inter-regional connectivity is the key to success
On November 28, 2008 Regional Transportation Plan approved by Metrolinx Board

Top 15 priorities for early implementation include:

- Viva Highway 7 and Yonge Street through York Region
- Spadina Subway extension to Vaughan Corporate Centre
- Yonge Subway extension to Richmond Hill Centre
- Sheppard/Finch LRT
- Scarborough RT replacement
- Eglinton Crosstown LRT
...transit city LRT plan
yonge subway – next steps

TODAY

Notice of study commencement: PCC

- 2008
  - October

- 2009
  - January

- PCC

Public Review

- February

Project approval: In time for consideration with provincial budget

- March

Design and Construction

- April

Prepare project report

Submit project report

Toronto report to Commission/Council

MOE review
what’s important when planning this subway extension?

You told us your top three priorities were:

1. Connections to other transit
2. Careful planning of existing neighbourhoods and future growth
3. Destinations, places to go and sensitivity to the local environment were tied for the third priority

In addition, we need to address all the technical and operational requirements and costs
yonge subway at a crossroads

- The Yonge Subway is TTC’s most important asset
- Must preserve and protect existing Yonge line ridership
- Capacity of Yonge line to accommodate ridership growth a growing issue
- Extension of Yonge/Spadina lines matched by downstream capacity
- Three major issues:
  1. Capacity of Yonge Subway line
  2. Capacity of Yonge-Bloor Station
  3. Sequence of events for expansion
yonge-university-spadina subway – peak hour volumes

1985–2007, with selected modal splits

Central Business District bound TTC modal split for AM peak period

Sources: TTC subway count surveys, Crowd Count surveys
yonge subway capacity: history

- Capacity of Yonge line an issue since early 1980s
- RTES study conclusions (2001):
  - Implement new signalling system (ATO/ATC)
  - Allows closer spacing of trains
  - Add a train platform at Yonge-Bloor
  - Construct another line in the downtown core
  - Looping of Yonge/Spadina lines not required with ATO/ATC
- Led to Spadina/Yonge radial extensions to Highway 7
yonge subway capacity

Historical Ridership Peak
1981: 32,000

<table>
<thead>
<tr>
<th>Per Hour Capacity</th>
<th>Theoretical Capacity</th>
<th>Practical Capacity</th>
<th>Current Peak Point Ridership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>32,000</td>
<td>29,700</td>
<td>30,000</td>
</tr>
</tbody>
</table>
yonge subway quality of service

- Significant operational problems; at practical capacity
- Reduced reliability of service
- Passengers left at platforms, especially Yonge-Bloor
- Platform congestion during delays
- Increased passenger complaints
- Recovery from delays more difficult
● Relationship between the two an important future growth issue

● People make choices for travel downtown:
  ➢ Speed/frequency of service
  ➢ Fare levels
  ➢ Availability /cost of parking

● Other ridership growth issues:
  ➢ Population growth in 905
  ➢ Growth in downtown employment levels
  ➢ Overall economic/ridership trends
  ➢ Congestion levels on Yonge line
GO rail am peak period ridership – north lines (1980-1999)
future growth in yonge subway ridership

- Modelling of future ridership growth a science/art
- To be used with caution for planning purposes
  - Current peak hour ridership: 30,000 per hour
  - 2031 projection (low): 37,000 per hour
  - 2031 projection (high): 42,000 per hour
  - Net change: +7,000-12,000 per hour
- How can we accommodate this growth?
yonge subway am peak hour / peak direction volumes

1996–2007, projected to 2031

Yonge line passenger volumes southbound to Wellesley Station to 2031
Factors contributing to Yonge Subway growth

- 10% attributable to Transit City Network
- 20% attributable to Yonge Subway extension
- 70% due to:
  - General population/employment growth
  - Other service/network improvements
- A network issue of importance to the whole GTA
- Impact of many factors, not one factor
TTC/City response to growth and capacity

- a) Short to Medium Term
  1. Spadina Subway must open before Yonge Subway extension to divert riders
  2. New signalling system must be funded/implemented to improve capacity
  3. Capacity of Yonge-Bloor station must be addressed
  4. New Toronto Rocket Cars to increase capacity of trains
  5. Operate Finch/Richmond Hill service to service York/Toronto riders

- b) Long Term
  6. Downtown Relief Line
  7. 7th car added to subway trains
spadina subway extension
1: effect of spadina subway extension

- Spadina Subway extension must open before Yonge Subway extension

- Connects to:
  - Barrie GO line (Sheppard West Station)
  - Finch LRT (Finch West Station)
  - Jane LRT (Steeles West Station)
  - Highway 407 Transitway (407 Station)
  - Viva/YRT (Vaughan Corporate Centre)

- Will help “dilute” the ridership on Yonge Subway for people from north/west destined to downtown

- 1,300 peak hour riders diverted to Spadina Subway (4% diversion)
2: new signalling system

- Capacity improvements to existing line are urgently needed prior to operating the extension
- Funding commitment to re-signal YUS subway line ($350 million)
- Will significantly increase capacity with closer spacing between trains:

  Current: 142 seconds
  
  With new signal system: 105 seconds (35% increase)
3: yonge-bloor station

- Key to improving Yonge Subway capacity
- Bottleneck to adding more trains, with existing or new signalling system
- Must cut train ‘dwell’ time in half
- Add a third platform at Yonge Subway level
  - Train doors will open on both sides
  - Unload to new centre platform
  - Load from relocated side platform
  - Unloading/loading at the same time!
  - Will cut theoretical dwell time by 50%
- Could also add platforms on BD level
congestion at yonge-bloor station
yonge-bloor station: third platform concept (interim)
yonge-bloor station: third platform concept (ultimate)
3: Yonge-Bloor Capacity Study

- Initiated in January 2009
- To be completed by Fall 2009
- Confirm previous concepts for expansion
- Identify other operational strategies to increase capacity
- $450 million project
- Currently not funded
- 4-5 years to design/construct
- Station will be operational throughout construction
4: new toronto rocket cars

● New trains will allow riders to walk/stand in between each car:
  ➢ 10% increase in train capacity
  ➢ Better distribution of passengers along train length

● Currently on order for delivery by 2012
  ➢ Prior to opening of Spadina or Yonge Subway extensions
4: interior of new toronto rocket car
5: Yonge Subway Extension: Planned Service Levels

AM Rush Hour
Downsview – Finch: 2 minutes 21 seconds
Downsview - Richmond Hill Centre: 4 minutes 42 seconds

PM Rush – Initially
Downsview - Richmond Hill Centre: 2 minutes 21 seconds
5: Yonge Subway: Initial Service Levels

- Every second northbound train will short-turn at Finch station
- These trains will be empty for southbound departures at Finch station
  - For local Finch riders with extension
- Every other train will start at Richmond Hill Centre station
  - Will capture ridership north of Finch Station
- Helps to increase seat availability south of Finch in AM Rush
6: downtown relief line

- Long-term option (Pape to Queen)
- Diverts 40% of Yonge riders to new line (Metrolinx estimate)
- Yonge peak hour ridership reduced to 25,000 per hour
- A last resort after maximizing capacity of existing system
- $2.1 billion project
7: longer subway trains

- Existing platforms are 500 foot long
- Existing trains are 450 foot long
- 50 foot allowance for drivers to manually stop the train
- With new signal system, computer will stop the train
- One foot stopping allowance with ATO/ATC
- Allows the operation of longer trains
- 10% improvement in capacity
- Significant operational impacts to implement
- A long term option
improved GO service levels

- Increased service levels in GO rail corridors essential
  - Especially Richmond Hill GO corridor
- Potential to offload Yonge ridership
- Both GO service improvements and Yonge extension are required
- Each serves a different travel market
- Need both improvements, not one or the other
### Capacity Improvements to the Yonge Line

<table>
<thead>
<tr>
<th>Timing</th>
<th>% Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study in 2009</td>
<td>Fix Yonge – Bloor station capacity</td>
</tr>
<tr>
<td>2012</td>
<td>New subway cars have increased capacity (+10%)</td>
</tr>
<tr>
<td>2015</td>
<td>Closer spacing between trains (+36%)</td>
</tr>
<tr>
<td>2015</td>
<td>Transfer to Spadina Subway (+4%)</td>
</tr>
<tr>
<td>Long Term</td>
<td>7th car added to train (+10%)</td>
</tr>
<tr>
<td>Long Term</td>
<td>Build downtown relief line (Pape – Queen) (+40%)</td>
</tr>
</tbody>
</table>
timeline for yonge subway capacity / ridership milestones

- 2008: Funding of new signalling system for YUS line
- 2009: Yonge Bloor station capacity study complete
- 2010: Subway rail yard needs study complete
- 2011: Yonge subway EPR to NDE
- 2012: Sheppard East LRT opens
- 2013: Toronto Rocket cars in service (10% increase in Yonge capacity)
- 2014: ATO complete Eglinton/Union
- 2015: ATO complete Finch/Union
- 2016: Eglinton LRT opens (Stage 1)
- 2017: Scarborough Malvern LRT opens
- 2018: Don Mills LRT opens
- 2019: Jane LRT opens
- 2020: Improved headways to 105 seconds with full ATO in place
- Spadina subway opens to Vaughan Corporate Centre with ATO (diversion of 4% of peak hour Yonge riders to Spadina)
- Increased GO service levels on Richmond Hill, Stouffville and Barrie GO lines
Theoretical Yonge Subway Capacity and Ridership
Assumes Bloor-Yonge Station Expansion

Sources: TTC subway count surveys, Centrex Count surveys

to 2031
Theoretical Yonge Subway Capacity and Ridership
Assumes Bloor-Yonge Station Expansion

Sources: TTC subway count surveys, Cordon Count surveys

TTC 2019-2031 Plan

36
theoretical capacity and ridership
Presenting Yonge subway extension project
subway construction techniques
cut-and-cover process
traffic management during construction at stations
the final yonge subway project includes…

- Six stations
- Two intermodal Terminals
  - Steeles & Yonge
  - Richmond Hill Centre
- Bridge over East Don River
- Park-and-Ride facilities for 2,000 cars at Langstaff/Longbridge
benefits of yonge subway northerly extension

● Southbound buses destined to Finch Station will now go to Steeles Station
  ➢ Significant reduction in bus volumes on Yonge St.
  ➢ Reduced noise, fumes, bus traffic on Yonge St.
  ➢ Local Yonge bus service will remain

● Two new stations (Cummer/Drewry and Steeles)
  ➢ Improved bus and walk-in access to new stations
  ➢ New bus terminal at Steeles

● Allows opportunities for Finch Station surface facilities to evolve/develop and consolidate bus terminal

● Improved availability to Finch Station commuter lots
## Yonge Street Bus Volumes (Finch – Steeles)

<table>
<thead>
<tr>
<th></th>
<th>Number of Buses in Peak Period/Direction (SB) (6 – 9 am)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current</strong></td>
<td>370</td>
</tr>
<tr>
<td><strong>With Yonge Subway Extension</strong></td>
<td>6</td>
</tr>
</tbody>
</table>
construction overview
what comes with a subway?

- passenger pick-up and drop-off
- entrances
- bus terminals
- parking
- electrical substation
- emergency exit
- buildings
- vent shafts
<table>
<thead>
<tr>
<th>Station</th>
<th># of Entrances</th>
<th>Electrical Substation</th>
<th>Commuter Parking</th>
<th>Bus Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cummer/Drewry</td>
<td>2</td>
<td>No</td>
<td>No</td>
<td>Bus loop only</td>
</tr>
<tr>
<td>Steeles</td>
<td>2-3</td>
<td>Yes</td>
<td>No</td>
<td>Bus terminal (25 bays)</td>
</tr>
</tbody>
</table>
justification for cummer/drewry station

- Threshold of 100 persons per hectare (pph)

- At or above this level = successful transit station
  - Cummer/Drewry currently at 82 pph

- Station will meet the threshold close to opening day
cummer/drewry station
part of the north york centre plan
steeles station - underground bus terminal

- Maximizes passenger convenience
- Minimizes bus operating costs
- Reduces bus travel time
- Best possible transit oriented development opportunities
- Reduces property acquisition costs
- Offers negligible difference in long-term maintenance costs over other options considered
- Anticipate less business impact
- Accommodates future rapid transit along Steeles Avenue
steeles station – concourse / bus level
# Major Project Costs

<table>
<thead>
<tr>
<th>Major Project Elements</th>
<th>Cost M$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stations and Area Facilities</td>
<td>$650</td>
</tr>
<tr>
<td>Finch improvements</td>
<td>$5</td>
</tr>
<tr>
<td>Cummer/Drewry</td>
<td>$70</td>
</tr>
<tr>
<td>Steeles</td>
<td>$195</td>
</tr>
<tr>
<td>Clark</td>
<td>$70</td>
</tr>
<tr>
<td>Royal Orchard</td>
<td>$65</td>
</tr>
<tr>
<td>Langstaff/Longbridge</td>
<td>$85</td>
</tr>
<tr>
<td>Richmond Hill Centre</td>
<td>$160</td>
</tr>
<tr>
<td>Tunnels, special structures and operating systems</td>
<td>$600</td>
</tr>
<tr>
<td>Subway trains</td>
<td>$240</td>
</tr>
<tr>
<td>Storage and maintenance facilities for subway trains</td>
<td>$110</td>
</tr>
<tr>
<td>Engineering and other costs</td>
<td>$675</td>
</tr>
<tr>
<td>Property</td>
<td>$125</td>
</tr>
<tr>
<td><strong>Project cost estimate, 2008 dollars</strong></td>
<td><strong>$2.4 billion</strong></td>
</tr>
<tr>
<td>Project</td>
<td>Capital Cost</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Yonge-Bloor Expansion</td>
<td>$450 million</td>
</tr>
<tr>
<td>Subway Fleet Expansion</td>
<td>$168 - $252 million</td>
</tr>
<tr>
<td>5 stations already included in TTC budget</td>
<td></td>
</tr>
<tr>
<td>Yard Expansion</td>
<td>Up to $15 million per station</td>
</tr>
<tr>
<td>Downtown Relief Line</td>
<td>$2.1 billion</td>
</tr>
<tr>
<td>Sheppard Subway Extension (Yonge-Downsview)</td>
<td>$1.4 billion</td>
</tr>
</tbody>
</table>
### Capital Cost Estimates and Timeline

<table>
<thead>
<tr>
<th>Event Description</th>
<th>Duration</th>
<th>Start Year</th>
<th>End Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete Functional Design</td>
<td></td>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>Provincial Project Approval</td>
<td>6 months duration</td>
<td>October 2008 - April 2009</td>
<td></td>
</tr>
<tr>
<td>Project Notice To Proceed</td>
<td>Initial Capitalization</td>
<td>May 2009</td>
<td></td>
</tr>
<tr>
<td>Project Management</td>
<td>Governance</td>
<td>AFP Set-up</td>
<td>1 year, mid 2010</td>
</tr>
<tr>
<td>Property</td>
<td>CEAA</td>
<td>12 months duration</td>
<td>2009-2011</td>
</tr>
<tr>
<td>Design</td>
<td>Engineering</td>
<td>48 months overall duration</td>
<td>2010-2013 (multiple projects starts and completion)</td>
</tr>
<tr>
<td>Construction</td>
<td>66 months overall duration</td>
<td>2012-2016 (multiple projects starts and completion)</td>
<td></td>
</tr>
<tr>
<td>Subway System Commissioning</td>
<td>1 year duration</td>
<td>Throughout 2016</td>
<td></td>
</tr>
<tr>
<td>In-service</td>
<td></td>
<td>2016/2017</td>
<td></td>
</tr>
</tbody>
</table>
next steps for City of Toronto & TTC

- To TTC Commission for approval on January 21
- To Toronto Council for approval on January 27-28
- Environmental Project Report submission to Ministry of Environment in February
staff recommendations

- Approve project concept and authorize submission of the project report to Ministry of the Environment

- Funding, service and other agreements required on the basis of the following principles:
  - City will not be liable for any capital costs and increases in net operating costs related to the project
  - TTC will be project manager for project
  - TTC will own, operate and maintain property, assets, subway facilities in York Region except bus terminals, PPUDOs
staff recommendations

- Spadina Subway Extension and ATO/ATC must be in place prior to opening of Yonge Subway Extension

- Project costs should include those attributable from:
  - Addressing capacity constraints at Yonge-Bloor station
  - Rail yard requirements
  - North York service road
TTC recommendations

- TTC’s base capital funding must continue to be fully funded including replacement streetcars, and the timely implementation of Transit City lines

- TTC’s future base capital funding needs for rail yard expansion, expanded subway car fleet to support reduced headways on YUS line and increased capacity of Yonge-Bloor station must also be funded

- The above ‘requirements’ must be met
Thank-you
clark station
- Allows for shallow, relatively flat subway tunnel that will be operationally least costly
- Allows for a shallow subway station at Royal Orchard – easier pedestrian access, quicker emergency response
- Opportunity to reduce the slope on Yonge Street for pedestrians and drivers
- Opportunity to naturalize the valley
east don river bridge crossing
east don river bridge crossing

Concept drawing only
royal orchard station
langstaff/longbridge station
• Bicycle and pedestrian paths
• Noise buffers
• Maintain a green corridor
• Bio-swales
• Sustainable treatments for parking
• Protection of natural environment
key considerations at richmond hill centre

407 transitway

subway

YRT/Viva

GO bus

GO train
richmond hill centre terminal