



Strategic Regional
Research Alliance

PUBLIC CONFIDENCE IN TRANSIT
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The research brings together in a current and hopefully useful form the four major themes that have been, and remain, the focus of SRRA since 2012: connecting home to work; employers' response to public infrastructure policy; the economic impact and enablers of growth; and exploration of ways to add non-government funding to transit.

The research on 'getting more out of what we have' began with the 6th SRRA Forum in May 2017 in response to a growing view among the partners of SRRA that more could be done now with the transit infrastructure we have in place. Throughout the last 18 months SRRA has been deepening our research and relying on the contributions, experience and knowledge of partners and associates.

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Executive Summary

The Confidence Challenge

With four regional governments (Halton, Peel, York and Durham) and the City of Toronto, 23 local governments¹; 10 transit agencies²; direct input from several Provincial ministries³; and indirect input from the Federal government as potential project funder, keeping Canada's principal economic hub moving about smoothly is a challenging problem.

This is, perhaps, nowhere more apparent than in the realm of transit and intensified development planning. Short term political decision-making cycles often conflict with the long-term development and delivery cycles associated with large scale infrastructure projects. While delays and abrupt policy changes are the most visible adverse consequences of this conflict, the most enduring impact is the wide spread lack of confidence amongst stakeholders.

For private sector stakeholders, ranging from employers to institutional investors such as pension funds, it is worth asking how long corporate Canada is willing to wait for the Region's reputation for making good decisions with respect to investments in public transit and other essential infrastructure to match its claims that the Toronto Region offers the highest quality of life in urban Canada.

Long range public infrastructure decisions are made by political actors operating in short political cycles. This will not change. Change to better manage the business of transit within this reality, however, has occurred elsewhere in the world and can occur here. This paper seeks to address the issue of building more confidence in citizens, politicians and stakeholders so that transit decisions are based on a broader foundation of evidence and transparency reflecting community building values and goals.

Transit is more than the familiar debates about busses, LRTs, subways and rail. A well-designed network of transit acts as the Region's spine to help realize more than just moving people. Transit can support place making, intensification, realize environmental goals and enable economic growth by connecting affordable places to live and work. Regional transit shrinks geography while expanding the urban footprint of a growing city-region. This multi-faceted nature adds to the complexity of transit planning and serves to underscore the importance of getting it all right.

The study outlines the problem of providing more affordable and efficient options for local and regional mobility. It outlines the challenges associated with optimizing the existing transit infrastructure and how to plan for and fund more capacity. The report is based on the principle of building public confidence in the complex world of transportation and the development which supports public investment in transit. The study poses questions about how decision makers can better fund and prioritize the necessary investments to support the region's current and rapidly growing population.

¹ Halton Hills, Milton, Oakville, Burlington, Caledon, Brampton, Mississauga, Toronto, Vaughan, Richmond Hill, Markham, Aurora, Newmarket, East Gwillimbury, King, Oshawa, Ajax, Brock, Clarington, Pickering, Scugog, Uxbridge, Whitby)

² GO, UPX, TTC, Brampton, Burlington, York Regional Transit, VIVA, Mississauga Mi-Way, Oakville, Durham Region Transit

Congestion on the roads in the region at the turn of the century prompted an appetite to re-invest in public transit. Government leaders and transit operators argued correctly that a new round of investment was required. The ensuing public focus on transit options culminated in new strategies notably the City of Toronto's 'Transit City' and the Province's 'Big Move'. These initiatives along with regional programs in York and Peel Regions and others moved the conversation from "should we invest" to "how much and where."

For governments the challenge is to prioritize and allocate finite public infrastructure resources in an economically and socially optimal manner amongst demands for roads, schools, medical facilities and transit. As transit competes with other priorities it is critical that transparent and evidence-based analysis underpin decisions with the confidence of the public and identifies projects which will best support regional growth and livability.

Current government forecasts suggest that the GTA will grow by an additional three million people and over one million more jobs by 2041. The challenge is to fit all those people and jobs into the same region which already has more than six million people. In its simplest form this challenge is about making space that is affordable, connected and productive. The demand for new development is staggering including an estimated 1 billion square feet of new residential and 100 million square feet of new commercial accommodation with even more required to meet the retail and institutional demands of a growing population. Public policy will shape where that development occurs and where transport solutions are created.

If the growth forecasts play out as anticipated the demands for improved mobility in and across the Region's already congested highway and transit infrastructure will reach critical proportions. Within this integrated economic region, employment broadly consists of jobs that follow population growth (retail, small scale commercial and public service & institutional activities) and jobs in established and new economy sectors where Cities and City-Regions must compete to attract, secure and nurture such employment. Related to this is the need for these employers to compete for employees. Today, these types of jobs are largely commercial in nature and require attractive, accessible and high-quality office and alternative space locations. This sector is generally high paying and a foundational part of the Region's current and future prosperity.

The rate of growth in the Toronto region has been unprecedented and Toronto has become a major force in financial markets and today has the third largest office market in North America. For this sector there are four identifiable employment geographies across the Region. Although, the GTHA is one economy, conditions vary across the region and land economics, land use policy and the nature and location of infrastructure investment all influence expansion decisions made by large employers.

Citizens face a daily choice about how to commute. They see only one road network which knows no borders. For transit travelers, service is delivered by 10 transit systems supported by four levels of government all of which have different mandates. Workday commuters travel to four major employment centers with only one serviced by significant public transit investment. This does not inspire public confidence.

Compared to road travel, transit offers a service that is less than optimally connected, expensive and incomplete in the range of destinations and options provided. Movement across transit systems (in most cases) requires fare payment at each transfer point. Complexity is most apparent in the areas of service levels and pricing which reflect local rather than regional priorities and dynamics serving to further reduce the effectiveness of the transit choice.

The value proposition offered by driving and transit are very different depending on where you live and work. Transit cannot be a realistic alternative unless and until it provides comparable value to commuters and other users throughout the whole Region. Especially where cost is limited to fuel and parking it is still the case that driving, when it involves long distances that cross transit provider boundaries, remains less expensive or at least only marginally more expensive than transit.

Transit beyond the core of the City fails to compete on convenience. Driving allows commuters endless choice to add errands to their trip. It is difficult for any transit offering to approximate the range of choice provided by private vehicle without extensive network connectivity and desirable amenities at or near transit stations and the ability for hop-on/hop-off without financial penalty.

To meet the challenge of creating confidence, this paper seeks to provide an overview of the complex and inter-related aspects of regional transit planning.

Summary Outline of the Report

Section 1: What can be done to get more out of what we have?

Creating confidence amongst all stakeholders requires getting more out of the extensive network now in place across the Region. A renewed focus by decision makers now to support and increase ridership, address adjustments to service levels, fare normalization and a commitment to removing the structural limitations borne of the way subsidy is underwritten will build more acceptance and feed a stronger appetite for more investment in transit.

The first step is to generate more regional travel, more local travel and more inter agency collaboration from the existing transport infrastructure. Generating new riders and therefore more revenue lessens the burden on governments to subsidize transit operations in the first place.

Service integration is always challenged by who pays for what. Because transit agencies compete with other local priorities for locally provided subsidy there is a demand for transit to focus on local rather than regional needs. Loosening or eliminating the link between local taxes to support transit operating subsidies may be required. An alternative or complimentary approach can focus on functional roles. Discrete functions need to be identified and aligned with specific funding approaches to provide clearer alignment between funder and provider.

Section 2: Building better communities – land value creation, hubs and intensification

Universally, transit network operations best succeed when the areas they serve have sufficient densities. Where transit-oriented development (TOD) provides the densities fitting the transit mode, it is also the case that ridership normally reaches optimum levels. This section explores how land development can contribute to new revenue streams and explores how the Region's rail corridors can stimulate new mixed-use communities.

Employment and industrial lands constitute much of the land uses surrounding the rail corridors. The Regional Express Rail initiative will be even more successful if Transit Oriented Development occurs within its reach. In many parts of the Region development has not followed transit infrastructure leading to suboptimal ridership. This has been due in large measure to land values which have often risen substantially based on the expectation of announced new transit. This phenomenon of land value accretion prior to transit development perversely serves to make TOD more expensive than development along corridors not serviced by transit, a problem that needs to be addressed.

Ridership to support rapid rail also depends on fully integrated networks of community-based transit in transit hubs where consumers change from one service to another. Many of the Region's disbursed communities, including large parts of the City of Toronto with a suburban rather than urban built form, will need innovative solutions to create the networks through the adaption and investment in new technologies. Transit hubs should also provide many of the daily amenities to support consumers with more services and convenience located on or near new transit lines. In other words, a commitment to providing a wide range of amenities at these hubs.

Section 3: Funding and prioritizing new capacity

Reliance upon government sources for all funding for new transit limits the amount of transit expansion. Innovations in funding which attract non-government sources of funding are accelerating transit expansion elsewhere, giving global peers such as London and New York an advantage. To take

advantage of these lessons, we must distinguish between financing and funding and move beyond debates about P3 financing which is very different.

The first step is to build confidence amongst possible funders that the public sector is operating the business of transit well and that new projects have received the kind of due diligence which public pension funds and private equity pools require. Focusing on the importance of solid analysis in the creation of broad consensus in favor of new transit is central to building that confidence. Due diligence helps build that confidence.

The public also needs reassurance that the principles of public good are maintained. Equitable fares and reliably maintained service are both necessary to build confidence in the public and allow politicians to seek non-government sources of capital.

Section 4: The rail corridors – connecting the people of the Region

Throughout the world urban centers rely on rail corridors to support local transit operations. Much is said about the extensive “Tube” network in London, but few realize that 45% of the ‘tube’ is above ground utilizing rail corridors. With the commencement of the transition of the GO Train commuter service to two way all day service, the network of rapid transit in the region will have made a great leap forward. The ‘new’ map of rapid transit can soon look comparable to other great cities.

Providing **rapid** transit over long distances is a major challenge in the region, especially where road congestion is stifling growth and reducing the quality of life. This section highlights the advantages, low cost to create, ease of transition and attractiveness to the consumer of frequent service on the existing rail corridors and will explore the value of the specific applications of '**surface subways**' to the GTHA identifying future opportunities to continue to build an effective public transit network.

Challenges to Public Confidence

Today there is much to celebrate when considering the transit advancements that have recently been added to the Region: the Spadina Subway Extension, UPX, significant Bus Rapid Transit (BRT) programs in York and Mississauga with more now in delivery, major Light Rail Transit (LRT) expansions driven by the Province such as the Eglinton Crosstown, and the Hurontario and Finch LRT. In addition to these local enhancements, public sector support for new transit for the region is best seen in the transformative commitment to Regional Express Rail (RER) and the nascent steps announced recently to create a standard fare for travel within the City of Toronto and further reduce the challenge of dual fare commuting through a Provincial commitment to establish reduced co-fare regimes amongst the TTC and neighboring transit services.

While plans for the next generation abound, there are significant challenges that must be addressed. Business case analysis is not consistent across the Region and different actors continue to use different data sets and assumptions. Transparency is not the norm. Plans with high political support often have no underpinning business case or rest upon justifications that may no longer align with market reality on the ground. Revenue models lag other jurisdictions creating new transit lines that increase the demand for on-going subsidies which in turn reduce the resources available for further system expansion and asset maintenance.

Over the past decade, SRRA has sought to explore and share ideas highlighting the opportunity for transit and development around transit to support the growth in the Region. The focus of enquiry has been to see transit solutions through the eyes of the consumer and bring the perspective of the employment and development communities to these discussions. The work advances the proposition that partnerships with non-government actors can add significant value and funding opportunities from those who benefit.

Learning from the experience of major City regions abroad such as London and New York, SRRA has championed the need for evidence and data to support best practices in business case analysis (BCA) to both inform and prioritize new choices and support funding complete networks. Recently, the BCA models used abroad have been expanded to include the social and cultural value created by good infrastructure which, when well-articulated, contributes to broader support for the initial public investment. SRRA seeks to apply those principles in innovative funding and the prioritization process for the next round of transit decision making.

Challenge 1: Too many cooks, too little integration

Roads are simple and make sense to the user. From the commuter's vantage point there is one road network which knows no borders. The same is not true for transit. This is the result of the structures that govern our transit systems.

Municipal, Regional and Provincial roads and highways are integrated seamlessly. Payment for road construction and maintenance is (except for Highways 407 and 412) indirect with user fees paid annually to register a vehicle, excise tax assessed when fueling and property tax levies paid monthly or semi-annually. Which government owns a road is not obvious to the user. As a result, the choice to walk, ride or drive on the road infrastructure knows no political, organizational or other barriers to travel.

Transit, however, is not organized in the same way. Capital funding is complex with Federal, Provincial, Regional and Municipal players involved (generally) in the provision of new services. Users pay fares for a substantial part of the operating cost with the balance provided by all four orders of Government reflecting different priorities and, perversely, encouraging rent seeking behavior by transit operators.

The politics of transit favor new capital projects over the maintenance of existing assets. This reflects the political nature of such decisions. “Ribbon cutting” is seen as more beneficial to political actors operating within 4-year or shorter electoral mandates than the mundane reward that comes from directing capital funds to state of good repair (SOGR). The focus on new transit also generally prefers projects within municipal boundaries over those that cross boundaries and improve regional network connectivity.

As well the political nature of the decision-making process constrains transit agencies by requiring them to balance the books locally, make additional concessions to politically valuable demographic groups and leads to growing operating subsidies. The result is a lack of public confidence and a business model that is unattractive to potential new sources of non-government funding.

Challenge 2 - Stakeholders frustration with the delivery of new projects

Frustration with the long timeframes surrounding new transit development is inevitable. Projects marked by delay and cost overruns and the lament that political struggles over prioritization increase frustration. In some cases, it often means that no plan is real until its actual construction is so far advanced as to place it beyond the point of no return.

Stakeholder groups lack confidence in the current process when consumer needs are not addressed. Commuters, who are the largest single group of users (typically 50% or more of transit users, worldwide), suffer when employment and transit are not aligned. Employers and possible funders of infrastructure are not sufficiently engaged in the political or planning process leading to further frustration.

The alignment of development and transit, a hallmark of the early days in downtown Toronto, has not occurred in the past 40 years as one would have thought. An aerial view of the region shows that density follows transit routes in only a few locations. As documented in SRRA’s earliest work it is also a critical failing of transit planning and development that three of the region’s four major employment nodes remain road-dependent without reliable transit connections. The failure of public policy to understand and address the needs of employers and public pension funds means these critical partners in the future of the region are not being engaged by the public process.

Challenge 3: Governance

Governments today determine what projects to invest in, where to invest, how much to invest and when to invest. Those decisions can and often do depend on the political landscape of the day. This can become counterproductive especially if the four levels of government are not on the same page. Projects can be started by one actor then terminated by another unless those projects have widespread and transparent “buy-in” by the public. If one considers a new process where the **What** and the **Where** become a matter of broad consensus based on evidence of public value then it becomes less a matter of partisanship and more of “getting on with it”.

There are some who advocate for a single regional transit operator in the Region. It is suggested that this leap to a “big bang” solution is premature and potentially unnecessary. Governance changes do evolve once there is a full understanding of who is best suited to do what. Rather than sacrificing the benefits of local operations it is suggested that first we examine who is best qualified to advise and support the decision-making process. There are concrete functions that can better be executed centrally while other functions are best delivered locally and within explicit operating disciplines. There are skill

sets such as evaluating where people will live and work in 10 to 25 years which are very different from the expertise to operate, price or improve service.

The public is often divided along political lines defined by projects championing different types of transit service to meet local demands often driven by a short-term perception of value. Much has been debated about what kind of mobility solutions are best with advocates for surface rail, subways, LRTs, busses, automobile, cycling and walking suggesting “one size fits all”. Yet all these modes have their rightful place. The question remains how is the public best served with limited resources? Should politicians be experts in one mode or the other? Who is best positioned to develop the arguments for what is best and where?

Building public confidence requires that all levels of government can agree on principles and processes which help to evaluate and prioritize, out of the realm of political opportunity, the highest value for money. Elected officials can then debate **how much** public resources can be allocated to transit and **when**.

Challenge 4: Prioritization of new investment

Prioritization today depends greatly on who is asking. Provincial, Regional and Municipal priorities are all different, but to build public confidence that those decisions are being made effectively and not simply reflective of political considerations depends a great deal on several important principles. Identifying the problem, determining where need is highest, selecting the most effective type of transit service projecting where growth will occur and how the service fits into the network are processes which require more than just transit operational knowledge.

Evaluating projects is a complex process requiring multiple skill sets and knowledge. Those responsible, must consider ridership benefits which come from future development and unrealized network expansion, cost to construct, operate and maintain the investment as well as social and cultural benefits for users. The region grew for decades on the principle of sprawl. But cities are now encountering the even more complex problem of growing within themselves. Intensification is creating new challenges for planners and transit operators but similar challenges confront those responsible for road management and the movement of goods and services. These realities require far wider based knowledge and expertise to evaluate options.

Challenge 5: Knowing the customer you don't have

Transit decision makers spend billions on new capacity with a minimal investment in research, evidence and analytics. Businesses do not launch new products without an investment, usually substantial, in market research. Transit projects advance when they achieve political support with business cases often used after the fact to justify the decision. The lack of transparency and the reluctance of actors to revisit decisions when confronted with new analysis and data is a symptom of the crisis of confidence that affects many transit plans.

Quality and comprehensive data is the foundation of good analytics. Transit decision makers have had very little current data on the customer and even less sophisticated data and evidence on where potential customers will be in the future. Presently transit agencies tend to use their own data and analytical tools. As a result, decisions between agencies are more difficult to assess or implement. The regional traveler is most affected by this. The challenge is to build a region wide transparent platform of data about who uses, who doesn't use, and who might in the future use new transit. It is vital that this data be combined with the most robust analytical tools available.

Challenge 6: Knowing how much more the region requires?

Metrolinx's Draft 2041 Regional Transit Plan (RTP) envisions a need for \$20 billion for plans now "in development". Most of these are "Big Move" projects that were left unfunded when the Province shifted its focus to RER. Some Toronto LRT projects were first proposed as part of the "Transit City" vision. The proposed projects would add 120.5 km of BRT, 52 km of LRT and 25.4 km of subways. The estimated cost does not include financing or inflation estimates. The RTP also envisions new projects totaling \$23 billion excluding financing and inflation related costs. These include a Sheppard West subway extension to connect the two northern lines of the TTC Line 1 and 16 BRT/LRT routes. Many of these are also revivals of Big Move and Transit City projects. The plan also calls for the addition of 30 proposed Priority Bus routes.

Although this is a major commitment are we convinced that it will be enough and, more importantly, does current evidence support the proposed projects? Many projects are themselves legacy items from plans reflecting conditions on the ground from over a decade ago. Is it also necessary to ask if the proposed plans still make sense? Considerable new independent work should be done on a regional basis to evaluate how much and what sort of additional investment is required to accommodate growth particularly with a focus on projects that serve to complete the networks in disbursed areas, to expand regional connectivity and increase the options available to users.

How do we know how much transit we need? First, we must understand growth then measure how much capacity we are providing to determine if it is enough. For an overview of the dynamics driving growth in the Region, please refer to **Appendix A**. SRRA's research reveals that this process has not been adequately done in the GTHA.

Challenge 7: Innovation for funding a fast-growing region

Why innovate? If governments can provide all the transit infrastructure needed why look for innovative ways to exploit non-government sources? Major unfunded projects will require innovative ways of funding them if governments are not able to do so. Opportunities to partner with institutional investors such as public pension funds and the development industry have played a significant role in many competing cities around the world but have not played a major role in funding transit in the Region. The challenge is to recognize these opportunities and apply them to the Region

Managing transit investment from multiple levels of government creates barriers to attracting other significant sources of non-government funding. Based on an extensive review of how jurisdictions as different as London, New York, and Paris have delivered transit projects that governments could not fully fund, we argue that the time has come for the Region to embrace new ways to think about paying for more transit. Many innovations, which have been made elsewhere, have originated when a new project was recognized as having value but governments were unwilling or unable to allocate all the resources necessary to fund the project.

Challenge 8: Fund Regional nodes with little or no transit to begin with

The challenge in the Region is building in areas where existing networks are just emerging leading to an even greater demand for funding those networks. Although governments have made great strides over the past ten years to overcome decades of under-investment in the Region's transportation infrastructure, more is needed in areas where dispersed communities don't seem to fit the traditional transit model.

These disbursed areas need fresh solutions to maintain growth especially in employment nodes where access to labor, cost competitiveness and convenience is no longer met by roads and highways alone. Such is the case in the major employment nodes of Mississauga, Markham/Richmond Hill and the environs of Toronto Pearson International Airport. Regional rail service is the foundational step but investment in local networks must occur at the same time to build the connectivity, enhance convenience and reduce the pressures on heavily congested road infrastructure.

Challenge 9: New technologies

Automated Vehicles, new paradigms in data application, apps to enhance the customer experience, technology solutions for first and last mile connectivity will play a role in improving mobility in the region. Transformation in workplace including car sharing and strategies of collaboration between employers and transit providers will all have an impact on mobility in city economies.

Disruptive technologies will impact transit and auto use but the question remains, “What will the impact be”? The research into the impact of new technologies must be a part of the projections of value in each new infrastructure project and form part of the value matrix.

Challenge 10: Optimizing the rail corridors

The use of rail corridors creates an opportunity to achieve the same ridership benefits as subways at a considerably lower cost, particularly in low density areas and without the disruption to existing communities. As well, new development of homes and places of work in these dispersed areas can then access rapid transit. Issues such as land use optimization, leveraging low cost land, and creating affordable housing and work places along with prioritizing the expansion of the corridors is a next step in creating optimal transit networks.

Transforming these rail corridors is an iterative process. Industrial rail corridors where freight use has become redundant or reduced have provided cities around the world with low cost high speed opportunities for public transit. Those lines where freight is not in conflict can be exploited earlier than those where freight is still an integral part of the economic viability. Long range transformation of these corridors ought to be an ongoing pursuit of governments throughout the Region. As well the exploitation of other corridors which can be converted economically to rapid transit is a priority of Metrolinx's Regional Transportation Plan.

Section 1: What Can Be Done to Get More Out of What We Have?

A city region and a regional network hiding in plain sight

The Greater Toronto and Hamilton Area (GTHA) is a single economic, social and cultural urban area centered on the City of Toronto. Current administrative boundaries crisscross the region which consists of seven 1st tier municipalities⁴ and more than 30 lower tier municipal administrations. The reality of multiple governance structures in a common urban space is shared by the Greater London Urban Area (Greater London) and the New York Metropolitan or Tri-State Area (Tri-State Area) which are *today* what the GTHA will soon become.

It is not civic hubris for leaders in the GTHA to look to London and New York as peers and more importantly as examples. In terms of absolute population, the 2017 Provincial Growth Plan expects the GTHA to grow to 10.16 million people by 2041 which is larger than Greater London's current population of approximately 10 million. In terms of density the GTHA will soon come close to today's Tri-State Area centered on New York City which had a 2015 population density of 1,161 people per square km. Anticipated growth for the GTHA projects a 2041 population density of 1,116 per square km.

To realize the growth envisioned for the region a transit network comparable to those in Greater London and the Tri-State Area must be created for the GTHA. However, London and New York had populations in the 1960s very similar to their current populations. Their investment in new transit today is a response to very recent growth. Their foundational transit networks were built long before this recent growth trend. The GTHA has grown from 1 million to 6 million since 1960 creating a need to leverage, as did New York and London almost a century ago, existing rail networks to connect the region. When we look at those corridors there is the skeleton of a full network hiding in plain sight.

The transportation network in Greater Toronto shares structural similarities with both London and New York. In the highest density urban cores subways operate serviced by extensive above ground feeder services of bus and light rail. Across greater regional distances commuter rail has grown on the rail infrastructure legacy of an earlier heavy industry and freight economy servicing the ports located at the centers of these urban areas.

Today, within the GTHA there are 585 km of provincial highways compared to 499 km of regional rail and first order rapid transit (subways, LRT, RT and BRT services). The TTC's 11 streetcar services are both the largest and busiest light-rail system in North America as well as the largest tramway in the Americas in terms of ridership, rolling stock, and track length. The streetcar routes cover 83 km bringing the current network of regional and first order transit to 582 km. Enhancements now underway will increase system capacity by enhancing the GO commuter system on seven rail corridors radiating from Union Station.

Metrolinx's Draft 2041 Regional Transit Plan (RTP) includes proposed projects now "in development". Most of these are Big Move projects that were unfunded when the Province shifted its focus to RER and some Toronto LRT projects were first proposed as part of the Transit City vision. Combined, these projects would add 120.5 km of BRT, 52 km of LRT and 25.4 km of subways. The RTP also envisions new projects not now underway or in development including a Sheppard West subway extension to connect the two northern lines of the TTC Line 1 and 16 BRT/LRT routes as well as the addition of 30 proposed Priority Bus routes.

⁴ City of Toronto, City of Hamilton, Regions of Halton, York, Peel and Durham and Simcoe County.

The recent Provincial election has also seen proposals to extend the Sheppard Subway into Scarborough to “close the loop” and connect with the extension of Line 2 to the Scarborough Town Centre along with proposals to modify significantly the planned extension of the Line 2 subway. The change in Government provides an opportunity for decision makers in the region to take stock of what we have with an eye towards innovation rather than maintaining the status quo.

Evolution of the regional network

The fundamental challenge for regional transit integration is reconciling two very different approaches to transit: an urban approach found largely in the old City of Toronto, the old City of York and former Borough of East York and a suburban and commuter focused approach which largely is found in the 905 regional municipalities and with the GO service. Between these two extremes are the old Cities of North York, Etobicoke and Scarborough where elements of both approaches can be found.

What can be discerned from the evolution of transit in the region are patterns of expansion outward from the core which, over time, have seen the necessity of transforming to an urban model. This process is not seamless or without conflict which is inevitable as the two models are in many respects contradictory in important ways such as the approach to intensification around transit, the balance between speed and service frequency and cost.

The Toronto Transit Commission (TTC) and its predecessors began in 1849 with horse drawn vehicles owned and operated by private companies. Various private companies were granted franchises by the City of Toronto and this model of transit provision functioned until 1921, when the Toronto Transportation Commission was formed. The precipitating event was when the private franchise, the Toronto Street Railways Company, refused to extend service to newly annexed parts of the city, prompting the realization that the scale of transit operations had expanded to the point where government intervention was required to manage operations for the benefit of the growing City.

Even though the TTC has been a public agency for almost a century, the TTC operated as a business and paid for most capital and all operating costs out of fare box revenues until the early 1970s. This impressive record included funding construction of the Yonge subway from Union to Eglinton, which opened in 1954, the same year that the TTC became the Toronto Transit Commission. The capital costs of the subway were paid for out of accumulated surpluses and debt that was serviced and repaid from operating surpluses.

Prior to 1962 multiple fare zones existed in the suburban boroughs of Metropolitan Toronto much as today's regional network has multiple fare systems creating a de-facto system of zone-based pricing. In 1962 a two-zone system was implemented which saw Metropolitan Toronto transit users from outside the City of Toronto proper pay a double fare to enter the City core. The collapsing of these two zones in 1973 created a single common fare area co-terminus with the boundaries of Metro Toronto. This change was also the precipitating event for the provision of public operating subsidies. The experience in Toronto in the 1970s is instructive today as the expansion of transit beyond the City and into its regional neighbors presents challenges and opportunities comparable to those faced by the City itself in the 1970s.

Commercial Coach Services

Regional transportation and local transit operations have been related since the 1940s when the TTC owned Grey Coach Lines and the Hamilton Street Railway owned Canada Coach Lines (CCL). In 1989, the TTC sold Grey Coach to Greyhound and in 1993 the HSR sold CCL which today operates as Coach Canada

and Mega bus. While commercially operated inter-city coach services continue to operate their function has been gradually reduced as transit services have expanded and integration amongst services has occurred.

GO Transit

In 1967, GO Transit started as a commuter service from Oakville to Pickering with two additional trains to and from Hamilton operating on existing freight rail corridors. In the 1970s, GO started its first bus service connecting Oshawa and Hamilton to the hourly train service at Pickering and Oakville. Bus service expanded with GO taking over former suburban Grey Coach and TTC routes. The Georgetown rail service began in 1974 and by 1981 GO was operating on all seven of its current corridors.

Regional Service Expansion

In the last 20 years, municipal regional transit expansion has included regionalization of service, the expansion of separate systems within regions and hybrid systems which add regional services to complement existing municipal systems. There is no standard or single pattern.

Regional Integration – York, Durham and Waterloo

In 2001, York Region amalgamated five separate local transit systems, extended bus service into towns such as Stouffville and King City, and later introduced Viva, a network of separately-branded limited stop bus routes. Durham Region followed suit in 2006. Outside of the GTHA, in Waterloo Region, Kitchener Transit and Cambridge Transit were merged into Grand River Transit (GRT) which integrated the separate systems, introduced new routes, and improved schedules.

Regional Expansion without Integration – Peel & Halton

In Peel Region, Mississauga Transit (MI Way) and Brampton Transit remain separate operations. In Halton Region three separate systems in Oakville, Burlington, and Milton operate. The operational decision to avoid regionalization, however, has left significant communities such as Caledon (in Peel) and Georgetown (in Halton) without local transit.

Regional Expansion with partial Integration –Niagara and Simcoe

Expansion through a hybrid approach that adds regional connectivity without replacing local systems has occurred in Niagara and Simcoe. Niagara Region introduced several bus routes connecting St. Catharines, Niagara Falls, Welland/Port Colborne, and Fort Erie in 2011, without amalgamating the local systems together.

In Simcoe, Bradford-West Gwillimbury introduced a local transit service in Bradford connecting the big box shopping districts in the west with residential areas and the downtown core and the Bradford GO Station. This service was the third standalone transit operation in Simcoe, joining those in Barrie and Orillia. A partial regionalization in Simcoe is scheduled for 2018 which will add regional transit services to complement the stand-alone services in Barrie, Bradford and Orillia.

Optimizing the current transit “Product” to maximize ridership

The scope and coverage of transit that exists is obscured for consumers and decision makers alike because we think of transit in the GTHA as 13 separate services (including Barrie and Bradford transit) rather than seeing the extensive network that is hiding in plain sight. Even transit services operated by the same entity – the GO and UPX systems under the common umbrella of Metrolinx – are seen as separate rather than complimentary.

This approach is the exact opposite of the way in which the function of the transit network as an integrated whole is seen in London and New York and the exact opposite of how drivers in the GTHA experience the road network. It is not certain if the proposed transit expansions will mitigate this reality or serve to reinforce it.

Within the Region there are lessons about service integration and fare co-ordination that should be expanded. For almost two decades operators in the 905 have worked to integrate services amongst themselves and worked to better integrate with GO rail operations. In many respects the dynamic is the same as within the City of Toronto where an extensive bus network is integrated with and feeds the main rail-based elements of the system. Outside of Toronto the bus transport feeds the GO service but the functional roles are comparable to those within Toronto.

From the user's perspective the integration is most apparent with the system of mutual recognition by bus operators of a 2-hour transfer across the 905. Related to this is the practice of fare subsidy for users transferring onto the GO system by which the lost revenues are paid to operators by GO which is to say by the Province. This is effectively the same dynamic of public spending being used to enable connectivity as was witnessed within Toronto in the 1970s.

Provincial subsidies to "buy" commuter customers

In the early days of the GO system community shuttles operated by GO connected people living in 905 residential communities to nearby GO stations. Replacing these services was the original rationale for the development of discounted co-fare arrangements with local transit operations in the 905. These co-fare arrangements provide subsidies to local operators at a cost to the Province (via Metrolinx) of approximately \$13 million annually.

The co-fare system and related service integration efforts to link local transit with GO has facilitated significant system connectivity outside of the City of Toronto. In Oakville, Burlington, Milton, Pickering, and Ajax, the local GO stations are the main transfer hubs. In Mississauga, Brampton, and in York Region, many local routes serve bus loops at the GO stations, or serve adjacent terminals, such as in Downtown Brampton and at Richmond Hill Centre.

The recently announced co-fare program to enable 50% off fares for commuters using GO and the TTC costs an estimated \$18 million and is fully funded by the Province and represents an enhancement to the efforts to link systems in the region.

Connections between TTC services and the 18 GO stations within the City of Toronto, however, are not as convenient as in the outer regions. Remarkably, there is no connection between the Sheppard Subway Line and the GO service that crosses it. Ease of connection is found at only six GO stations. Steps to better integrate the remaining 12 stations with the 18 bus services nearby can and should be an immediate priority.

Since the 1960s the pattern within the region regarding fare integration has involved the elimination of zones notably in the 416 and the extension of coverage areas serviced by single fare structures financed by public subsidy. The multiple zones in the outer suburbs that formed Metropolitan Toronto were collapsed into a single zone in 1962. In 1973 the two-zone system within Metropolitan Toronto was eliminated. More recently, the multiple zone system in York Region was eliminated.

The 2018 Provincial Budget proposed new Provincial resources to fund a new co-fare regime to reduce the cost of transfers between the TTC and regional transit services. While this is a definite improvement over the status quo it is not as comprehensive as the integration now afforded to riders across the 905. Rather than a co-fare regime that reduces cost but retains the need for two fares complete service integration requires a 2-hour transfer regime between regional transit and the TTC.

The Limitations of Focusing on the Provider rather than the Consumer

Too often transit advocates and providers look exclusively at the discrete system that is the focus of their concern. Thus, for many, the TTC and the TTC alone is the foundation for transit thinking and planning when addressing transit challenges within the boundaries of the City of Toronto. This has concrete, and costly, implications. As an example, a desire to provide riders relief from congestion on existing TTC lines leads to approaches that require new TTC lines to provide alternatives for current and future riders. By focusing on “who” provides the service the resulting plans and debates serve to reinforce and extend the focus on systems and operators rather than on the network and riders. Relief for over-crowded subway routes provided by enhanced use of non-TTC assets such as those operated by GO is minimized as an option when the reality of a focus on transit operators is taken as an unquestionable starting point.

Putting the operator first also leads to conflicts when transit proposals that would expand and integrate the network are proposed. This has, until recently, been the case with debate over the extension of the subway system into York Region along Yonge Street. It was also a significant factor in the scaling back of the original SmartTrack proposal which saw the abandonment of the inter-regional connectivity elements of the original concept. It was not uncommon to hear concerns raised that Toronto tax payers would be asked to pay for services to Mississauga and Markham that would directly support the commercial tax bases of those neighboring cities. The SmartTrack debate also highlighted the challenges that arise when two different operating models and operator cultures become the focus of planning.

Local Taxation Drives Local Focus

The focus on the operator is the direct result of the nature of transit funding. If transit capital, and more importantly, transit operations and maintenance are primarily funded by municipal taxes there will of necessity be a built in need to place local needs and priorities over regional goals. This is entirely appropriate as it reflects the principle that public funds be allocated in a manner accountable to those from whom such funds are raised. Balancing the need for democratic accountability with services that cross political boundaries is, however, a structural challenge.

Current transit revenue models rely almost exclusively on fare box revenues and public subsidy. The region’s largest operator, the TTC, for example generates less than 5% of its operating revenue from ancillary sources such as parking or advertising. Metrolinx generates slightly more than 6%.

The amount of declared subsidy in any given year is not simply the delta between revenues (almost exclusively fares) and operating costs. This is mostly due to the use of funds from reserves. Because maintenance is often considered a capital expense it is also possible for these costs to be covered by non-operating revenues such as grants and draws from capital and operating reserves. There is nothing suspect about these practices which are often used to achieve a political goal of reducing the amount in any given year of the declared subsidy. Their use, however, can serve to diminish the transparency of public expenditure reporting.

For illustrative purposes we define the operating subsidy as the amount needed to bridge any gap between operating costs and actual system revenues. In this approach reserves and capital grants are excluded from the analysis.

This approach shows that regional transit operating expenses for the 10 municipal systems exceeded fare revenues by just over \$950 million in 2017. In 2017, the Provincial subsidy for GO and UPX totaled \$160 million bringing the total regional operating shortfall to just over \$1.1 billion which represented more than 33% of total operating expenses.

Table 1: Operational Costs for GTA Services (2017)

GTA Services (2017)	Opex (\$m)	Fares (\$ m)	Fare Recovery	Other Revenue	Operating Subsidy
TTC	1,765	1,168	66%	69	528
GO	717	521	73%	36	160
UPX					
YRT/VIVA	183	75	41%	-	108
Mississauga	173	87	50%	-	86
Brampton	137	74	54%	-	63
Hamilton	119	56	47%	-	63
Durham	80	27	34%	1	52
Oakville	33	10	30%		23
Barrie	26	6	24%		20
Burlington	19	9	45%		10
Milton	5	1	30%		4
TOTAL	3,256	2,033	62%	106	1,118

Rethinking Property Tax

Severing the link between locally levied taxes and local decision making involves two separate issues that are often treated as a single issue. The first issue is the extent to which transit subsidies should be derived from the property tax base and the second related issue is that of operating support from other orders of government.

Severing property taxes dedicated to a public service from direct municipal control is neither difficult nor without precedent. In Ontario property taxes to support education are collected by the Province and allocated by formula to school boards. In 2018-19 it is estimated that such taxes will raise \$6.1 billion. Assuming the GTHA is 54% of Ontario it can be assumed that \$3.3 billion is attributable to the Region. A carve out of existing property tax equal to 1/3 of the current carve out dedicated to education could create a dedicated revenue stream for transit across the Region. Care in the allocation of this would require extensive consultation but the principle itself should first be considered.

Rethinking Capital – Rolling Stock

An analysis undertaken by the Toronto Region Board of Trade estimated the annual cost including capital costs for State of Good Repair (SOGR) maintenance and pegged the system wide shortfall at \$1.87 billion for municipal transit operations. Adding the GO and UPX operating subsidies brings the system wide estimated shortfall to just over \$2 billion.

Interviews with transit operators across the region have highlighted the difficulty of including SOGR costs. This is a function of the fact that lifecycle maintenance is cyclical meaning reliance upon any single year's costs can be misleading. While averaging such costs over a set period to determine an annual amount can be useful this analysis focuses only on direct operating costs.

This challenge, however, highlights the importance of the capital side of all transit operations. Transit operators do not treat maintenance costs in a consistent manner. For some the full cost of maintenance is considered a capital expense while for others it is a mix of operating and capital making direct comparison difficult. Yet the function of asset maintenance is a critical activity.

New capital spending is also an area where the reality of intergovernmental funding and, related to this, the rules of public sector accounting, serve to add complexity. Consider the issue of rolling stock. From time to time a senior order of government will make funds available for new asset purchases usually in a cost-sharing arrangement that effectively offers transit operators the ability to purchase new rolling stock for 1/3 to ½ of the cost. The economic imperative to seize these opportunities is obvious. But doing so can force operators to buy assets before needed or shorten the life of assets already owned to take advantage of “free money.” This approach creates unnecessary economic inefficiency and can also distort the long-term capital plans of operators.

If rolling stock acquisition and maintenance was considered to be a discrete function it is possible to envision a region wide approach that could simplify roles and eliminate the distortions that can now occur. If all rolling stock in the region was procured, owned and maintained by a regional body and then leased to individual operators there is the potential for significantly increased transparency and more efficient allocation of public resources. Under such a model a new asset management entity could be created which could potentially include non-government partners. Transit operators would continue to operate the assets and maintenance standards could be set between operators and the asset management organization.

This model allows for economies of scale which are region wide. It also could provide a means for one time Provincial and Federal grants to be allocated without impacting operator’s existing plans. For operators it also provides a means to upload significant capital and maintenance costs thus reducing the demand for support from local tax bases.

Rethinking Capital

The capital cost of building transit corridors and transit lines makes such undertakings a critical and complicated function. The development of major new transit lines has traditionally been undertaken by local operators with funding support provided by senior levels of government. This approach is profoundly impacted by the rules of public sector accounting which requires grants for non-owned capital assets to be expensed in the year that they are made. The impact of this approach on Federal and Provincial annual budgets can be significant.

To address the accounting challenge many innovations have been used. Trusts can be created to hold funds until a project is ready but this is only useful when a senior government has the ability or willingness to expense the amounts involved in each fiscal year. The challenge of accounting is also a reason the Province chose to focus major transit expansion investments on the GO network which is an owned asset rather than pursuing many of the projects in the original Big Move which would have required a different accounting treatment.

The accounting driven preference for owned assets also led to the meaningful change adopted for the extensive LRT program now underway. Direct Provincial ownership and funding of these new lines allows the Province to take advantage of public sector accounting provisions that provide for the amortization over time of the cost of assets that are owned by the Province. Upon completion, responsibility for the operation of the service on the lines is transferred to local operators.

A variation of this model has recently been proposed by the Progressive Conservative Party for the TTC subway lines. The Liberal Party, in its 2018 Provincial Budget, has expressed a willingness to discuss this approach if desired by the City of Toronto.

The expansion of transit lines which separates ownership and building from operating is an innovation which should be explored and, if possible, extended to allow for the accounting benefits to also be shared by the Federal Government as a means of securing steady, predictable and long-term capital.

Operating Subsidy from Provincial and Federal Sources

From the 1970s through the 1990s a *Users' Fair Share* formula was used by the provincial and municipal government under which fares were expected to cover 68% of operating costs with the balance provided equally by each government. Operating subsidies from the Province ended in 1998. Provincial and Federal dedicated support for transit in the form of gas tax transfers began in 2004 and 2005.

Today, Provincial and Federal gas tax transfers to municipal governments in the Region for transit total approximately \$517 million. Including the provincial subsidy to Metrolinx the total direct subsidy from senior levels of government represents 33% of the total.

Table 2: Operating Subsidy (Including Provincial and Federal Sources)

	Amount (\$ m)	% of OPEX	% of Subsidy
Fares & Other	2,139	66%	
Provincial Subsidy	402	12%	36%
Federal Subsidy	301	9%	27%
Net Municipal Subsidy	415	13%	37%
	3,997		

Since the elimination of a formula based operating subsidy from the Province it has been a standard annual feature of municipal budget making for calls for a return to the status quo ante approach. As shown above, however, Provincial and net Municipal operating subsidies across the region are almost equal.

As shown below, a return to the Users' Fair Share formula would require an increase in fare revenues of almost 15% to bring such revenues to 68% of operating costs.

Table 3: Municipal Transit Operating Subsidy

	Current (\$ m)	Fair Share (\$ m)	Change (\$ m)
Fares	1,512	1,727	215
Other Revenue	70		
Provincial	242	406	164
Federal	301		
Net Municipal Subsidy	415	406	8

An increase of \$164 million in provincial support would be required if the old approach was renewed. This is less than the \$238 million the Province has committed to deliver by doubling the current gas tax transfer.

What is noteworthy is the extent to which the Province has moved towards direct funding of its policy goals rather than simply increasing block transfers to municipal operators. The Province has announced \$10 million in targeted support to assist seniors with the cost of transit and a further \$18 million to finance the TTC/GO co-fare program which is in addition to the \$13 million funded by the Province for co-fare programs between GO and regional transit services.

The proposed discounts of \$1.50 for Presto users who switch between the TTC and York Region Transit, Brampton Transit, Durham Region Transit, and Mississauga's MI Way are estimated to add \$70 million over three years to the quantum of provincial support for transit. The additional plan to reduce GO fares

within the boundaries of Toronto to \$3.00 and to apply this tariff to trips of 10km or less would add an additional \$90 million over three years.

Table 4: Provincial Subsidy (GTA)

Direct Provincial Spending	\$ in millions
GO/UPX Subsidy	160.30
GO/905 Co-fare	13.00
Seniors Support	10.00
GO/TTC Co-fare	18.00
TTC/905 Co-fare	23.33
416 \$3 Fare	30.00
Total	254.63

The choice of direct funding of identifiable policy goals is part of a pattern in intergovernmental transfers away from block funding to targeted and politically beneficial actions. This trend began with the Federal Government which has increased its direct spending on people rather than flowing new money to Provincial Governments in the form of grants. Examples of this trend since the early 2000s are the Canada Child Benefit, the Working Income Tax Benefit and an array of enhancements to EI benefits.

As noted above, directing support from senior governments to specific undertakings can achieve the goal of reducing the impact on municipalities while also ensuring that regional goals are pursued. This is a functional approach to subsidy in which goals sought by the Province are funded directly.

Are subsidies a foregone conclusion? Can they be better targeted?

Almost all public transit systems in the world receive some form of direct operating subsidy from the public purse. This is particularly true for new services with evolving ridership as is the case with the York Region VIVA service. Subsidies as a form of social and environmental policy are also quite common and used as a means to reduce fare costs to achieve social equity goals or as a means of supporting ridership goals to achieve environmental goals.

Transit operations in large urban City-Regions, however, do not automatically require subsidies to operate. Large transit systems in Asia such as those in Hong Kong operate as profit making businesses. In London a goal of eliminating public subsidy has been announced and is well on its way to realization.

There are two significant consequences for transit operations that require on-going (and growing) public subsidy to cover operating expenses. The first is the opportunity cost as public expenditure is not available to support other priorities such as on-going transit system expansion. A less obvious consequence is related to perception. As “money losing” operations such systems are not attractive possible investments to non-tax provided sources of capital (Pension Funds, Development Partners, etc.) unless public sponsors provide revenue or ridership guarantees which are de facto operating subsidies.

While subsidies delivered directly to operators are the norm it is also true that public support for transit can be provided in the form of subsidies provided to transit users. The recently eliminated Federal Transit tax credit is an example of such a direct subsidy to users.

Significant public support is also directed to transit services through supports provided by provincial and municipal programs and agencies funded by same. In Toronto alone, transit tokens given to clients cost \$4.35 million annually and Ontario Works transportation benefits in Toronto total an additional \$26 million. Similar expenditures are made in other Regions. Central to planning for new regional service in

Simcoe is the expectation that transit will save almost \$350,000 annually now spent by Simcoe administered Ontario Works to provide cabs for clients.

In addition, there are also significant indirect subsidies largely in the form of tax concessions. The exemption of transit fares from the 13% HST represents almost \$260 million across the region in foregone revenue. Municipal expenditures such as transit also attract a partial HST rebate of 11.25%. On system expenses of \$4 billion this rebate would be worth almost \$450 million bringing total tax exemptions to more than \$700 million.

Foregone municipal and provincial property taxes on transit owned properties are not expressly quantified in public records but are not insignificant given the book value of municipal transit assets which is close to \$7.5 billion across the region excluding GO Transit assets. It is not unreasonable to peg the total value of regional transit assets at \$10 billion. Research to estimate foregone property tax revenues is desirable.

Because operating subsidies are funded by municipalities disincentives are created for regional approaches to transit operations and fare setting. Fare integration efforts become focused on who pays the subsidy rather than operational or rider-focused considerations. As new services come on line they serve to increase the amount of operating subsidy that is required. In the case of new services this is often a transition cost as ridership grows over time.

Demand for subsidy continues to grow. The TTC estimates that the first year of the new subway extension service into York Region will require an increase in operating subsidy of \$25 million. The new Eglinton Crosstown LRT service carries an annual operating and maintenance cost of \$80 Million requiring an estimated subsidy of \$39 Million. The Finch and Sheppard LRT services are envisioned as costing almost \$100 million annually with the net subsidy requirement not yet estimated. As these services largely improve existing TTC bus services the new ridership and revenue is projected be small. In addition to the estimated annual subsidy of \$160 million for these projects in the City of Toronto there are other projects across the region now in delivery. It can be assumed that services in the delivery phase will require \$200 million in operating subsidies.

The transit expansion proposed in Metrolinx's Regional Transit Plan also create additional and on-going pressure on public resources as they assume a need, upon completion, for new annual operating subsidies for transit in excess of \$1 billion annually. The one exception to this maybe the RER plan which has a positive business case. Added to the current operating subsidy across the region it can be reasonably assumed that current transit and proposed enhancements will require operating subsidies exceeding \$3.2 billion by 2025 which is a 60% increase above current levels.

Can fares and subsidy be delinked?

Transit has much in common with post-secondary education where there is a significant role for revenues from the users or beneficiaries.⁵ A key difference with respect to transit, however, is what economists refer to as 'price elasticity'. Unlike the case of students attending business or law schools who demonstrate a willingness to pay very high fees compared to other disciplines, transit fares are thought to be 'price inelastic', which means that transit agencies have very limited ability to increase fares to cover rising costs and historically, at least, very limited ability to price services to reflect different supply and demand dynamics. This not only has implications for how existing transit systems are subsidized but also virtually guarantees that new transit projects unable to cover operating costs from the outset will require ongoing public subsidy.

⁵ User fees in the form of fees and tuition are significant in the funding of post-secondary education.

Across the region the annual operating subsidy for transit by municipal governments and the Province is estimated to be \$1.1 billion. This amount has been estimated to be over \$2.0 billion when you add in hidden and indirect subsidies.

When transit operations focus on the maintenance or enhancement of subsidy levels they do so at the expense of ridership enhancement or other revenue creating actions. This observation is not a criticism of transit operators. It is completely sensible that an operator that is financially dependent upon one source will operate in a manner that directly addresses the needs and priorities of that funder. This dynamic, however, creates a norm in which the operator focuses on the subsidy provider rather than the fare paying rider. In effect the minority stakeholder comes to drive the actions of the operator.

If public subsidies were not delivered to operators directly there would be an attenuation of the need for operators to focus behavior on the providers of such subsidies. If public support was delivered to the users of transit the economic power of consumers would be increased.

Know your customer and Identify the customer who could be a transit user

Investing in any new product or service whether it be public sector or private sector comes with an investment in market research. The reliance on evidence-based decision making is only as good as the evidence. There is a new paradigm of quality in evidence being used worldwide and to make good decisions transit planners need to develop better and more timely data combined with robust analytical tools. Harnessing the power of big data to understand potential and future travel patterns is driving London's remarkable increase in ridership and revenue. In London, big data is validating better service levels and more reliable ridership estimates for future transport plans.

Aligning the interests of all four levels of government begins with agreement on data and analytics with a focus on regional dynamics as well as local conditions. Transit agencies in the GTHA have limited access to Region wide travel data and no common platform between agencies to begin to understand the potential of uncaptured ridership.

This is especially important in understanding who the customer/transit user is who is not using transit and why? Presently, this task falls to the operators of transit. For two decades the, municipalities and the province have conducted every five years a survey Transportation for Tomorrow based on a phone canvas of people and recently a mailing to form the basis of information which then is analyzed independently for purposes of each transit agency. The analytical tools are developed independently to suit each transit operator's needs.

Payment systems provide a wealth of data about customers travel patterns and changing preferences. With the recent and almost complete implementation of Presto more data will be available. Who will have access and for what purposes has not been made clear.

Research shows that big data is providing transit operators with knowledge to adjust and implement more productive service. The evolution of payment systems, new data from non-transit sources combined with more robust analytics provide better predictive tools for revenue enhancement. This process and independent data collection by some agencies conducted by students and staff provide the only real evidence of customer need.

Although efforts have been made to survey customers every five years by the Province and more frequently by local agencies, the data is limited and is only used to model potential ridership based on

the patterns of existing riders. For the planning process this data, sometimes five and six years old, is then projected in algorithms to predict future demand. SRRA has done considerable research into best practices worldwide and has identified processes and collaboration with private sector data suppliers which we believe are urgently needed to assist planners and decision makers.

The opportunity to discover more about the customer through readily available data in the hands of private sector business is powerful. Various transit agencies in the region have initiated projects to partner with third party data holders. Information about people's mobility choices, repetitive trips, off-peak travel and the reasons why people choose or reject transit is potentially available. The investment the public sector should make to take advantage of this opportunity requires the development of the analytics to mine that data.

The Presto card has the potential to give transit planners better information but how that is analyzed and by whom is yet to be determined. In other jurisdictions new processes which protect business confidentiality and respect the personal privacy have been successfully implemented with success. SRRA's preliminary research indicates that the value of this data is driving more consumer confidence in new service levels, greater understanding of the value of new projects and driving solutions to improving ridership.

Section 2: Building Better Communities: Land Value Creation, Hubs and Intensification

Build it and they will come...unless they don't

To date public transit providers across the Region have relied on the perception of the value of transit to the development community and assumed that Transit Oriented Development (TOD), the holy grail of integrated transit and land use planning, is an automatic result of transit being created. This approach, however, in many cases has not worked. Transit planning has all but ignored a collaborative approach to private building needs relying on the old mantra of "build it and they will come"

Faith that the desired result will occur as a result of transit being created has also been a hallmark of the region's experience with ridership projections. Mitigating the errors of the past where transit has been overbuilt and operated at a subsidy for decades requires a different approach to forecasting ridership that understands the relationship between place making and transit ridership.

Aligning transit with development cannot be undertaken as a simple solution applied universally. Instead must be a very local exercise. There are within the vast geography of the GTHA many different forms of land use and market conditions requiring multiple solutions. to address the complexity of TOD. Intensification adds to that complexity. SRRA's study of intensification strategies in cities like NYC and London, which both have had boundaries to growth (London's greenbelt policy and New York's blue belt reality) for a much longer period than the GTHA, reveals informative intensification strategies. We have an opportunity to learn from the experience of others and take advantage of the land bordered by our Greenbelt to intensify and achieve the desired result.

In general terms, both New York and London created regional transit networks in the core of the city using underground subway/tube strategies where historical 19th century densities precluded surface options. Both cities also leveraged industrial rail corridors extensively to expand the reach of their transit options early in the 19th century when commuter travel was essential. Both cities rejected the notion of expanding expressway options to support their financial hubs recognizing that roads alone simply cannot handle the volume of commuter traffic which is required in an intensified financial hub environment. The same is true in Toronto. The Don Valley Parkway's daily volume of people movement is less than the capacity of heavy rail on TTC Line 1 to move people during the rush hour alone. However, cities need roads and need to optimize them first and foremost to allow for the movement of goods and services as well as providing a mobility option for people.

Recent strategies under consideration in both London and New York are employing the principle of extending mobility through investment in heavy rail witnessed by CrossRail 2 in London and the Gateway Project through the heart of Manhattan. These two massive transit plans are addressing the problem of high capital cost supporting affordable options for managing growth and urban intensification. But these both depend on the creation of transit-oriented development and whole communities, which must support ridership and supply affordable living and working alternatives. In this section we address some of these strategies as they may be applied to the GTHA.

Land value capture or land value creation

To capture value for transit, development must occur. If no development occurs adjacent to transit its ridership will not reach optimum levels. Land Value **Capture** tools, largely taxes which increase cost, have had a limited impact on TOD. Research elsewhere indicates that Land Value **Creation** tools can encourage Transit Oriented Development. When implemented effectively Land Value Creation creates

productive sources of non-fare cash flow for transit. The distinction between effective Land Value Capture policy and the objective of Creating Value for both the private and public sectors is very dependent on local conditions.

Improper application of “Capture” tools can have a negative impact on anticipated ridership. There are notable exceptions. The business rate tax in London which was dedicated to the funding of CrossRail was initiated by big business in London and accepted as an equitable way for the private sector to contribute to transit funding. Various forms of tax combined with public incentives had the same impact on Line 7 in New York.

Understanding what attracts development lies in a full understanding of what drives developers to build where they do. The proforma for development starts with land cost and the availability of land suitable for development. A better understanding of how public policy impacts land values is an important first step. The public sector provides the permissions, including zoning and allowances for good planning principles but that does not by itself mean investors will respond.

Policy implications need to be examined to incentivize the development of lands to allow for commercial development and intensification around transit in a timely manner. To date public transit providers in the GTHA have not collaborated with the private sector development community to measure development potential as it has been assumed that transit alone will stimulate growth, eventually.

Land value accretion

If left entirely to market forces land value often accretes before development and to levels which are unaffordable or simply uncompetitive to build on. When new transit is announced land values usually rise in a manner that is more reflective of speculative rather than actual future value. This alone delays development. The south east and south west corners of Yonge and Bloor St. are a good example. These corners went undeveloped for 50 years despite favorable zoning and market realty taxes despite being at the intersection of the two most effective subway lines in Canada. Because development did not occur the public sector lost an estimated (2017 dollars) \$150 million in ridership revenue from those two underdeveloped properties in that one node alone. Today two large condominium developments are now providing thousands of new customers the opportunity to use transit.

The stakeholders in those properties were never engaged or encouraged to develop by the public sector. No public policy was initiated to leverage the public investment. Countless other examples of conditions which did not result in transit-oriented development have occurred in the region. More specifically development has often occurred throughout the region where there have been no transit options.

To mitigate this obstacle, public policy must address, in collaboration with land owners, the inherent liability posed by the reality that underdevelopment along transit lines is not in the public good. Public good in this case is the value of ridership to support the operations of the facility which created the uplift in value for the land owner in the first place.

Preserving employment lands & leveraging low cost land around the rail corridors

Employment lands for heavy manufacturing, logistics and general manufacturing is critical to the economic success of the region. Governments recognize this and have created policy to preserve these lands. “Employment lands” policies have created a ready supply of low cost land which is required by business to compete. Maintaining low cost is critical to the employment base in a diversified economy.

The pressures of urban intensification, however, distorts the preservation of these low-cost lands. This land value distortion accretes to the perceived value of the land in two significant ways. First, industry using these lands see opportunities to leverage the artificial increase in property values by selling land for repurposing to non-employment uses such as multi-residential or higher value cultural uses which may result in reclassification. Secondly, the assessment of these lands for ‘market value’, assuming a higher and better use, increases the tax cost for industry which remain putting additional costs to operate on the lands which inevitable leads to a potential loss of the intended employment

SRRA has conducted research on numerous examples and concludes that policy review in this matter is overdue. As well, consideration for places with rapid transit development opportunities should also be reviewed with the purpose of change which promotes higher density employment options in “new economy” sectors which can coexist with mixed use development strategies. In addition, further consideration should be given to policy innovation which retards land vale accretion until after improvements are constructed. By retarding the immediate accretion of land value surrounding transit opportunities there exists the opportunity to build new mixed-use communities and accommodate affordable places to work and live.

Public lands

Publicly owned lands can produce affordable buildings if the public takes a long-term view of the value of the land. By retaining and repurposing public land in partnership with the development industry long term cash flow resulting from those partnerships can be reinvested into public transit as is done elsewhere (TfL, Hong Kong, etc.). Where this strategy has been implemented these long-term partnerships aligned with transit develop more value for the public than the one-time cash infusion provided by short term land sales.

Land now used for transit is generally not even considered for additional and complimentary purposes. Existing transit nodes which have public land opportunities that could be readily developed have remained undeveloped. Instead of selling land to development actors the public should explore the benefits of partnering. Publicly owned lands can produce other social and cultural benefits such as affordable buildings. Related to this is the recognition that Official Plan policies that favor the maintenance of low-density communities around existing transit may serve to artificially limit potential ridership and revenue that could otherwise be supported by greater density development.

New technologies

Much has been learned about the use and advantages of new technologies such as automated vehicles, ride-sharing apps and new businesses, apps which enhance the consumer use of transit and knowledge which is acquired through new technologies such as payment cards, apps like WAZ which provide travel options and more.

The application of new technologies to enhance and support public transit has the potential to solve many of the first and last mile issues which inhibit traditional transit use. Most new technologies in the payment and mobility space, afford excellent opportunities to leverage data and learn more about the customer and permits transit operators to adjust service levels and plan new capacity.

In the Jan/Feb issue of ReNew, systems engineer Bern Grush summarized his report on vehicle automation prepared for RCCAO. He set out a range of well-thought out challenges faced by policy makers but also stated that ride-sharing (which he calls ride hailing) has led to increased congestion and

reduced transit ridership. These claims are not supported by the evidence and detract from an otherwise important contribution to the debate about the impact of autonomous vehicles on urban mobility. Autonomous vehicles may well usher in a better quality urban environment, but it isn't necessary to demonize other disruptive technologies such as ride-sharing.

First, as any transportation planner will attest, municipal traffic counts cannot – and do not – distinguish between private automobiles and cars operated by individuals carrying passengers on behalf of ride-sharing apps such as Uber or Lyft. Even though taxis are more easily identifiable than private cars, their numbers are lumped together with private cars. Regardless of whether traffic counts are made with automatic traffic counters or with manual (i.e. human) observation, there is no tangible evidence that ride-sharing causes increased congestion.

Second, although the uptake and popularity of ride-sharing in many Canadian cities has been nothing short of extraordinary (limited in some jurisdictions by provincial regulations affecting insurance), arguing that ride-sharing undermines public transit is a dubious claim.

In places like York Region, north of Toronto, for example, the Region is working with Uber to see how ride-sharing can help solve ‘the first mile/last mile’ problem. Brampton, Vaughan and Markham are benefiting from the expansion of uberPOOL, a lower cost option for Uber riders like car-pooling, which was launched in Toronto early last year. There are now more than 200,000 monthly users of uberPOOL in the GTA.

There is every reason to believe that ride-sharing apps and services are complementary to transit use, not harmful, particularly in lower density and other hard to serve parts of the urban environment. In the U.S., both companies have established partnerships with transit agencies and agreements to share data with municipal planners aimed at expanding the effectiveness of public transit.

Section 3: Funding and Prioritizing: Building Confidence

International innovations

"London has widened its sources of money available for the capital finances of transit projects. 20 years ago, London transport only had access to fare revenue and government subsidies which is probably much the same as Toronto is now."

"...both fare and subsidy are always under pressure and can limit renewal investment... In London pushed by need we have been forced to innovate..."

"Crossrail 2 is about supplying much need housing affordably to the downtown."

- Julian Ware, Head of Major Project Funding
Transport for London, UK

Faced with enormous capital costs to expand transit networks our international competitors are building more because they are embracing innovations in funding by advancing public goods while creatively engaging the private sector and adding much needed additional investment in transit. In London, New York and Washington dispersed employment nodes are being connected with transit solutions. Affordable housing is being added along intensifying transit routes. Stations are being better integrated with development. More transit is being built.

To understand the challenge and opportunity of lessons from abroad we need to focus on the key cultural, structural and policy innovations that underpin the actions underway elsewhere. The cultural changes rest upon the creation of broad public support for long term investments to inoculate them from the risks of political change in a sector where public investment is required but insufficient to achieve all desired goals.

Transit investment decisions are often made by one government, but by the time it is procured and ultimately completed there often has been several changes in government. This is particularly true in our Region where projects are funded by more than one level of Government. This reality serves to increase the uncertainty that surrounds a transit project. Uncertainty can also be increased as decisions are often taken in one economic cycle but projects are built and completed in a different economic environment.

Political and market uncertainty are not unique to us. To address these risks other jurisdictions have created a culture of consensus based on evidence. To avoid a project being abandoned or substantially altered the project should have established its value before a commitment is taken and that it must have wide support from a broad base of the political spectrum.

"We needed to make as wide a case as possible and one which brought together all of the groups, communities and audiences which needed to support Crossrail"

"...to build the case meant we had to think about the different reasons why people would support such an investment... new ways of thinking about the reasons why people take transport."

- *Bridgette Rosewell, economist City of London,
commissioner National Infrastructure Commission,
from a video prepared for SRRA 2018 on the steps
undertaken to approve the building of Crossrail.*

Central to this cultural change is the linking of the decision to proceed with a transit project to future revenues resulting from both new fares and new ancillary revenues associated with or created by that investment. This is in stark contrast to approaches often taken within our region where net-new ridership is rarely a determinative or even fully estimated consideration and the acceptance of perpetual subsidy is an unchallenged assumption.

Structural innovations elsewhere most fully differ from our traditional approach in that they seek to include non-government funding sources through the creation of partnerships which exchange the sale or pooling of public lands for the long-term benefit of new project revenues created. At the policy level, land planning permissions and public realm enhancements are added to station developments in exchange for on-going equity in the created developments.

Why is this not happening at the same pace here in our Region and what can be done to allow us to catch up with our peers and competitors? To understand this a brief overview of our current approach to transit funding and operations is required.

A government centered model

While most transit operations in the Region derive some ancillary revenues from secondary non-fare sources such as advertising, parking and small on-site retail operations these constitute a minute fraction of total revenue. Operations are funded from the fare box with annual shortfalls covered by public source subsidies.

Capital funding for transit in the GTHA is provided primarily by the province with contributions from larger municipalities and the federal government. Project implementation is managed by local transit agencies, and, for the most part in the GTHA, by Metrolinx. More recently, the implementation of large projects has been contractually assigned to private sector partners using the Alternative Financing and Procurement (AFP) model of P3 delivery pioneered by Infrastructure Ontario (IO). Long term costs related to maintenance and operations are not typically included in announced project costs and, unlike elsewhere, the full costs of lifecycle replacement, generally based on 30-year replacement cycles, are also generally excluded. The result is the presentation of lower costs that reduce "sticker shock" at the expense of full transparency.

A government-centered approach to funding transit relies on two principal sources of revenue. The first is general tax revenues from Consolidated Revenue Funds (CRF) of governments. In the case of the federal and provincial governments, most revenue comes from income and consumption taxes. For municipalities, the principal source is revenue from the property tax base.

The second principal source of capital is tax-supported debt derived from bonds issued by federal and provincial governments and debentures issued by municipal governments. While the federal and provincial levels of government have broad discretion in terms of the amount of debt they are willing to take on, there are defined limits to the amount of debt that Ontario's municipalities are allowed to incur. Moreover, unlike the senior levels of government, municipalities are only allowed to incur debt to finance capital.

A similar difference is that municipal borrowing generally includes an element of principal repayment while borrowing by senior governments rarely includes this element. In simple terms, municipalities issue debt comparable to personal mortgages which are paid within a known and fixed period while senior governments issue debt comparable to personal lines of credit in which there is no requirement (or expectation) that the principal amount will be retired in a known or fixed period.

Limitations of government centered model

There are three sets of constraints associated with relying on a government-centered approach to funding transit:

- The first is that transit investment is one of many competing demands on the public purse.
- The second is the need to respect public sector accounting rules and how these rules influence public sector decision-making.
- The third is a long-standing practice of focusing funding discussions exclusively on a project's capital cost of construction.

Southern Ontario in general and the GTHA, in particular, have been the beneficiary of government investments in infrastructure over many years. Historically, levels of infrastructure spending have been directly related to the levels of taxation. In the 1950s and 1960s, the proportion of tax revenue that was spent on infrastructure was higher than today. It was also possible for successive provincial and federal governments to spend more on infrastructure because there were fewer competing priorities for government spending.

Public funding of health care and significant public support for post-secondary education date from the 1960s and 1970s. Today, healthcare accounts for nearly 40% of the provincial budget; spending on post-secondary education accounts for a further 20%, leaving infrastructure investments to compete with all other remaining demands on the provincial purse. At the federal level, the significant transfers to provincial governments and income supports for individuals known today are significantly greater than in earlier periods.

Funding vs financing

Private sector actors have always been involved in the provision of new transit as contracted delivery agents, advisors and other service providers. Over the past 20 years the innovation in infrastructure delivery represented by public, private partnerships (P3) in their many variations have served to enhance the roles played by the private sector.

The constraints of public sector accounting were a significant driver in the creation of the public private partnerships (P3) delivery model pioneered in the United Kingdom. In Ontario, the Alternative Financing and Procurement (AFP) model of P3 delivery is the preferred form of infrastructure delivery for provincially funded infrastructure. The original appeal of P3 procurement approaches lay in the

accounting treatment that this approach enabled. Where a private partner assumed financing responsibility for a project, a government could avoid the need to incur the immediate financing costs. Moreover, capital payments structured as lease payments or availability payments are afforded a different accounting treatment. These payments, however, are comparable to amortized capital costs in that they have an on-going fiscal impact for the duration of a P3/AFP contract's life.

As noted by academic and other observers, financing costs through P3 approaches are higher than those available through traditional procurement approaches. This is because a P3 project is generally structured as a stand-alone corporate structure. These special purpose vehicles (SPVs) do not provide possible lenders with access to the full credit of the companies that form the SPV consortium or the sponsoring government thus leading to higher interest rates to reflect the great risk.

Despite higher financing costs, P3 projects have retained their appeal for governments as a means of reducing the risk associated with major infrastructure. Before embarking on P3 projects, government accountants undertake a comprehensive assessment of risks and rewards associated with a project. This is the fiscal equivalent to 'value engineering'.⁶ For the purposes of these comparisons, it is not uncommon to assign a risk premium of 30% to almost 50%. The lack of universally established and accepted empirical basis for these premium levels, however, remains an issue for critics of P3s.

A critical point, however, is that P3 model does not deliver significant new private capital to the development of transit. It is not a form of private funding. Rather, P3 models serve to provide financing for government-funded projects. In practice, P3s have provided cost and schedule certainty to government rather than net new funding to complement or reduce funding from public sources.

Pension funds in infrastructure

The past few years have seen the emergence of a new government focus on attracting pension fund capital to support infrastructure development. Since the 1990s, major Canadian pension funds have pioneered a strategy of direct equity investing in non-traditional assets such as infrastructure. Today, Canada's ten largest funds have more than \$1.1 trillion in assets with almost one third held in alternative assets such as infrastructure, real estate and private equity.

Pension funds investment in infrastructure has also risen since the 2008 financial crisis as plunging interest rates and bond yields drove these players to seek steady returns elsewhere. According to Boston Consulting Group, Canadian pension funds now rank among the world's top 10 infrastructure investors.

Funds typically look for nominal returns of 6% - 8% from infrastructure with a preference for investing in established 'brownfield' offerings rather than new 'greenfield' projects. Worldwide, major Canadian funds hold equity investments in transportation assets such as rail projects and airports, which are particularly attractive as investments because they have the potential for diversified revenue streams from commercial/retail operations and parking as well as regulated passenger and freight carriage fees.

The clearest and most developed method of engaging non-government funding (NGF) is the co-sponsoring of specific projects. Development of private property in partnership with transit providers will produce long term revenue for transit. Every dollar created through partnership with the private sector is a tax dollar saved or available for reinvestment.

⁶ Value engineering (VE) is a systematic method to improve the "value" of goods or products and services by using an examination of function. Value, as defined, is the ratio of function to cost. Value can therefore be increased by either improving the function or reducing the cost. (Wikipedia)

Impediments for non-government funders

The most important reason the non-government sector has not invested is the lack of confidence in the business of public transit. The absence of non-government funding in the GTA can be mitigated by establishing an environment where pension fund decision makers can align the needs of long term, secure revenue streams to fund their pensioners with the business of delivering transit. Some considerations are:

- Confidence that projects once approved will be completed
- Confidence that the project has long term public value regardless of partisan opinion
- Confidence that the organization which they partner with can operate the project effectively
- Confidence that their revenue streams are secure.

Large transit agencies such as the TTC and Metrolinx are not equipped or mandated to jointly enter into these arrangements. Agencies should be mandated to explore these concerns and allowed to pursue strategies to engage with major pension funds. Partnerships ought to be developed as projects are being evaluated and prioritized as part of the project not as an afterthought when complete.

The risks that projects are not delivered on time and on budget can be mitigated with the skills and expertise of a partner who regularly invests in infrastructure and whose mandate involves accountability and value for its customer. It is also often the case that a private partner may be more amenable to project changes that add value to an undertaking even at the immediate price of cost or time slippage. In an entirely political environment cost and time considerations can perversely trump otherwise sound changes as few, if any, political actors are prepared or empowered to consider same.

Importance of analysis and a due diligence process

In SRRA's examination of best practices from around the globe three critical components form the basis of good decision making:

- A realistic understanding of the cost to construct;
- A better understanding of the cost to operate; and
- An evidence based approach to ridership.

To accomplish this there needs to be improvement to the processes we currently use. Building confidence that once a project is operational, has significant ridership to offset the cost of operating and operators have the resources to maintain the project is an important part of the initial decision to build.

There is a great deal more to the value of building transit than just jobs to construct and anticipated uplift in tax revenue and transit does lead to property tax base uplift and creates jobs. Although these are important considerations, of much more concern to the public in the future is the ridership value, social and cultural value which can be measured and, where ridership does not cover operating costs, who pays the subsidy to operate the service. These needs to be part of the overall consideration of the project from the outset.

Public confidence that transit agencies can deliver projects on budget, on time and within scope is not high. To build public confidence, realistic costs at the early stages of prioritizing projects should include significant allowances for contingency. The solution is to build a pricing estimated based not on optimism but pricing which properly recognizes risks of the unknown.

"A key component of building confidence in a project is a proper analysis of cost" At the outset of a project many things are very uncertain. Probably there are many more things we don't know than we do know."

"The UK treasury applies an optimism biased of between 30% and 150% applied to the original cost estimates. Which resulted in considerable increase in the estimated cost at an early stage which made our task of justifying the project (Crossrail) that much more difficult." The original estimate of 18 billion pounds became 15.9 billion in 2017 and ultimately 14.9 Billion by 2010 which created "a firm foundation over its period of execution. This demonstrates the value of this approach and has provided a stable platform."

- *Martin Buck, Director, Crossrail Inc., London, UK*

Section 4: The Rail Corridors: Connecting the People of the Region

Intensification in rapidly growing urban city regions leads to higher costs for both housing and workplaces. It also leads to congestion on roadways as they reach full capacity. These are the dynamics confronting the GTHA. When considering how to address mobility and affordability it is important for policy makers to first build upon the assets that exist before committing to the creation of new and often more expensive solutions. The region's rail corridors are such an existing asset. Provincial policy recognized this and is investing in rail corridors. This is the beginning of the necessary transformation necessary which, as described below, can and should be expanded greatly.

Rapid transit connectivity allows for employees to access jobs throughout the region with more affordable places to live, work and play. Its development encourages employers to locate business along the route giving better access to a larger, more diverse labor market. This will stimulate investment in jobs and encourage business to grow in the region.

Metrolinx, over the past 10 years, embarked on the acquisition of privately-owned rail rights of way such that most are now owned by the public sector. These public corridors are still to varying degrees used by rail companies which requires a phased approach to transforming them for public transport service. But transforming these corridors into city building opportunities is more than just a transportation implementation process. Success will require a different approach to the planning and development of communities around these corridors.

Transforming the rail corridors gives rise to the opportunity of providing for the regeneration of under-developed areas along the seven corridors many of which dedicate large parcels of land to lower value uses. The majority of land surrounding the rail corridors is currently used for manufacturing and distribution which was the original purpose of the corridors, supporting the industrial and manufacturing economy from the late 19th century until the latter part of the 20th. The transition to post-industrial uses from formerly industrial lands has been a hallmark of the City of Toronto's growth over the past 20 years as best exemplified by the transformation of the "Kings" along King Street to the east and west of the downtown core. The same opportunity for transformative city building along the rail corridors now exists especially given the possibilities for intensification on lands that now have very low density, but not at the cost of reducing jobs.

Creating intensified nodes surrounding new stations along the rail corridors makes it possible to transform these into places where local transit networks can interface with the new rapid rail service and mixed-use communities. The result facilitates growth, manages the reality of intensification and supports complete communities with acceptable urban densities. These new places to work and live around the regionally connected hubs helps solve a key component in keeping the region growing the way people want.

The benefits of Regional Express Rail to the environment, congestion on the roads and stimulating job creation are achieved at considerably less investment than any other form of rapid public transport. But equally important is the need to invest in support networks which connect low density dispersed housing and jobs to the rail corridors. Without this additional investment RER will not reach its potential.

A great deal of progress has been made on the development and integration of the rail corridors since SRRA's Regional Relief Line was first published in 2012. Planning policies at the Provincial and municipal levels have recognized the need to create Transit Oriented Development on the rail corridors.

Subways and surface rail

From the people's point of view there is no appreciable difference between the use of surface rail and subways. Both are high speed, neither compete with auto use to impact road use, and both have the same convenience factor. Subways are highly suited to existing dense population and employment areas. Surface rail is more suited to lower density areas. But when you ride on both modes of rapid transit the customer experience is the same.

The iconic "Tube" map of London's subway system masks the fact that 45% of "the subway" is actually on the surface. Much of the London Tube network was either purpose built for public use or converted from industrial rail. NYC and Washington have also managed the same challenge of connecting dispersed nodes with rapid rail service with a mixture of surface and subway rapid transit service.

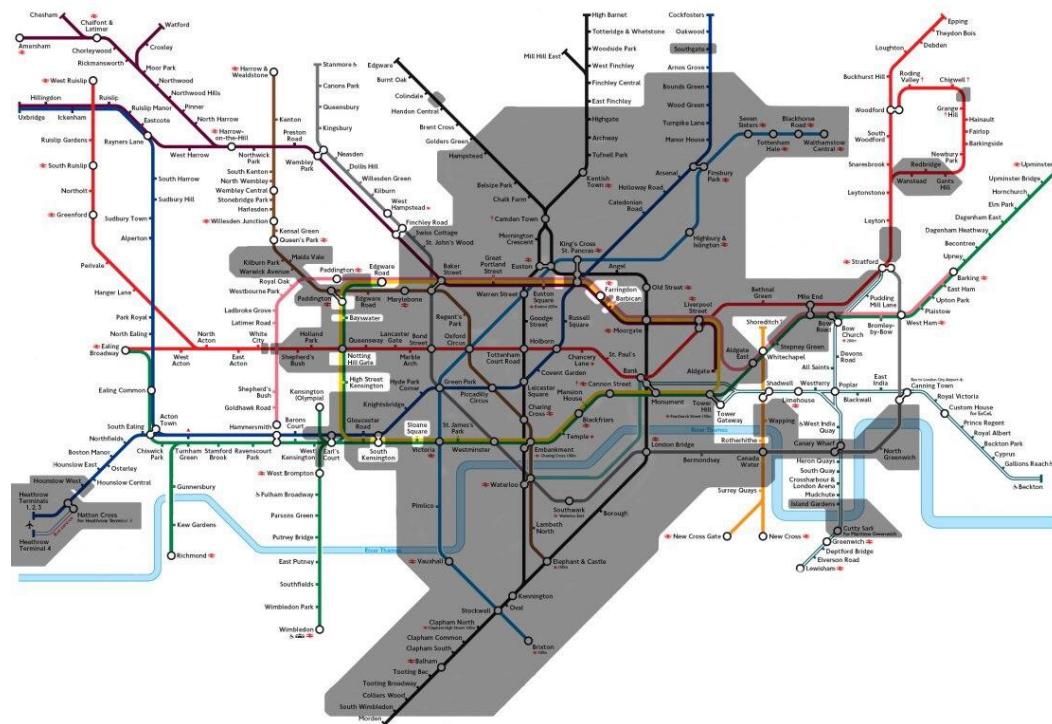


Figure 1: London's Subway System

The extensive bus network in London is not shown on the map but in the GTA there is a comparable investment in local transit and technology-based alternatives which provide the customer with local access to complete the travel experience.

Why shouldn't the GTA map of rapid transportation embrace all the rapid transit uses and potential to create one seamless network?

Most importantly the development of the rail corridors will produce more options for public transit in a shorter time and at a more modest capital cost than more traditional investment in subways and LRTs.

The cost of transforming the corridors is considerably less to fund, provides the opportunity to build stations on the surface with significant public realm and place making potential at a lower cost than subterranean stations. The result is more mobility options for more people provided earlier than conventional subways or LRTs, at a lower cost, particularly in areas where intensification can occur without disrupting established communities.

Unique regional ridership potential

The GTA has significant employment nodes not in the central part of the region but close enough to benefit from rapid transit connections. This is a unique opportunity which is not available to transit planners in many of the major city regions throughout North America. Transforming the Stouffville and Kitchener and its rail based spur to the airport corridors into cohesive, high speed, high frequency transit systems with two-way peak hour traffic is made possible because the employment nodes at both ends are already at high levels of development with plenty of room to expand.

The employment destinations in the 905, unlike the core of the City of Toronto, are under serviced by transit. The potential for peak hour transit use in both directions on the rail corridors creates highly efficient operating advantages. Peak hour traffic with significant ridership in both directions means more revenue for the same operating cost. This has only been successfully achieved in a few transit projects in the history of transit world-wide. To optimize the effectiveness of two-way peak hour ridership, there must also be considerable investment in bus and LRT services in the dispersed employment clusters in Richmond Hill/ Markham and in Mississauga's Airport district.

Frequent service with optimum fares creates a major backbone for growth with the potential to generate over 750,000 net new riders per day within five years of commencing operations. This represents over \$1.035 billion in net new transit revenue⁷ which is 50% of system wide fares in 2017 of \$2.03 billion and almost equal to the 2017 operating subsidy provided across the region of \$1.09 Billion.

Not since the original construction of the Yonge Street Line to Eglinton in 1954 has transit been able to reach into and service established employment nodes so vital to the regional economy. SRRA participated in a regional study of the impact of transit on growth (May 2016). In that study SRRA worked with the University of Toronto Transportation Research Institute and developed scenarios of growth and ridership through the repurposing of the rail corridors. Transforming these corridors proved to create more net new system ridership than any other project under active consideration, however, with a commitment to develop new mixed-use full communities at each intersection has yet to begin.

Potential enhancement of the rail corridors

The following are examples of potential enhancements to the regional rail network. Research by the SRRA team reveals that on a preliminary review these projects are of high ridership value. These options are presented here to suggest to readers the there is more that can be done to attract people to public transit than meets the eye. The following is a brief outline of the options and their potential value.

SRRA proposes to continue to research these options in collaboration with transit, planning, financial experts and the real estate development industry to establish a more complete and transparent assessment of their value to the public.

Example 1: Quick relief downtown

The single most pressing problem facing commuters is overcrowding on Lines 1 and 2 south of Bloor St. It affects plans to add service to both lines. There is wide public acceptance of the need for relief with support for a new subway line to provide an alternative route to downtown. Phase One of the Downtown Relief Line Project is in preliminary planning stages and envisions an initial line running from

⁷ Based on 230 trips per rider per year at a daily cost of \$6.

Line 2 at Pape and Danforth south to Queen Street and then west to connect with Line 1 at Yonge and Queen. Phase Two suggests continuation from along Queen up to Line 2 at the Dundas West St.

Public demand for relief can obscure the significant challenges faced by the proposed subway solution. There has not, to date, been a thorough business case undertaken for the project. Analysis by UTRI shows that the project will provide the desired relief but will not attract significant new system wide ridership based on current densities. Net new revenues system ridership does not appear to support the estimated cost of both phases, \$15 billion+ and there are no public-sector funding commitments to undertake the project now.

Much work has yet to be done to establish the value of the proposed subway relief project referred to as the Downtown Relief Line. For example, only two years ago the estimated cost for the first phase was \$3.2 Billion. Recently, that estimate was revised to \$6.8 billion in 2014 dollars and when funded at some point in the future the cost the cost is expected to exceed 8 billion while the benefit in ridership remains the same.



Figure 2: Green is the corridor utilized for Quick Relief, yellow is the crosstown LRT under construction, Red circles are potential station enhancements (source: Google Maps)

The proposed route of the DRL is largely through well-established, complete communities with limited opportunities for intensification required to support the operating costs. The project will also take at least 15 years to complete while some suggest 20 years. Analysis must be done in a transparent and open way including full contingency for the capital cost to build public confidence that this project is a reasonable public investment.

From the consumer perspective, the lens the SRRA team prefers, the DRL, while capable of solving the relief problem, is a long-term solution. Is there a shorter-term solution lying in plain sight which can precede the implementation of the DRL and provide the consumer with relief the consumer so desperately needs?

Quick relief is a project conceived by the SRRA team in 2016 during its work on “The Impact of Transit on Regional Growth” to build upon earlier work first presented in the 2012 study “The Business Case for Regional Relief Line”. It provides immediate relief in a very short period.

This alternative solution transforms two rail corridor which currently provide commuter GO service. Quick Relief provides new service between the TTC Dundas West subway station (and potentially as far north as Eglinton) in the west through Union Station and then on to the TTC Main Station and GO Scarborough stations (again potentially as far north as Eglinton) in the east. Prior to the completion of RER, the new service would utilize existing surplus GO rolling stock the line to create a peak-hour service with transfers from the TTC at no additional cost to consumers.

Passengers would only pay for one TTC fare at each of the stations or to transfer to the new service from the TTC network, effectively making the service part of the TTC offering. Steps towards this seamless fare approach have been announced by the Province with the commitment to a \$3 per trip standard fare within the 416 on the GO system and relief for passengers transferring to the TTC with a discounted \$1.50 transfer fare. Quick Relief fares are the next step in the integration of heavy rail transit options within the 416 and the region.

Quick Relief service would be at 5 to 7-minutes intervals during peak hours when the TTC's Lines 1 and 2 are at capacity. During off-peak hours new passengers attracted to transit by Quick Relief could still travel by transit on Lines 1 and 2. It does not need to operate beyond extended peak hours. Transit engineers and other transit experts with whom we have consulted have suggested the time to implement such a service, once approved, is between 12 months and 18 months with a capital cost of between \$50 million and \$200 million depending on how one accounts for investment in station enhancements that will be done for RER anyway.

The service would be more convenient for Scarborough commuters heading downtown and all passengers west of Dundas West who would not benefit from Phase One of the proposed DRL subway. Some riders would immediately save as much as an hour a day in commute times for very little public investment. The relief of Line 1 and 2 would encourage more ridership (revenue) for customers who do not use Quick Relief thus providing the TTC with even more revenue. Most importantly the project would provide timely relief of congestion at St George and Bloor Stations.

Stations Improvements - Dundas West

The intersection of the rail corridor and Line 2 at Dundas West was originally extremely well thought out by TTC planners in the 1950s. Passengers using the station must currently exit at the western end of the platform but the Eastern end is under the rail corridor. The capital cost to make Quick Relief seamless involves building a direct accessible connection to the existing GO/UPX station to make transfer easy and convenient.

Stations Improvements - Main Station

Much has been said about the distance from the Main Station and the GO Station, but upon closer examination the 290 meters is not a major distance if the trip is convenient, sheltered from the weather and a pleasant and safe experience. Comparable distances exist in the network today. At Spadina Station the link between Lines 1 and 2 is 160 metres. Passengers travelling from Union Station in the underground walk 450 metres to reach King Street, the transfer at Black Creek station from the YRT bus terminal to the TTC bus exchange is 270 meters of walking.

Stations Improvements - Scarborough Station

This station will be completely redesigned for RER Quick Relief service, which should benefit from the acceleration of this new transit hub. There is also the consideration of additional stations at Gerrard St., East Harbour and Liberty Village which will stimulate accelerated development in these nodes by bringing certainty to investors that transit will service those nodes.

There are few technical impediments to activating this service now.

The bulk of new revenue will accrete to the TTC in both new ridership using Quick Relief and new ridership using a less congested Line 1 and 2. The cost of the service is Metrolinx's. The challenge is to align the Province and the City and accommodate both the approvals, cost and revenue sharing required.

The benefits are more than relief and more transit use: the ridership analysis suggests that once Quick Relief is implemented more riders will be attracted to Lines 1 and 2 as congestion is relieved, thus necessitating further relief investment in the future such as the DRL or the Wellington Relief Line as proposed in this paper.

Example 2: Accessing the GTAA and Airport Corporate Centre

Employment in and around TPIA is arguably the largest employment node in the GTHA which has not received the attention in new transit it requires. There are 56,000 auto-dependent employees in the Airport Corporate Centre and 35,000 employees largely based in the two terminals alone. The Union Pearson Express opened in 2016 and service provided by the TTC and MiWay are the only current methods off reaching TPIA by public transit. All three are mostly used by air travelers. TPIA has developed a long-range concept called the Pearson Hub but an immediate project to service TPIA is the challenge the SRRA team seeks to address.

The use of the existing GO rail corridor and Eglinton Avenue Rd. right of way between Mount Denis and the Airport Corporate Centre provides low cost high speed connectivity options. This right of way was intended to be an expressway and is currently planned to be an extension of the Eglinton LRT although this project remains unfunded. Design of the proposed LRT remains actively debated with strong support on the current council for tunneling most if not all the route. Should this be the chosen design, however, the incremental cost of heavy rail rather than light rail becomes the primary difference between the proposed services. The difference, however, has significant impact on potential ridership, speed and thus revenue. Fuller modelling of these options should proceed. From the perspective of the consumer and the traffic studies undertaken in 2016 show that more riders will use a rapid continuous service between downtown Toronto and the Airport than will use a service requiring a transfer from a rapid rail service to a slower LRT service.

Example 3: Solutions to get Mississauga more transit options

Mississauga is one of the largest Cities in the country. It is facing intensification challenges very similar to the City of Toronto as described above. Affordability for both residents and employers, congestion on its roadways are issues which can be relieved by increasing mobility options today. Growth in Mississauga is essential to the entire region.

Mississauga's long-range plan calls for the development of the Milton GO line bisecting Mississauga. This project is not just about the line in Mississauga. The significant challenge is the freight use of the line. To

mitigate the problem would necessitate the movement of CP's freight to an alternate route for the entire line through the City of Toronto into Scarborough. Moving freight elsewhere has considerable potential but it is a very large undertaking. We discuss this under **Example 4** because the bypass issue affects the entire region. Without creating an alternative route for CP Freight, it's hard to see how this line will advantage Mississauga in the near term. But Mississauga needs greater transit solutions to maintain its growth.

Another, shorter term solutions should be explored in more detail. MiWay has developed a bus rapid line between the Mississauga City Centre and the Airport Corporate Centre. It has further plans to connect the Mississauga City Centre with a similar right of way to Meadowvale. Options to enhance this route with more service and options to enhance the entire network of bus rapid ways is a critical first step.

Another option worthy of consideration is to extend the proposed rail link between the ACC and the Mount Denis, as discussed in **Example 2**, straight through to Mississauga City Centre where current and proposed densities are established. This option would link MCC with the airport and the downtown core with convenient rapid transit. This option has the potential to continue to Meadowvale and further to connect Milton. Subject to further research, this project could have significant impact of the growth of population and jobs in both Mississauga and more broadly into Peel and Halton regions. In the short term this will build confidence in the employment and development community to invest and provide the people with affordable transit options.

Example 4: CP/CN rail bypass

Moving freight off the CP line from Tapscott in Scarborough through to Milton has been explored by the Ministry of Transportation and recently by Metrolinx. It is a complicated matter involving a new route which utilizes existing power, highway and some existing rail rights of way. It will require an agreement to relocate which involves both major rail freight providers CP and CN.

Assessment of the viability of such a project has not yet been done although there are obvious benefits in transforming this right of way into a passenger facility. The complete benefit analysis will take commitment of governments to explore in more detail, but there are many potential benefits to city building strategies. If the benefits are realizable the argument to invest becomes more viable. The project is of such scale that it may be problematic to allocate sufficient public resources to it regardless of how beneficial it is. However, the project maybe ideally suited for consideration of a special purpose vehicle with both government funding and public pension fund involvement if the benefits can be proven to exceed the cost.

Example 5: Markham Richmond Hill employment node

There are over 150,000 jobs making this node one of the three largest employment districts in the GTA. The reality for the 150,000 plus people who presently work in this node partly located in the City of Toronto and predominantly in Richmond Hill and Markham is either twin fares on slow speed public bus transit or reliance on congested roadways. This is unsustainable and getting worse.

The simple fact of the matter is these jobs are critical to the regional economy. Employers are hesitant to expand because of the rising congestion on the highways and roads in the district. These jobs are dispersed over many hectares and require investment in last mile connectivity. The solution is to take a new approach to integrating existing bus service levels and pricing strategies described above and to

make a considerable investment in new technologies and business collaboration to provide the employees of the region with viable first and last mile mobility options.

The rail corridors frame this node and provide an opportunity by increasing service both ways. Connecting frequent service on the Stouffville line, the Richmond Hill line and an extension of Line One on Yonge Street with transfer hubs and a network of new mobility options which provide convenient and cost-effective service is the strategy which will allow this node to continue to grow.

The rail corridors and investment in last mile solutions will give employers access to more labor markets, employees more options to access jobs in this important node and build on the existing transit infrastructure in York Region. Quick Relief allows for a much earlier case to extend Line One north to at least Hwy 7. This case can be made if the options are enhanced for employees in the 416 to get to work in the employment areas. Solving access to this employment node requires a renewed commitment to invest in transit solutions to stimulate employment growth in Markham and Richmond Hill, a vital outcome for the economic growth of the entire region.

Example 6: Wellington relief line

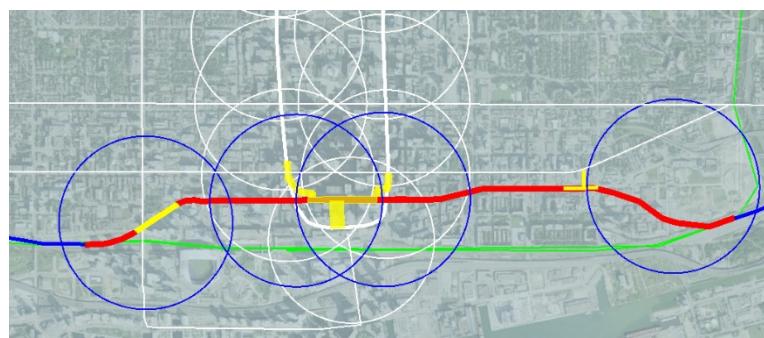


Figure 3: The Wellington Relief Line - Red Line is Subway Route, White circles and lines represent existing subway and street car network, Yellow shapes are stations and network connectors to existing transit infrastructure, Green Line is the existing GO corridor into Union Station (map from the 2012 Regional Relief Line Study, SRRA) (source: Google Maps)

The Wellington subway option was first proposed in the RRL line study by SRRA in 2012. It was conceived then in response to the potential long-term problem of congestion at Union Station as the development of passenger service on the rail corridors grows. It is a project which will relieve Union Station by diverting commuter traffic from the north east and north west. This could free up limited track space around Union Station.

The ability to move significant ridership arriving at Union Station into a subway along Wellington Street has major benefits:

A new major downtown station servicing employment

A new superstation under Wellington Street between University and Yonge St. with 250,000 sq. ft. of new retail built at the base of the highest concentration of office space in Canada would seamlessly integrate with the existing underground PATH network of retail spaces. The core of the City is currently developed with very high employment densities. This project will provide relief for the King St light rail Street car service as well.

Support growth in the core

It is noteworthy to recognize that the growth of the office employment in the core which was expected in the 80s to move north to Queen St. has moved south instead. Many sites have been converted to residential and further employment opportunities are required. This project would provide that opportunity east and west along King Street.

Fewer construction challenges and less disruption

Street car use on Wellington is limited to turnaround functionality and there are few businesses facing the street to disrupt during construction. Below ground there is very little subsurface infrastructure and on the surface, there is low vehicular traffic which is largely used to access parking and deliveries in the core office towers.

Non-Government Support

The project is a long-term solution to a problem which has not fully evolved. It is not critical to consider now, but proving its value and reserving the corridor as is done in many other jurisdictions is prudent. This project also has the potential for the owners of the major towers which include significant investment by public pension fund to become involved in funding the station and the connector paths to Union Station, the King and St. Andrew stations and potentially fund the part of the entire project.

Appendix A

Growth comparison between NYC, Toronto and London

The New York region went through a major change in its economy in the 1950s when its industrial base shifted from manufacturing to the service economy. After a period of significant depopulation, this resulted in Manhattan becoming the principal focus of office employment, first in the core around Wall Street and later in midtown. Over time, high costs in Manhattan led to the development of major concentrations of ‘back office’ jobs in places like New Jersey, Queens and Brooklyn, but these communities already had a fine-grained urban fabric that facilitated mixed development and creation of an attractive work culture. Although the region has struggled to maintain its transit networks in recent times, there is currently a push to develop high speed transit interconnectivity among the region’s principal concentrations of employment. The project is driven by a desire mitigate the impact of rising costs for employers and to find ways to help office workers commute to their jobs from housing they can afford.

Like New York, post-war London experienced a period of slow growth as other regions in the UK took up the slack in economic growth and workers relocated to other centers where housing was more desirable for an increasingly affluent labor force but still accessible to jobs in central London as a result of an existing mature commuter rail network. A key policy decision in the 1930s saw the creation of a massive greenbelt to curb growth in London. This was followed by plans hatched during the Second World War to further contain growth in London, and a commitment in the 1960s to the creation of ‘new towns’ such as Milton Keynes and ‘overspill’ communities in the counties closest to London. The late 1970s and 1980s saw a massive shift in the economy however which had a major impact on affordability as well as the demand for refurbished housing in inner London and other locations inside the greenbelt. This was also feasible as a result of the existence of both an extensive network of underground and over ground public transit, integrated with half a dozen commuter rail hubs located around the periphery of inner London.

Toronto, in contrast, grew rapidly in the post-war period but until the 1980s, when the shift from manufacturing to the service economy (boosted by the exodus in the 1970s of many large corporations from Quebec) saw an explosion of office development beyond the core, first in car-oriented suburbs within the former Metro (now Toronto) area and then in scattered concentrations outside of Toronto in what is now generally referred to as ‘the 905,’ primarily in former industrial zones, hastily converted to ‘office parks.’

Employment Growth Centers

Attempts to focus new job growth in centers such as North York, Etobicoke and Scarborough were largely unsuccessful. Although North York managed to attract some office growth as a result of its proximity to the 401 and the Yonge subway, this area quickly peaked, as did Mississauga’s attempt to create a mixed-use downtown in the Mississauga City Centre. After racing to early success as a center for job growth in the 1980s, no significant new office buildings have been created in Mississauga’s downtown since 1992, although the area has enjoyed high density residential growth and attracted rapidly expanding institutions such as Sheridan College.

History of growth in the Region

The region's steady economic expansion has withstood a number of external shocks over the years as well as positive impacts such as the influx of head offices from Quebec following election of the Parti Québécois in 1976. This momentum provided some of the impetus for Toronto to emerge as one of the world's top-ranked financial centers. It also precipitated a period of rapid growth in the GTA's office market beyond the borders of Metro Toronto (now the City of Toronto) that dramatically changed the economics of office location in the region.

Although the future of NAFTA dominates the current discourse, its predecessor, the U.S.-Canada Free Trade Agreement, signed in 1988, had a dramatic but little discussed impact on the region's spatial economy as companies with operations in both the U.S. and Canada scrambled to adjust to the new agreement.

First, uncertainties linked to the Free Trade Agreement brought rapid expansion of office development in the 905 to a sudden halt. In a very short space of time, the region went from 905 municipalities threatening development freezes due to a lack of basic infrastructure to a five-year period in the mid to late 1990s where virtually no new office buildings were constructed anywhere in the region. Many developers that had enjoyed success building offices on spec went bankrupt. When the appetite for new office development returned in the late 1990s, decisions on where to build new offices began to be made by major employers; and decisions to greenlight development shifted to conservatively minded pension funds.

A second impact of the Free Trade Agreement, consolidated by the implementation of NAFTA and since compounded by the forces of globalization, was to accelerate a shift from manufacturing to a service economy, a process that is still playing out in cities and towns throughout southern Ontario today.

Metro Toronto and Governance

One clear result of these many changes in the complexities and pace of corporation decision-making is that the Greater Toronto Area now operates as single economic region. In many respects, however, urban governance has been unable to keep up the market place. As the region's economy expanded beyond the borders of Metro Toronto, Metro's share of the CMA population dropped from 77% in 1961 to 54% in 1991.

The rationale for creating the two-tier form of government exemplified by Metro Toronto in 1953 was to provide a practical way for government to fund much needed hard infrastructure to handle growth. Metro provided the "regional" perspective, using the combined economic heft of 13 (later six) local municipalities within its borders to fund construction of trunk services for sewer, water, highways and, with help from the province, public transit. The two-tier arrangement worked so well that the concept was extended to policing, schools and the delivery of social services. Metro was also responsible for planning the urban structure for the region until the late 1960s, although land use approvals – and remains – a local responsibility.

In the 1970s, the province decided that the two-tier form of governance was working so well that four new "regional" governments were created to reflect the need to accommodate the region's outward growth and expansion. Although Metro had been reinvented twice since its creation, the formation of fixed municipal boundaries on Metro's borders meant that Metro (and its planning function) could no longer evolve to reflect changes in the economy. As the internal capacity and capabilities of local (or 'area') municipalities expanded, particularly in the former City of Toronto, municipal responsibilities for managing growth that had once been so clear started to become blurred.

Nowhere has this blurring of responsibilities had more of an impact than in how various local governments in the region dealt with the challenge of delivering public transit. The formation of Metrolinx (originally the GTTA) in 2006, coinciding with release of the first Growth Plan, established a provincially-funded agency that combines operations (GO operations were integrated into Metrolinx in 2009) with planning rapid transit expansion. Some would argue that the planning function is also being done by the Ministry of Transportation, the Toronto Transit Commission, the Region of York and half a dozen local municipalities. But other than high-level prescriptions in the provincial Growth Plan, none of these transit plans are being coordinated with land use. And, as documented in several reports published by SRRA, the needs of the market place, particularly those represented by major employers, are not reflected in any of these plans.

Suburbanization of Employment?

As documented in a report published by CUI and Real Estate Search Corporation in 2011, the GTA operates as a single economy but the location of office jobs is distributed among four very different “geographies,” which reflect changing market priorities. The largest sub-market (and one that in recent decades has seen considerable growth), is the cluster of office development centered around Toronto’s Financial District. A second sub-market is office development located on the subway (essentially based on Yonge Street). This sub-market is no longer growing. A third sub-market comprises dozens of campus-like office buildings constructed in Toronto suburbs in the 1980s. Without rapid transit, this market has seen no growth in more than a quarter century. The fourth sub-market is car-oriented office development in the 905, originally spurred by the promise of easy access to low-cost, highway-accessible locations.

One of the most significant was the impact of different property tax rates between Toronto and the surrounding 905 municipalities. Another is the wide variety of planning regulations and the time required to get municipal approvals for an office building: this can range from 18 months in Mississauga and Markham to more than five years in the City of Toronto. A third factor, which seems to be gaining in importance, is the need for employers to offer a “higher quality of working life” to their employees, which includes providing better options of connecting home to work as well as access to amenities during and after the working day.

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Although important steps have been taken to retroactively install public transit in some parts of the 905, growing concerns over congestion, the lack of amenities and push-back from a new generation of office workers who prefer not to spend their lives commuting, the public sector’s response to serving the needs of a single economic region does not inspire confidence.