

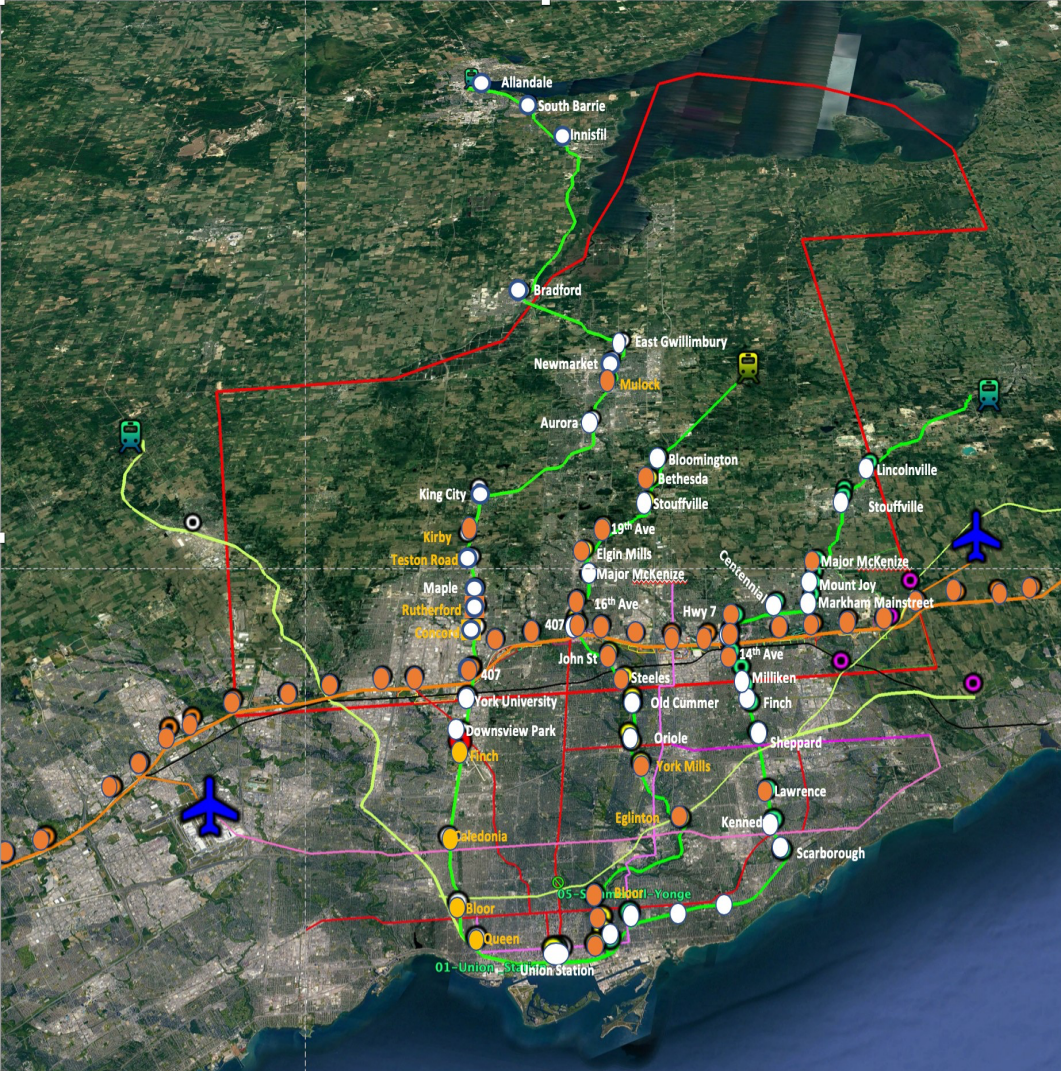
Creating a Competitive And Affordable York Region Economy 2020 & Beyond

Harnessing Technology for the Build Form and Infrastructure

Markham Regional Councillor
Jim Jones

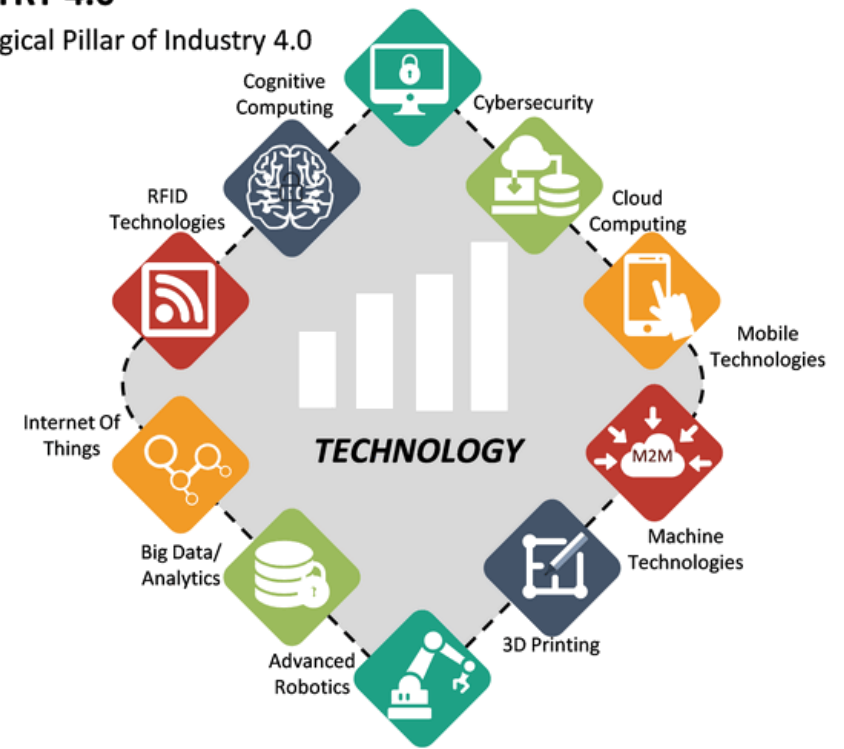
Creating a Competitive And Affordable Economy

Harnessing Technology for the Build Form and Infrastructure



INDUSTRY 4.0

Technological Pillar of Industry 4.0



Re-Purpose York Region's GO Transit Lines To Metro Light Transit Service

Plan York Region GO Corridor Stations As Rail Integrated Communities

Jim Jones
Markham Regional Councillor
Email: jjones@markham.ca
Tele: 905-479-7757

Stouffville GO Transit Line Planning Responsibilities

Who should be responsible for the Economic Development and Growth?

1. Markham / Toronto / Stouffville Councils ☐
2. York Council ☐
3. Metrolinx ☐

Who should be responsible for the Stouffville GO Transit daily ridership numbers?

1. Markham / Toronto / Stouffville Councils ☐
2. York Region Council ☐
3. Metrolinx ☐

Who should be responsible for Rail Integrated Communities Planning (TOD)?

1. Markham / Toronto / Stouffville Councils ☐
2. York Region Council ☐
3. Metrolinx ☐

Who should be responsible for Track twinning and Station Technical Requirements

1. Markham / Toronto / Stouffville Councils ☐
2. York Region Council ☐
3. Metrolinx ☐

Who should be responsible for grade separations or elevated tracks?

1. Markham / Toronto / Stouffville Councils ☐
2. York Region ☐
3. Metrolinx ☐

Who should be responsible for urban design and place making?

1. Markham / Toronto / Stouffville Councils ☐
2. York Region Council ☐
3. Metrolinx ☐

Who should be responsible for design criteria and train specification?

1. Markham / Toronto / Stouffville Councils ☐
2. York Region Council ☐
3. Metrolinx ☐

Who should be responsible for determining the type of Rail Transit service?

1. Markham / Toronto / Stouffville Councils ☐
2. York Region Council ☐
3. Metrolinx ☐



Economic Development Motion : “Creating a Competitive Economy

Moved By: Regional Councillor Jim Jones

Seconded By: Councillor Andrew Keyes

Whereas, the City of Markham strives, where feasible, to create complete mixed-use, high density Rail Integrated Communities (RIC) at rail stations as part of its development objectives; and,

Whereas, City of Markham’s desire is to create a rail transit corridor that provides for a range of housing and economic development opportunities and investment that results in a high quality of life, walkable communities, reduced transit commute times, reduced gridlock and a smaller carbon footprint; and,

Whereas, strategically planned, rail transit corridors creates a framework to guide change and sustainable growth over the next 40 years by transforming the Stouffville, Richmond Hill and Barrie GO transit lines from regional commuter heavy rail transit network to an urban high frequency metro light rapid rail service; and,

Whereas, Rail Integrated Communities are key to changing development patterns at all GO, subway and 407 Transitway stations; and,

Whereas, the Province has indicated that future GO, subway and 407 Transitway development will be based on re-purposing lands to their highest and best use in partnership with the private sector, development industry, investors and pension funds; and,

Whereas, Vancouver’s Canada Line currently accommodates 150,000 boardings per day, with two-car driverless electric trainsets, 40-50m station platforms and a frequency of 18 trains per hour, and growing to 250,000 boardings per day over the next 6-7 years with system improvements and future growth plans; and,

Whereas the Richmond Hill GO line has 10,500 boardings per day with 10 car double decker trainsets; and,

Whereas the Stouffville and Barrie lines each have 18,000 boardings per day with 12 car double decker trainsets with 300m station platforms; and ,

Whereas, the GO rail transit network has the potential for substantial increases in ridership, greater efficiency and a better return on investment; and,

Whereas, rail integrated community stations provide convenient access to the urban metro light rail rapid transit system, better utilizes surrounding lands for development versus parking lots, and when combined with first and last-mile (FMLM) solutions, reduces the 11 billion dollars of lost economic productivity caused by gridlock in the Greater Toronto Area; and

Whereas, the goal is to achieve 200,000 boardings per day for each of the Stouffville, Richmond Hill and Barrie GO lines by 2041;

And therefore, be it resolved:

That the current/future stations in the three GO rail transit corridors in York Region be strategically planned as complete Rail Integrated Communities that are scalable, attractive, utilizing state-of-the-art technological solutions, including district energy, central garbage collection system, utilidor (underground efficient multi-utility corridor), frictionless technology solutions (IoT), integrated urban schools, urban vertical farming and a 20 per cent affordable housing strategy which in total could reduce the cost of living by 20-30 per cent; and,

That the Government of Ontario be requested to initiate the planning process to re-purpose the GO Transit lines through York Region, creating rail integrated communities, supported by urban high frequency rapid rail service; with shorter electric trainsets, shorter station platforms, more rail stations with a frequency of 3-5 minute service in peak times and 6-12 minute in non-peak times in collaboration with Metrolinx, York Region, and the cities of Toronto, Markham, Vaughan and Richmond Hill; and,

That capital financing for stations could be generated from, but not limited to: development charges, land value capture, condo transit fee uplift, investors, pension fund investments and Tax Incremental Financing; and,

That all RIC stations identified in the attached map be seriously considered for a range of 5.0-12.0 FSI and that the final plans, when adopted, be included in the Official Plans of the respective municipalities; and,

That a copy of this resolution be forward to York Region and the cities of Toronto, Vaughan and Richmond Hill for their endorsement and partnership in achieving these objectives; and further,

That a copy of this resolution be forwarded to:

The Hon Doug Ford, Premier of Ontario,

The Hon Christine Elliott, Deputy Premier and Minister of Health,

The Hon Rod Phillips, Minister of Finance,

The Hon Victor Fedeli, Minister of Economic Development, Job Creation & Trade,

The Hon Stephen Lecce, Minister of Education,

The Hon Caroline Mulroney, Minister of Transportation & Francophone Affairs

The Hon Jeff Yurek, Minister of the Environment, Conservation and Parks,

The Hon Greg Rickford, Minister of Energy, Minister of Indigenous Affairs,

The Hon Paul Calandra, Government House Leader,

The Hon Steve Clark, Minister of Municipal Affairs and Housing,

The Hon Laurie Scott, Minister of Infrastructure Ontario,

All York Region MPPs, and MPs

Development Objectives and Goals

- **Eight Strategic Transit Lines in York Region**
 1. Spadina Subway Extension
 2. Yonge Subway Extension
 3. Barrie GO Transit Line
 4. Richmond Hill GO Transit Line
 5. Stouffville GO Transit Line
 6. Future Bolton GO Transit Line
 7. Future Peterborough GO Transit Line
 8. 407 Rail Transitway
- **Competitive, Affordable and Balanced Rail Integrated Communities Economy**
 - Reduce transit travel time
 - Reduced gridlock
 - Reduce carbon footprint
 - Increase transit ridership and travel options
 - Saver and more efficient way of travelling
 - All identified Station areas be included in the Municipal Comprehensive Review
- **Load balancing the GO Transit lines**
 - Helps Offload Yonge Subway Ridership
 - Commit to a aggressive boardings target of 200,000 ridership for each re-purposed GO line by 2041
 - Include a branch into the Scarborough Town centre on the Stouffville GO Line (really, then it is a Smart Track)
- **Walkable Communities**
 - Plan Complete Rail Integrated Communities - Urban Design
 - Delivering a 20% Affordable Housing Strategy and Component
 - Reduce the cost of living by 20% - 30% by comprehensive holistic planning
 - Develop a P3 Corporation for each re-purposed GO line based on business commercial principles

Need A Paradigm Shift To Urban Metro Light Transit

Develop RIC Corridor Plans For The 3 Re-Purposed GO Lines

York Region has experience and Toronto is experiencing unprecedented growth, traffic congestion, gridlock and are calling for a better utilization and improvements to the GO rail transit system. The GO Rail Transit Network is an underperforming Ontario Government asset. Re-purposing the Stouffville, Richmond Hill and Barrie lines are essential to connecting people to schools, jobs, play, live, shop, entertainment and their communities. All complete Rail Integrated Communities station areas will include a 20% affordable housing component strategy.

There is a need to re-purpose the GO lines going through Toronto and York Region to a more urban metro light style service with more rail stations, shorter trainsets and platforms and greater train frequency. Transforming all GO stations into vibrant, healthy, complete rail integrated community destination stations. Investigate an Autonomous Vehicles strategy to address the first and last mile transit issue for all rail stations and to significantly reduce the parking requirements at each station.

Yonge and Spadina Subway lines are the primary north-south spine of Toronto's transit system, which handles over ¾ of a million boardings a day. The Yonge Street Subway has been operating at 150 per cent capacity for the last 10-15 years impacting transit passengers' comfort. Even when the planned Yonge Street Extension is finally open, it is predicted that the overcrowding issue will still exist. Traffic congestion will continue to get worse, and commute times will continue to grow longer, with negative impacts to residents of York Region and Toronto's quality of life, environment and economy. Re-purposing the 3 GO Rail Transit Lines to an urban friendly subway type services will help offload the overcrowded Yonge Subway.

Increasing the rail transit network capacity into downtown Toronto, other major employment areas and neighborhoods throughout the Region is critical to unlocking the GTA's true economic potential and maintaining GTA's appeal to people and major employers.

Re-purposing the GO rail network will shape growth in the Regions, encourage all stations to be developed as complete rail integrated communities and improve overall mobility and quality of life. Re-purposing the 3 GO lines in York Region into urban metro light style service is critical to offering a more balanced, affordable and efficient delivery of the GO rail transit service and giving more options for people to take transit instead of their car.

Strategically plan the transformation of the Stouffville, Richmond Hill and Barrie GO lines into Urban Metro light transit Corridors creating complete Rail Integrated Communities around all existing and new proposed rail GO stations.

Vancouver's "Millennium, Expo and Canada Line Model"

People have said that the Canada Line was bad planning and underbuilt. It is turning out to be one of the most successful transit and planning project ever in Canada. The **Canada Line** links Vancouver, Richmond and the Vancouver International Airport. The Canada Line comprises 19.2 kilometres (11.9 mi) of track; the main line goes from Vancouver to Richmond, while a 4-kilometre (2.5 mi) spur line from Bridgeport Station connects to the airport. It had been scheduled to open on November 30, 2009, but opened three months ahead of schedule, well in advance of the 2010 Winter Olympics the following February.

The capacity of a trainset is estimated at 334 people per pair of cars (comfortably) or 400 people at crush load. The trains have a top speed of 80 kilometres per hour (50 mph) in normal operation and 90 kilometres per hour (56 mph) in catch-up mode. Each married pair of gangway-connected cars is 41 metres long and 3 metres wide. Translink has taken delivery of 12 new trainsets. Once the new trainsets are in full operation, the Canada Line will be able to handle 8,000 PPHPD per hour. The fleet now consists of 32 fully automated two-car articulated trains, for a total of 64 cars.

Much of Metro Vancouver's future — where residents live, work, and play — will revolve around areas served by SkyTrain lines and stations (Expo, Millennium and Canada Lines), where the region is already experiencing its greatest urban transformation projects. Buoyed by municipal and regional policies that encourage dense developments around SkyTrain stations, also known as RIC, tens of thousands of new homes and millions of sq. ft. of new office and retail spaces will be oriented around the region's rapid rail transit system and stations.

The 4.5 million sq ft redevelopment of the Oakridge Centre mall will serve as the pinnacle of the new density being introduced into Vancouver's Cambie Corridor. The Cambie Corridor 2018-approved master plan framed by 16th Ave to the north, Ont St to the east, Oak St to the west, and the Fraser River to the south will create 32,000 new homes for approximately 60,000 residents over the coming decades, with the greatest densities located around the four Canada Line stations serving the area. Major neighbourhood-size redevelopments entail not only Oakridge Centre, but also Pearson Dogwood, Langara Gardens, the old Vancouver Transit Centre, and the old RCMP Headquarters on the Heather St Lands. Just beyond the station nodes, the Cambie Corridor Plan calls for an outward transition of mid-rise buildings, low-rise buildings, and townhouses.

Canada Line will add 4 new stations and with the latest series of Canada line upgrades and station area plans, ridership will soar to 250,000-300,000 within the next 6-8 years.

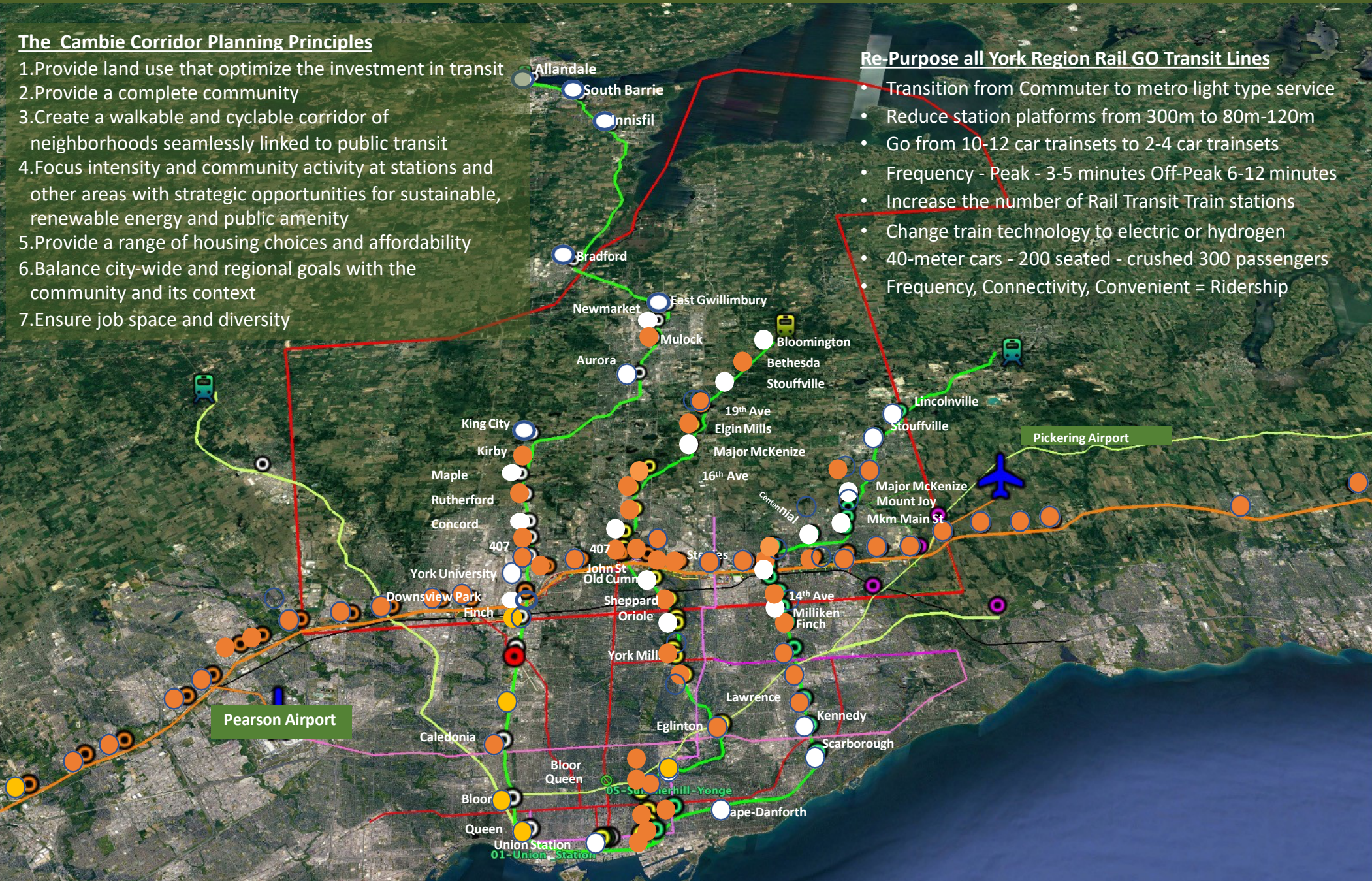
York Region's GO Rail Transit Lines and 407 Transitway

The Cambie Corridor Planning Principles

1. Provide land use that optimize the investment in transit
2. Provide a complete community
3. Create a walkable and cyclable corridor of neighborhoods seamlessly linked to public transit
4. Focus intensity and community activity at stations and other areas with strategic opportunities for sustainable, renewable energy and public amenity
5. Provide a range of housing choices and affordability
6. Balance city-wide and regional goals with the community and its context
7. Ensure job space and diversity

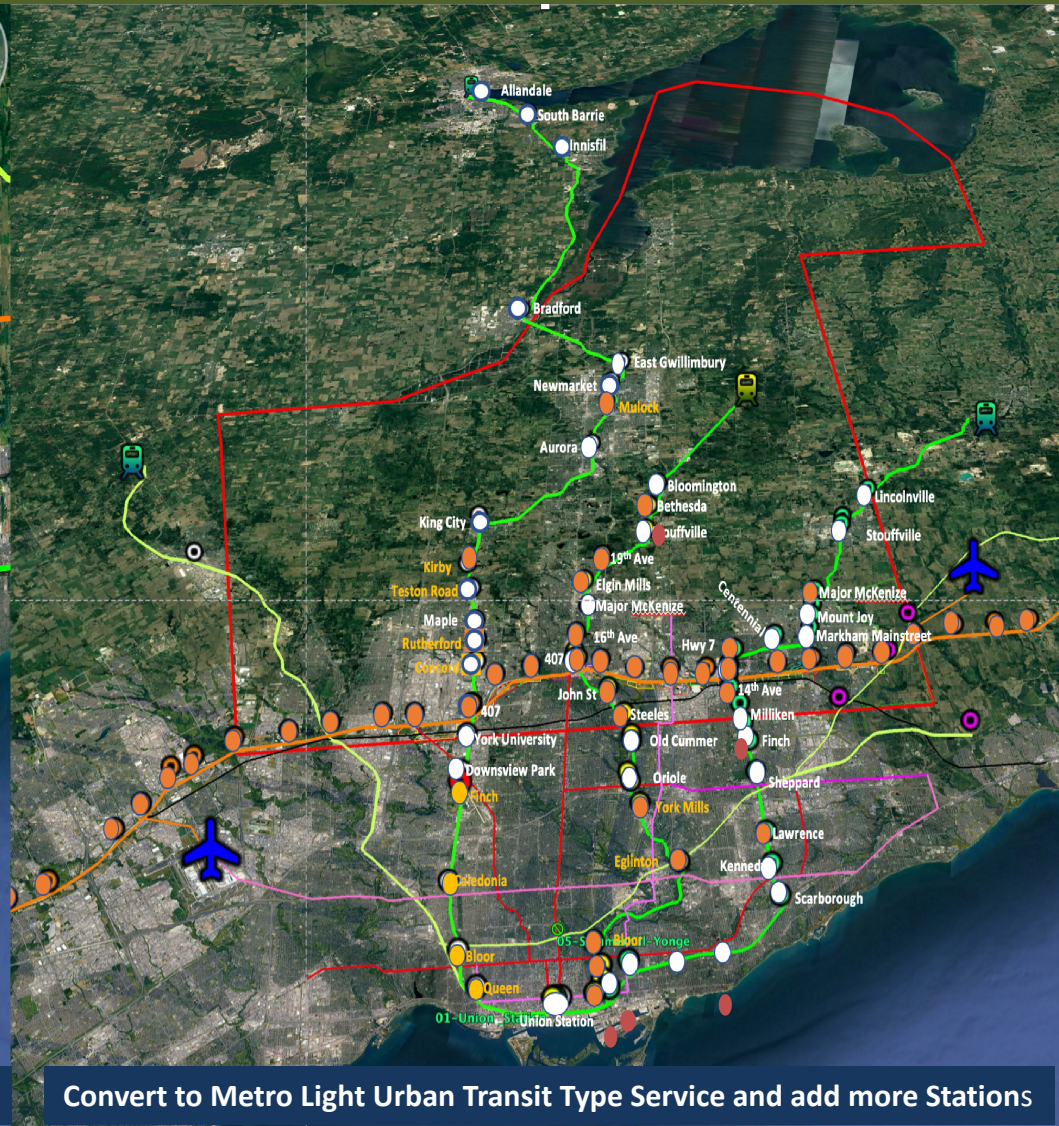
Re-Purpose all York Region Rail GO Transit Lines

- Transition from Commuter to metro light type service
- Reduce station platforms from 300m to 80m-120m
- Go from 10-12 car trainsets to 2-4 car trainsets
- Frequency - Peak - 3-5 minutes Off-Peak 6-12 minutes
- Increase the number of Rail Transit Train stations
- Change train technology to electric or hydrogen
- 40-meter cars - 200 seated - crushed 300 passengers
- Frequency, Connectivity, Convenient = Ridership



The People's Rail Transit Network

York Region Existing & Proposed New GO Stations\



REM trains are not commuter trains, but more closely resemble a metro. Its cars are more akin to those found in Montréal's metro. As the REM gets closer to the Gare Centrale, some people may have to stand, but the space is designed to accommodate this dynamic (poles, bars, larger spaces), which is not the case in the current commuter train.

Plan The Stouffville GO Corridor For 250,000 - 500,000 Daily Boardings

Change GO Lines into Urban Metro Light Transit is a “Game Changer”

The Canada, Millennium, Expo lines and the land uses around it, play a pivotal role in Vancouver's future. The Cambie Corridor is an excellent example of a sustainable, liveable city of neighborhoods and connected communities with convenient, viable transportation alternatives.

When comparing LRT transit lines and surrounding land use, the Canada Line provides the clearest evidence of success in 3 dimensions:

1. stimulation of development in the city centre;
2. stimulation of development in declining areas;
3. change in the pattern of urban development.

The Cambie corridor meets residence needs with places to live, work, shop, play and feel part of the community. The 2010 winter Olympics showed Vancouver and the rest of Canada what was possible when people choose public transit. The Canada line saw weekday services increased by 118% from 105,000 to 228,000 boarding a day resulting in approximately 3.9 million boardings overall in a two-week period.

The Cambie Corridor plan builds on that success, linking land use, built form, transportation infrastructure, affordable housing, and other elements of sustainability to make the district neighbourhood surrounding Cambie Street a better place to live. Vancouver's SkyTrain was particularly impressive: "The most effective system in terms of shaping urban growth is the SkyTrain. The corridor that the SkyTrain runs through became the main development axis of Vancouver with a notably denser urban form after the opening of the Canada Line.

Development densities along the SkyTrain routes have changed especially as a result of the rezoning plans of the municipalities. These plans increased the densities at station areas and encouraged office and retail centres at stations. Some of the SkyTrain stations became the 'new town centres' as proposed in the metropolitan development plan. Results demonstrate that SkyTrain neighbourhoods near stations have become physically denser, wealthier and more educated compared to Vancouver as a whole.

We can learn many lessons from the evolution of the Millennium, Expo and Canada Line corridors and other Canadian cities' LRT implementations.

We know that the integration of higher-density land-uses with transit and use of low carbon or zero emission energy resources has a powerful cumulative effect on our carbon emissions.

We know that compact and complete rail integrated communities that combined a concentrated, well-designed, mix of housing types, job spaces, shopping, local gathering places and community facilities make neighborhoods more walkable, liveable and sustainable.

We know that well planned communities will enable people of different lifestyles, income levels to grow and the ability of seniors to age in place.

We know that a concentrated urban form where jobs and services are close to housing also supports a healthier lifestyle and overall health outcome.

We know the collective challenge to improve housing affordability by working with a variety of partners to strive to develop equitable cities that provide housing for all income levels.

We know that living and working close to transit in a pedestrian friendly, amenity rich environment reduces the need for a car, which frees up overall household income as a result.

We know that it is critical to attract, foster, and retain business in order to facilitate sustainable growth in our economy. Offering goods and services that meet human needs at key locations along a complete corridor can help reduce our overall ecological footprint.

The success of major economic corridors is typically assessed in terms of five key pillars.

Employment: The Corridor needs a critical mass of employment with the appropriate office, academic, research and other space necessary for its day-to-day functioning. The Corridor must create an attractive and functional environment for employees and provide employers with access to the requisite skills and knowledge through their employees, service providers, academic institutions and other collaborators.

Economy: The Corridor needs a critical mass and clusters of specialized and complementary entities and individuals. This provides the synergies associated with co-location, collaboration, competition, and workforce development. This critical mass also supports the development of specialized support services and joint use facilities (e.g., laboratories, demo space and research institutes).

Housing: The Corridor needs a variety of housing options in order to attract and retain a diverse range of employers and employees. This includes an adequate supply of multiple forms (apartments and ground-oriented forms), housing tenure options (including both rental and ownership), and various sizes (from studio suites up to homes suitable for families).

Community: A strong sense and physical manifestation of community is needed for the Corridor and its diverse neighbourhoods. The Corridor needs inclusive opportunities for residents and employees, to choose from a variety of work environments, seek educational opportunities, participate in recreation and cultural activities, and acquire the goods necessary for their day-to-day lives. Quality public spaces support a diverse public life, offer opportunities for residents and employees to socialize and connect with one another and with guests and visitors from beyond the Corridor.

Connectivity: The Corridor needs strong transportation linkages to be interconnected within itself, as well as linked to complementary activity nodes in the Metro Vancouver region. A range of transportation choices should be provided, ensuring appropriate infrastructure and service levels (speed, capacity, reliability) are maintained to enable efficient movement of people and goods. Strong connectivity is critical to each of the other key pillars and provides a foundation for economic growth.

Strategically Plan the Stouffville Corridor to be another Yonge Street:

1. Creating place: Elevated Track creates better public realm versus grade separations
2. Connectivity: Connect rail link from Stouffville line to Scarborough Town Centre
3. Creating place: Elevate GO track, eliminate grade separations south of 401 Hwy to Kennedy stn
4. Respect Ridership: Repurpose GO Line to 2-4 car electric trainsets, more stations, shorter platforms, increase frequencies
5. Plan RIC: Strategically plan the corridor for complete rail integrated communities
6. Putting People First: Plan for the people and forget about municipal boundaries

Strategically plan the Stouffville GO corridor for another 250,000 - 500,000 people

The cheapest solutions isn't necessary the best solution

Re-Purpose Stouffville GO Line into Urban High Frequency Metro Light Rapid Rail Service

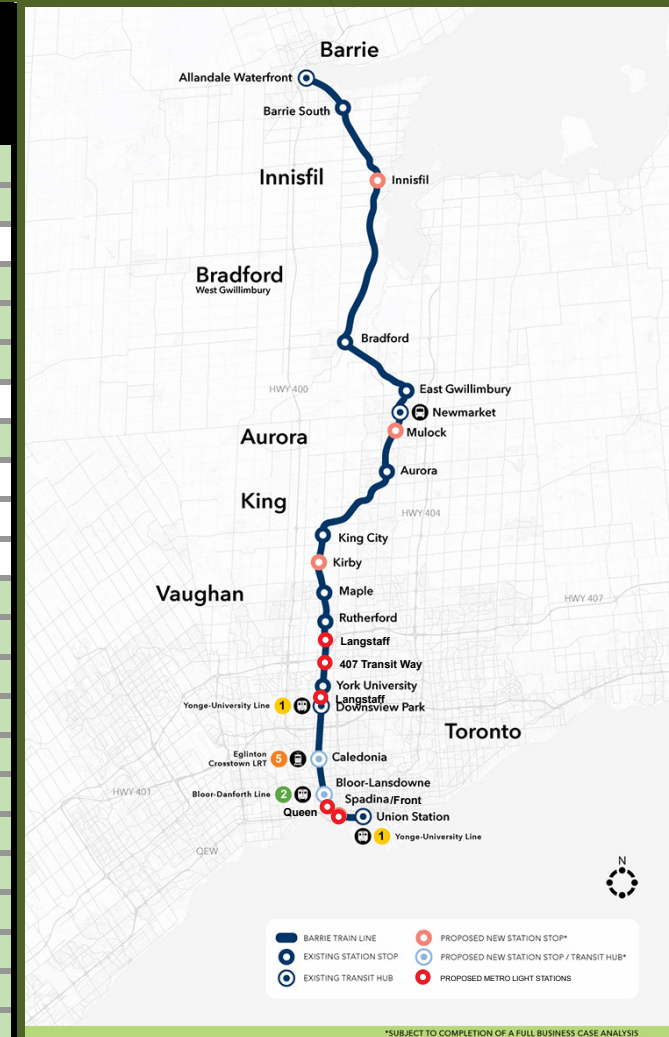
	Stouffville Stations	Distance (m)	GO Time (Sec)	LRT Arrival Time (Sec)	Dwell Time	LRT Departure Time	LRT Average Speed (KPH)	LRT Station Spacing (m)	GO Station Spacing (m)	GO Speed km/h
1	Union Station	-	-	-	60	60	-	-	-	-
2	Distillery	1,800		222	20	242	40	1,800		
3	East Harbour	2,674	405	321	20	341	40	874	2,674	25
4	Gerrard-Carlaw	4,600	702	514	20	534	40	1,926	1,926	25
5	Pape Danforth	8,400	1,026	808	20	828	50	3,800	3,800	45
6	Scarborough	13,400	1,446	1,128	20	1,148	60	5,000		45
7	Kennedy	16,400	1,706	1,364	20	1,384	50	3,000	8,000	45
8	Lawrence Kennedy	17,771	1,924	1,507	20	1,527	40	1,371	1,371	25
9	Elsmere	19,663		1,697	20	1,717	40	1,892		
10	Agincourt – Sheppard	22,900	2,313	1,950	20	1,970	50	3,237	5,129	50
11	Finch-Kennedy	23,849	2,470	2,056	20	2,076	40	949	949	25
12	McNicoll	25,101		2,188	20	2,208	40	1,252		
13	Milliken	26,400	2,857	2,325	20	2,345	40	1,299	2,551	25
14	Dennison	27,764		2,468	20	2,488	40	1,364		
15	14th Avenue	28,525		2,557	20	2,577	40	761		
16	Mkm Ctr – Unionville	29,436	3,314	2,659	20	2,679	40	911	3,036	25
17	Highway 7	30,735		2,795	20	2,815	40	1,299		
18	Centennial	33,513	3,701	3,038	20	3,058	45	2,778	4,077	40
19	Markham Mainstreet	35,500	4,007	3,237	20	3,257	40	1,987	1,987	25
20	16th Ave.	36,892		3,382	20	3,402	40	1,392		
21	Mount Joy	37,833	4,267	3,487	20	3,507	40	941	2,333	35
22	Major MacKenize	39,914		3,673	20	3,693	45	2,081		
23	Stouffville	46,010	4,823	4,059	20	4,079	60	6,096	8,177	55
24	Lincolnville (2018)	49,205	5,398	4,309	60	4,369	50	3,195	3,195	20



Connect to all major TTC Bus Routes, Streetcar and Subway Systems and Planned 407 Transitway

Re-Purpose Barrie GO Line into Urban High Frequency Metro Light Rapid Rail Service

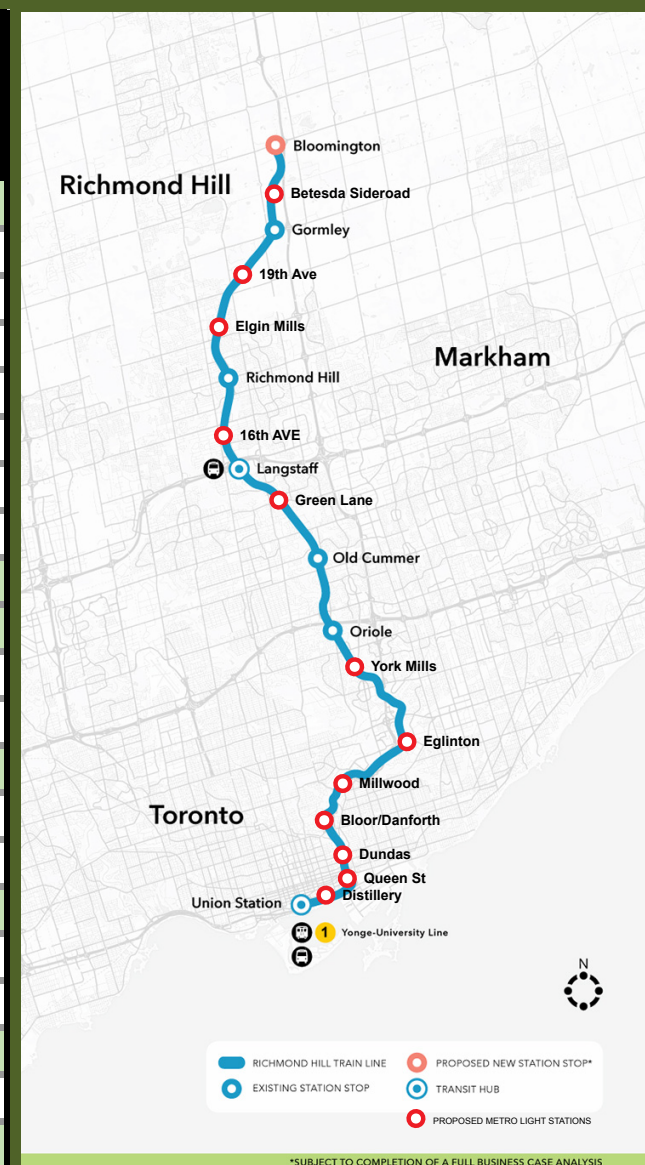
No	Barrie Stations	Distance (m)	GO Time (Sec)	LRT Arrival Time (Sec)	Dwell Time	LRT Departure Time	LRT Average Speed (KPH)	LRT Station Spacing (m)	GO Station Spacing (m)	GO Speed km/h
1	Union Station	-	-	-	60	60	40	-	-	-
2	Spadina-Front	1,431	192	189	20	209	40	1,431	1,431	30
3	Queen Street	4,320		440	20	460	45	2,889		
4	Bloor Subway	6,454	814	631	20	651	45	2,134	5,023	30
5	Caledonia	10,742	1,349	931	20	951	55	4,288	4,288	30
6	Downsview Park	17,883	1,940	1,380	20	1,400	60	7,141	7,141	45
7	Finch (LRT)	19,034		1,503	20	1,523	40	1,151		
8	York University	20,246	2,149	1,632	20	1,652	40	1,212	2,363	45
9	407 Transitway	22,378		1,823	20	1,843	45	2,132		
10	Highway 7	23,122		1,910	20	1,930	40	744		
11	Langstaff Rd	25,269		2,102	20	2,122	45	2,147		
12	Rutherford	27,305	2,678	2,285	20	2,305	45	2,036	7,059	50
13	Maple	29,304	2,937	2,484	20	2,504	40	1,999	1,999	30
14	Kirby	33,582	3,398	2,785	20	2,805	55	4,278	4,278	35
15	King City	37,750	3,846	3,077	20	3,097	55	4,168	4,168	35
16	Aurora	48,616	4,735	3,749	20	3,769	60	10,866	10,866	45
17	Mulock	52,988	5,149	4,055	20	4,075	55	4,372	4,372	40
18	Newmarket	55,449	5,422	4,272	20	4,292	45	2,461	2,461	35
19	East Gwillimbury	57,748	5,679	4,476	20	4,496	45	2,299	2,299	35
20	Bradford	67,427	6,235	5,077	20	5,097	60	9,679	9,679	65
21	Innisfil	89,999	7,158	6,451	20	6,471	60	22,572	22,572	90
22	Barrie South	96,822	7,792	6,881	20	6,901	60	6,823	6,823	40
23	Allandale	102,069	8,421	7,216	60	7,276	60	5,247	5,247	30



Connect to all major TCC Bus Routes, Streetcar and Subway Systems and Planned 407 Transitway

Re-Purpose Richmond Hill GO Line into Urban High Frequency Metro Light Rapid Rail Service

No	Richmond Hill Stations	Distance (m)	GO Time (Sec)	LRT Arrival Time (Sec)	Dwell Time	LRT Departure Time	LRT Average Speed (KPH)	LRT Station Spacing (m)	GO Station Spacing (m)	GO Speed km/h
1	Union Station	-	-	-	60	60	-	-		
2	Distillery	1,900		231	20	251	40	1,900		
3	Queen Street	3,098		359	20	379	40	1,198		
4	Dundas	3,528		418	20	438	40	430		
5	Bloor/Danforth	5,198		588	20	608	40	1,670		
6	Millwood	8,628		855	20	875	50	3,430		
7	Eglinton	13,237		1,176	20	1,196	55	4,609		
8	York Mills	17,942		1,504	20	1,524	55	4,705		
9	Oriole	19,536	1,583	1,668	20	1,688	40	1,594	19,536	45
10	Old Cummer	22,700	1,983	1,916	20	1,936	50	3,164	3,164	30
11	Steeles	24,359		2,085	20	2,105	40	1,659		
12	Green Lane	26,305		2,280	20	2,300	40	1,946		
13	407/7 – Langstaff	29,337	2,534	2,518	20	2,538	50	3,032	6,637	45
14	Silvercity	29,828		2,583	20	2,603	40	491		
15	16 th Avenue	31,291		2,734	20	2,754	40	1,463		
16	Major MacKenize	33,800	2,962	2,955	20	2,975	45	2,509	3,972	35
17	Elgin Mills	35,616		3,138	20	3,158	40	1,816		
18	19 th Avenue	37,926		3,343	20	3,363	45	2,310		
19	Gormley	42,300	3,662	3,650	20	3,670	55	4,374	8,500	45
20	Bethesda Sideroad	43,888		3,812	20	3,832	40	1,588		
21	Bloomington	45,900	4,094	3,993	60	4,053	45	2,012	3,600	30



Connect to all major TTC Bus Routes, Streetcar and Subway Systems and Planned 407 Transitway

Light Rail Systems In Canada

City		System	Transit Mode	Avg Weekday ridership	Opened	Stations	System Length
Calgary, AB	1,547,484	CTrain	Light Rail	293,400	1981	45	59.9 km (37.2 mi)
Edmonton, AB	1,461,182	Edmonton LRT	Light Rail	108,400	1978	18	24.3 km (15.1 mi)
Ottawa, ON	1,323,783	O-Train	Light Rail	18,600	2001	18	20.5 km (12.7 mi)
Toronto, ON	6,417,516	Toronto Streetcar	Streetcar	292,100	1861	708 stops	82.0 km (51.0 mi)
Kitchener, ON	535,154	ION Rapid Transit	Light Rail	N/A	2019	19	19.0 km (1.02 mi)
Vancouver, BC	2,463,431	Canada Line	Light Rail	150,000	2009	16	19.2 km (11.5 mi)
Montreal, QC	4,027,100	REM	Light Rail	191,000	2022/23	26	67.2 km (47.2 mi)
Stouffville, ON		Stouffville GO	Light Rail	18,000	2019-2041	24	49.6 km (30.8 mi)
Richmond Hill, ON		Richmond Hill GO	Light Rail	10,500	2019-2041	23	45.9 km (28.5 mi)
Barrie, ON		Barrie GO	Light Rail	18,000	2019-2041	21	102.2 km (63.5 mi)

RIC Corridor Planning integrates the Regional And Local Contexts:

- Transit corridors are planned as part of a broader regional transportation network.
- RIC corridor planning is typically done through station area plans or even station by station.
- Corridor-level analysis is required to build an efficient transportation network.
- Optimizing the potential at each individual stations and take into consideration each station's role relative to each other stations along the corridor.
- From a holistic and comprehensive viewpoint, planning at the corridor level benefits by seeing how stations along the corridor make connections that will maximize ridership, simplify interfaces and RIC opportunities.
- Corridor strategy and planning is a 40+ year decision so we must get it correct the first time.
- The siting of a station should be strategic rather than apologetic and be based on the surrounding origin/destination patterns.
- Connections to the surface transit network, sized appropriately, and based at the right corner of an intersection.
- Station planning includes routes, alignment, station location, siting, park & rides, terminal & transfer needs, number of stations, headway, and ridership calculations.
- Transit Exchange Planning - The location, size, and function of a transit exchange determines the value to the customer as well how it works operationally.
- Vancouver's Sky Trains are one of the best examples in the world for successful LRT Lines.
 - "It determines where development will take places and is shaping the future of Vancouver around the Sky Train Lines.
 - The Sky Train lines determine where growth will occur, station strategy for office, retail and designed to respect the transit riders' time.

Stouffville GO Transit Line		Richmond Hill GO Transit Line		Barrie GO Transit Line	
Municipalities	Population	Municipalities	Population	Municipalities	Population
Stouffville	50,000	Richmond Hill	210,000	Barrie	197,554
Markham	355,000	Thornhill	103,704	West Gwillimbury	35,325
Scarborough	632,098	North York	672,955	East Gwillimbury	23,991
East York	118,071	Toronto	798,642	Newmarket	84,224
Toronto	798,642			Aurora	58,000
The Stouffville, Richmond Hill and Barrie line have the same population numbers along their corridors as the Canada Line, C-Train and Montreal's REM Line have. Need a corridor strategy for these three re-purposed GO Lines and make all their stations destination instead of parking lots. Re-purpose the GO Lines from 10-12 double-decker trainsets to 2-4 car electric subway type service, shorter trainsets, greater frequency, more stations and electric or hydrogen LRT train technology.				King	24,512
				Vaughan	330,233
				North York	672,955
				Toronto	798,642
Stouffville GO Line	1,953,811	Richmond Hill GO Line	1,785,301	Barrie GO Line	2,224,467

Corridor Planning

Corridor plans are a variation on the concept of Specific Plans, but it is different from station area plans in that they attempt a broader strategy of coordinating development, investment, destinations, access, and other policies across multiple transit stations or stops. Certain types of transit service (light rail in particular) usually it takes the form of many-miles-long stretches of tracks and/or boarding facilities along existing rail corridors. Adopting a Corridor Plan and developing an integrated community vision creates an opportunity to transform the land use and character of the entire length of these arterials at the same time as new rail transit is built or upgraded.

Stouffville GO Corridor planning Principles:

1. Support Affordable, Diverse, Equitable and Inclusive Complete Neighbourhoods
2. Foster a Robust and Diverse Economy
3. Demonstrate Leadership in Sustainability and Resilience
4. Encourage Contextual Design
5. Recognize and Enhance the Area's Distinctive Neighbourhoods and Places
6. Enhance The Stouffville GO Corridor line as an economic engine
7. Provide and Support Healthy Transportation Options
8. Create and Enhance Parks and Public Spaces
9. Corridor is the new home for 500,000 people who have access to rail transit

Outcomes

1. Increased development near transit stations located along corridors
2. Coordinated development and policies along the entire length of a transit route(s)
3. Development of Complete Rail Integrated Communities Streetscape and other infrastructure improvements near transit
4. Appropriate transformation to surrounding neighborhoods

Vancouver's Canada Line – (Exceeding Expectations)

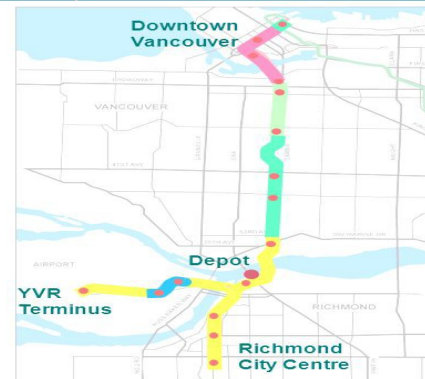
Canada Line -Two Car Trains, 19.2km, 16 Stns

Canada Line - 2019 - 150,000 riders a day



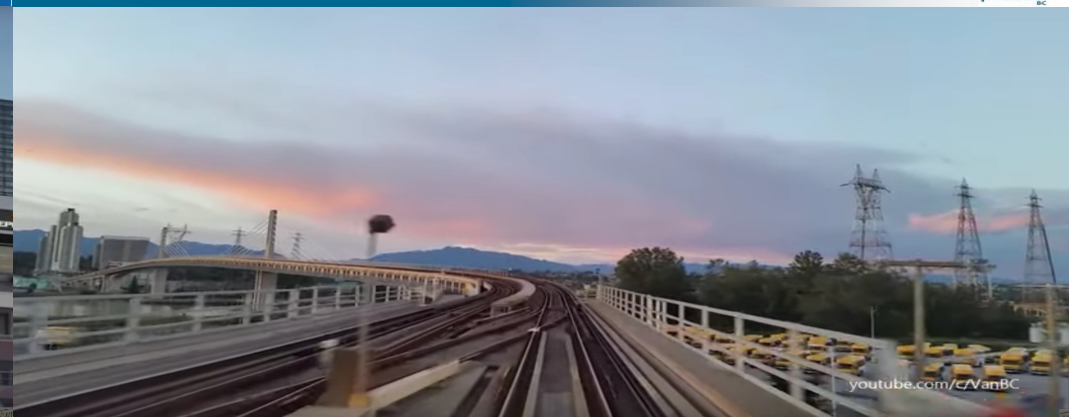
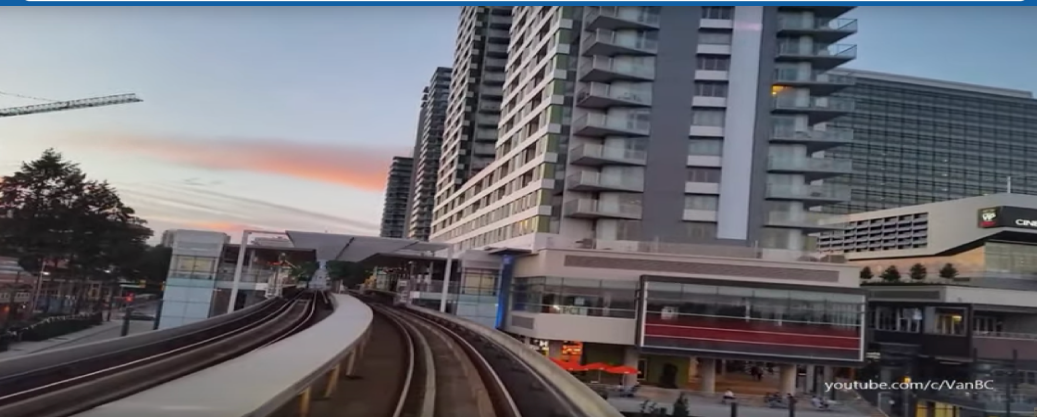
CANADA LINE

System Alignment



- 18.5 km fully automated system
 - 7.6 km elevated
 - 1.8 km at-grade
 - 9.1 km underground
- 16 stations (6 elevated, 2 at-grade, 8 underground)
- 3 water crossings (2 bridges, 1 tunnel)

- Bored tunnel
- Cut & cover tunnel, stacked configuration
- Cut & cover tunnel, side by side conf.
- At-grade section on airport lands
- Elevated in Richmond, on airport lands and in Vancouver to 63rd Ave.



Currently, the Canada Line has a peak hour capacity of 6,100 pphpd, and this will increase to just over 8,000 pphpd when 24 new two-car trains are added to the system by 2020. Increasing the Canada Line's capacity mostly revolves increasing scheduled frequencies and once that frequency limit is reached there will likely be a consideration of performing 10-metre platform extension on all stations with 40 metre platforms to create a systemwide standard of 50 metres (stations such as Waterfront, Vancouver City Centre, Yaletown-Roundhouse, Olympic Village, YVR Airport and Richmond-Brighouse are already at 50 metres and the rest have void spaces.

This slight platform extension allows for slightly longer trains — an additional car for the creation of three-car trains. The Canada Line operating speed 80kmp comprises 19.2 kilometres (11.9 mi) of track; the main line goes from Vancouver to Richmond,

While 4-kilometer (2.5 mi) spur line from Bridge Station connects to the airport. It had been scheduled to open on November 30, 2009, but opened three months ahead of schedule, well in advance of the 2010 Winter Olympics the following February.

The Canada Line was anticipated to have 100,000 boardings per day in 2013 and 142,000 boardings per day by 2021, but it has consistently exceeded early targets. Ridership has grown steadily since opening day, with average ridership of 83,000 per day in September 2009, 105,000 per day in March 2010, and over 136,000 passengers per weekday in June 2011. During the 17 days of the 2010 Winter Olympics, the line carried an average of 228,190 passengers per day and one day during the Olympics carried 272,000 passengers.

Oakridge Centre - Canada Line Oakridge Station



Lansdowne Mall-Canada Line
4,500 units
276,000 sq ft retail
1,000,000 sq ft office



Oakridge Centre - Canada Line
29 acres
430,000 sq ft office
1,000,000 sq ft Retail
50,000 sq ft food court
9 Acre roof top park
5,000 condo u nits



Brentwood - Millennium Line
26 acres
6,000 units
1,000,000 Office
1,100,000 Retail



Oakridge Westbank: At nearly 10 acres, the park will form the connective tissue of Oakridge, uniting all programs and user groups across the site, while weaving nature into the lives of residents and visitors. The Oakridge park will be accessible, with convenient paths connecting access points and major destinations, such as the Community Centre.

Montreal's Réseau Express Métropolitain (REM)

The Réseau Express Métropolitain

The Réseau express métropolitain is a light metro rapid transit system under construction in the Greater Montreal area around Montreal, Quebec, Canada. The system will link several suburbs with Downtown Montreal via Central Station. The plan is to run 4 car trains during peak and 2 car trains in non-peak hours. The train will operate 20 hours a day.

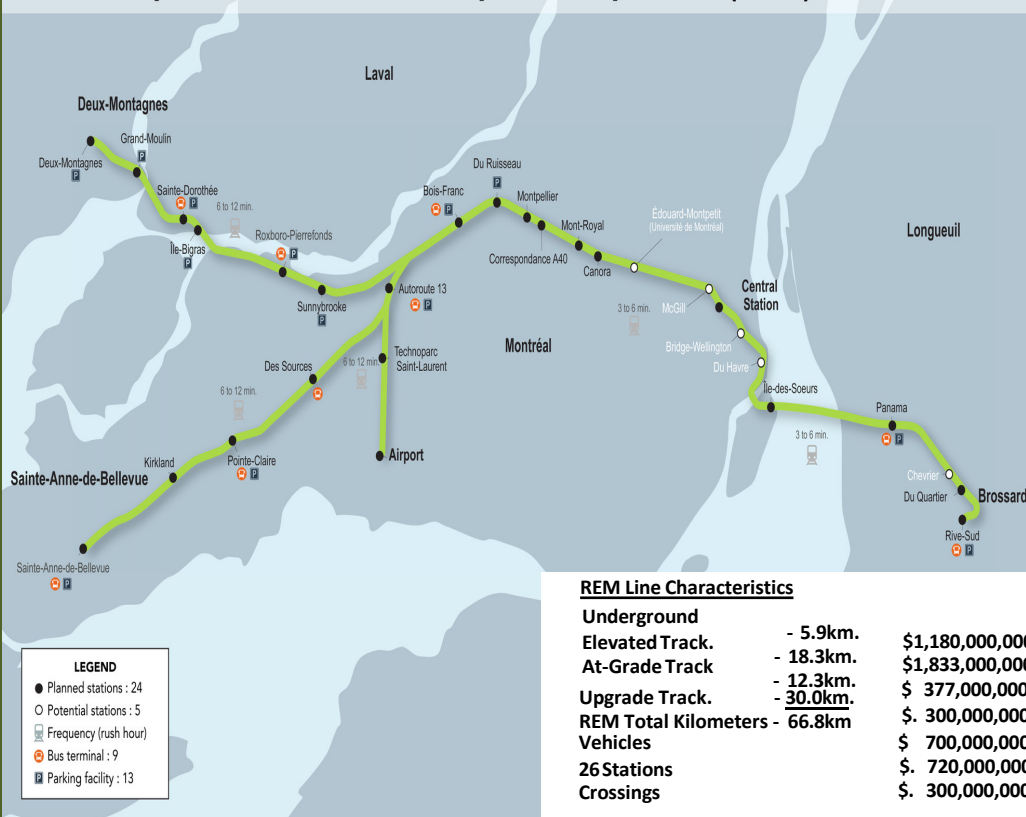
A station at Montréal–Pierre Elliott Trudeau International Airport will serve as the terminus of one of the four branches.

The 67 km (42 mi) light metro rail system is projected to cost CA\$6.3 billion. It will be independent of—but connected to—the existing Montreal Metro, operated by the STM. Trains on the network are expected to be fully automated and driverless. Expected daily ridership is 191,000.

REM Line Carrying Capacity



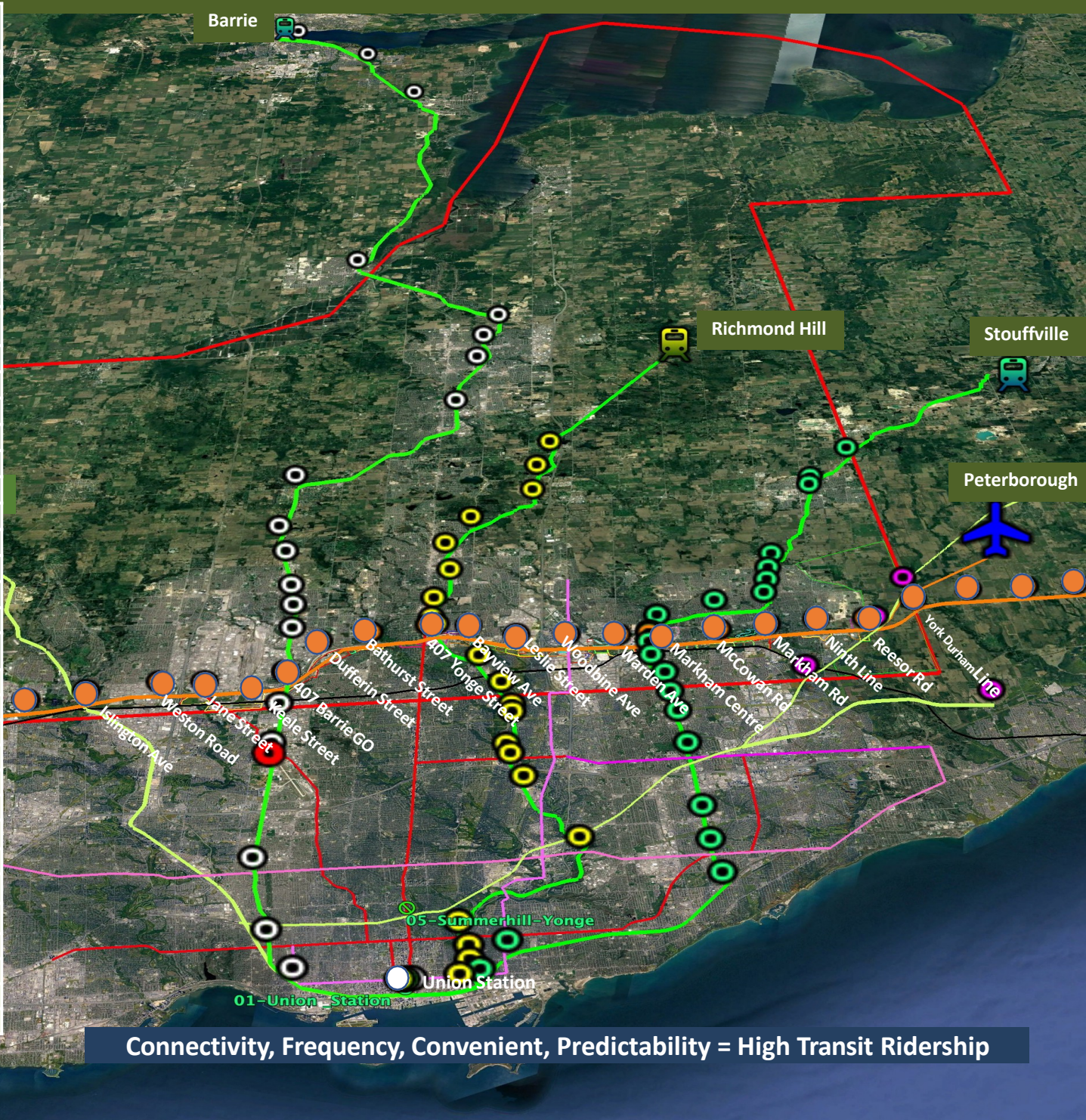
Map of the Réseau électrique métropolitain (REM) – Stations



407 Transitway Lines Est # of Condos

Stn #	Name	Distance (kms)	Condo Units	LVC-Acres
1	Harmony Rd	0		
2	Brooklyn	8,465		
3	Brock Rd	13,013		
4	Rossland Rd	2,521		
5	Whites Rd	2,220		
6	York-Durham	2,537		
7	Reesor Rd	2,087	10,753	54.0
8	Ninth Line	2,120	9,338	29.0
9	Markham Rd	2,095	10,578	95.0
10	McCowan Rd	2,104	8,406	58.0
11	Markham Ctr	2,741	42,421	66.0
12	Warden Ave	1,401	22,785	81.0
13	Woodbine Ave	2,100	16,409	52.0
14	Leslie Street	2,048	13,748	43.0
15	Bayview Ave	2,114	10,632	31.0
16	407-Yonge St	1,756	44,483	192.0
17	Bathurst St	2,386	5,000	31.0
18	Dufferin St	2,162	20,031	96.0
19	Barrie GO	2,133	12,687	53.0
20	Keele Street	1,435	18,515	85.0
21	Jane Street	2,476	32,939	48.0
22	Weston Rd	1,863		
23	Islington Ave	2,319		
24	Martin Grove	2,369		
25	Albion Rd	2,972		
26	Goreway Rd	2,384		
27	Dixon Road	1,407		
28	Kitchener GO	2,097		
29	Dixie Rd	1,935		
30	Hurontario	6,399		
31	Mavis Rd	2,163		
32	Mississauga Rd	3,233		
33	Winston Churchill	2,749		
34	Milton	2,739		
35	Trafalgar	2,061		
36	Thomson	5,546		
37	Milton	2,927		

407 Transitway Stations in York Region



Rail Integrated Communities



Tokyo's railway station areas are models of transit-oriented design. To differentiate them from transit-oriented developments (TOD), the term rail integrated community (RIC) has been created to describe these high density, safe, mixed-use, pedestrian-friendly developments around railway stations that act as community hubs, served by frequent, all-day, rail rapid transit and are accessed primarily on foot, by bicycle, or by public transit. Japanese private railways have been instrumental in creating these RICs. Though they receive little financial support from the government, private railways in Japan achieve profitability by diversifying into real estate, retail, and numerous other businesses.

Ten indicators, such as ridership, population density and mode share are used to analyze two stations created by Tokyo to demonstrate how this model is manifested in Tokyu's rail integrated communities.



Elevated Rail Is Faster, More Cost Effective And That Matters

Elevated rail is faster, more cost effective and that matters

A few years ago, [Jarrett Walker on his website](#) (Human Transit) wrote about the plan to build Honolulu's proposed elevated light rail system.

Everyone is prone to reduce the complexity of urbanism to a problem solvable by their own profession, and risks being dismissive of the expertise of other professions' points of view. When a group of architects proposes that a major new transit investment should be made slower and more expensive to operate in order to foster a better streetscape, as is happening in Honolulu, one hopes that they have thought through the urbanist consequences of all the people who'll be in cars instead of on transit because the transit is too slow, infrequent, and unreliable.

Michael Schabas, the author of the Neptis report, [Review of The Big Move](#) where he notes that Metrolinx's own numbers show that an elevated light rail line on the suburban stretch of Eglinton East would attract about three times as many new transit riders as the surface line currently planned. Metrolinx is destroying the Milliken Station area and wrecking any place making opportunities.

Surface rail lines, some of which already have GO commuter services, can be upgraded, but they don't serve all the places people want to go. Surface light rail has its place, but elevated and automated transit is emerging as the best way to provide a service fast enough in suburban areas to attract people out of their cars, at an affordable price.

It's a model that has proven successful in Vancouver, Dubai, Paris, London, Copenhagen, Montreal and a dozen other cities. No, the lines aren't invisible, but the slender structures (about one-quarter the width of the Gardiner) arguably enhance the suburban environments through which they run. More importantly, they carry new transit riders to their destination quickly, take cars off the road and reduce congestion. Elevated transit lines are also much cheaper than subways to operate and maintain.

Metrolinx's own numbers show that surface light rail, as planned along Eglinton East, Sheppard and Finch, will attract few new riders. The LRT lines on Eglinton east of Laird Drive will make traffic worse, by taking away three lanes on a road that is already congested. Metrolinx data showed that an elevated light rail line on Eglinton East would attract about three times as many new transit riders as the surface line currently planned, delivering a service like a subway at a third of the price, and with a better view for the riders too.

Also, grade separation make for ugly urbanism, poor place making. Ultimately, isn't attracting new riders to transit a way to relieve congestion what transit investment is all about?



Brightline Station

Elevated rail can be done badly, but if done well there are many benefits.

These include:

- Opportunities for multi-scale economic and social development around stations
- Extended networks of linear parks and quiet streets for safer walking and cycling
- Opportunities to reorganize the bus system and its rail connections
- Superior passenger experience, views and way-finding
- Greater efficiency: gravity aids braking and acceleration through stations
- Less disruption to traffic and trains during construction.



Aerial View of Brightline Station

Heavy lifters Make Short Work of REM's Elevated Track Project

Which is cheaper? - 5 Grade Separations or 3,000 meters of Elevated Guideway

It's an innovative project with a tight deadline, so the builders of the \$6.3 billion REM Project have come-up with a cutting-edge way to build part of its elevated track

The 67-kilometre network, called a surface métro, will provide a driverless light-rail train to link the Trudeau airport, the current Deux-Montagnes commuter line, Brossard (over the Samuel De Champlain Bridge) and Ste-Anne-de-Bellevue. The goal is for the REM rail network to be up and running in phases between 2021 and 2023.

The 13.5-kilometre Ste-Anne-de-Bellevue section of the project, and part of the branch heading to the airport, is being assembled with what is called a launching gantry - essentially a massive crane that holds up several concrete segments at once while crews place them, fasten them with post-tensioning cables and connect them to the piers, or concrete posts, already in place.

Between now and 2023 when that part of the network is slated to open, the gantries will move slowly through the West Island — about 40 metres every two days — as they assemble 4,102 concrete segments. Weighing between 42.3 and 57.7 tonnes each, the concrete segments are manufactured in a factory in St-Eugène-de-Grantam by [BPDL](#), the same company that made the segments for the Champlain Bridge project.

"Every piece is unique," said Stefan Balan, director of the Ste-Anne-de-Bellevue and airport sections of the REM. "They resemble each other very, very much, but each of the 4,102 pieces are designed as a unique piece and have unique characteristics."

It takes just two days to complete the span of 40 metres, when in the traditional method, it would take a month."

Balan explained that this method of building — a first in Quebec — is far faster than the traditional one, which relies on cranes to lift each block individually. The gantry can hold several concrete pieces at once, and the one on display was holding up 10 segments that will make up one span.

That allows builders to reduce the time they need to close roads, as the project will cut through urban areas. The use of the gantries also improves worker safety because the amount of time workers spend at heights is reduced.

Once a span is completed, the gantry is moved to the next concrete pier — a process that takes about five hours from start to finish, while the gantry's supports are moved and the 500-tonne structure rolls into place.

We would be able to build 2800 metres of elevated guideways in less than 6 months where it would take 3 years to build 5 road grade separations.



REM's Gantry for constructing Elevated Track

The massive launching gantries that are constructing the elevated parts of Montreal's Réseau express métropolitain (REM) light rail commuter rail network are expediting construction time. Instead of using traditional cranes to lift each of the 4,102 precast segments in place that make up the REM spans, the gantries lift a series of segments and fit them together. A span is being built in two days versus traditional methods which could take a minimum of three to four weeks, say project officials,



REM's Gantry weight 580 tons and 110m in length

They weigh 580 tons, are 110 metres in length and each of them can support up to 600 megatons. They're the new launching gantries that are constructing the elevated parts of Montreal's Réseau express métropolitain (REM) 67-kilometre, 26-station, light rail commuter rail network.

The gantries, built by DEAL, a subsidiary of Italian construction group Rizzani de Eccher S.p.A., are vastly expediting the construction of the network's 366 spans, averaging 40 metres in length along 14.5 kilometre of what will be an elevated track.

Grade Separation vs Elevated Track

N0	Road	Distance (m)	Grade Separation
0	South of Huntington	0	
1	Huntington	219	\$ 56,000,000
2	Finch	993	\$ 56,000,000
3	McNichol	2,259	\$ 56,000,000
4	Passmore	3,033	\$ 56,000,000
5	Steeles	3,607	\$122,000,000
6	Kennedy	4,315	\$ 69,000,000
7	Denison	4,920	\$ 69,000,000
8	North of Denison	5,124	

6 Grade Separation Est Costs \$484,000,000

250m South of McNichol to 250 m north of Denison

Cost to Elevate 3,000m of Track	Est	\$300,000,000
Huntington Grade Separation Cost		\$ 56,000,000
Finch Grade Separation Est Costs		\$ 56,000,000

REM Line Cost Components

Underground	- 5.9km	\$1,180,000,000
Elevated Track	-18.3km	\$1,833,000,000
At-Grade Track	-12.3km	\$ 377,000,000
Upgrade Track	-30.0km	\$ 300,000,000
Vehicles		\$ 700,000,000
26 Stations		\$ 720,000,000
Crossings		\$ 300,000,000



The GO Transit Wall



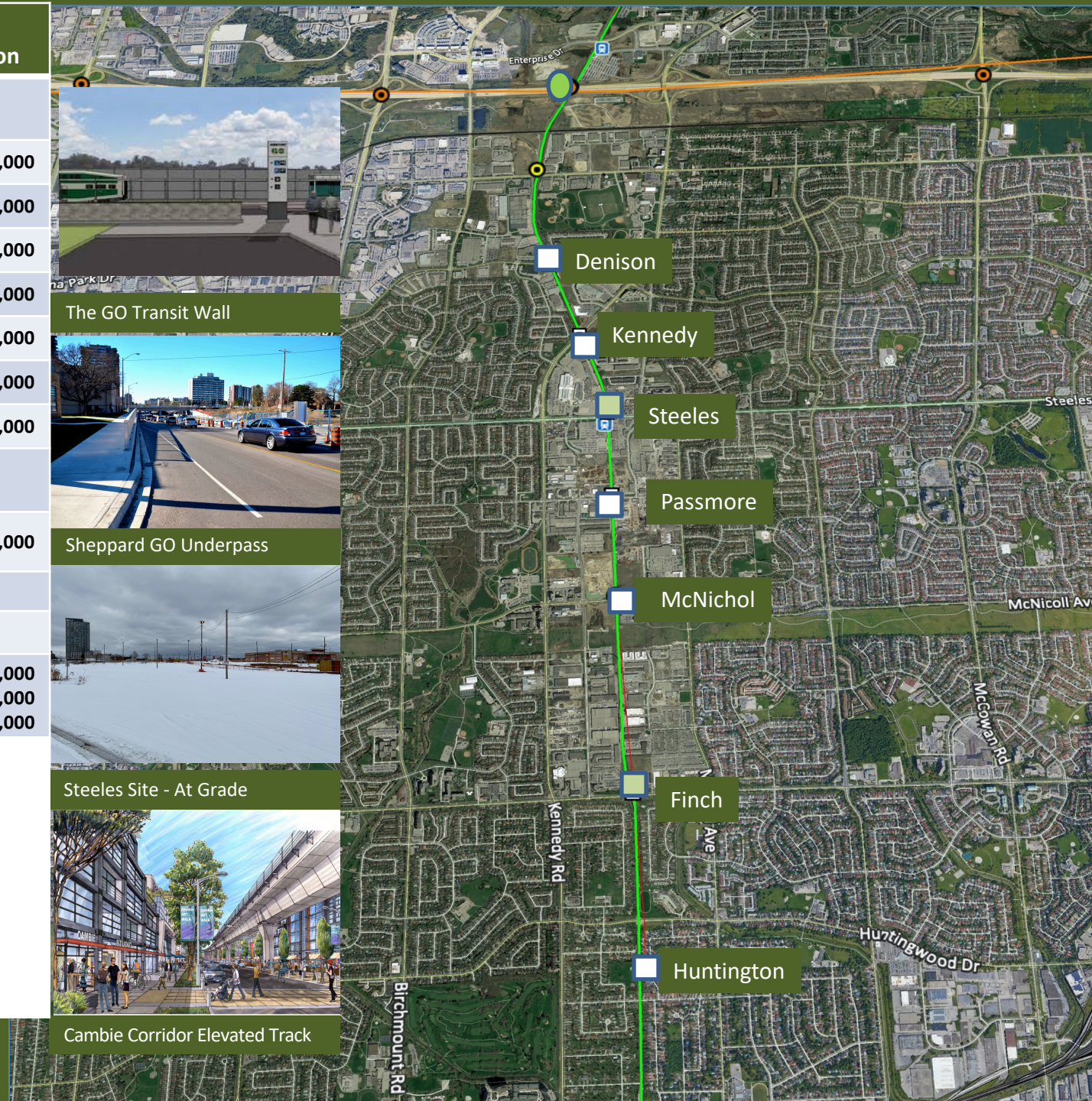
Sheppard GO Underpass



Steeles Site - At Grade

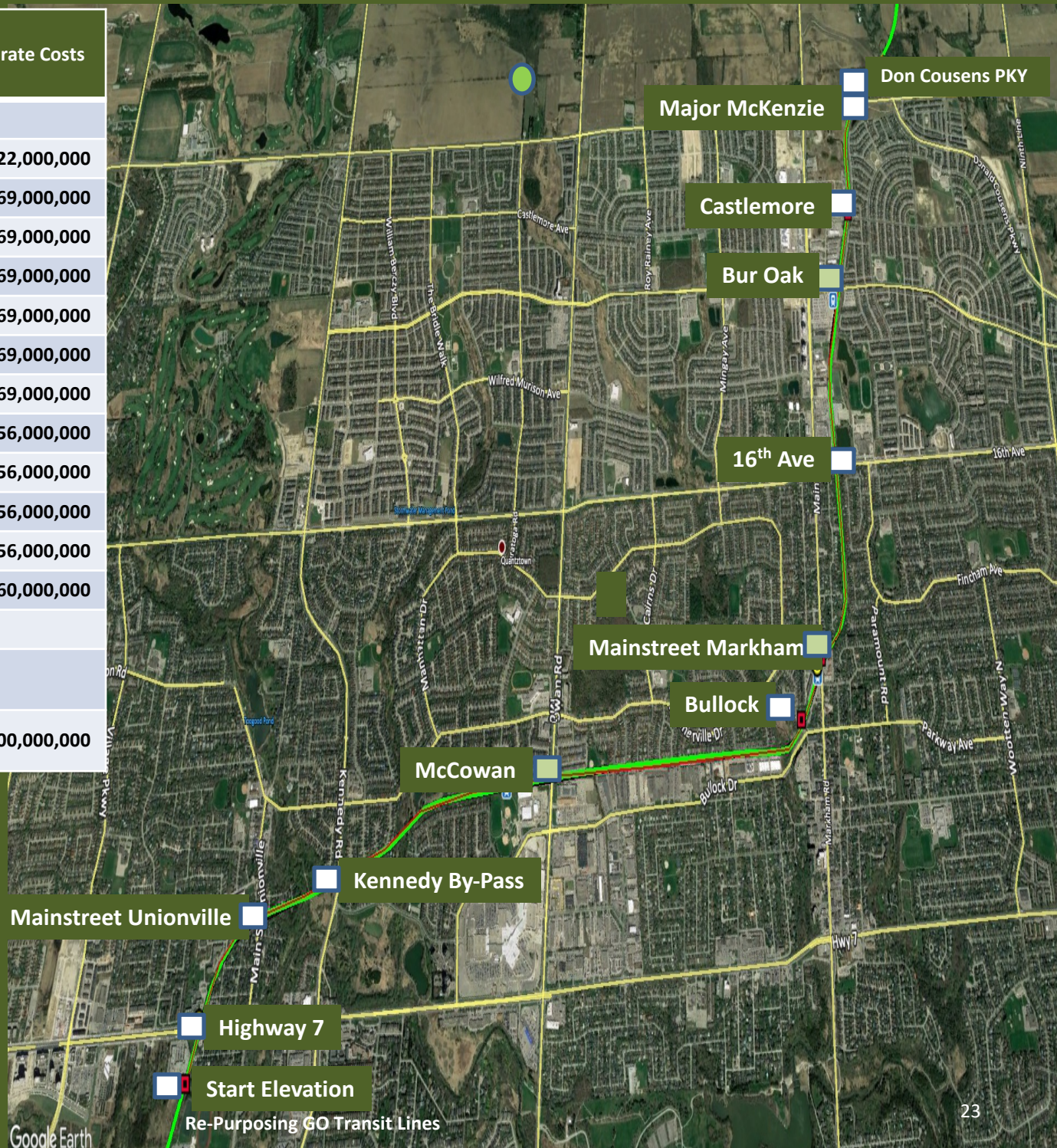


Cambie Corridor Elevated Track



Grade Separation vs Elevated Track

N0	Road	Distance (M)	Grade Separate Costs
0	South of Hwy7	0	
1	Highway 7	242	\$122,000,000
2	Mainstreet Unionville	802	\$ 69,000,000
3	Kennedy Bypass	1,406	\$ 69,000,000
4	McCowan Road	3,065	\$ 69,000,000
5	Bullock Drive	5,040	\$ 69,000,000
6	Mainstreet Markham	5,375	\$ 69,000,000
7	16 th Ave	6,435	\$ 69,000,000
8	Bur Oak	7,377	\$ 56,000,000
9	Castlemore	7,794	\$ 56,000,000
10	Major McKenzie	8,793	\$ 56,000,000
11	Don Cousin Parkway	8,996	\$ 56,000,000
10 Grade Separate Costs			\$760,000,000
South of Hwy 7 to North of Don Cousens Parkway			
Cost to Elevate 8,996 meters of track			\$900,000,000



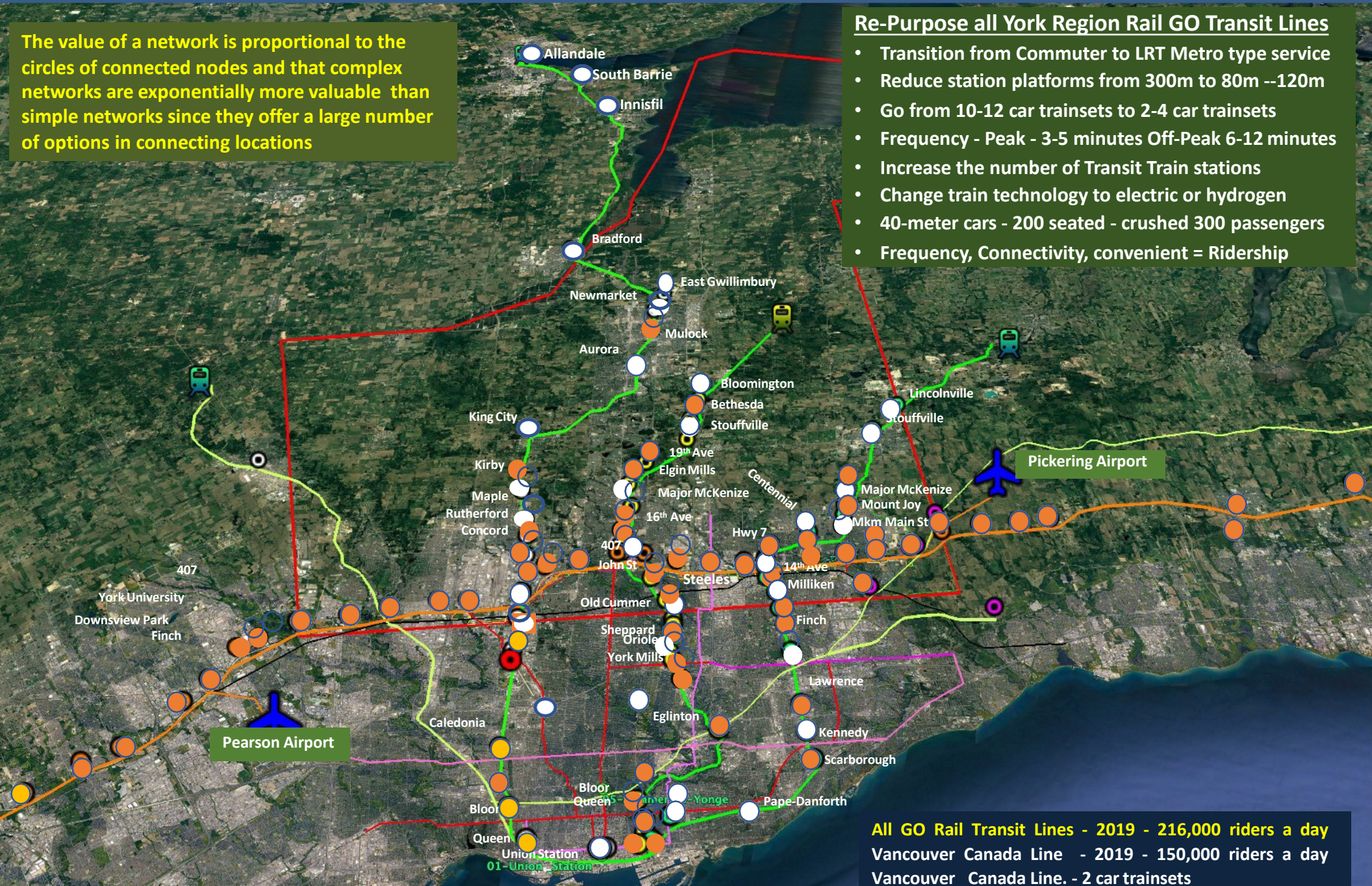
York Region's GO Rail Transit Lines and 407 Transitway

The value of a network is proportional to the circles of connected nodes and that complex networks are exponentially more valuable than simple networks since they offer a large number of options in connecting locations

Re-Purpose all York Region Rail GO Transit Lines

- Transition from Commuter to LRT Metro type service
- Reduce station platforms from 300m to 80m --120m
- Go from 10-12 car trainsets to 2-4 car trainsets
- Frequency - Peak - 3-5 minutes Off-Peak 6-12 minutes
- Increase the number of Transit Train stations
- Change train technology to electric or hydrogen
- 40-meter cars - 200 seated - crushed 300 passengers
- Frequency, Connectivity, convenient = Ridership

- Transition from Commuter to LRT Metro type service
- Reduce station platforms from 300m to 80m --120m
- Go from 10-12 car trainsets to 2-4 car trainsets
- Frequency - Peak - 3-5 minutes Off-Peak 6-12 minutes
- Increase the number of Transit Train stations
- Change train technology to electric or hydrogen
- 40-meter cars - 200 seated - crushed 300 passengers
- Frequency, Connectivity, convenient = Ridership



All GO Rail Transit Lines - 2019 - 216,000 riders a day
Vancouver Canada Line - 2019 - 150,000 riders a day
Vancouver Canada Line. - 2 car trainsets
 - Frequency - 18 *trains an hours*
 - Length of Station Platform - 40-50m

The People's Rail Transit Network