A Grand Design
Transit Planning for the Toronto Region
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Prologue

Since the launch of the website www.stevemunro.ca, my thoughts on transit have reached a larger audience at a quicker rate than anything I've written or said in 34 years of transit advocacy. The road runs both ways, and I receive questions, comments, boos and huzzahs at a faster rate too.

One of the persistent questions, especially in light of the recent debates about subway extensions, is "so what would *you* do?"

This is one attempt to answer that question. Many will think that I have gone completely overboard, that any proposal on this scale is a wild dream that will never be taken seriously. The problem with decades of transit planning is that we have tinkered around the edges, we have treated transit as something to be done a bit at a time because it doesn't really matter. "Transit is for everyone else – I will drive my car" is the prevailing attitude.

If we are serious about building a transit city, we must do far more to show we really mean business. This means big spending on transit and smart spending on transit. This means real commitment to how transit can change our city. Any fool can announce support for one subway line that will take years to design and build while the rest of our transit systems decay.

This is not intended to be *The Plan***,** an unalterable, perfect, writ-on stone-tablets, lightning-will-strike-you-dead-if-you-ignore-my words kind of effort. Would that many professionals and politicians could say the same.

Acknowledgements

Before I begin, I must acknowledge the many people – professional planners, engineers, transit management and staff, urban thinkers, writers, politicians, transit fans, fellow advocates, friends and even a few political enemies – for the long education they gave me in how cities work and what transit can do. Their ideas plus my own have long simmered to produce the thoughts expressed here. If you recognize threads of your own, my thanks for the contribution.

[1] Updated on March 23, 2006 with minor changes to correct typos.

The Context for a Grand Plan

Drawing a line on a map is a dangerous exercise. Land values rise and fall, towns are born and disappear, fortunes are made and lost all because somebody decides that a new highway or railway or subway is going to be built *here*. I've tried to avoid the trap of drawing a map rather than talking about the basic principles. Readers who want a one page prescription for transit nirvana should look elsewhere.

Transit planning is driven by mega-projects and mega-announcements (which are far more numerous because they cost so much less). There is much irony in the fact that my *Grand Plan* is probably more ambitious than all of them, but this is for a good cause.

Back in the 1970s when the Province of Ontario got involved in transit funding, Queen's Park realized that there was no hope for transit in its current form – plans for subway expansion and not much else. We simply could not afford it. Thus began the search for something simpler and cheaper that could cover a wide network, quickly, and provide good trunk transit routes as an integral part of the growing Toronto area. So far, so good.

Alas, Ontario technology boosters got in the way. Rather than using transit technologies that were already available "off the shelf", Ontario would develop its own. The GO-ALRT scheme was born. (For a detailed history of this, please visit the Transit Toronto website at http://transit.toronto.on.ca/gotransit/2107.shtml.)

I'm not going to dwell on this era beyond saying that its outcome was a failed attempt at new transit technology, and a reinforcement of the sense that there was nothing in between buses and subways. This failure cost Toronto dearly by precluding the rapid expansion of transit services keeping pace with developing suburbs.

Transit capital planning in Toronto for decades has gone more or less like this:

- Draw a few lines on a map.
- Spend at least two terms of Council deciding which one we can afford to build if someone will give us the money.
- Beg.
- Build less than we had planned and hope for better times.
- Survive a few changes of government policy on transit funding.
- Go back to step 1.

This is a very long cycle and transit actually falls behind growth rather than leading it. The paltry bits of subway we do manage to complete are irrelevant to most of the city and they serve small demands. Nobody really believes that transit will be an option because, demonstrably, it has failed so far, and any talk of transit on a grand scale invites ridicule.

Most people have a good idea of what roads can do and what they cannot. Everyone can see the effect of congestion and of road-oriented land uses – sprawl, expressways, parking lots, wide pedestrian-hostile streets. Transit is another matter. Few people have a sense of what it could do for the region because nobody is giving them the information. If you don't know what the options are, you certainly won't be advocating them. People who speak outside of the established world view will be treated with suspicion or hostility because we advocate a scheme that is not on the long-approved list.

A few years ago, after much effort and advocacy by me and others, the TTC and now-Mayor Miller embraced the concept of a *Ridership Growth Strategy*. For decades, the standard TTC response to advocates was "it-will-cost-too-much" for any transit proposal. We pushed the TTC to create RGS and insisted that they catalogue the possibilities and estimated costs. Now we see all of the options, we balance them against each other in the context of available funding, and we choose.

The same undertaking is required on a grand scale for regional transit. "Tell us what we could have" should be the driving command. We will decide later what we can afford, and will make that decision in the larger context of the effect of choosing to do nothing.

Basic Principles

The most important principle in transit planning is that there is no single solution to anything. Any scheme that looks at only one aspect of the problem or one type of solution cannot work.

Second, we need to look at transit on a large scale and see services as a network rather than as individual lines. This does *not* mean that we plan only for the major corridors and demands, or that we think only in megaprojects. We need to see the many parts of the network for their collective value. Just as the 401 would be meaningless without the local streets to everyone's homes, the subway would be meaningless without the network of surface routes. Just as every auto trip does not go via an expressway, many transit trips don't use or need the subway. These trips are important too.

Finally, the suburbs are not downtown. Even with the dreams embodied in Toronto's Official Plan, there will not soon be the same density of employment and housing anywhere else in the GTA. In the timescale of anything we plan today, we will be lucky to see a gradual change first in the older, inner suburbs and then working outward to the "older" parts of the 905.

One Size Doesn't Fit All

Travel around the GTA (inside and outside of the 416) goes everywhere. As long as we could build and widen roads, that was the solution to suburban travel. Transit didn't even try to compete and was happy to carry more and more commuters mainly to downtown. Now we have gridlock in suburbia far worse than anything we see in the core, and a change in the makeup of suburban populations. Many people cannot afford to have a car for each trip, but the transit systems offer little or no alternative.

Transit comes in many forms from subways all the way down to buses, and each has its place. Communities come in many forms too, and it is the travel between and within them that transit hopes to serve.

Let's look at all the variables:

- Local versus regional travel
- Peak versus off-peak
- Core-oriented, nodal and diffuse demand patterns
- Density patterns of origins and destinations

Different modes serve different types of travel, and if we build only the most expensive modes, we will tend to serve the most common type of journey to maximize return on investment. This brings us subways linking huge suburban carparks to downtown.

Many trips in the developing GTA are not served by this model, but suburban travelers, asked if they would use transit, often reply with *"build me a subway too"*. Unfortunately they live and work all over the place.

Long-haul regional systems like GO Rail and express buses have stations far apart, they are dependent on parking lots and feeder buses, and they are not tied to the existing grid of corridors. This is not the model for local transit.

Local services need to go where people are and be easy to reach. Good feeder networks and connections, minimal transfer times, and closely-spaced stations are essential. Service quality is important for local trips where access time (walk, wait, possibly transfer enroute, walk again at the end) may consume more than half of the total journey. Missing a bus or streetcar must not impose such a penalty that potential riders are driven away to their cars, to taxis or to walk.

Off-peak travel is a particular challenge. First we have the commuter who worries that the return trip home will be botched by missing the last train. Next we have the rider who has oddball work hours. Finally we have the rider who might take transit, but uses their car for so many off-peak trips that transit isn't considered for any trip.

Work trips are widely dispersed in the GTA and many trips no longer go downtown at all. This underscores the need for a network plan rather than a core-oriented subway building program.

A transit network designed for workday commutes doesn't necessarily go where people are traveling midday, evenings and weekends. Demand is less concentrated. Those who grade a transit system by the amount of space still available for passengers on the roof are dismayed at the low productivity. They think that off-peak service is expendable even though it is one key point in attracting riders to transit.

On the TTC, more than half of all riding occurs during the off-peak, but there are so many more off-peak hours that the demand is spread out and we miss its importance. Service quality suffers and we ignore the possibility of adding riders through comparatively inexpensive service improvements.

How Not To Build A Network

Each transit mode has its own needs and impacts. An alignment that would be suitable for a bus line might be totally inappropriate for a subway. An LRT line on its own right-of-way has the option of diving into a tunnel when the need arises. A commuter rail line needs an existing corridor with few or no grade crossings.

When we plan networks, we tend to look at options from the point of view of some already-chosen end position. If our goal is to build subways, we will discard any option where a subway is physically impossible or extravagantly expensive. Indeed, thinking in

the GTA has been so coloured by subway designs for many decades that we look at little else.

We must recognize and separate the regional demands, especially those going downtown, from the local demands within the 416 and 905. Downtown-bound traffic is important, but we should not burden local systems with that demand or, even worse, use potential 905-to-downtown regional demand as a justification for subway construction.

The TTC did this in the early days of Sheppard Subway planning using a model that loaded all future growth in demand from north Scarborough and Markham onto the subway line and ignored the potential of GO Transit service. Projected peak demand on the Yonge line at Wellesley was well over 40,000 passengers per hour, massively above the line's capacity.

We must avoid the lure of an available right-of-way especially if we hope to serve local riders. If you want to drive hundreds of buses to a subway terminal, a dedicated busway can make sense, but don't expect to serve riders along the way. Don't even think of running local transit in an expressway median.

Rights-of-way tend to be empty and difficult to access by foot. They are dependent on feeder services to provide riders – just look at the Spadina Subway and the Scarborough RT. Unless you are planning a regional service where the path taken is less important than the start and end points, building in a right-of-way guarantees problems with demand.

We must particularly beware of the call for *"just one more"* subway line. Subways are an addiction for planners and politicians. They give the quick, easy relief and avoid the hard decision of looking at alternatives. What alternatives? Well, at some point the dense, inner-city subway network must end and something attractive but suited to the suburban form and travel pattern must begin.

Subways should be a last choice rather than a first choice. If Mississauga City Centre were built to the density of King and Bay for at least a kilometer in every direction, we could talk about a subway, but it's not. York University Campus occupies a space roughly equal to a block bounded by Front, University, Dundas and Church, but with a fraction of the travel demand. The campus and the land around it will never be developed at a density comparable even to midtown Toronto.

As long as we keep talking of more subways, we don't give serious consideration to anything else. Endless discussion and financial deadlock seem to be preferable to actually building anything.

Technology Overview: What Are the Options?

I apologize here for being a tad didactic. Many people who should know better don't seem to know the difference between transit modes or even use consistent terms to describe them. That's the product of decades of misinformation about alternatives in Toronto.

Everyone is familiar with subways, streetcars, buses and commuter rail, but "Light Rapid Transit" is the oddball for two reasons. First, we don't have good examples in Toronto. More importantly, LRT implementations can vary substantially even within one route or system and "LRT" is not as distinctly recognizable as a subway.

Even in Toronto, we see everything from streetcars in mixed traffic through reserved lanes with or without paving right up to underground operation. Such is the flexibility of LRT.

The principal characteristics of various transit modes are summarized in a table in an appendix. I have also included chart taken from the TTC's Scarborough RT Replacement Study showing the relative capacity of various transit modes. The full report is available at http://www.toronto.ca/srtstudy/index.htm.

LRT uses streetcar technology as a starting point, but quickly moves into its own territory in various ways:

- Trains of two or three cars with a capacity of 300 or 450 passengers respectively can be used provided that stations are big enough to hold them.
- Fare collection is either prepaid or some form of self-service with onboard ticket validation. Passengers do not have to pass by an operator when entering to have their fare checked. This speeds loading at stops and distributes the load over the length of a train.
- Some degree of right-of-way segregation is used. This can range from the simplicity of reserved lanes with curbs in the middle of a street to a fully separate right-of-way.

The major advantages of LRT in comparison with subways or the "RT" technology in Scarborough are:

- A completely protected right-of-way is not required. LRT trains can run in street medians and can cross intersections at grade. As the design capacity of a line goes up, so does the need for traffic segregation.
- LRT stations are usually at grade and are easily accessible by riders. Expensive structures including escalators and elevators are not required. Because stations are simpler, they can be more numerous and closer together. This has an offsetting disadvantage of lowering a line's average operating speed while moving stops closer to riders' origins and destinations.
- LRT geometric constraints for curves and grades are not as severe as on subways, and LRT can fit in tighter locations than subway.
- LRT construction impacts are much lower than subway and lines can be built much more quickly.

As for other technology options:

- Commuter rail works well for medium to long hauls, but it is core-oriented because that's where the railway lines go. We need more service on more lines, and especially all-day service. There are technical constraints on capacity both on the rail lines themselves and at Union Station that require detailed study.
- Bus Rapid Transit is good for line haul operation of bus feeders to a terminal. The North Yonge scheme feeding into Finch Station, and the express busway to York University are good examples. BRT is works reasonably well as long as frequent services don't have to actually stop. Otherwise, congestion at stops can be a big problem. The "Rapid" context is mainly the effect of wider stop spacing than on regular bus routes.
- Buses and streetcars remain important to the transit system because they will continue to serve routes where a right-of-way is physically impossible or is not justified by the volume of riders.

Any planning exercise must select technologies that fit each part of the network. Transit should not be hostage to any one technology or to external factors such as industrial development or job creation schemes.

In proposing many LRT lines, I may seem to contradict my own advice about focusing too much on one technology. Alas, LRT has never had a fair shake in Toronto and nobody has presented a network design that treats it on an equal footing with buses and subways. This plan attempts to redress the balance and show what LRT could do given a chance.

An Outline of a Grand Plan

Some elements of this plan have appeared before, notably in the Toronto Board of Trade's proposal *A Strategy for Rail-Based Transit in the GTA (July 2001)* which is available at http://www.toronto.ca/taf/pdf/strategy_railtransit_mainreport.pdf. This report leans heavily on improvements to and expansion of the GO Transit rail network noting that this is the most cost-effective way to get additional riding on transit.

The *Strategy* contains a few LRT routes, notably a crosstown route through the Finch Hydro corridor. From my point of view this is not a good choice for a new line because it does not run on an established main street. We need to keep transit where the riders are and where they want to go even if this means taking road space away from cars. Transit needs to be on main streets where it can support goals of the Official Plan with its Avenues, intensified development and urbanization.

Many other schemes are present here, and I take no exclusive credit for thinking of them. My aim is to put an integrated view on the table for discussion.

Regional Core-Oriented Demand

The most important component of this plan is a substantial investment in GO Transit rail services. This is essential to handling the peak period demand between the outer 416, the 905 and downtown Toronto. Improved and additional peak services will siphon off demand that would otherwise flow to the subway system with the following benefits:

- Leave core subway capacity available for trips within the 416
- Reduce or eliminate peak demands that might challenge LRT alternatives
- Provide rapid service to the central area from outlying parts of the 416 which are unlikely to be served by subway extensions such as Agincourt/Malvern and Rexdale.

Go Rail options include:

- All day service: This makes GO Transit a real alternative to driving. Potential riders need to be freed from a schedule that dictates when they travel.
- Richmond Hill: Grade separation at the York Subdivision (CNR Toronto freight bypass line) to permit frequent service to Richmond Hill.
- Stouffville: Grade separation as above.
- Georgetown: A grade separation is already planned for West Toronto Junction. Planned work in Weston related to Blue 22 is eliminated in this proposal (see Airport service below).
- Bradford: Grade separation as above. Extension to Barrie.
- Agincourt – North Pickering – Peterborough: New service on the existing CPR line but running to Union. (Earlier schemes to connect at North Toronto Station, now the LCBO on Yonge at Summerhill, would place a significant burden on the Yonge subway.)

Existing TTC Surface Operations

Before we launch into a massive LRT scheme, we mustn't forget the regular surface operations. Current loading trends on bus and streetcar routes show that there is a latent demand for transit that is not met by current service levels. We need to start improving service significantly in peak *and* offpeak periods.

Peak improvements require more vehicles and garages, and these take time to bring into operation. Offpeak improvements require only the will to operate more service. One reason that many people ask for subways as their preferred mode is that subways are not subject to the same standards as surface routes. By policy, we run trains frequently and keep stations open whether or not this is justified by some economic formula or by demand.

Commitments to surface transit need to be concrete. Vague promises for the future fall victim to the annual budget charades. Just as we make long-term commitments to capital projects, we must make long-term commitments to the surface system. This would include:

- An ongoing plan to increase the bus fleet at a rate greater than needed to replace obsolete equipment and absorb natural growth in riding. In a post entitled *If I Had a Billion Dollars* at http://www.stevemunro.ca/?p=48, I wrote about the cost and impact of buying 100 extra buses each year for five years. This would allow, roughly, a one-third increase in peak service and return the system to pre-1990 service levels.
- A thorough review of the Service Standards including improving loading standards and maximum off-peak headways.
- A program of deliberately improving service to determine what latent demand exists on major routes. This approach has not been tried since the early 1980s when it succeeded in showing that more riders would use service if it was more convenient and reliable.

Meanwhile, the streetcar system needs a new, accessible low-floor fleet plus additional service. Any new fleet for an LRT could be compatible with the streetcar network, or could be from a family of cars with different specifications for pure LRT operation. This issue requires detailed study.

The existing CLRV fleet is to be rebuilt in what the TTC describes as "a life-extension program". This understates the need for continued operation of these cars. The TTC's streetcar replacement plans would only barely provide an equivalent capacity to the existing fleet. This makes no provision for riding growth, improved service or network expansion. Moreover, TTC plans to replace CLRVs on a 3-for-2 basis with larger cars will have significant effects on the perceived quality of service. I wrote about this in *How To Kill Ridership: The Saga of the Queen Car* at http://www.stevemunro.ca/?p=59.

There is no reason why we could not retain a mixed fleet of low and high floor cars with the latter restricted to peak period operation. This would give us a buffer against growth or problems with the new cars (much as the PCCs propped up the system during the CLRVs' teething problems).

An LRT Network for Toronto

An LRT network does not have to be built all at once, but we need to plan for a significant number of lines concurrently. The current TTC practice of studying one line a year in isolation will not produce a vision of what a network could be in the timeframe we need one.

Two lines are central to this proposal as they are to the City: Eglinton and Don Mills.

- An Eglinton line could stretch right across the city running underground from roughly Leaside to Caledonia or Keele Street.[2] This line could also provide access to Pearson Airport from the south rather than the northern approach through Rexdale common to many other plans.

- The Don Mills / Waterfront East line could provide a third route into downtown parallel to the Yonge Subway, but from the east. It could link many communities on Don Mills from Finch in the north, through Flemingdon and Thorncliffe Parks, the Danforth subway and the eastern waterfront. There are at least three possible alignments between Thorncliffe Park and downtown, a topic for discussion elsewhere.

In the east, a network could eventually consist of:

- the SRT replacement with an extension north to Malvern,
- the east end of the Eglinton line,
- Sheppard east from Don Mills.

Possible additions include Kingston Road (highly dependent on redevelopment of the old highway strip) and a second north-south route such as Victoria Park.

In the west, a network could include:

- the Waterfront West extension hooking into the existing Queensway right-of-way and Lake Shore Boulevard,
- a Weston corridor line from Union Station via the railway corridor to connect with the Eglinton line and turning north via Jane Street, and
- a line from Kipling Station west into Mississauga.

[2] Entering a tunnel west of Leslie, the line could have stations at Laird, Bayview, Mt. Pleasant, Yonge, Avenue Road, Spadina, Bathurst, Allen Road, Oakwood, Dufferin and somewhere near a portal west of Caledonia.

In the north, a network could include:

- a line north from Downsview Station through York University and beyond into the 905,
- a Finch West line,
- a northerly extension of the subway to Steeles (see below),
- an LRT service north from Steeles as part of the Viva system, and
- the Don Mills line described earlier.

The Yonge Subway extension addresses two major problems:

- serious bus congestion at Finch that will not be relieved by the North Yonge busway, and
- provision for revised turnaround capabilities on the Yonge line that would allow headways to be reduced below 120 seconds.

Looking at the 905

I must admit that I do not know the 905 and its demand patterns at anywhere near the level of detail as in the 416. All the same, proposals have been floated by others, and they should be re-examined as part of any regional plan.

In Mississauga, there have been schemes for an east-west busway or LRT parallel to Dundas Street, and a north-south service on Hurontario. It is vital that these be built *on* the streets because this will serve any development and growing demand along those corridors. Any line that is engineered only to get people quickly to one destination such as Square One or Kipling Station would perpetuate a commuter-oriented transit demand pattern.

In York, we already have the Viva bus network and plans, eventually, to upgrade to LRT. These plans need to be nailed down so that we can see how an expanding 416 LRT network might integrate into York's network. Indeed, it might make more sense for a line like the York University LRT to be a southerly extension of a York network rather than a northerly extension of a Toronto network.

In both cases, the rapid transit networks need to be well integrated into the basic bus services so that they are a useful part of a local system as well as providing commuter services.

Getting to the Airport

Pearson Airport has always been a problem child not least because it is a creature of the Federal Government. Plans for the airport are skewed by priorities that have nothing to do with local transit.

Blue 22 will pass through Rexdale and Weston, but will contribute nothing to them in transit accessibility. The line will stop (maybe) at Bloor Street for a connection with Dundas West Station (no funding has been identified for this yet), and at Union Station. Less than 20% of the airport traffic comes from downtown, but we are building a rapid transit line to serve it.

The *Blue 22* proposal needs to be cancelled as soon as possible. The idea that we would build a new facility taking valuable space from an existing rail corridor for a premium fare service to the airport is laughable.

Conclusion

Any attempt at regional transit planning must address these important issues:

- The TTC is and will remain a major part of the total regional transit system. For over a decade it has been starved for funds and service has fallen well behind development and potential ridership growth. Any plan that serves only the 905 will literally tinker around the edges of a much larger problem.
- We must look at the big picture: networks rather than individual routes. Building one or two routes will serve only a tiny fraction of the regional demand. Planning for networks shows what can be done for everyone and the level of public commitment needed to make such networks happen.
- Don't focus on one mode, be it subways, bus rapid transit or even LRT as a magic solution. Each has its place in an overall plan.
- Ensure that regional travel doesn't overwhelm local services. Go Rail services need to be improved to the point where they are a regional rapid transit system for travel oriented to the core area.
- Improve local services now to keep and build transit demand while awaiting future rapid transit lines.

We need to show everyone – politicians, taxpayers, businesses, the media – transit users and car drivers alike that transit can make a huge difference to the quality of life, the development and the future of Toronto and the surrounding GTA.