Choices for Scarborough

Transit, Walking, and Intensification in Toronto's Inner Suburbs

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Executive Summary

Transit investment serves a dual purpose: that of providing better mobility options for existing residents and employers, and of encouraging new local investment and intensification that will lead to improved services, walkability, and livability in urban areas. Redevelopment and intensification, however, are more likely in some places than others. The existing built form, especially street configurations, housing types, and parcel sizes are important in shaping the pattern and quantity of new construction near transit stops.

Therefore, any transit investment in the Toronto region should entail an examination of existing development patterns, land use, street networks, pedestrian access to transit stops, and development potential. These elements must be a major consideration in choices of transit routing and of transit technology. Building a high-capacity rapid transit line in an area with low or moderate intensity of land uses will make sense only if it is possible to redevelop and intensify lands within walking distance of the transit stops. Unfortunately, this consideration has not been a significant part of transit planning debates in the Toronto region.

In this paper, we apply this approach to proposals for transit in Scarborough, a former city that now makes up the eastern part of the City of Toronto. Our findings show that because of their large lots and wide property frontages and the low current intensity of land use, Scarborough's east-west arterials, such as Eglinton and Sheppard, present the best redevelopment opportunities.

Our analysis further indicates that a combination of three LRT lines along these arterials would not only be cheaper and faster to build than a subway, but offers greater potential for attracting ridership and for spurring much-needed reinvestment in the area. By comparison, building the Scarborough subway extension from Kennedy to Sheppard Avenue, as approved by Toronto City Council in 2013, would be expensive, would be accessible by fewer potential riders from the surrounding neighbourhoods, and offers much lower potential for redevelopment along the corridor. Our analysis found, for example:

- The three LRT lines would serve an area of 2,794 hectares in terms of access to transit stops on foot. This area is more than 8 times as large as that of the subway, which would serve only 332 hectares.
- The prime potential redevelopment land within walking distance of stops is 458 hectares for the LRT lines, compared with 84 hectares for the subway.
- The total population within walking distance of stops is more than 125,100 for the LRT lines, and for the subway is less than 11,000.
- The number of jobs within walking distance of transit stops is more than 14,000 for the LRT lines, and less than 3,000 for the subway.
- The best performing corridor of those examined in terms of redevelopment potential and local population and employment accessibility is Sheppard.

Our findings suggest that the superior performance of LRT is not just because they offer a longer set of lines, but also that LRT represents a much better fit with the existing urban form and patterns of population and jobs in Scarborough than the proposed subway.

Our analysis suggests that whatever is eventually decided with regard to the Scarborough Subway and SmartTrack – which each face years of planning, engineering study, and approvals before they can break ground – construction of the fully funded Sheppard LRT should start immediately. Sheppard LRT performs best of all the potential lines in terms of the number of residents and jobs and pedestrian network per kilometer of line, and is already approved with completed environmental assessments. It could be carrying passengers before construction starts on either of the other two proposals.

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The Cities Lab at UTSC

Is a research group at the University of Toronto Scarborough designed to engage undergraduate students in Human Geography and City Studies in team-based research projects.

Contents

1. Introduction

The Toronto region is at a crucial juncture, with major decisions about public transit investment to be made. Yet a chaotic process of planning (including the cancellation of approved projects) and the unfortunate politicization of transit planning have resulted in the approval of major investments without detailed study, engineering analysis, and the comparison of alternatives. This report is an evidence-based contribution to the debate on transit options in Toronto, with a focus on Scarborough.

Everyone knows that we desperately need to improve our public transit systems in Toronto. Extremely high levels of congestion are reported to cost the Toronto region between $6 billion and $11 billion a year in lost productivity,[1] and Torontonians have among the longest commuting times in North America, according to recent reports.[2] Travel times are getting steadily longer. Toronto's population is growing rapidly, leading to major private-sector investments in both housing and offices, yet in the suburbs much of that development is in locations poorly served by transit.[3] As a result, both congestion and travel times will continue to worsen unless we make major investments in transit.

Toronto has significant new public transit investments under construction and several more are being planned. We also have a new Mayor and new Premier of Ontario, both of whom have put transit investment at the top of their political agendas. Yet transit planning in the region is undeniably in a crisis. Over the last five years we have seen the cancellation of major public transit projects that were approved and fully funded, and we now have competing plans being advocated by different actors for different areas. Pressure is understandably high to just start building something, *anything*. But with investments that cost billions, that will last many decades, and that will profoundly shape future patterns of urban development, it is essential to make the right choices.

We argue that any new high-capacity public transit systems must take existing urban form into account, and redevelopment potential should be evaluated for each proposed route. If high-capacity rapid transit systems are to be built within existing built-up areas, those areas must either have existing built forms and densities that support rapid transit, or the potential for redevelopment to higher densities and better walkability.

1.1 The Scarborough Context

Scarborough is one part of Toronto most poorly served by rapid transit, as is reflected by the fact that three major rapid transit investments are currently being proposed there. These include the Sheppard LRT, the Scarborough Subway extension to the Bloor-Danforth

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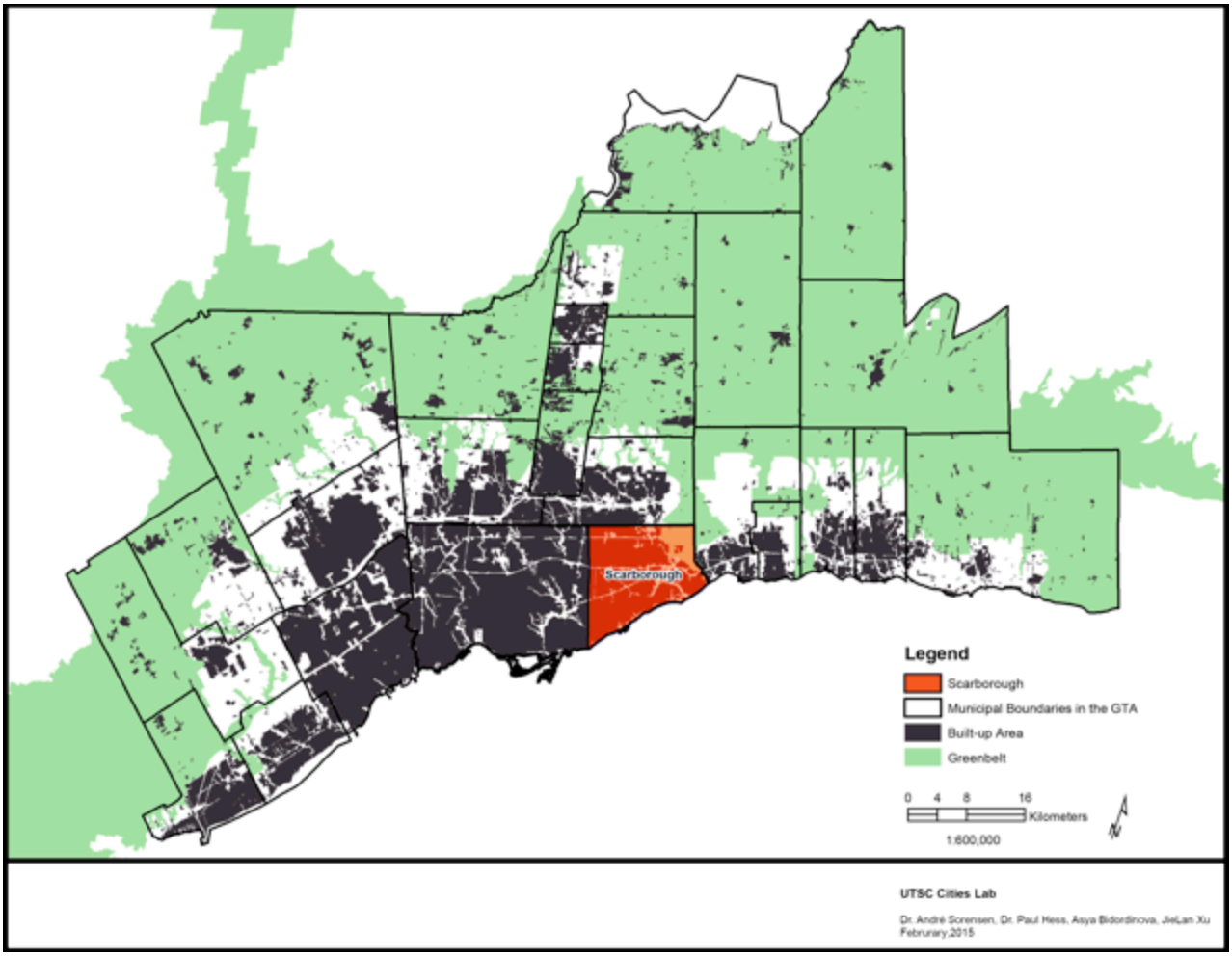
1 Toronto Board of Trade (2013), *A Green Light to Moving the Toronto Region: Paying For Public Transportation Expansion*, Toronto; Melanson, T. (2013). Gridlock is costing Toronto up to $11 billion yearly, *Canadian Business*, July 11.

2 Spears, J., and T. Kalinowski (2010), Toronto commuting times worst of 19 major cities, study says, *Toronto Star*, March 30.

3 Canadian Urban Institute (2011), *The New Geography of Office Location and the Consequences of Business as Usual in the GTA*, Toronto.

line, and Mayor John Tory's SmartTrack proposal. This report therefore focuses on Scarborough (see Figure 1).

Figure 1. Scarborough in the Toronto Region



We were prompted to carry out this study by the apparent incompatibility of some of the current plans. In particular, building both the Scarborough Subway extension of the Bloor-Danforth Line and Mayor Tory's SmartTrack proposal would concentrate much of the new transit investment in a very small area. The currently proposed plans suggest that the new Scarborough lines would be serving largely the same potential riders with pairs of stations located just two kilometres apart from each other.[4] We believe that before any of the proposed lines are built, the city and its transit agencies should undertake a careful examination and comparison of all current options.

[4] Kalinowski, T. (2015), Scarborough subway plans complicated by SmartTrack proximity, *Toronto Star*, January 29.

Our primary contribution is to suggest that the debate on transit projects has been too narrowly focused on the ridership potential and projected costs of different alternatives, while two other key issues that are also important in evaluating transit investments have been almost completely neglected.

First, walking trips are a part of every transit trip, and affect the number of potential riders as well as residents' choice of travel mode. People who live or work within walking distance of transit stops are the primary potential ridership of new rapid transit lines, therefore pedestrian networks of sidewalks and public space must be considered in evaluating competing transit proposals. Most areas of Toronto's inner suburbs were designed primarily for car access, and are not very pedestrian-friendly. The urban form of the suburbs is quite different from that of areas closer to downtown where most redevelopment is now occurring. Downtown has densely connected grids of streets, whereas the suburbs have winding local streets and major arterials for through traffic.

Second, Toronto's suburbs were deliberately designed to limit incremental change and redevelopment within residential areas. Virtually all of Scarborough is relatively recently built and in good repair, and there are few vacant lots. Most of Scarborough consists of "*stable residential neighbourhoods"* where intensification and significant redevelopment is not permitted and is frequently opposed by residents. A careful evaluation of the existing built-up area shows that the potential for redevelopment and intensification is constrained, although it is greater in some places than others.

We have mapped and analysed the urban form and pedestrian networks along each proposed transit corridor, and evaluated and compared the numbers of people and jobs and the potential for redevelopment and intensification within walking distance of proposed rapid transit stops for the main transit options: the Scarborough Subway, the LRT system planned as part of Transit City, and SmartTrack, and possible combinations of these proposals. We are not putting forward any new plans, nor are we advocating a particular investment. We are presenting an evidence-based analysis of different options.[5]

1.2 Research Questions

- Which new transit alternatives provide better access to improved public transit options for larger numbers of people?
- How can we measure the impact of different types of urban form on both pedestrian access to transit and development potential?

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[5] For the record, one member of the research team has argued publicly in the past in favour of a proposal similar to SmartTrack (see Sorensen 2009, 2013 in the list of Sources Cited), and we are in favour of the Metrolinx Regional Express Rail (RER) plan to electrify and provide more frequent all-day service in many GO commuter rail corridors. We believe that SmartTrack is a viable approach to accelerating the RER plan, and could be an important addition to public transit for the Toronto region, if some of its design problems are worked out. We are therefore not arguing for or against SmartTrack, but in favour of an evidence-based review of *all* current plans in Scarborough.

- Do different corridors present measurably different transit and development opportunities?
- Which new transit alternative is most likely to encourage transit-oriented intensification and redevelopment in Scarborough?
- How do different combinations of available options compare based on a series of standardized measures of urban form, population, jobs, and development potential?

The report is not exhaustive in its evaluation of all possible transit routes or technologies. We are not endorsing any particular combination of routes, and we do not attempt to account for many factors that should be considered in making transit decisions. For example, ridership estimates and an analysis of how transit investments change regional access to employment centres and other destinations are clearly key considerations in such decisions, and we do not discuss them here. Rather, the primary goal of this research report is to emphasize the importance of issues of urban form, pedestrian networks, and redevelopment potential for transit debates in the Toronto region that have been mostly missing to date. Their analysis could be further refined and extended beyond what we do in the report. Any analysis of redevelopment potential, for example, should also be accompanied by a market study, but the analysis we present captures important, basic differences in different combinations of route options and highlights the necessity for examining the interplay of transit and urban form in decision-making.

Section 2 outlines the approach taken in this research project. We identify our assumptions about the relationship between transit investment and urban form and the significance of walking and pedestrian networks for transit access. We also review the major characteristics of urban form in Scarborough, and how that form shapes both pedestrian accessibility and redevelopment potential. In Section 3 we analyse pedestrian networks, redevelopment potential, population and jobs along five different possible transit corridors. Section 4 examines five possible combinations of the planned transit corridors. Section 5 presents our main conclusions.

2. Transit Investment and Transit-Oriented Intensification in Toronto

2.1 Research Approach and Assumptions

Transit debate in Toronto during the last several years has understandably focused on two main issues. First is the route of the proposed service and how it will accommodate existing and future ridership demand. Second is the cost of different systems and technologies in comparison to each other, and in relation to expected benefits of ridership capacity and improved levels of service. These are both important considerations.

Another important issue, scarcely mentioned in recent debates, is the question of existing development patterns and land uses along the proposed routes, how these shape potential

ridership, and how they will affect future development. All the proposed transit lines will be built within existing built-up areas, and existing patterns of development will have major impacts on ridership potential, future development potential, and the long-term success of the transit investment. Yet almost all recent proposals are presented as coloured lines on a blank page, without reference to existing land-uses and patterns of development, including road networks, pedestrian networks, parks, and the locations of institutions such as schools, hospitals, and other large employers.

A premise of this research is that an examination of existing development patterns, land use, street networks, pedestrian access to transit stops, and development potential are essential in planning any transit investment in the Toronto region, and must be a major consideration in choices both of transit routing and choices of transit technology and networks.

2.2 Transit Investment, Intensification, and Urban Form

It is well known that different transit technologies give rise to very different patterns of mobility and access, and are likely to encourage different kinds of built form.[6] For example, subway stops are usually much farther apart from each other than LRT and bus stops, and subways have the potential to move much higher volumes of passengers than either LRT or buses. The built form that takes greatest advantage of subway capacity is one with nodes of high density of both population and jobs around each subway station, as at Yonge and Eglinton, or Yonge and Sheppard. In contrast, LRT/BRT[7] and streetcars work best in corridors of medium density all along a route, and regular city buses that operate on normal streets with other traffic can work well even in much more dispersed environments, and are most suited to shorter trips and as feeders to other transit systems.

We therefore assume that if the current urban form and density do not currently meet the ideal for the technology and route proposed, then it must, at the very least, be possible to move towards a more appropriate urban form through redevelopment and intensification. Building a high-capacity rapid transit line in an area with low or moderate intensity of land uses will make sense only if it is possible to redevelop and intensify lands within walking distance of the transit stops. Different urban forms, and their potential for incremental change to achieve such patterns should therefore be a primary consideration in any new transit investment.

2.3 Urban Form and Intensification Potential in Scarborough

In the Toronto region, major transit investments are planned in the postwar suburbs built from the 1950s to the 1980s, particularly in Scarborough, but also North York, Etobicoke,

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6 Cervero, R. (1998), *The Transit Metropolis: A Global Inquiry*, Washington, D.C.: Island Press; Mees, P. (2010), *Transport for Suburbia Beyond the Automobile Age*, London, Sterling, VA: Earthscan.

7 Light Rail Transit (LRT), and Bus Rapid Transit (BRT) are considered by most transit analysts to be intermediate-capacity modes, between subways and buses. Both are usually built on the surface, in existing major corridors. In the City of Toronto most plans have been for LRT, so that is what is discussed here, but BRT can provide a comparable level of service.

York Region, Mississauga, and elsewhere. These areas are currently underserved by rapid transit, and include relatively low-income populations who will benefit greatly from better transit services. But the goal of providing better transit services in the inner suburbs is not just to provide better mobility options for the existing residents and businesses. It is also to encourage redevelopment and intensification in areas near the new transit facilities.

Cities throughout North America promote urban regeneration by attracting investment into older urban areas through redevelopment and intensification.[8] Many inner suburbs in North American cities experienced decline in recent decades as the frontier of newer development moved farther out and the initial postwar building stock aged. This process is often associated with increasing poverty in these neighbourhoods, as lower-income residents take advantage of the lower rents and house prices of the aging housing stock. Growing poverty in the inner suburbs has clearly occurred in Toronto, as shown by David Hulchanski's *Three Cities within Toronto* research.[9] The process has been exacerbated by rapid gentrification of inner-city areas best served by public transit.

Redevelopment and intensification is essential to transform older suburban areas into more transit-friendly, less automobile-dependent environments. Well-planned intensification will increase the variety of land-uses, services, and jobs near transit stops, and neighbourhoods near to transit stops will gain a greater variety of walkable destinations and services. The ideal is to create higher densities and a greater mix of uses near rapid transit stops. In many cases, this may take the form of mid-rise buildings with retail and services on the ground floor to create a lively, interesting and safe streetscape, and housing or office uses on upper floors. Good design of the pedestrian areas near new transit stops, as well as pedestrian connections to nearby neighbourhoods is essential to achieve the greatest impact of new transit investments.

As Toronto is currently experiencing considerable new construction and the demand for more appears to be continuing, this is not just a naïve hope, but is a realistic policy goal. The challenge is to ensure that such intensification happens in the right places. So far, however, the vast majority of residential intensification investment is going to relatively small part of the downtown core, especially to former industrial areas to the south, east and west of the core area, and some locations along the Yonge subway line. Employment is also growing in the core, but most new investment in offices has occurred in the outer suburbs. For the Toronto region to have any hope of growing in a more transit-friendly way, a greater share of both population and employment growth should be in places within walking distance of rapid transit lines.

Ideally, over the next decades a growing share of such investment will be in the inner suburbs, particularly areas built in the 1950s and 1960s. These areas need re-investment

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8 Dunham-Jones, E. and J. Williamson (2009), *Retrofitting Suburbia: Urban Design Solutions for Redesigning Suburbs*. Hoboken, N.J.: John Wiley & Sons, Inc. ; Talen, E. (2011), Sprawl retrofit: sustainable urban form in unsustainable places, *Environment and Planning B* 38(6): 952-978.

9 Hulchanski, J. D. (2010). *The Three Cities Within Toronto: Income Polarization among Toronto's Neighbourhoods, 1970–2005*, Toronto: Cities Centre, University of Toronto.

and could provide locations with fast transit access both to the downtown core and to employment and retail areas in the outer suburbs. Transit is an important tool to encourage investment in the inner suburbs, and redevelopment potential should be a primary consideration in planning such investments. Transit investment therefore serves a dual purpose: providing better mobility options for existing residents and employers, and encouraging new local investment and intensification that will lead to improved services, walkability, and livability.[10]

2.4 Constrained Redevelopment Potential in the Inner Suburbs

A central consideration in planning new rapid transit infrastructure within existing urban areas is the fact that redevelopment and intensification is more likely in some places than others. Built form, street configurations, housing types, and parcel sizes are important in shaping the pattern and quantity of new construction near transit stops. Unfortunately, this consideration has not been a significant part of transit planning debates in the Toronto region.

The inner suburbs of Scarborough, Etobicoke, and North York are unlike the older areas of downtown Toronto. Downtown consists of a grid of small blocks and mixed land uses with many former industrial and commercial sites that are relatively easy to redevelop and intensify. But Toronto's suburbs were planned with large-scale arterial roads designed for through traffic, looping local roads to discourage through traffic, and strictly separated land uses with large areas of low-density housing separated from employment and retail areas, as shown in Figure 2. Toronto's suburbs were designed for automobile mobility, not for walking or cycling, and are in most cases difficult to redevelop to other uses because of their land-use segregation, automobile-oriented design, building regulations, and zoning. This built form means that the potential for redevelopment and intensification is greater in some locations than in others.

In this report we examine the urban form of Scarborough, considering both existing patterns of built form, street networks, land use, and planning regulations. Each has important impacts on redevelopment and intensification potential, and tends to change slowly. This analysis is based on research on Toronto's urban planning, land development, and development history conducted by the authors during the last 10 years.[11]

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[10] Any significant amount of intensification will rightly raise concerns about gentrification and the displacement of low-income residents who cannot afford higher rents associated with new buildings and improved accessibility. In recent decades the areas of Toronto best served by rapid transit have increasingly attracted wealthy residents, who have driven up housing costs there, while areas least accessible by rapid transit have seen increasing poverty. Yet because the benefits of better public transit mobility for lower-income people are potentially so significant, and the area of Scarborough affected is so large, we do not think that this provides a good argument against better transit services. Instead, the best option will be to greatly increase the availability of rapid transit, encourage increases in density within walking distance of transit stops, and ensure that a significant percentage of new housing units close to transit stops are affordable to buy or rent. Policy approaches to ensure that happens exist in many cities.

[11] Hess, P.M., A. Sorensen, and K. Parizeau (2007), *Urban Density in the Greater Golden Horseshoe*, Centre for Urban and Community Studies Research Paper 209; Hess, P.M., and B. M. Milroy (2006), *Making Toronto's Streets*. Toronto, Centre for Urban Health Initiatives; Hess, P.M. (2009), Avenues and Arterials, *Journal of Urban Design*; Sorensen, A.,

Although the common stereotype of suburbs is that they are the same everywhere, with lots of low-density single detached homes, strip malls, shopping centres and big-box stores, highways and gas stations, in fact suburbs are extremely diverse in different cities. Toronto region suburbs are exceptional in several regards, and have a distinctive urban form.[12] Scarborough was developed partly before and mostly during the period when the Municipality of Metropolitan Toronto (Metro) was the regional planning agency, while local municipal governments, including the Borough of Scarborough, carried out local planning.[13] The legacies of the Metro approach to planning and land development endure today.

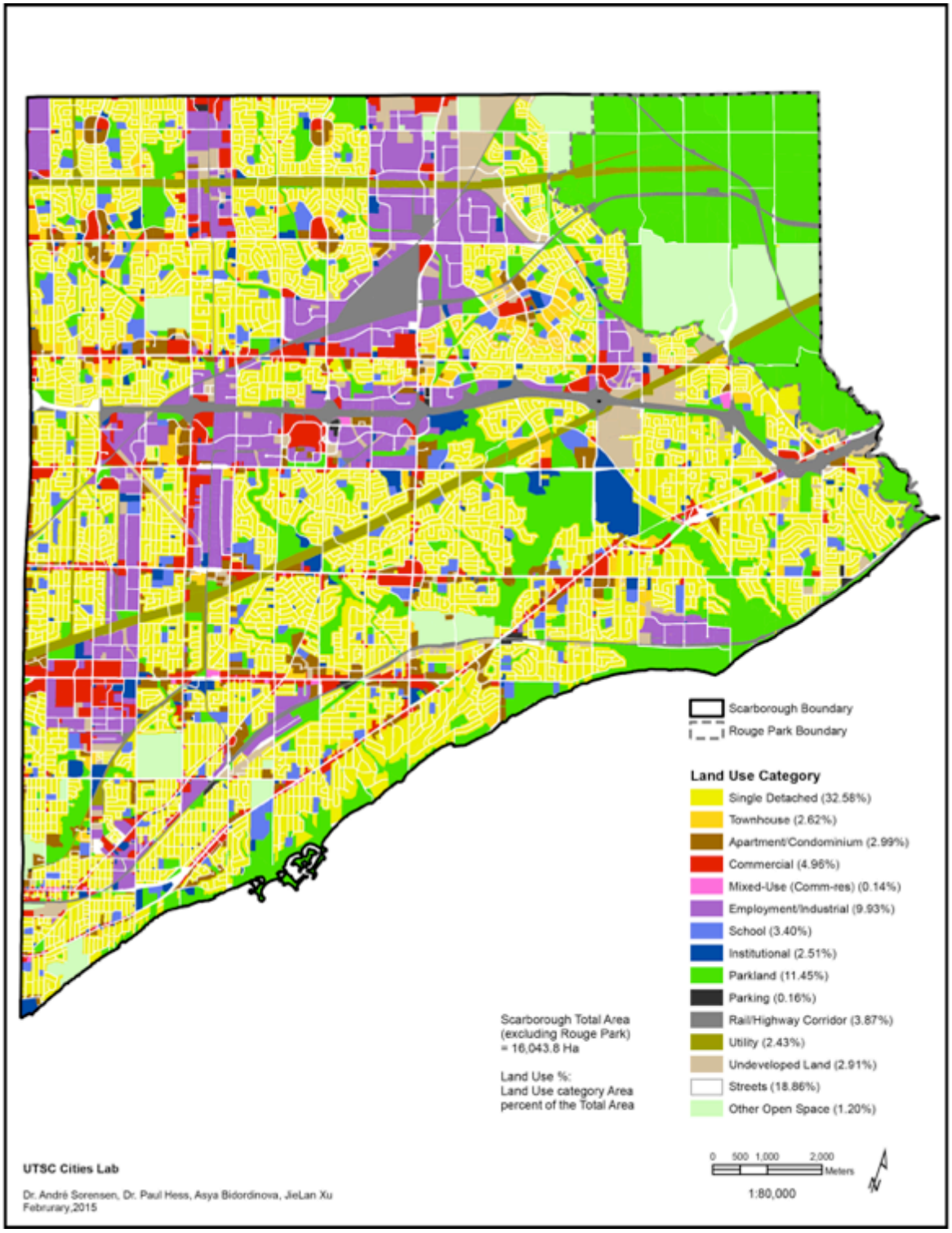
Scarborough is a highly planned suburban environment, built at relatively high population densities, with large areas of lower-density single detached houses, small clusters of high-density apartment towers, interspersed with employment areas built along railway corridors. The whole is structured by the arterial road grid, which in turn was based on the original farm concession roads laid out by the farm land survey of the 18th century, as shown in Figure 2.

(2011), Toronto Megacity: Growth, Planning Institutions, Sustainability, in A. Sorensen and J. Okata (eds.), *Megacities: Urban Form, Governance, and Sustainability*, Tokyo, Springer Verlag; Hess, P.M., and A. Sorensen (2014), Compact, concurrent, and contiguous: smart growth and 50 years of residential planning in the Toronto region, *Urban Geography*: Sorensen, A., and Hess, P.M., (forthcoming), Building suburbs, Toronto style: Land development, institutions, critical junctures, and continuity, *Town Planning Review*.

12 Hess, P. M., and A. Sorensen (2014), Compact, concurrent, and contiguous: smart growth and 50 years of residential planning in the Toronto region, *Urban Geography*; Sorensen, A., and Hess, P.M., (forthcoming), Building suburbs, Toronto style: Land development, institutions, critical junctures, and continuity, *Town Planning Review*.

13 Rose, A. (1972), *Governing metropolitan Toronto: A social and political analysis, 1953-1971*, University of California Press; Frisken, F. (2007), *The Public Metropolis: The Political Dynamics of Urban Expansion in the Toronto Region, 1924–2003*, Canadian Scholars Press.

Figure 2. Scarborough Urban Form and Land Use, 2011



The arterial roads are important for several reasons. First, they define the "superblocks" of residential and industrial lands, which are separated from each other, so there is little mixture of residential and employment land uses. Second, the arterial roads carry most automobile traffic, and almost all bus routes follow the arterials. Arterials also have extremely wide right-of-ways, with all east-west routes (including Eglinton Avenue, Lawrence Avenue, Ellesmere Avenue, Sheppard Avenue, Finch Avenue, and Steeles Avenue) having a minimum width of 36 metres. North-south arterials are more varied, but the minimum width is 27 metres. Even more important, with the exception of Finch and Steeles, which were developed later, almost all the east-west arterials have large lots fronting onto the right-of-way. These lots present some of the most important opportunities for intensification and redevelopment.

In contrast, much of Finch and Steeles, along with other arterials developed under Metro's arterial roads planning standards, were built with "reversed lot housing" – houses face adjoining local streets rather than the arterial. Because all property access is relegated to local streets, access to arterials is limited to a few intersections and traffic lights.[14] Such arterial roads create poor walking environments, and offer few opportunities for intensification.

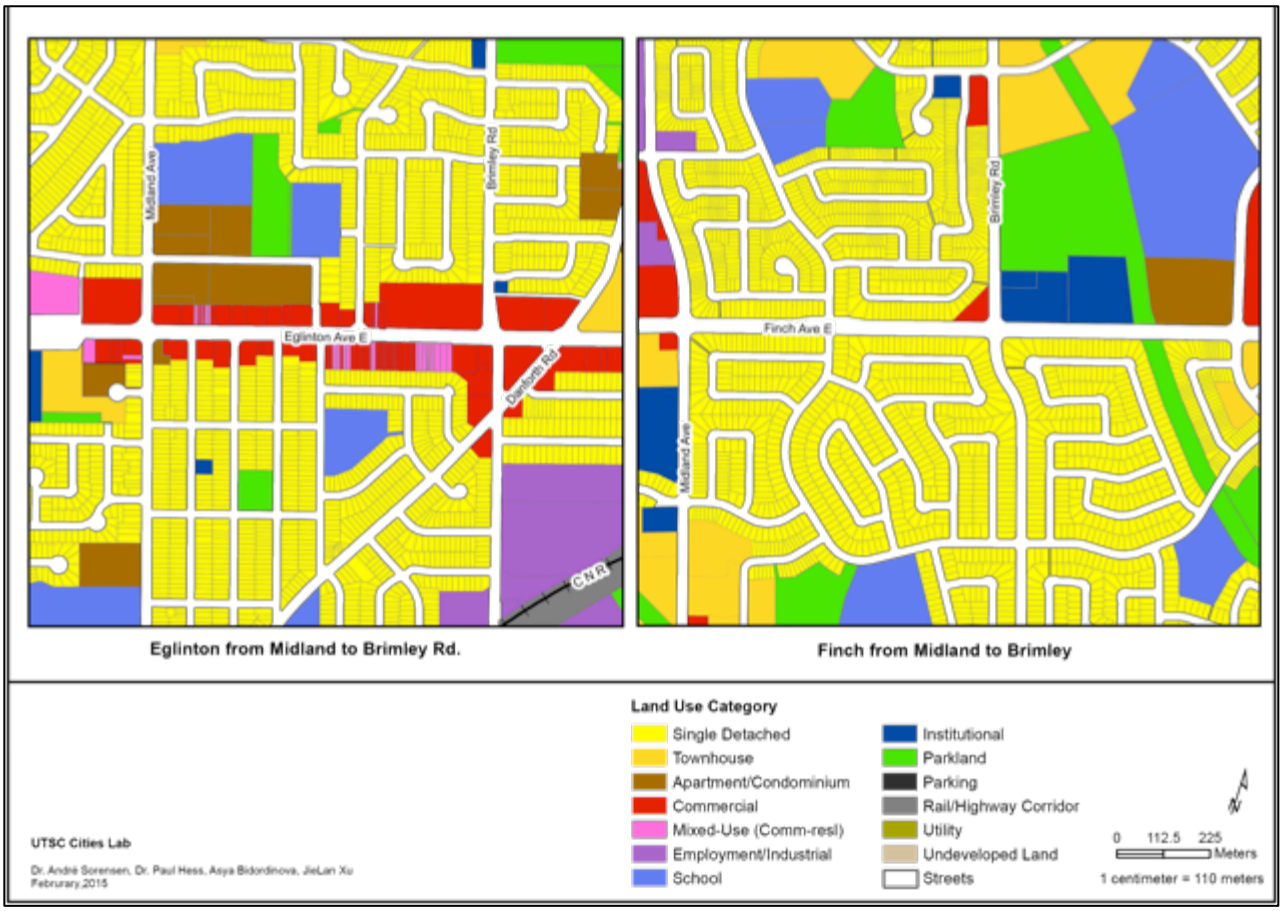
Figure 3 Reversed lots create a sterile, auto-oriented landscape

Photo Credit Katherine Childs

[14] Metropolitan Toronto Planning Department (1975), *The Metropolitan Arterial Road System: Development Control Policies and Standards*, Toronto, Transportation Division, Metropolitan Toronto Planning Department.

Figure 4 compares a stretch of Eglinton Avenue between Midland Avenue and Brimley Road, developed before Metro was established, with a section of Finch Avenue between the same streets, which conforms to the new Metro arterial roads planning approach. The latter policies helped to speed traffic where they were implemented, but created sterile traffic arteries lined by the back fences of houses along long stretches. Most arterials with this urban form will never develop into walkable or vibrant urban streets, but are frozen into their current form.

Figure 4. Comparison of Redevelopable Arterial and "Frozen" Arterial



Caption: Although the major redevelopment opportunities in Scarborough are found along arterial roads, not all arterial roads are the same. Where large land parcels front onto the arterial road and are occupied by low-intensity retail uses, as along most of Eglinton Avenue, redevelopment is feasible. But where parcels are small, front onto local roads with their backs to the arterial road, and are predominantly residential, as along Finch Avenue, redevelopment may never occur. Pedestrian networks are also much denser in the Eglinton example than in the Finch area, allowing walking access to transit for a larger area.

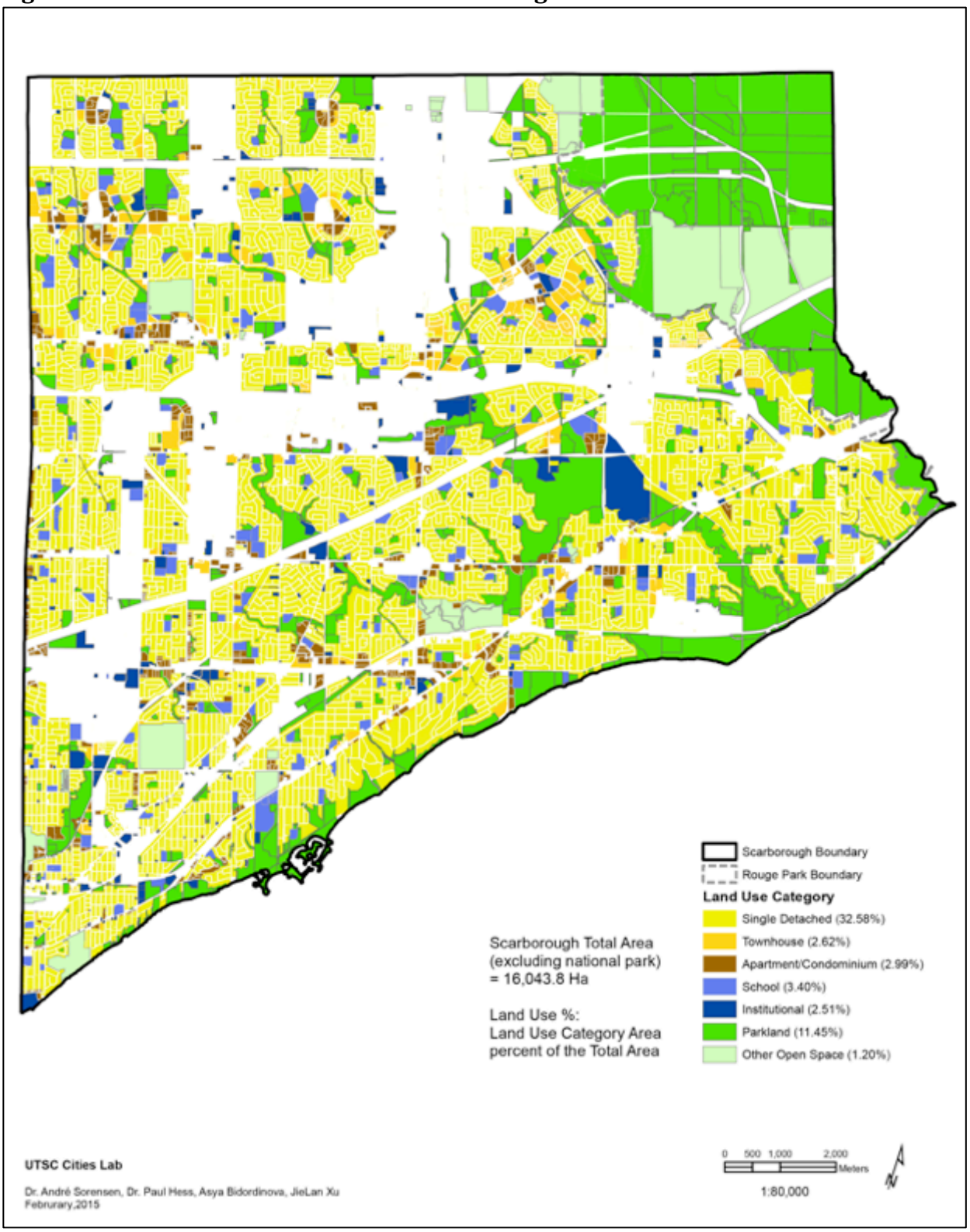
Residential neighbourhoods in Scarborough were designed to *prevent* incremental change. They are zoned and regulated to forestall unwanted land use changes, and most are designated as "Stable Residential Neighbourhoods" in the current Toronto Official Plan. Current planning policy does not permit any significant redevelopment and intensification

in such residential areas. Residents of stable residential neighbourhoods often protest vigorously when proposals for significant change arise.

Also, local roads within the "superblocks" are designed to discourage through traffic, with looping roads, confusing layouts, and few connections to major arterials. Even if a commercial use were permitted in such areas, it would be unlikely to succeed because by design there is little pedestrian traffic and poor access for those in cars. Finally, most land parcels are relatively small, so any project of significant size would require an expensive and risky land assembly. We therefore assume that there will be little intensification and redevelopment in these areas.

Figure 5 shows the residential land uses in Scarborough, plus all parks, schools, and institutions such as libraries and hospitals. This includes 57% of all land in Scarborough, if we exclude Rouge Park, which is now a National Park, and is not a part of the urban development area. Another 23.4% of all land is streets, the 401 Highway, and railway corridors, and these are also very unlikely to be redeveloped or intensified. Altogether, 80.4% of Scarborough is unlikely to see redevelopment and intensification in the foreseeable future. Any redevelopment in residential areas will occur very slowly. Redevelopment is most likely to occur along the arterial roads, where land parcels are much larger, pedestrian access is better, and road capacity is greater. Current Toronto planning policy favours mid-rise intensification along the major arterial roads, and particularly along the designated "Avenues," such as Eglinton Avenue, Lawrence Avenue, Sheppard Avenue, and Kingston Road.

Figure 5. Stable Residential Areas in Scarborough



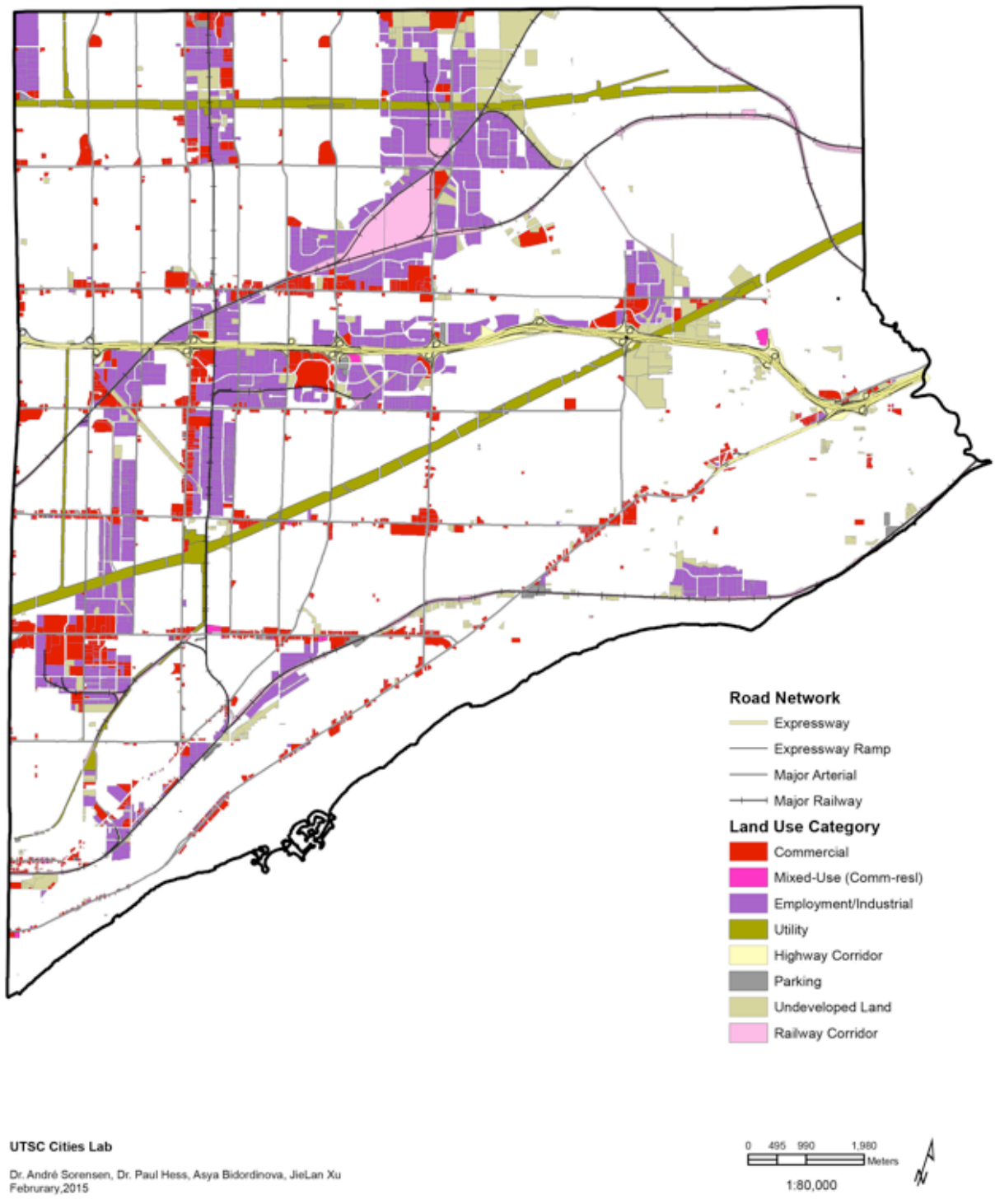
2.5 Employment Lands

If large parcels and frontage on arterial roads enables redevelopment and intensification in the inner suburbs, then employment lands present major redevelopment opportunities. But current planning policy is to protect employment lands from conversion to residential and commercial uses, to protect the jobs in those areas. We agree that this policy is justified and important. If the city permits any redevelopment of employment lands, then land prices of all employment lands will rise because of speculative pressure to redevelop, and commercial owners and tenants will no longer be able to afford many of these areas, resulting over time in a loss of jobs to other locations.

Figure 6 shows the 19.6% of land in Scarborough that consists of employment lands, retail parcels, hydro corridors, and a few significant blocks of undeveloped land. The largest area of undeveloped land belongs to the University of Toronto Scarborough at the intersection of Highway 401 and Morningside Avenue.

The City of Toronto is currently reviewing the zoning of employment lands and, at some point, it must further study employment lands within walking distance of rapid transit stops, and develop a clear and proactive policy to regulate redevelopment in these areas. But any such policy would have to be carefully designed and implemented only in clearly defined areas to prevent speculative pressure on other employment lands.

Figure 6. Employment, Retail, Utilities, and Undeveloped Land in Scarborough



2.6 Areas Where Redevelopment Is Likely

If both stable residential areas and employment lands cannot or should not be targeted for intensification and redevelopment, what is left? Our assumption for the purposes of this analysis is that four categories of land are relatively easy to redevelop and intensify:

- retail uses;
- parking lots;
- mixed-use parcels with retail on the ground floor and residential on the second floor;
- undeveloped land.

This oversimplification is reasonable as it largely follows current development practice: shopping malls with large parking lots and single-storey retail strips on arterial roads are currently the major sites of intensification in the suburbs. Parking is often an interim land use for parcels awaiting redevelopment. Mixed retail and housing uses in the suburbs consist of mostly small, older residential buildings in which the ground floor has been converted to retail uses or older strip malls with housing above the shops.

These are all prime redevelopment sites, provided the parcel is large enough. In most cases of redevelopment and intensification, retail space can be built on the ground floor, so there is no necessary loss of retail space.[15] Fortunately, most retail sites in Scarborough are found along major arterial roads. Indeed, because of their large lots, wide frontages, and low current intensity of land use, Scarborough's east-west arterials, such as Eglinton and Sheppard Avenues, present some of the best redevelopment opportunities anywhere in the inner suburbs, and these are oriented in linear corridors that are easy to serve with better public transit.

[15] Intensification may displace some existing stores, especially in aging strip malls where there are many small, independent stores that serve the local community and survive because these spaces are inexpensive to rent. Some of these businesses will not be able to afford the rents in new buildings. But any process of intensification will likely take place over an extended period, and policies can be developed to prevent the rapid displacement of small businesses.

Figure 7 Retail sites along Scarborough arterial roads are prime redevelopment sites

Photo Credit Katherine Childs

Many retail sites in the suburbs have large areas of surface parking, and very low-density temporary buildings. These create poor pedestrian environments. In cases where these are serviced with rapid transit they will become prime redevelopment sites.

2.7 Pedestrian Networks: Assumptions about Evaluating Population and Employment Within Walking Distance of Transit Stops

Every trip by public transit includes two walking trips: one from the origin (home or work) to the transit stop, and a second one from another transit stop to the destination. The quality of the pedestrian facilities and surroundings can affect transit ridership. If it is far from one's home to the nearest transit stop, people are less likely to use public transit. Transit analysts commonly use a threshold of about 800 metres as the average maximum distance most people are willing to walk, although that distance may be shorter for some people, including the elderly or the disabled, or longer for those who enjoy walking.

In Toronto, buses have been successfully used as feeders to the subway lines. We assume that practice will continue, but households and workplaces within the 800-metre walking distance to rapid transit will benefit most from new transit infrastructure, and that it is also within the 800-metre walking radius that most redevelopment and intensification should occur.

The quality of the surroundings is also important. An 800-metre walk through a beautiful park or along a street with interesting storefronts seems shorter than walking the same distance through an industrial district. Similarly, a sense of safety is important for walking trips. Busy areas with lots of other pedestrians, stores, and lights are usually understood to be much safer than empty streets without other pedestrians.

We have assumed that the area located within 800-metre walking distance of rapid transit stops present the primary area served by a particular transit line. Urban form, however, has a big impact on the actual area accessible within 800 metres, because pedestrian networks are highly uneven. In areas with small blocks and lots of streets, pedestrian networks are relatively dense, and a larger area will be accessible within 800 metres walking distance. But in the suburbs, street networks were designed for cars, with larger blocks and looping disconnected streets, so only much smaller areas can be accessed within an 800-metre walking distance.

Figure 8 shows that some areas near transit stops have much denser street and pedestrian networks than others, mostly because of street patterns. For example, in the area depicted, the upper left area has fewer streets, and much larger blocks. This difference can have significant impacts on the density of population and jobs within walking distance of rapid transit stops, even between areas with identical overall population densities.

Figure 8. Pedestrian Network Coding.

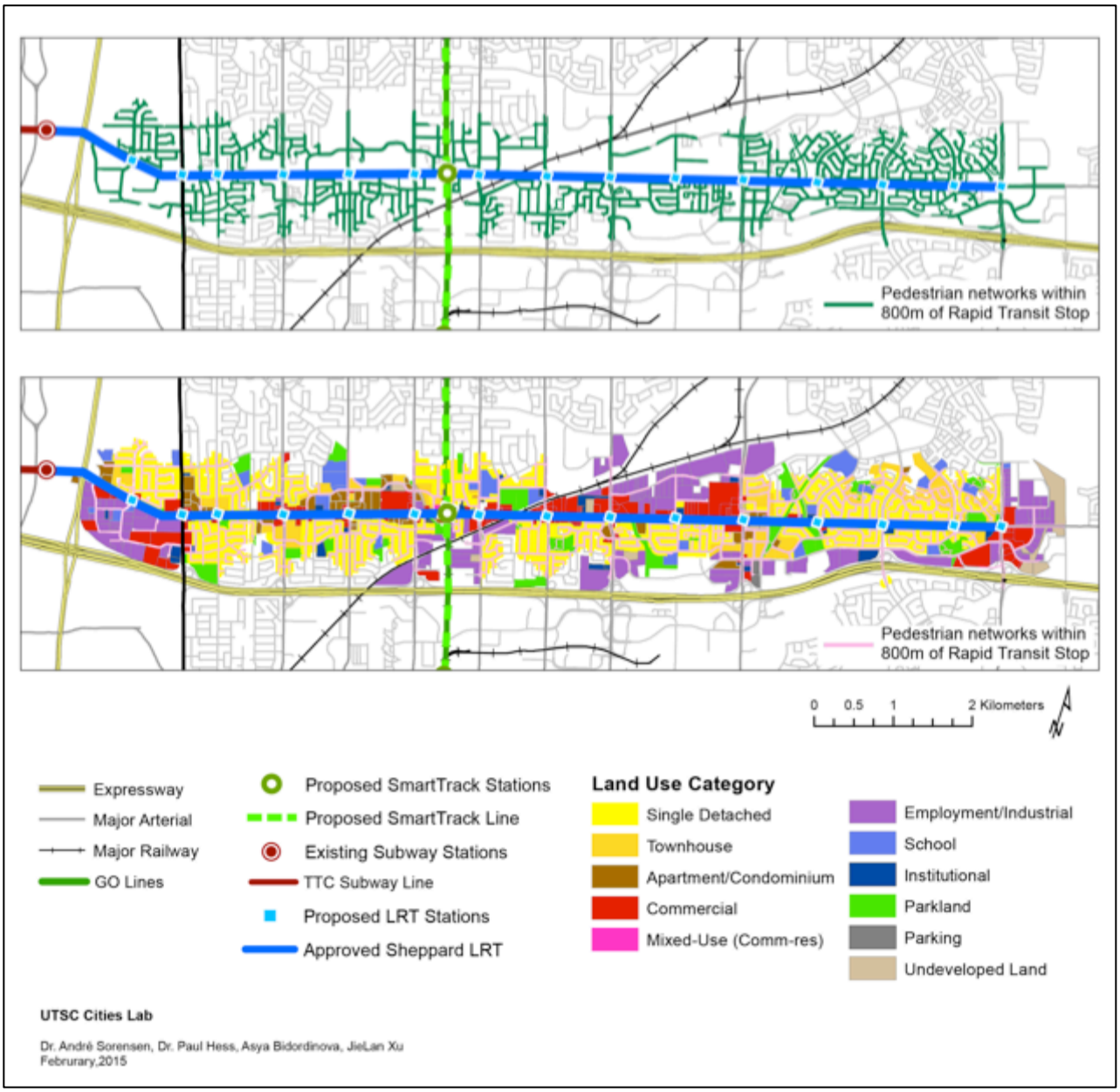
To analyse the areas accessible within walking distance of planned rapid transit stops we have mapped pedestrian networks throughout Scarborough and measured walking distances from transit stops along these networks.[16]

Figure 9 shows an example of our pedestrian network analysis for Sheppard Avenue between Highway 404 and Morningside Avenue. All sidewalks and pedestrian paths were coded as pedestrian routes, with pedestrian crossings assumed to exist wherever two streets intersect, allowing us to approximate actual pedestrian behavior and route choices. ArcGIS software was used to calculate the largest possible area that can be accessed within 800 metres of each proposed transit stop, using the most efficient route along every part of the network. We have assumed that LRT stops will be located at each north-south arterial

[16] The coding of pedestrian networks was done as part of another project focused on analyzing the built form and walkability of major arterial roads in Scarborough: the "Scarborough Great Streets" project. Undertaken in the Cities Lab at the University of Toronto Scarborough, undergraduate research assistants coded pedestrian networks and evaluated walkability using a consistent set of assumptions. That research will be released separately.

road for consistency with the other LRT routes, even though the Sheppard LRT Environmental Assessment assumed that LRT stops would be more closely spaced in many locations. Therefore our method slightly underestimates the population and jobs within walking distance of stops along Sheppard compared to having more stops. Using this dataset and network analysis method, it will be possible to model the most efficient spacing of transit stops to reach the largest number of people and jobs, with the fastest possible travel times, but that work is not undertaken here.

Figure 9. 800-metre walking networks for Sheppard Avenue and accessible parcels



As the network analysis shows, some urban forms are walking-friendly, while in other places there are few pedestrian routes. This consideration is important in comparing different urban forms and in estimating and comparing the number of people and jobs located within walking distance of proposed transit stops. An analysis that simply assumes a 800-metre buffer "as the crow flies" will in some cases greatly exaggerate the area that is accessible on foot.

For all the transit options evaluated here, we have used a consistent methodology and set of assumptions. First we mapped the pedestrian networks within 800 metres of proposed transit stops of all proposed routes in Scarborough. The network analysis assumes the shortest possible route along any pedestrian facility from any particular transit stop out to a maximum distance of 800 metres from the stop.

We then selected all land parcels within 30 metres of those pedestrian networks, and counted them as accessible parcels within 800 metres walking of transit stops. We used a parcel-based land-use dataset to evaluate the land use of all those parcels.[17] Population within walking distance of transit stops was estimated by using 2006 Statistics Canada Census data at the Dissemination Block scale, as the 2011 Census is flawed, particularly at smaller scales of analysis, because of the cancellation of the long-form census. Dissemination Blocks were aligned to the same area as the accessible parcels and population was estimated by the percentage of the block included, assuming that population was evenly distributed over the whole block, as is common in such analysis. Jobs data is attributed to each land-use parcel and draws on a Dunn and Bradstreet employment dataset that includes the address of each job.

3. Measuring and Comparing the Urban Form Characteristics of Planned Transit Corridors in Scarborough

As we have argued, a critical criterion for comparing and evaluating options for building transit in existing urban areas is the urban form of the areas. One obvious and frequently discussed criterion is the population density of the area to be served. Another is the numbers of jobs within the area.

We suggest, however, that several other characteristics have important impacts on the future success of a new public transit line. First is the pattern of streets and pedestrian networks that provide access to rapid transit stops. The nature, density, and connectedness of the pedestrian networks shown in Figures 8 and 9 can affect the numbers of people who can walk to rapid transit stops.

[17] This land-use dataset was developed between 2009 and 2012 by the authors for use in research on land use and urban form in the Greater Toronto Area.

Just as important may be the extent to which land within walking distance of transit stops is available for redevelopment and intensification. If the transit stop is located at Brimley Road and Finch Avenue, as shown in Figure 4, not only will few people be able to walk to the new station, but there will be very little opportunity for redevelopment and intensification, because most of the land is in residential uses, and fragmented into very small parcels that would be hard to redevelop.

In this section we quantify in a consistent manner the pedestrian networks and redevelopment opportunities for each of the recently proposed transit lines for Scarborough. The lines include:

1. The proposed **Scarborough subway** extension of the Bloor-Danforth subway from Kennedy to Sheppard, approved by Toronto City Council in 2013. The final route has not been selected for this option, but we model the one that has been most often identified.
2. Mayor John Tory's **SmartTrack** proposal, focusing on the portion that goes through Scarborough, from Scarborough Junction to Steeles Avenue along the Stouffville GO rail corridor.
3. The **Sheppard LRT**, approved by Toronto City Council, and fully funded by the Ontario government.
4. The former Transit City LRT plan approved by Toronto City Council in 2007, and cancelled by former Mayor Rob Ford in 2010. We have included the route along Eglinton Avenue, Kingston Road, and Morningside Avenue via the University of Toronto Scarborough to Sheppard Avenue, which we call the "**Eglinton-Morningside LRT**."
5. The route from Ellesmere Avenue via Scarborough Town Centre to Centennial College and Malvern Town Centre was also included in the original Transit City Plan. If SmartTrack is built, however, it will not be necessary to rebuild the all the way to Kennedy Avenue. In any case, the corridor will not be wide enough after the current single-track GO line is double-tracked. Instead, it would be possible to run a line from the Ellesmere SmartTrack Station to Scarborough Town Centre, Centennial College, and Malvern Town Centre, long seen as the ultimate destination of the former Scarborough RT line, and shown as one option in the Transit City plans. We call this option the "**Malvern LRT**."

Although the proposed Scarborough subway extension and the Transit City LRT system are very different public transit modes, with different levels of service, areas served, ridership capacities, and speeds, they come with a similar price tag. The 2010 estimates for the Sheppard East LRT is $1 billion for 13 km ($2010), and for Finch West LRT is $1 billion for 11 km ($2010). The average cost per kilometre for the two together is $83.33 million per km. So for the 30 km of LRT shown in Figure 10 (Sheppard, Eglinton-Morningside and Malvern LRT lines), the total cost would be close to $2.5 billion. The current estimate for the Scarborough subway extension is $3.5 billion, so it is realistic to suggest that the complete LRT network of all three lines totalling 30 km could be built for much less than the subway extension as approved by Toronto City Council in 2013.

Moreover, as the Sheppard LRT is already fully funded by the provincial government, completing the three LRT lines instead of the subway would actually cost only an additional $1.5 billion compared to the $3.5 billion for the subway. Unfortunately, we do not yet know how much SmartTrack would cost, so we cannot make financial comparisons here.

Figure 10 shows the pedestrian networks within 800 metres of each stop on each of these lines. We have excluded the walking area surrounding Kennedy Station on the Bloor-Danforth line, and that surrounding the Don Mills Station on the Sheppard line, as these areas are already served by existing subways.

Figure 10. Pedestrian Networks for All Proposed Transit Routes

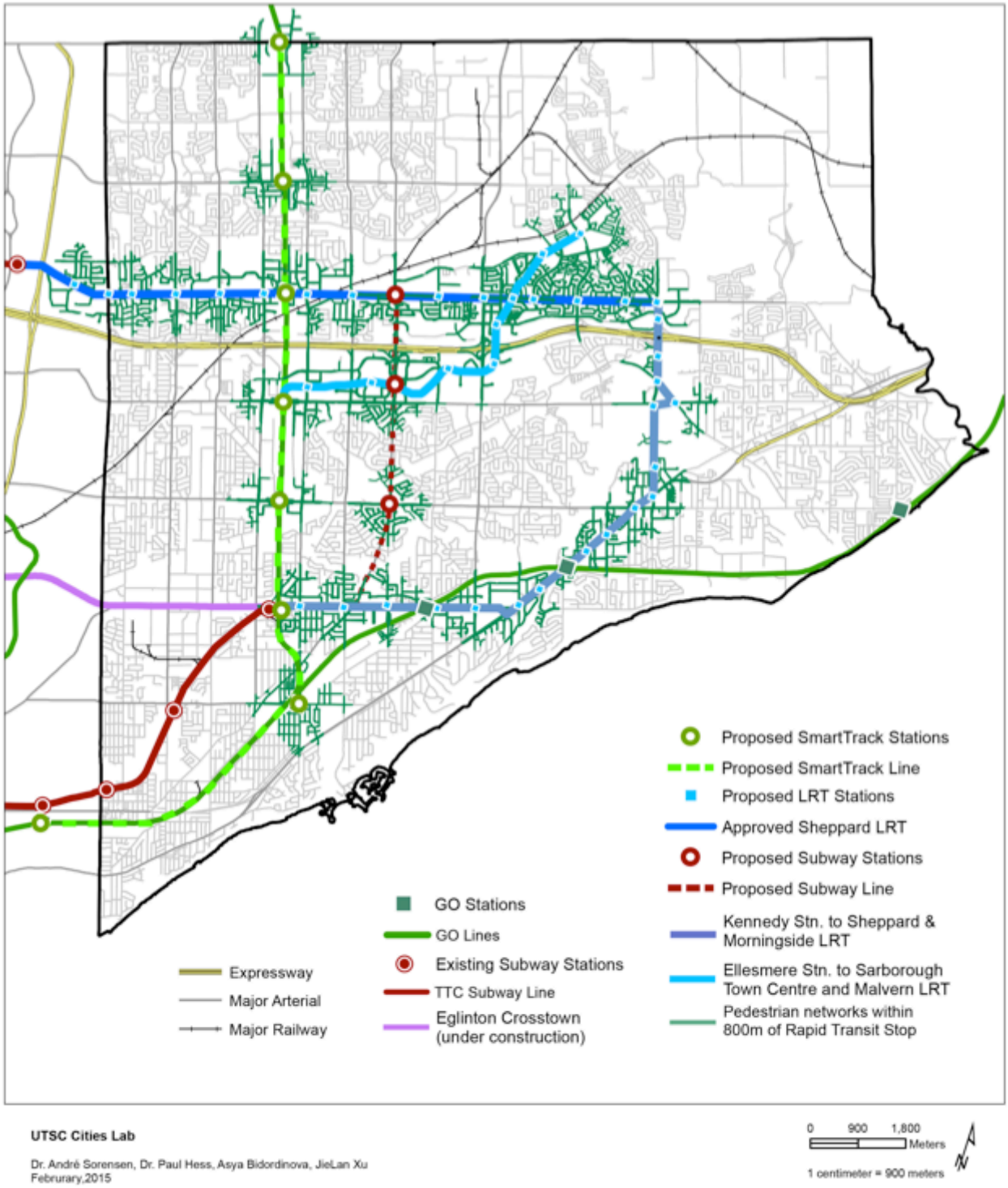


Table 1 presents the data on pedestrian networks, accessible area, network length, population, land use, jobs, and redevelopment potential for each of the proposed transit lines.

Table 1. Pedestrian Networks, Population, Jobs, and Redevelopment Opportunity for Six Transit Options

	SmartTrack	Scarborough Subway	Sheppard LRT	Eglinton-Morningside LRT	Malvern LRT	3 LRT Lines Combined
Length of Line within Scarborough (km)	12.6	7.5	10.3	12.0	7.7	30.0
Accessible Area within 800m (hectares)	732.7	331.5	1,062.4	1,099.1	985.7	2,793.7
Accessible area within 800m ha/km	58.0	44.1	102.9	91.8	128.4	93.2
Total Network Length within 800m (km)	141.9	71.9	302.0	309.2	198.5	748.5
Network Length (km/km)	11.2	9.6	29.2	25.8	25.9	25.0
Redevelopment Area (ha)	151.0	83.8	171.0	207.9	162.5	458.2
Redevelopment Area ha/km	12.0	11.1	16.6	17.4	21.2	15.3
Population	31,803	10,635	45,398	50,372	41,843	125,100
Population/km	2,519	1,413	4,395	4,209	5,452	4,174.1
Number of Jobs	4,777	2,803	7,167	4,388	6,797	14,390
Jobs/km	378.4	372.6	693.9	366.7	885.7	480.1

*Total of the 3 LRT lines combined is smaller than their sum because of overlaps of the lines, see Appendix A.

Obviously, these proposed transit lines are very different, and we do not suggest that they are directly equivalent, because each technology is associated with different levels of service. But it is significant that the three LRT lines together would cost much less than the subway extension by itself. Our purpose here is to show that in terms of the density of pedestrian networks, redevelopment potential, and the numbers of people and jobs within walking distance of stations, these corridors perform very differently, partly because of the different urban forms they travel through, and partly because of the larger numbers of stations on the LRT lines.

Even though the different corridors are similar in length, they are very different in terms of the area accessible within 800 metres on foot, redevelopment potential, population, and jobs. For example, the area (excluding streets) accessible by foot from stations on the proposed subway extension is 331.5 hectares, that from SmartTrack is more than double at 733 hectares, and those for the three LRT lines are each about triple the area of the subway. The pedestrian networks are on average denser close to the LRT stations, and the LRT stations are closer together. Even if we standardize on a per-kilometre basis, the LRT lines perform better. The subway would have 44 hectares per kilometre of line, SmartTrack would have 58 hectares, Sheppard 103 hectares, Eglinton-Morningside 92, and Malvern 128.

These differences are apparent also in the total network length, and network length per kilometre. Total network length is a measurement of the whole pedestrian network within 800 metres of each station. It is therefore a measurement of the urban form, and the density of the pedestrian network. Whereas the total network for each of the Sheppard and Eglinton-Morningside LRTs is more than 300 km, and Malvern LRT is almost 200 km, SmartTrack is 142 km, and the Scarborough Subway is only 72 km. Again, network length per kilometre is almost triple for Sheppard LRT compared with SmartTrack and the Scarborough subway. Better performance is not, therefore, just the fact that a greater length of LRT can be built for the same cost, but is a combination of the fact that SmartTrack and the subway have fewer stations, and that SmartTrack runs mostly through employment areas where pedestrian networks are sparse.

The "Redevelopment Area" is a calculation of the total area of land within walking distance of proposed stations that is allocated to retail, parking, or mixed retail and residential uses, or that is undeveloped, which we assume to be the lands most likely to be redeveloped. As Table 1 shows, SmartTrack has 151 hectares of redevelopable land, the subway has 84 hectares, Sheppard LRT 171 hectares, Eglinton-Morningside 208 hectares, and Malvern 163 hectares.

When measured by kilometre of line, the differences narrow, but the three LRT lines all have larger potential redevelopment area per kilometre compared with either SmartTrack or the subway. This finding is significant, as redevelopment potential is an important indicator of the likelihood of intensification along new transit lines, an essential element in ensuring long-term ridership. Redevelopment potential along transit lines will contribute to the larger goal of building transit-oriented and walkable areas in Toronto's inner suburbs. The development potential unlocked by the LRT lines is clearly much greater than that for either SmartTrack or the subway.

"Population" measures the number of people living within walking distance of transit stations for each of the proposed lines.[18] Although in all cases, other potential riders will arrive by bus, bicycle, or car, walking distance is a key measure of potential riders. The LRT

[18] In all cases, we have used the 2006 Canadian Census data, as the 2011 Canadian Census is flawed because of the elimination of the long-form census, particularly at smaller geographic scales such as those examined here.

lines clearly provide walkable rapid transit stations to larger numbers of people than either SmartTrack or the subway. The Sheppard LRT reaches more than 45,000 people, Eglinton-Morningside more than 50,000, and Malvern almost 42,000, while SmartTrack is less than 32,000 and the subway less than 11,000. If we recall that the three LRT lines together would cost less than the subway extension, the direct comparison of Subway vs LRT is between providing rapid transit within walking distance of more than 125,000 people with the LRT lines, or just under 11,000 with the subway.

4. Evaluating Options for Potential Combinations of Lines

In this section we evaluate five different options offering different combinations of proposed transit lines in Scarborough. It is important to evaluate the potential lines in combinations, as none of the current proposals suggest that a single line would be built by itself.

We have selected the five most logical combinations of transit lines for further analysis. Each combination has some possibility of being built. Where the lines intersect in multiple locations, to avoid double-counting population, jobs, or potential redevelopment sites at the intersections, we evaluate each combination as a network.

Maps of each combination of potential routes can be found in Appendix A.

Option 1 includes the two lines currently approved by the City of Toronto: the Scarborough subway and the Sheppard LRT.

Option 2 is the current proposal of Toronto Mayor John Tory, to add Smart Track to the two existing approved plans, and build three lines: Smart Track, the Scarborough subway, and the Sheppard LRT**.**

Option 3 is SmartTrack plus the three LRT lines: the Sheppard LRT, the Eglinton-Morningside LRT, and the Malvern LRT. We assume that with no Scarborough subway, a replacement for the Scarborough RT to Scarborough Town Centre will be necessary, and that it might run from the Ellesmere SmartTrack Station to Scarborough Town Centre, Centennial College, and Malvern Town Centre, long seen as the ultimate destination of the former Scarborough RT line.

Option 4 combines the Scarborough subway and the Transit City LRT network, but without the Ellesmere-to-Malvern line, which seems highly unlikely if the subway goes ahead. This is a possible configuration if SmartTrack proves unfeasible. The detailed engineering and Environmental Assessments for SmartTrack have not been done, and it does not have a budget estimate or funding, so the unknowns are significant.

Option 5: combines Smart Track and the Scarborough subway only. Even though the Sheppard LRT is already approved, and fully funded by the province, Mayor Tory has said that Sheppard is "not a priority," but has promised to build SmartTrack and the Subway.

We evaluate this combination in case only those two lines are built without the Sheppard LRT.

We evaluated each combination of routes using the same approach used for the individual routes shown in Table 1.

Table 2. Pedestrian Networks, Population, Jobs and Redevelopment Opportunity for different combinations of transit investments

	Option 1	Option 2	Option 3	Option 4	Option 5
	Scarborough Subway **Sheppard LRT**	**SmartTrack** **Scarborough Subway** **Sheppard LRT**	**SmartTrack** **Sheppard LRT** **Eglinton-Morningside LRT** **Malvern LRT**	**Scarborough Subway** **Sheppard LRT** **Eglinton-Morningside LRT** **Malvern LRT**	**SmartTrack** **Scarborough Subway**
Length of line within Scarborough (km)	17.9	30.5	42.6	29.8	20.1
Accessible area within 800m (hectares)	1,284.2	1,868.7	3,257.2	2,242.4	1,064.2
Accessible area within 800m ha/km	71.9	61.3	76.5	75.2	52.8
Network length within 800m (km)	345.4	459.7	840.3	640.6	213.8
Network length km/km	19.3	15.1	19.7	21.5	10.6
Redevelopment area (hectares)	222.2	344.2	553.5	383.3	234.8
Redevelopment area Ha/km	12.4	11.3	13.0	12.9	11.7
Population	52,695	77,143	143,497	100,998	42,438
Population/km	2,951.8	2,531.2	3,368.8	3,387.0	2,106.3
Number of jobs	8,127	12,901	16,193	11,184	7,580
Jobs/km	455.2	423.3	380.2	375.1	376.2

The point here is not to speculate on which combination of lines is most likely to be built, as this is currently unknown, but to evaluate the logical combinations.

Table 2 makes clear that on all the measures we are evaluating, the Option 3 combination of SmartTrack with Transit City LRT lines creates by far the largest area accessible to rapid

transit by walking: 3,257 hectares. It also generates by far the largest total pedestrian network within 800 metres of transit stations at 840 km, about four times the extent of option 5, which would cost more to build. It has by far the largest potential redevelopment area, at 554 hectares, and reaches the largest population within walking distance of stations (143,497 people). That is more than double either options 1 or 5, and over a third higher than options 2 and 4. Option 3 also reaches far more jobs (16,193) within walking distance than any other option. Option 3 combining SmartTrack and the LRT lines would clearly deliver the greatest benefits of all the options examined here, based on this analysis.

It is not a coincidence that it also results in the longest total length of lines. But it would be less expensive than *any* of the other options, even though we do not know what SmartTrack will cost, because all the other options include the subway, which by itself is more expensive than all the LRT lines combined.

Option 5, the combination of SmartTrack with the Scarborough subway extension, performs by far the worst of all five options on all measures. It is clearly a worst-case scenario, but is dangerously close to being accepted as the policy of the City of Toronto, as Mayor Tory has expressed reluctance to reconsider the decision to build the subway extension, is deeply committed to SmartTrack, and is unsure about whether the Sheppard LRT should be a priority.

The other options each fall somewhere in between Option 3 (best performance) and Option 5 (worst), mostly because each includes the Sheppard LRT line, which is the best performer of all the individual lines.

Finally, comparing Option 3 and Option 5 is the clearest way of comparing the Scarborough subway with the Transit City approach of surface LRT. Both options include the SmartTrack line. Option 3 creates a transit-walkable area that is triple the area of Option 5, but it also generates about 50% more walkable area per kilometre of corridor than Option 5, which suggests that it fits much better with the urban form of the areas it services.

Option 3 creates a total network four times the size of Option 5, and is almost double the length of network per kilometre. It has more than double the area of redevelopable land in its service area, and has more than three times the population and double the number of jobs within walking distance of its stops. This is mostly because it follows the major east-west arterial roads, where most potential redevelopment sites are located.

The Transit City–style LRT system is a valuable comparator not simply because it was the recommended and approved transit option for Scarborough before 2010, but also because the whole LRT network is less expensive to build than the subway, and could be completed in four or five years, whereas the subway is expected to take more than a decade to build.

5. Conclusions: Comparing Different Transit Options and Networks

In this report we have argued that plans for new rapid transit lines within existing built-up areas must take existing urban form into account. Such analysis has been surprisingly absent in most recent transit debates in Toronto. We present an approach to measuring the areas accessible from transit stops via pedestrian networks up to 800 metres from each stop, and evaluate population, jobs, and potential redevelopment sites within those areas. In building transit infrastructure in existing urban areas, it is critical to understand how it fits with existing urban form. We believe that given the long-term impacts of these investments, those decisions should be made in the light of the best available evidence.

A central issue in planning new rapid transit infrastructure within existing urban areas is the fact that redevelopment and intensification is much more likely in some places than others. The existing built form, street configurations, housing types, and parcel sizes shape the pattern and quantity of new construction near transit stops. This is particularly critical in the suburbs, which were designed to prevent incremental change. In Scarborough, relatively few areas can easily be redeveloped to higher density or mixed uses. Unfortunately, this challenge has not been recognized in transit planning debates in the Toronto region.

Our analysis makes clear that because of their large lots, wide property frontages, and low current intensity of land use, Scarborough's east-west arterials, such as Eglinton and Sheppard, present the best redevelopment opportunities anywhere in the inner suburbs.

Of all the possible combinations of transit investments for Scarborough, by far the worst-case scenario is the combination of SmartTrack and the Scarborough subway extension to Sheppard, as approved by City Council. Not only will those two lines be too close to each other, so that they will compete with each other, but they also run through areas with little potential for redevelopment and intensification, and low population and jobs densities. This is the worst possible combination of conditions to build a rapid transit line within an urban area. With the addition of the SmartTrack line so nearby, ridership estimates for the Scarborough subway should be re-evaluated. Despite the understandable reluctance at all levels of government to revisit these plans, such a re-evaluation is unavoidable if SmartTrack is to be built.

Apart from the conflict between the Scarborough subway and SmartTrack, based on this analysis it is clear that the subway simply makes no sense as currently planned. Of all the corridors examined, it performs by far the worst on all measures. It would be irresponsible to build this line as currently configured.

The extremely poor performance of the proposed Scarborough subway is particularly shocking compared to the extremely strong performance of the LRT lines planned as part of the Transit City plan. For less than the price of the Scarborough subway, it would be

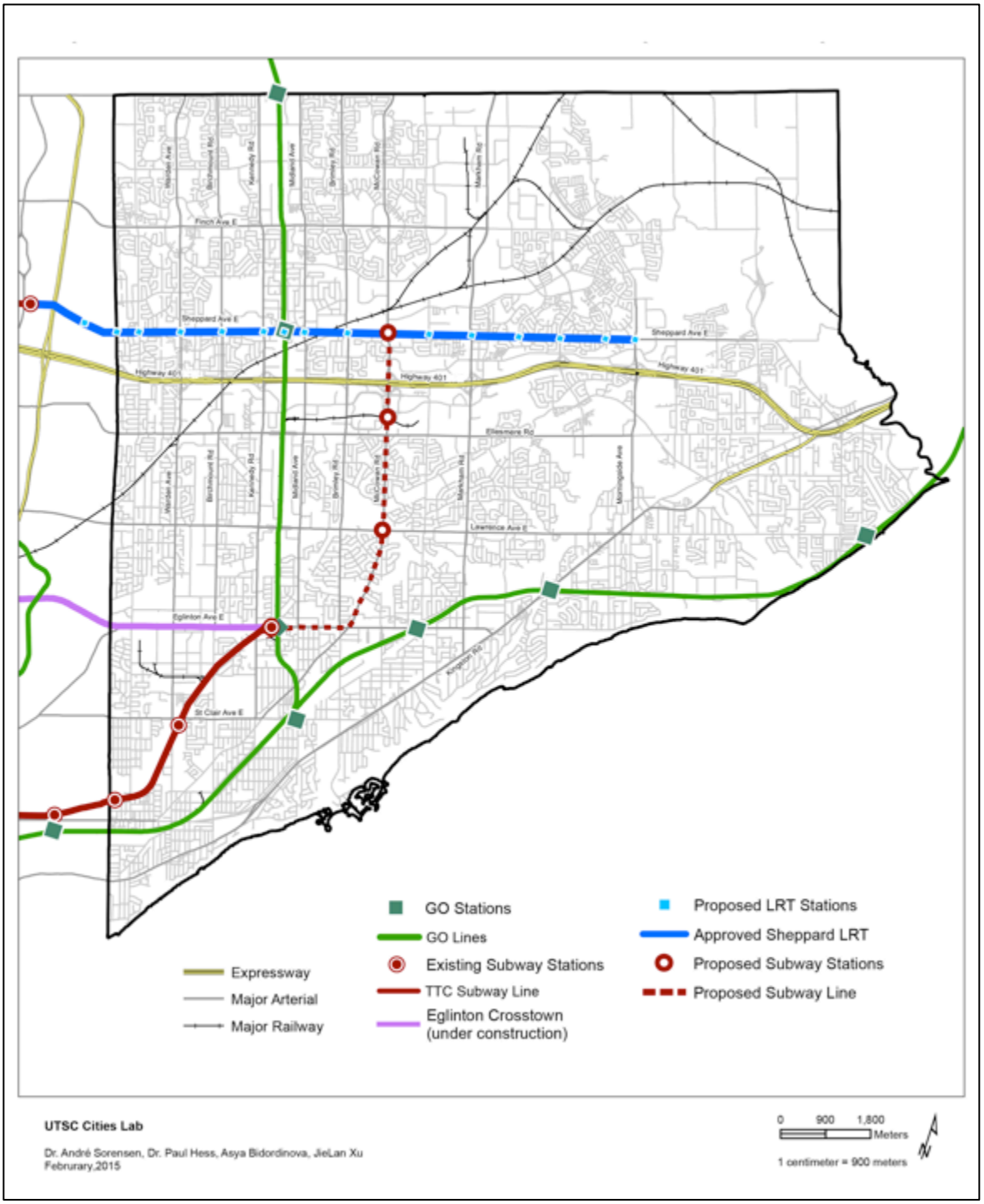
possible to build the entire former Transit City network that was the approved plan for transit in Scarborough before former Mayor Rob Ford cancelled it.

Our analysis suggests that whatever is eventually decided with regard to the Scarborough Subway and SmartTrack – which each face years of planning, engineering study, and approvals before they can break ground – construction on the fully funded Sheppard LRT should start immediately. Sheppard LRT performs best of all the potential lines in terms of the number of residents and jobs and pedestrian network per kilometer of line, and is already approved, with completed environmental assessments. It could be carrying passengers before construction starts on either of the other two proposals.

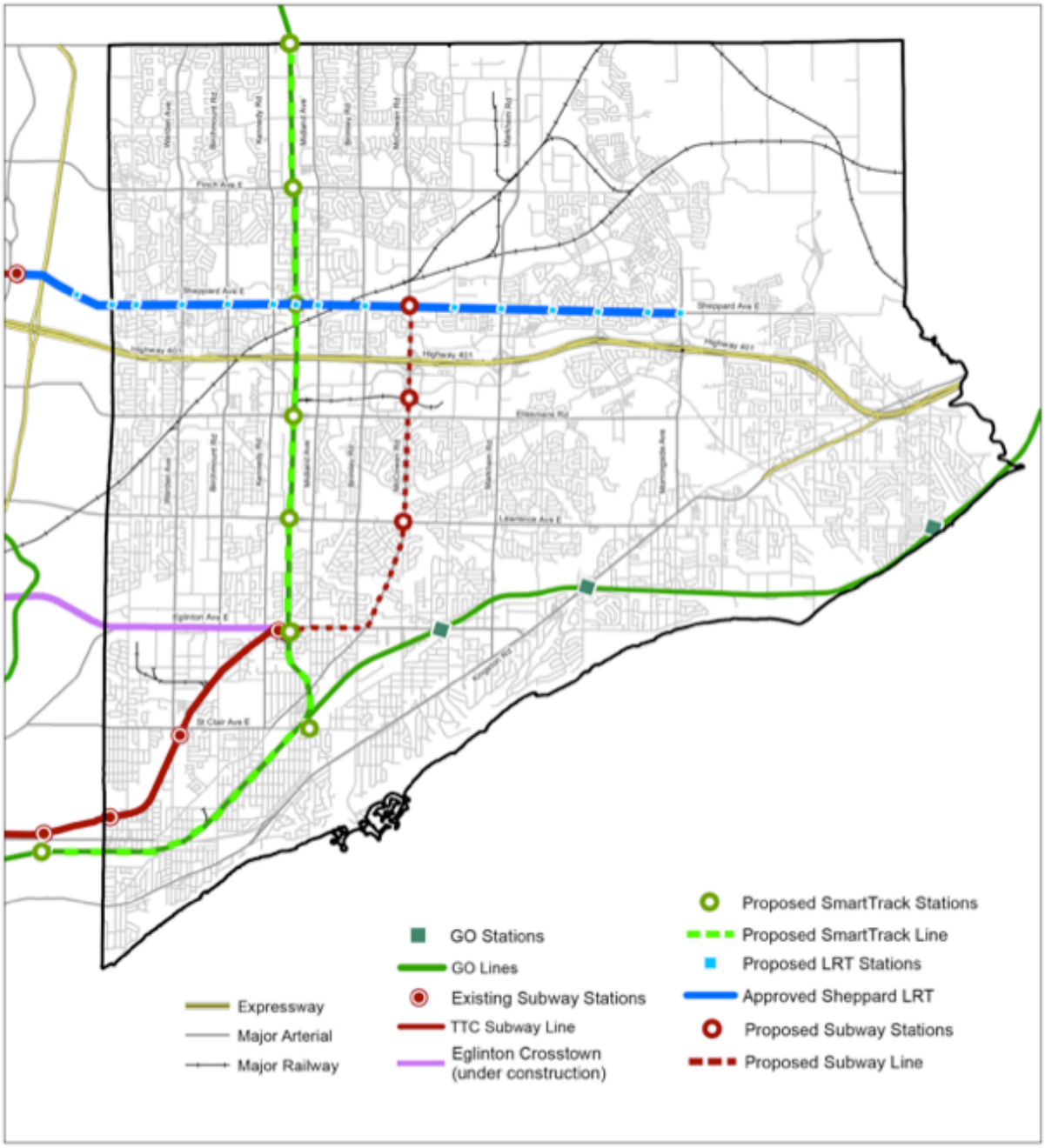
Scarborough needs new investment, and could offer good locations for new housing, at all price points, while improving the quality of the local environment and building a more transit-oriented, walkable, and livable city. This opportunity should not be squandered.

Appendix A. 5 Possible Combinations of Transit Lines

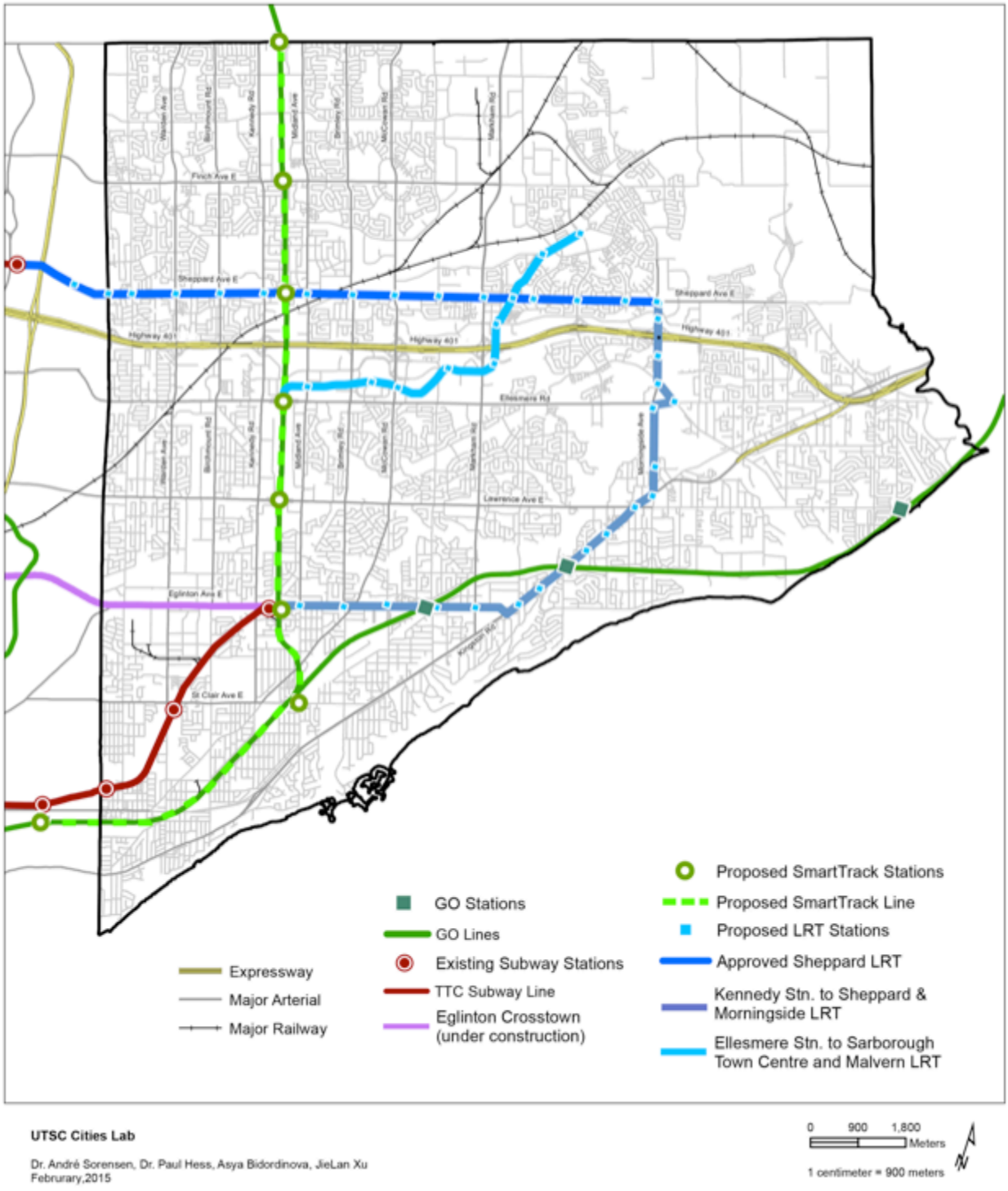
Option 1: Scarborough Subway, and Sheppard LRT



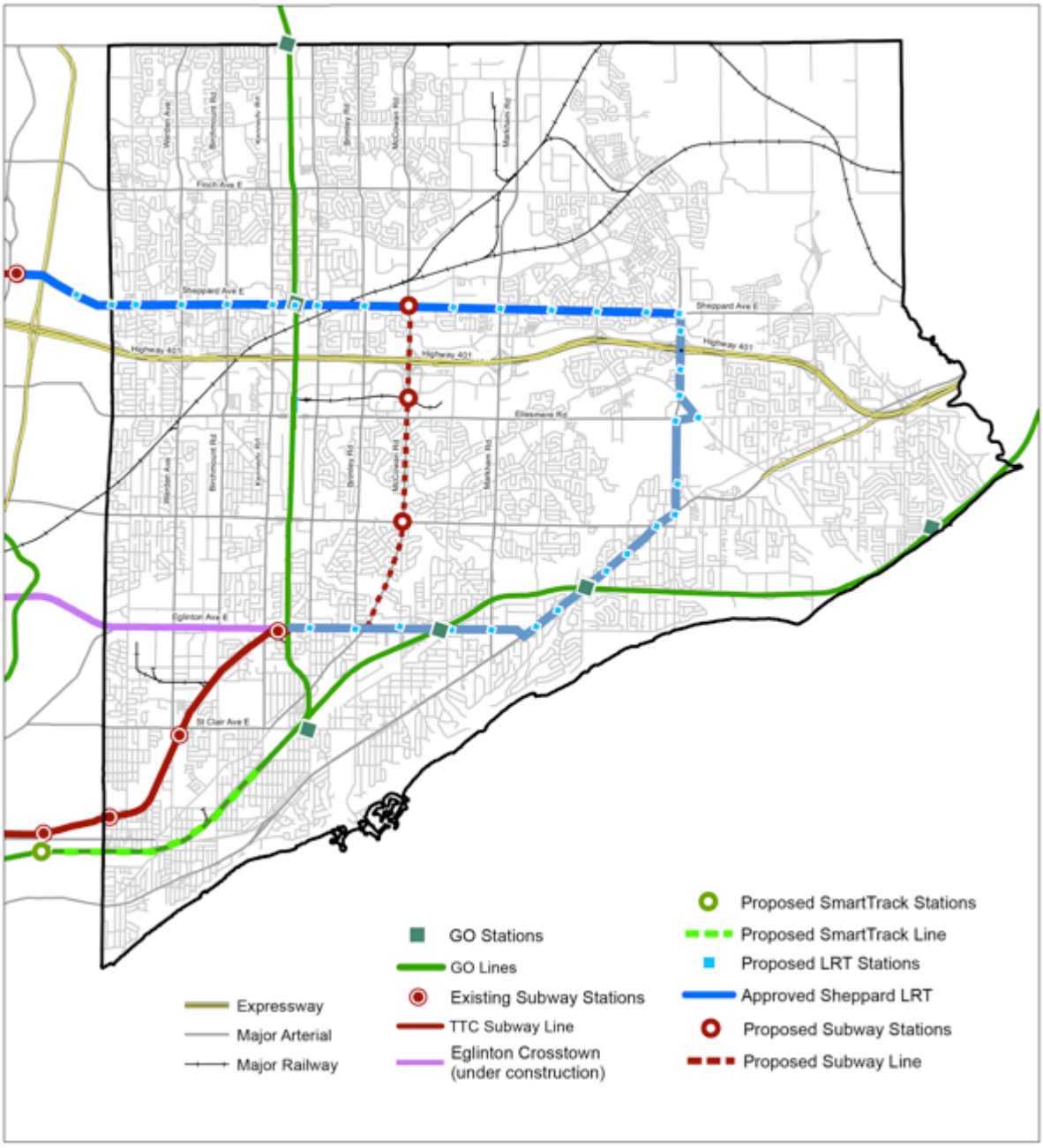
Option 2: Smart Track, Scarborough Subway, and Sheppard LRT



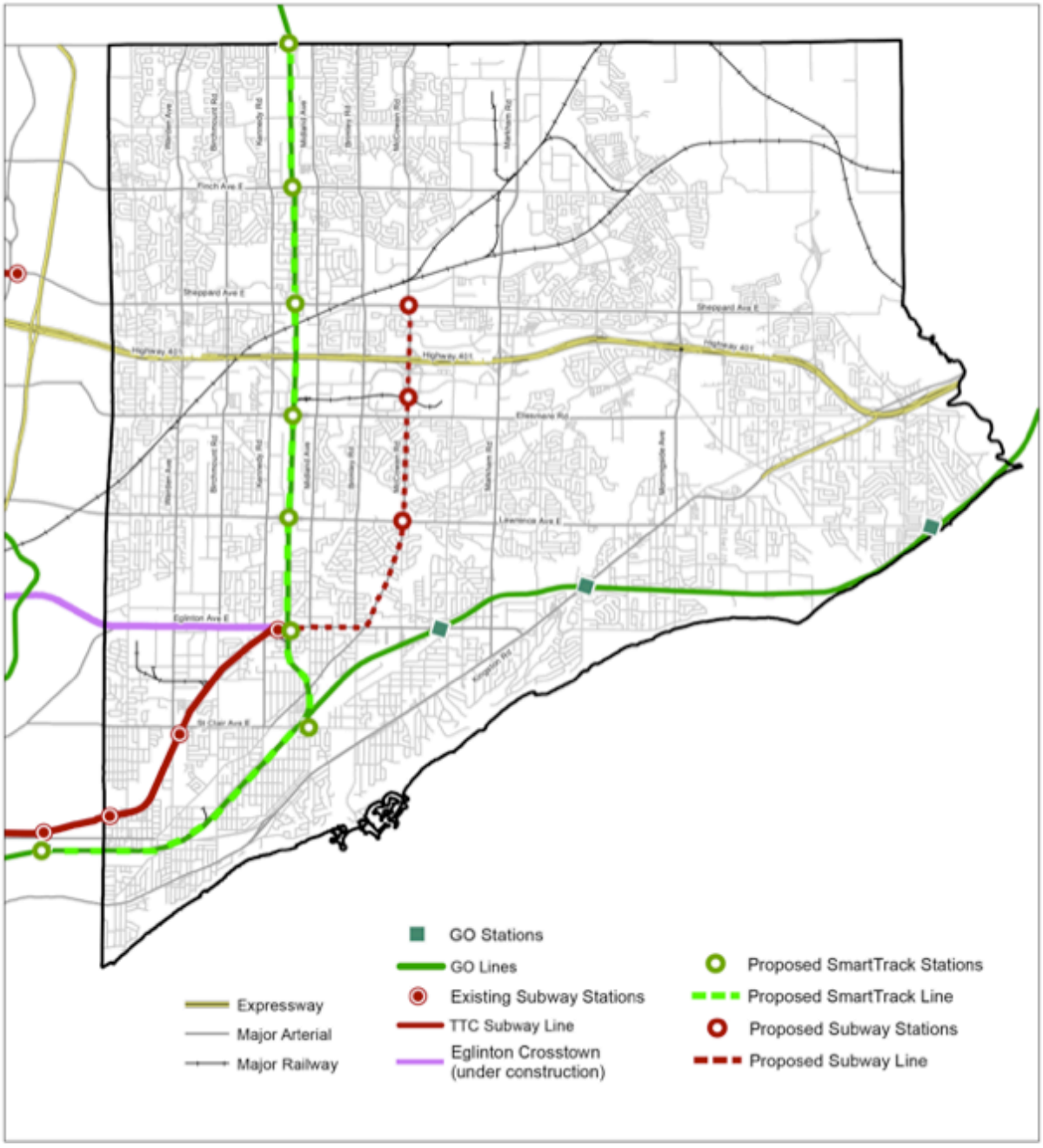
Option 3: Smart Track, Sheppard LRT, Eglinton-Morningside LRT, and Malvern LRT (SmartTrack plus Transit City)



Option 4: Scarborough Subway, Sheppard LRT, and Eglinton-Morningside LRT



Option 5: Smart Track and Scarborough Subway Only



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