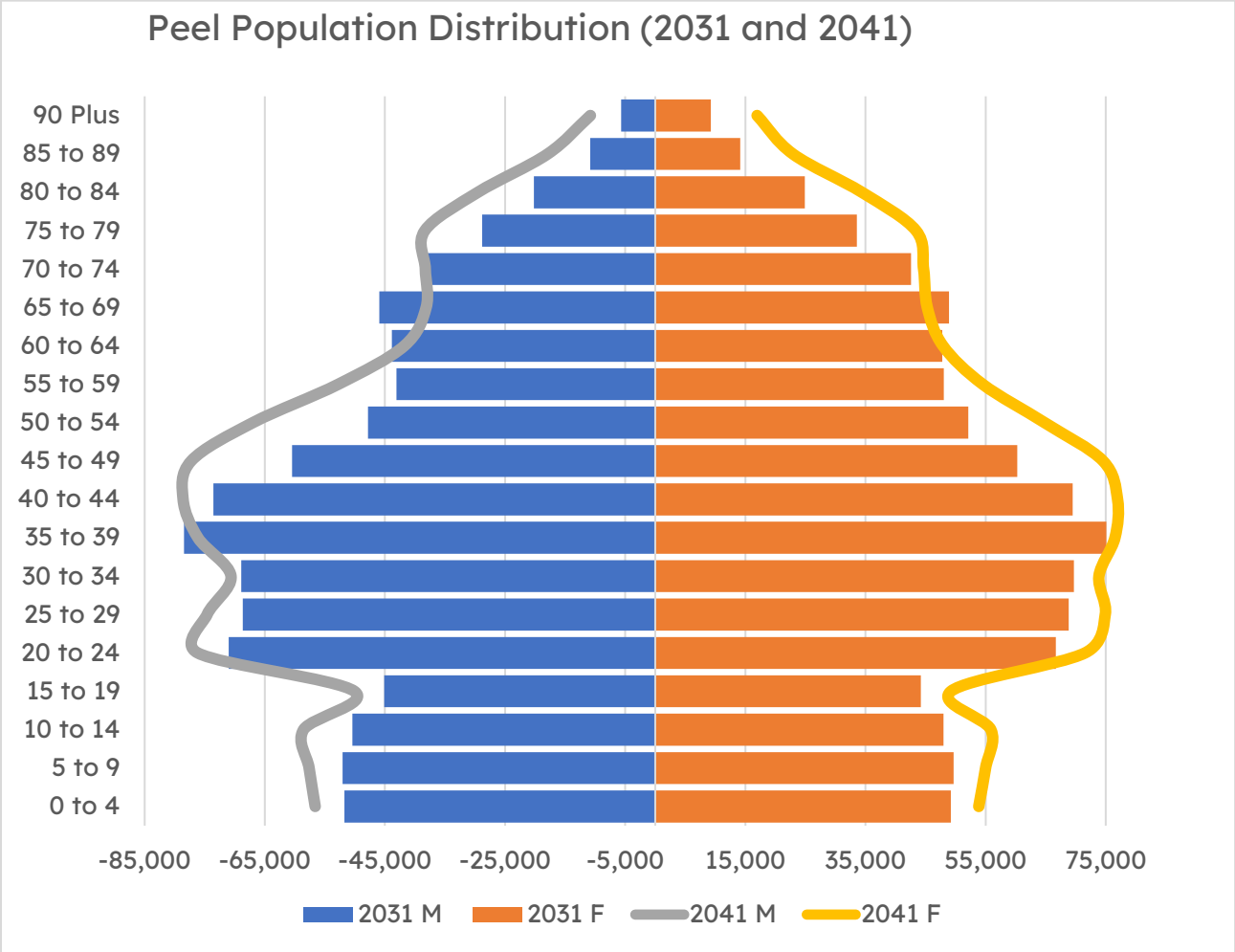
Appendix IV: Baseline population forecast for Peel

Population forecast, total population, by age cohort for Peel

Year	Total	0 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 +
2022	1,603,900	169,800	193,900	259,600	245,400	207,000	203,300	169,000	103,400	43,300	9,200
2023	1,634,000	172,800	194,300	262,700	255,400	211,300	199,900	174,700	107,600	45,600	9,700
2024	1,661,000	176,500	192,900	265,100	264,100	216,200	196,400	179,600	112,100	47,900	10,200
2025	1,687,900	180,800	191,400	266,900	272,000	221,500	193,800	183,300	117,300	50,200	10,700
2026	1,714,900	185,300	189,700	269,100	278,700	227,200	192,500	186,300	121,900	52,800	11,400
2027	1,737,500	188,800	188,500	270,300	283,900	233,000	191,300	187,600	125,700	56,500	11,900
2028	1,760,200	192,600	187,100	270,600	288,700	240,000	190,200	188,500	129,800	60,100	12,600
2029	1,782,800	196,500	186,200	271,500	291,600	247,600	189,700	188,800	134,100	63,500	13,300
2030	1,805,600	200,100	186,300	273,100	292,500	255,900	189,900	187,900	139,100	66,700	14,100
2031	1,828,200	202,700	187,800	275,300	292,200	263,800	191,100	186,500	143,900	70,000	14,900
2032	1,849,800	205,500	188,600	277,400	291,700	271,600	193,000	184,400	148,700	73,200	15,700
2033	1,871,500	207,700	191,000	279,300	291,100	278,600	195,900	181,200	153,600	76,400	16,700
2034	1,893,300	209,700	194,000	280,700	290,900	285,100	199,500	178,100	157,900	79,700	17,700
2035	1,915,100	211,600	197,100	282,200	290,700	290,900	203,500	175,700	161,100	83,600	18,700
2036	1,937,000	213,300	200,400	283,800	291,000	295,800	207,900	174,200	163,500	87,100	20,000
2037	1,959,200	215,200	203,100	286,100	291,900	300,100	212,900	173,300	164,800	90,100	21,700
2038	1,981,400	217,000	206,000	288,200	292,700	304,000	218,800	172,300	165,600	93,500	23,300
2039	2,003,600	219,000	209,000	290,500	293,800	306,400	225,200	171,900	166,100	96,900	24,800
2040	2,026,000	221,000	211,800	293,400	295,300	307,300	232,300	172,100	165,600	100,900	26,300
2041	2,047,900	223,100	213,700	297,300	297,200	307,400	239,000	173,100	164,700	104,700	27,700
2042	2,071,100	225,400	216,100	301,100	299,500	307,300	245,800	174,900	163,400	108,500	29,100

2043	2,093,900	227,800	218,000	305,400	301,700	307,000	252,000	177,700	161,200	112,500	30,600
2044	2,117,000	230,300	219,800	310,300	303,600	307,000	257,600	181,100	159,100	116,000	32,200
2045	2,140,000	232,800	221,500	315,500	305,700	306,800	262,600	184,800	157,500	118,800	34,000
2046	2,162,900	235,400	223,200	320,800	307,800	307,000	266,800	188,900	156,500	120,900	35,600
2047	2,185,800	239,400	225,500	328,600	311,800	307,100	269,700	192,700	154,300	119,400	37,300
2048	2,208,700	242,800	227,200	334,100	314,800	308,300	272,200	197,300	153,700	119,100	39,200
2049	2,231,300	246,200	229,000	339,300	318,300	309,300	273,600	202,500	153,300	118,600	41,200
2050	2,254,200	249,800	230,800	343,800	322,600	310,100	274,200	208,200	153,300	118,000	43,400
2051	2,276,900	253,400	232,700	347,600	327,800	311,200	273,900	213,800	153,700	117,200	45,600

Population pyramid for Peel, by age and sex, for 2031 and 2041



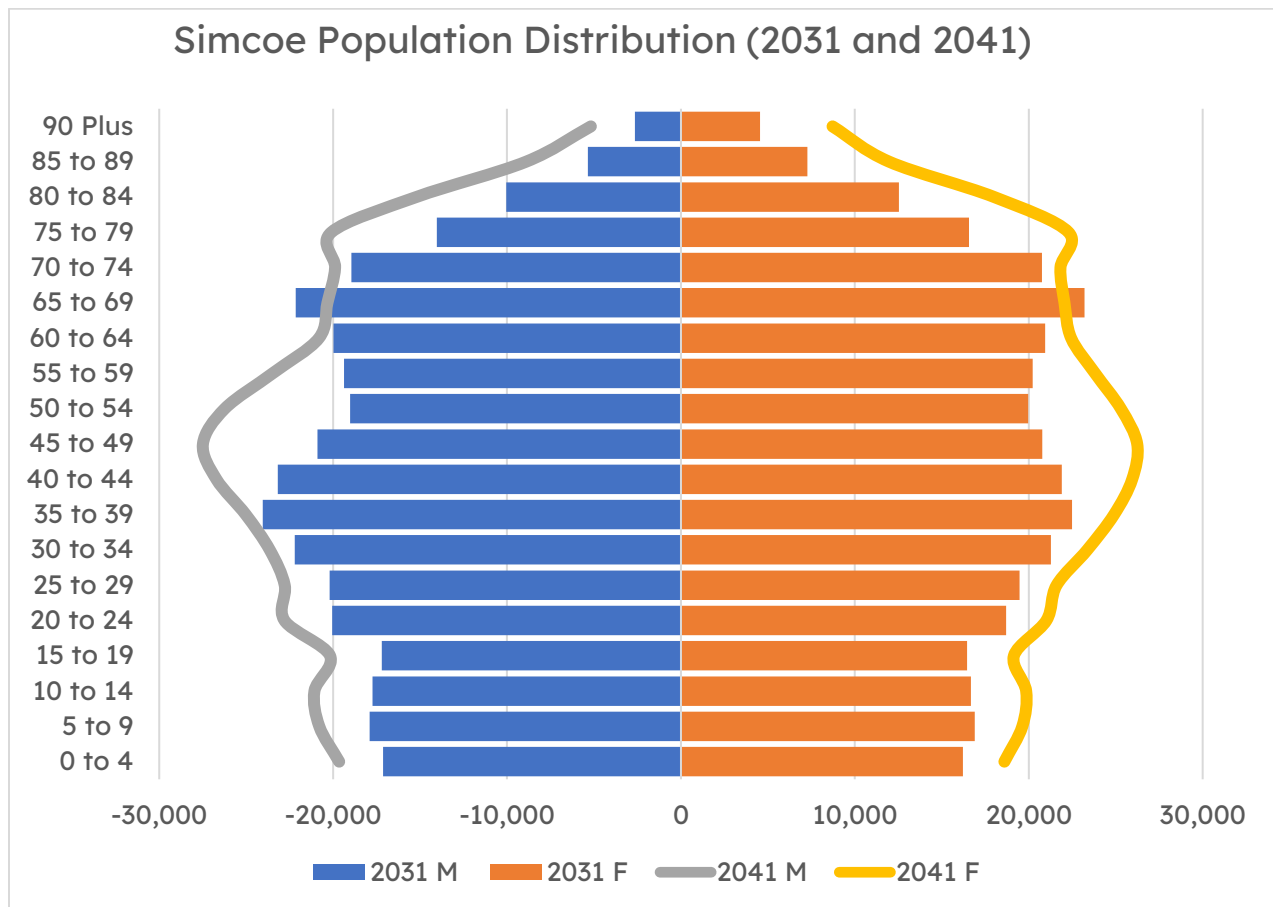
Appendix V: Baseline population forecast for Simcoe

Population forecast, total population, by age cohort for Simcoe

Year	Total	0 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 +
2022	560,800	57,300	61,600	70,600	73,500	68,000	78,400	75,300	50,100	21,400	4,600
2023	572,700	58,400	62,300	71,700	75,700	69,400	77,500	78,200	51,900	22,700	4,900
2024	584,600	59,600	62,700	72,900	78,000	70,900	76,500	80,900	54,100	23,900	5,100
2025	596,300	60,700	63,500	73,600	80,100	72,700	75,800	83,100	56,400	25,000	5,400
2026	608,100	61,800	64,200	74,500	82,100	74,400	75,800	84,700	58,700	26,300	5,600
2027	620,400	63,000	65,000	75,300	84,200	76,500	76,200	85,400	60,400	28,500	5,900
2028	632,500	64,200	65,600	76,200	86,200	78,700	76,700	86,000	62,300	30,400	6,200
2029	644,500	65,600	66,300	76,900	87,800	81,100	77,300	86,200	64,800	32,000	6,500
2030	656,700	66,900	67,100	77,600	89,100	83,900	77,800	86,400	67,500	33,600	6,800
2031	669,000	68,100	68,100	78,400	90,000	86,800	78,600	86,300	70,300	35,200	7,200
2032	680,900	69,400	68,900	79,400	90,900	89,400	79,500	85,900	73,100	36,800	7,600
2033	693,100	70,600	70,200	80,300	91,700	91,800	81,000	85,000	75,900	38,400	8,200
2034	705,100	71,700	71,500	81,000	92,500	94,300	82,500	84,100	78,500	40,200	8,800
2035	716,900	72,700	72,600	82,100	93,000	96,600	84,400	83,400	80,700	42,100	9,300
2036	729,000	73,800	73,900	83,100	93,600	98,800	86,300	83,400	82,200	44,000	9,900
2037	740,500	74,800	75,100	84,100	94,200	100,800	88,300	83,700	83,000	45,600	10,900
2038	752,300	75,700	76,400	85,000	95,000	102,800	90,600	84,000	83,600	47,400	11,800
2039	763,800	76,700	77,700	85,900	95,700	104,300	93,100	84,500	83,900	49,500	12,500
2040	775,500	77,700	79,100	86,900	96,200	105,600	96,000	85,000	84,100	51,700	13,200
2041	787,000	78,700	80,300	88,200	96,900	106,400	98,800	85,600	84,100	54,100	13,900
2042	798,700	79,700	81,500	89,400	97,800	107,200	101,600	86,600	83,900	56,400	14,600

2043	810,600	80,800	82,700	90,800	98,700	107,900	104,200	88,100	83,200	58,800	15,400
2044	822,500	81,900	83,800	92,300	99,400	108,700	106,800	89,800	82,500	61,000	16,300
2045	834,300	83,000	84,900	93,700	100,400	109,200	109,200	91,700	82,100	62,900	17,200
2046	846,000	84,100	86,000	95,300	101,300	109,700	111,500	93,600	82,200	64,200	18,100
2047	857,200	85,300	86,900	97,000	102,300	110,400	113,800	95,900	82,500	64,000	19,100
2048	868,500	86,500	87,900	98,500	103,000	111,200	115,800	98,200	82,900	64,400	20,100
2049	879,700	87,600	88,800	100,000	103,900	112,000	117,400	100,700	83,400	64,700	21,200
2050	890,800	88,800	89,800	101,400	104,800	112,600	118,600	103,500	84,000	64,900	22,400
2051	901,900	89,900	90,800	102,700	105,900	113,300	119,500	106,300	84,700	65,100	23,700

Population pyramid for Simcoe, by age and sex, for 2031 and 2041



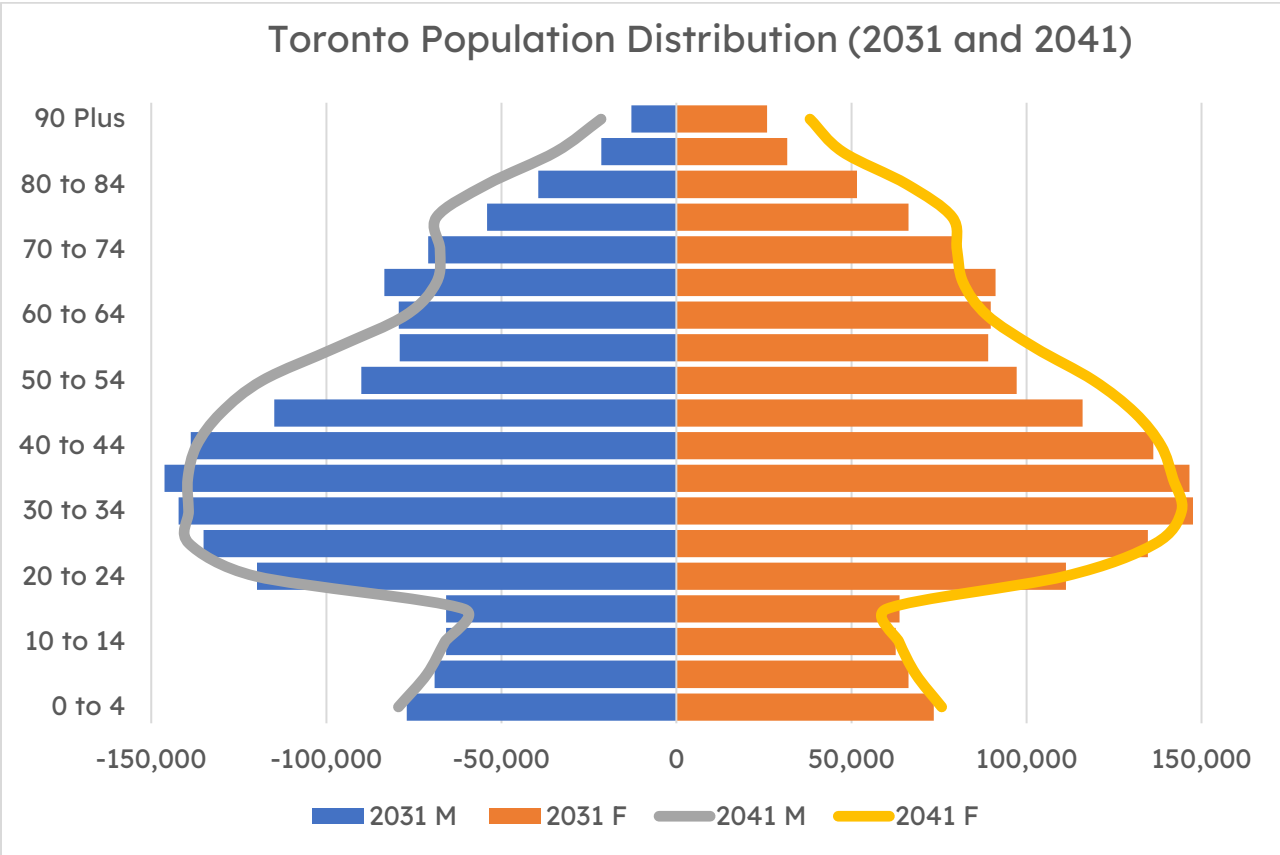
Appendix VI: Baseline population forecast for Toronto

Population forecast, total population, by age cohort for Toronto

Year	Total	0 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 +
2022	3,058,000	273,400	282,100	494,100	547,600	404,200	378,900	327,400	209,800	107,800	32,700
2023	3,093,200	273,500	281,500	499,800	557,800	413,800	371,900	335,600	216,800	108,900	33,600
2024	3,127,900	275,500	279,600	504,200	567,100	424,100	365,100	343,100	224,300	110,900	34,000
2025	3,163,300	278,800	277,400	506,100	575,900	435,700	360,300	348,400	232,800	113,300	34,600
2026	3,193,000	281,900	274,200	506,300	582,200	447,600	357,100	351,200	240,700	116,600	35,200
2027	3,212,000	282,100	270,500	506,500	584,200	458,800	355,000	350,700	246,100	122,200	35,900
2028	3,230,900	283,100	266,500	505,800	585,000	470,900	353,300	350,100	251,800	127,800	36,600
2029	3,249,700	284,600	262,600	504,700	584,500	483,200	352,400	349,200	258,000	133,200	37,300
2030	3,268,400	285,800	259,500	502,400	583,700	495,400	353,000	346,700	265,200	138,600	38,100
2031	3,287,000	285,800	258,000	500,900	582,500	505,900	355,300	343,700	272,100	144,100	38,700
2032	3,305,200	287,100	255,200	501,400	580,200	514,500	359,600	339,500	278,400	149,700	39,600
2033	3,323,200	287,800	253,700	503,300	577,000	521,100	365,600	333,200	285,600	155,300	40,600
2034	3,341,200	288,200	253,100	504,300	574,500	526,800	372,400	326,800	292,000	161,200	41,900
2035	3,359,300	288,700	252,900	505,200	571,400	531,700	380,200	321,800	296,300	167,700	43,400
2036	3,377,300	289,400	252,800	505,700	568,900	535,400	388,800	318,300	298,700	174,000	45,300
2037	3,394,800	290,500	252,000	505,800	568,100	537,400	397,900	316,600	298,900	179,000	48,600
2038	3,411,900	291,400	251,400	505,400	567,900	538,500	407,600	315,000	298,900	184,100	51,700
2039	3,429,100	292,500	251,400	505,000	567,500	538,300	417,800	314,100	298,500	189,600	54,400
2040	3,446,500	293,600	251,300	505,200	566,100	537,800	428,100	314,500	297,000	195,800	57,100
2041	3,463,700	294,900	250,400	506,900	565,000	536,700	437,000	316,300	295,000	201,800	59,700
2042	3,481,700	296,300	251,000	507,600	565,500	535,200	444,600	319,900	292,000	207,400	62,200

2043	3,499,700	297,800	251,500	508,700	566,400	533,400	450,700	325,200	287,400	213,700	64,900
2044	3,517,600	299,200	251,900	511,000	566,400	532,100	456,000	331,100	282,700	219,500	67,700
2045	3,535,500	300,500	252,300	514,000	566,400	530,200	460,600	337,900	279,000	223,700	70,900
2046	3,553,700	301,700	253,100	517,500	566,300	528,700	464,100	345,300	276,600	226,200	74,200
2047	3,574,200	302,500	255,700	521,400	569,600	533,000	469,200	345,700	272,900	225,800	78,400
2048	3,593,600	303,400	257,000	526,000	569,600	535,400	471,800	351,500	271,200	225,300	82,400
2049	3,612,800	304,100	258,400	531,300	569,600	537,500	473,200	357,900	269,800	224,500	86,500
2050	3,631,900	304,800	259,800	536,500	570,400	538,900	473,300	365,100	268,800	223,300	91,000
2051	3,651,000	305,400	261,200	541,100	572,800	540,400	472,500	371,700	268,500	221,800	95,600

Population pyramid for Toronto, by age and sex, for 2031 and 2041



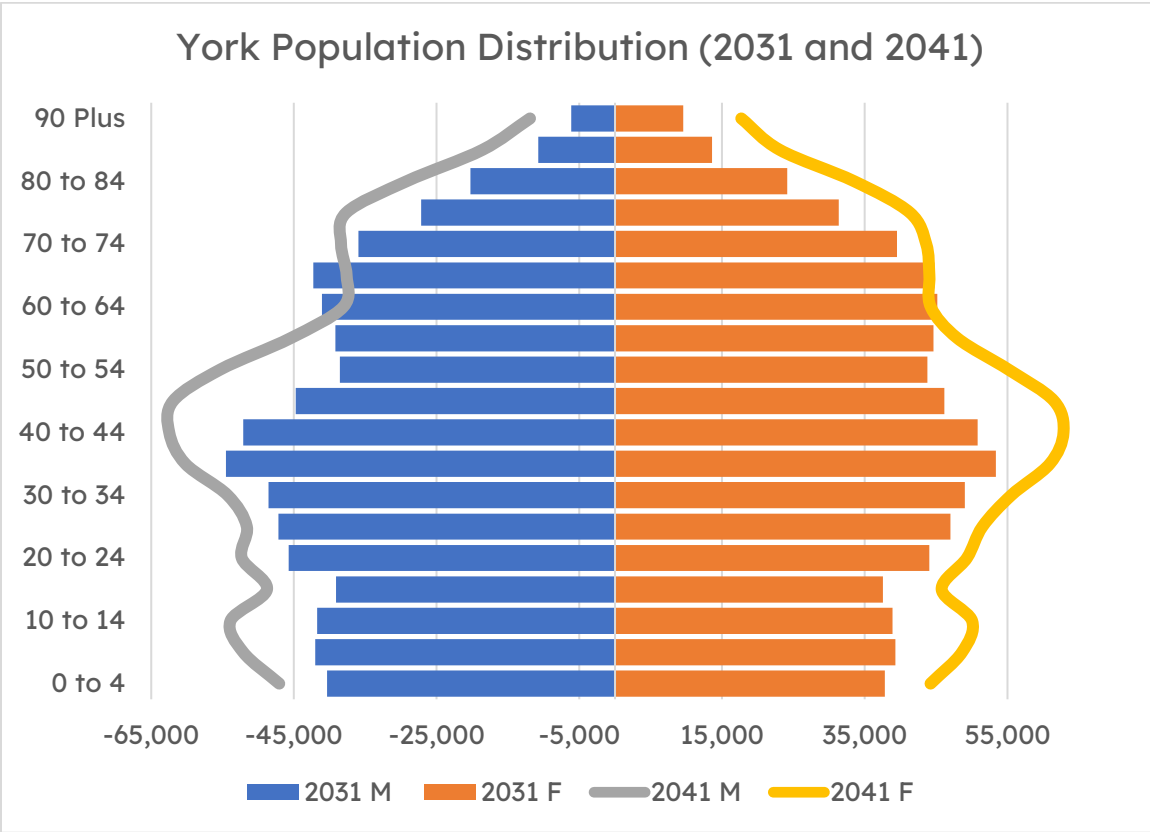
Appendix VII: Baseline population forecast for York

Population forecast, total population, by age cohort for York

Year	Total	0 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 +
2022	1,242,800	126,900	150,700	164,200	159,600	161,700	181,900	150,600	95,600	42,100	9,500
2023	1,263,000	128,300	150,400	167,600	165,200	161,700	179,600	156,200	100,100	43,800	10,100
2024	1,283,100	130,700	150,000	169,800	171,000	162,300	177,200	161,100	104,500	45,800	10,700
2025	1,302,900	133,300	149,500	171,500	176,700	163,900	174,900	164,700	109,300	47,800	11,300
2026	1,322,900	136,300	149,400	172,700	181,900	166,400	172,900	167,200	113,800	50,300	12,000
2027	1,350,100	141,300	150,300	175,500	187,900	170,400	171,700	168,900	117,100	54,300	12,700
2028	1,376,900	146,400	150,900	178,100	193,400	175,100	170,100	170,400	121,000	58,100	13,400
2029	1,404,000	151,300	152,100	180,700	197,700	180,900	168,300	172,000	125,100	61,800	14,100
2030	1,431,100	155,900	153,900	182,500	201,800	187,400	167,000	173,000	129,400	65,300	14,900
2031	1,458,100	159,500	157,200	184,000	205,500	193,900	166,200	173,300	134,000	68,800	15,700
2032	1,486,000	164,200	159,600	185,700	209,400	200,100	166,500	173,200	138,600	72,200	16,500
2033	1,513,700	168,400	162,500	187,400	212,700	206,700	167,700	171,500	143,800	75,700	17,300
2034	1,541,300	172,200	166,500	188,600	215,300	213,500	169,500	169,800	148,500	79,200	18,200
2035	1,569,200	175,800	170,800	190,000	217,400	220,300	172,100	168,300	152,100	83,100	19,300
2036	1,597,100	179,000	175,500	191,500	219,400	226,800	175,600	167,200	154,700	86,800	20,600
2037	1,625,100	181,700	180,400	193,500	221,900	232,300	180,000	166,500	156,400	89,700	22,700
2038	1,653,400	184,400	185,500	195,300	224,500	237,400	185,000	165,600	157,900	93,200	24,600
2039	1,681,700	187,000	190,400	197,600	227,000	241,500	191,000	164,600	159,500	96,700	26,400
2040	1,709,800	189,500	195,000	200,500	229,100	245,300	197,500	164,000	160,500	100,400	28,000
2041	1,738,000	192,000	198,500	204,700	231,000	248,800	204,000	164,000	161,000	104,400	29,600
2042	1,766,800	194,600	203,100	208,200	233,200	252,200	210,200	164,900	161,100	108,200	31,100

2043	1,795,700	197,300	207,200	212,100	235,300	255,100	216,600	166,700	160,000	112,700	32,700
2044	1,824,200	199,900	211,000	216,800	237,200	257,500	223,200	168,900	158,800	116,600	34,300
2045	1,853,300	202,500	214,600	221,900	239,200	259,500	229,800	172,000	157,900	119,800	36,100
2046	1,882,000	205,100	217,900	227,200	241,300	261,300	236,000	175,700	157,300	122,200	38,000
2047	1,909,700	208,300	220,200	232,300	244,300	262,900	240,500	181,900	157,200	122,000	40,100
2048	1,937,700	210,900	222,800	237,500	246,500	265,400	245,000	187,200	157,600	122,500	42,300
2049	1,965,300	213,400	225,300	242,600	248,800	267,700	248,800	192,900	158,300	122,900	44,600
2050	1,993,200	216,000	227,900	247,300	251,500	269,800	252,100	199,100	159,200	123,200	47,100
2051	2,020,900	218,500	230,500	250,900	255,600	271,800	255,000	205,100	160,500	123,300	49,700

Population pyramid for York, by age and sex, for 2031 and 2041



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