



YONGE NORTH SUBWAY EXTENSION

Initial Business Case - Project Update

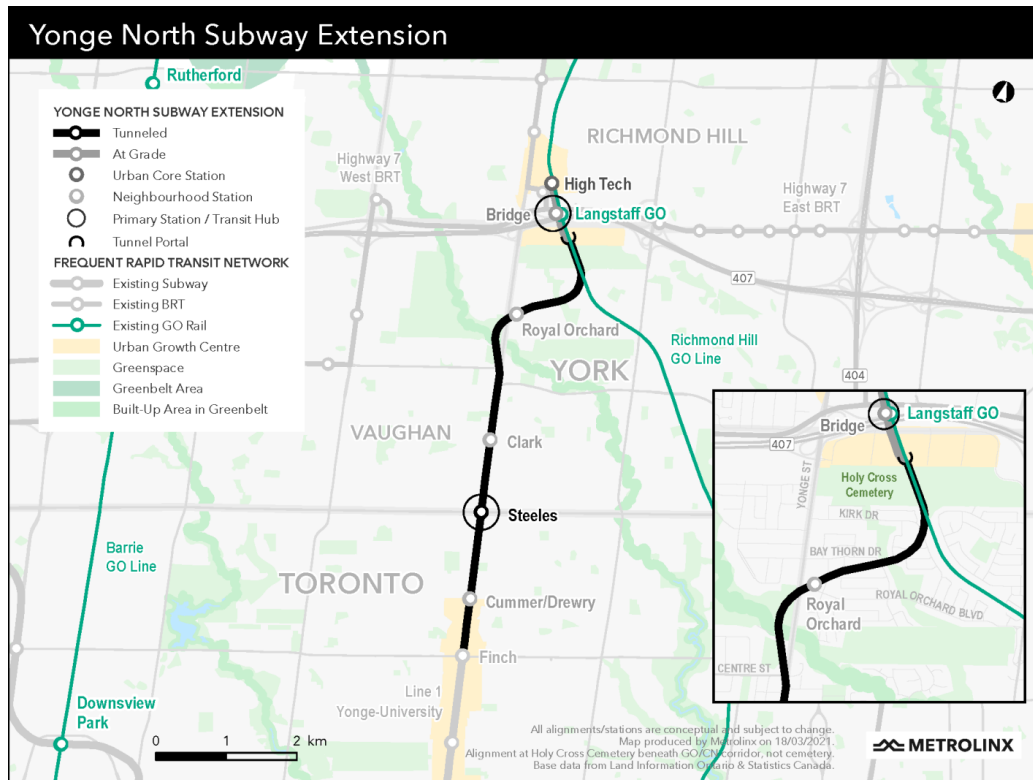
Stephen Collins, Program Sponsor, YNSE

Rajesh Khetarpal, Vice President (A), Community Engagement

April 7, 2021

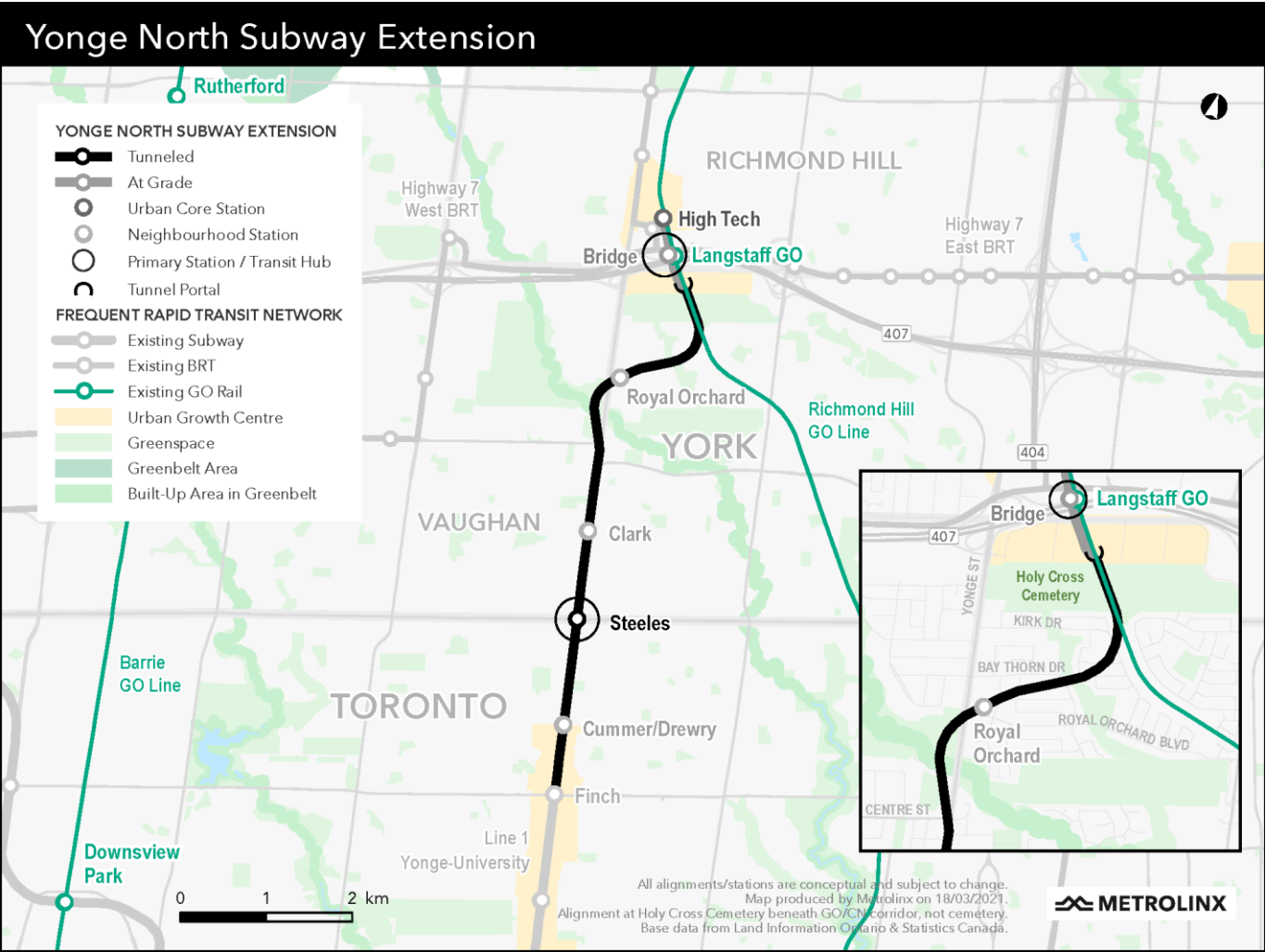
BETTER TRANSIT CONNECTIONS FOR YORK REGION & TORONTO

- Four new stations along an **approximately eight-kilometre extension** of TTC Line 1, from Finch Station north to Richmond Hill.
- Steeles Station will be a hub for local bus routes as well as a **future rapid transit line** along Steeles Avenue.



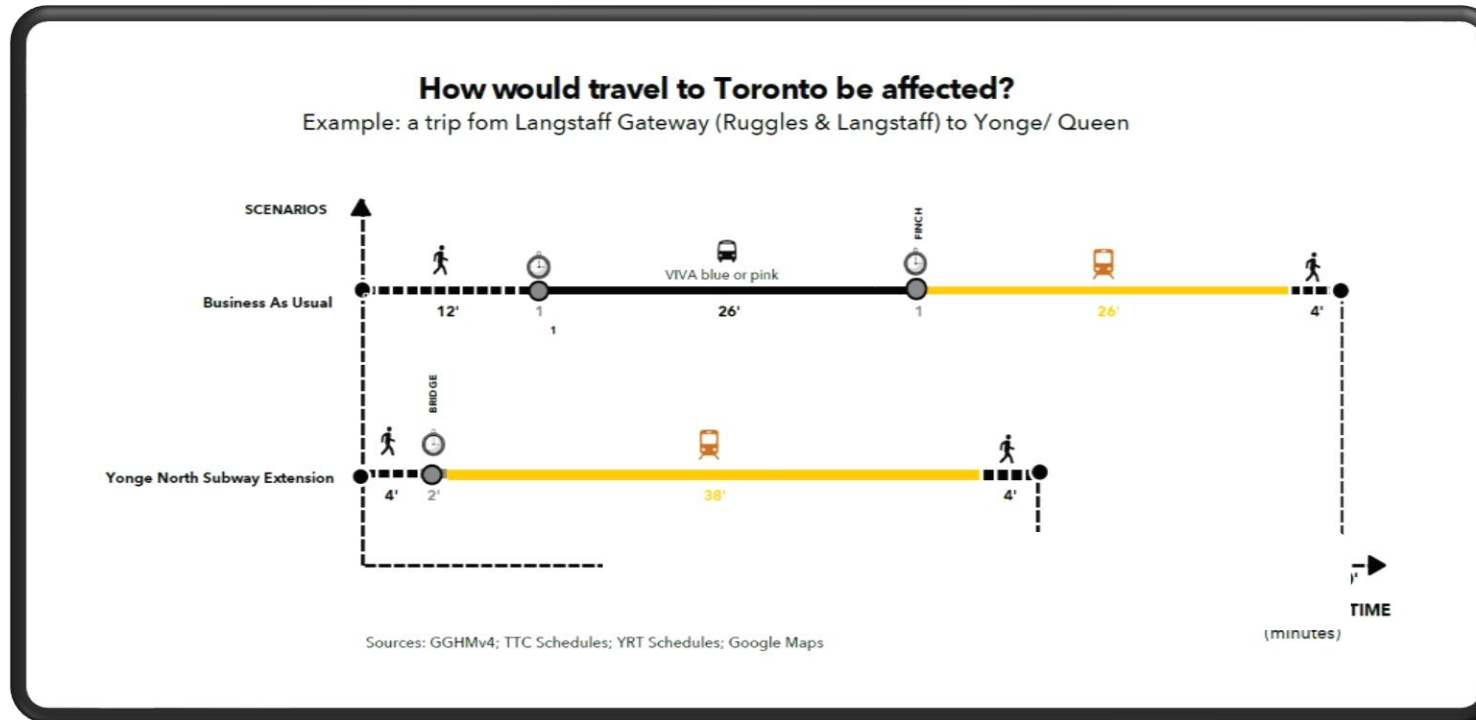
- Bridge Station will **conveniently connect** with GO train, GO bus, and local transit service, including VIVA BRT.
- High Tech Station will **serve future communities** envisioned within the Richmond Hill Centre area.
- Metrolinx is working with municipal partners to **evaluate and determine** the best location for the fourth station as planning work continues.

BY THE NUMBERS



| | |
|---|---|
| Route length | ~8 km |
| Ridership | 94,100 daily boardings |
| Improved access to transit | 26,000 more people within a 10-minute walk to transit |
| Improved access to jobs | 22,900 employees within a 10-minute walk to transit |
| Daily reductions in traffic congestion | 7,700 km in vehicle kilometres traveled |
| Yearly reductions in greenhouse gas emissions | 4,800 tonnes |

KEY BENEFITS



The extension will save riders as much as 22 minutes on a trip from York Region to downtown Toronto

- Bridge Station **maximizes TOC opportunities** by connecting two communities in Markham & Richmond Hill that are poised for growth.
- Shifting the alignment in the northern section **reduces construction timelines and property needs** by using a dedicated rail corridor that already exists.
- The project will serve **94,100 riders each day** by 2041, cutting the time spent commuting in Toronto and York Region by a combined **835,000 minutes daily**.

Initial Business Case & Supplementary Analysis

INITIAL BUSINESS CASE ANALYSIS - ALIGNMENT OPTIONS

Option 1

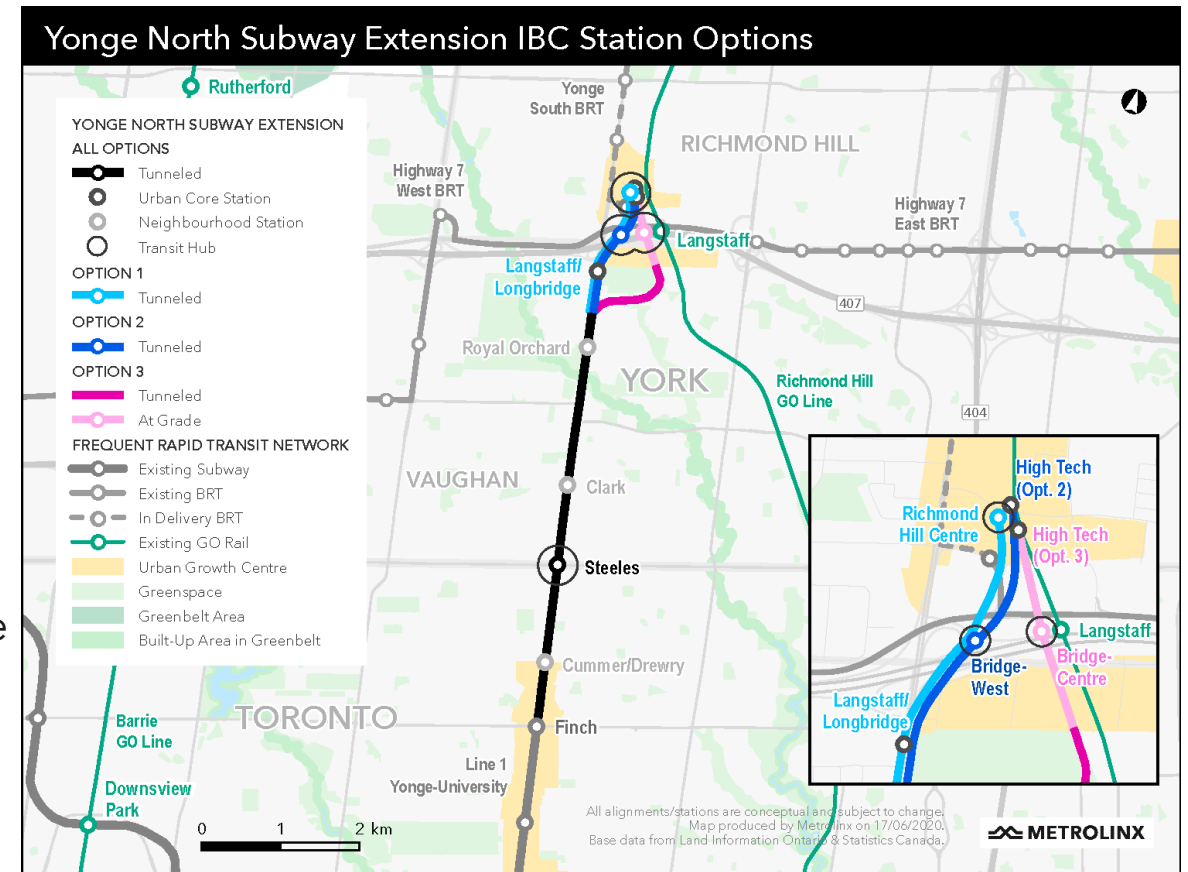
- Same alignment as approved EA, fully underground
- Funding envelope accommodates up to **3 stations**

Option 2

- Alignment curves east slightly to enable a different station placement, fully underground
- Funding envelope accommodates up to **3 stations**

Option 3

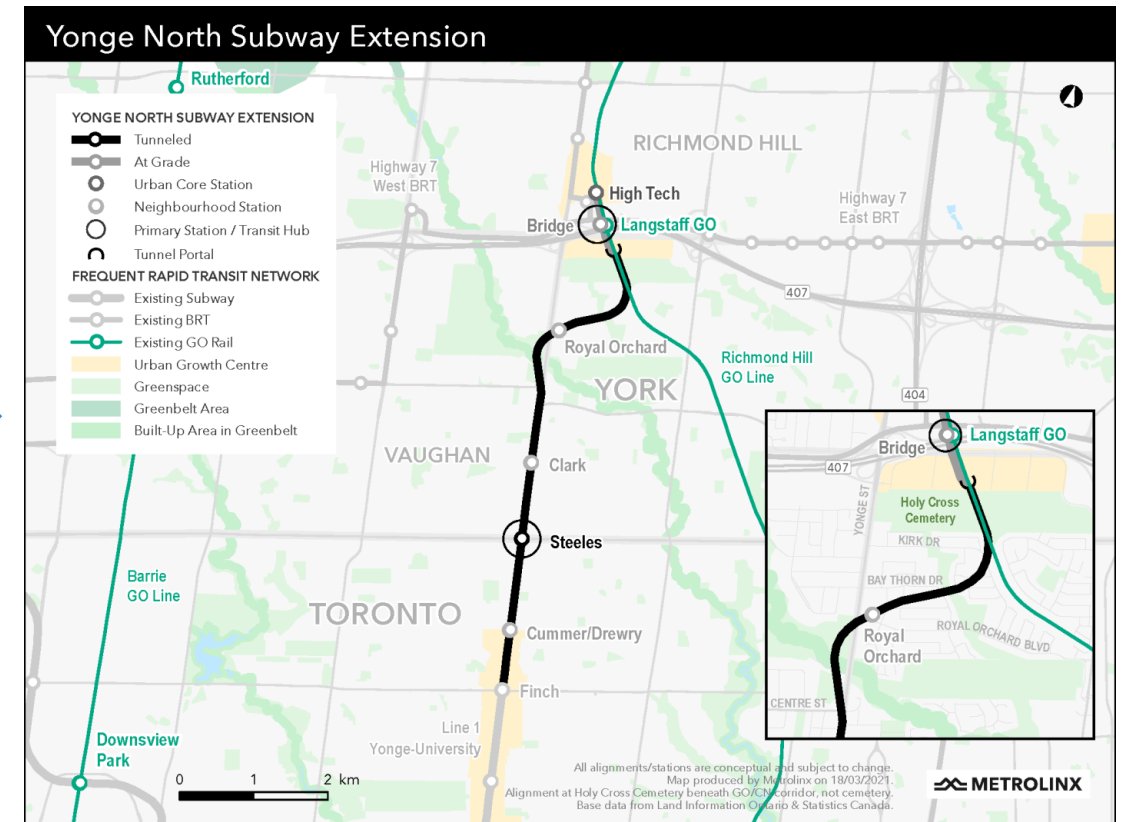
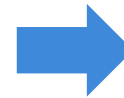
- Alignment curves east before turning again to run at-grade and within the CN/GO rail corridor
- Funding envelope accommodates up to **4 stations**
- *Challenges:* tunneling and excavation in additional residential areas, near Holy Cross Cemetery



OPTION 3 - REFINEMENTS



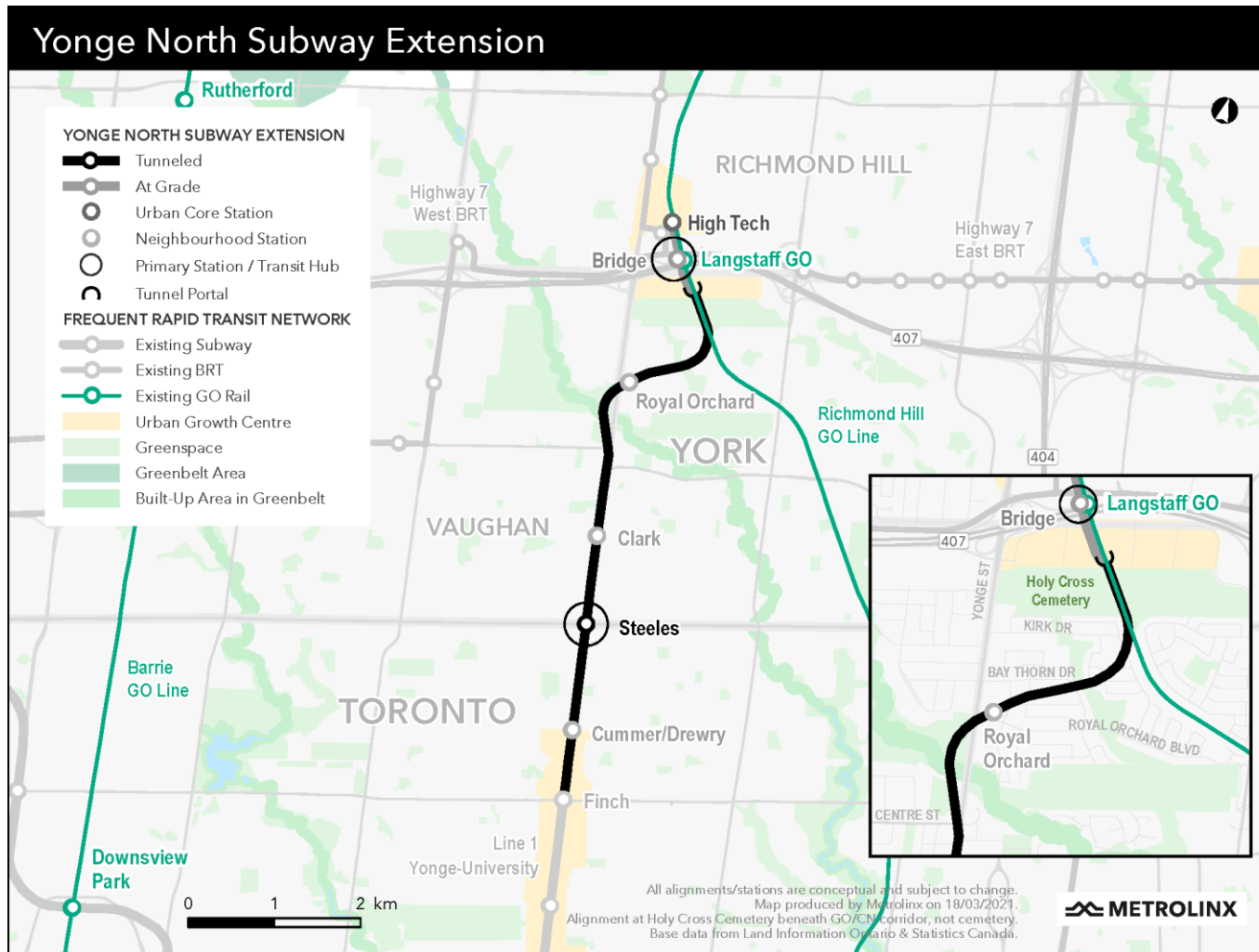
PRESENTED IN IBC



REFINED ALIGNMENT

- ✓ Key transit benefits
- ✓ Number of stations
- ✓ Design innovations
- ✓ Removes challenges of tunneling under Holy Cross Cemetery

APPROVED REFERENCE ALIGNMENT



- **Expected Benefit-to-Cost Ratio:** 0.79 (from 0.74 to 0.86)
- Potential for **highest number of stations** within \$5.6 billion project funding envelope
- **Primary Stations/Transit Hubs:** Steeles, Bridge
- **Complementary Urban Core Station:** High Tech
- **One Neighbourhood Station:** Cummer / Clark / Royal Orchard

** Further analysis on Neighbourhood Station selection to be conducted through next stage of business case process*

ABOVE GROUND ALIGNMENT

Running the extension above ground along the CN railway corridor means we can finish the project sooner.

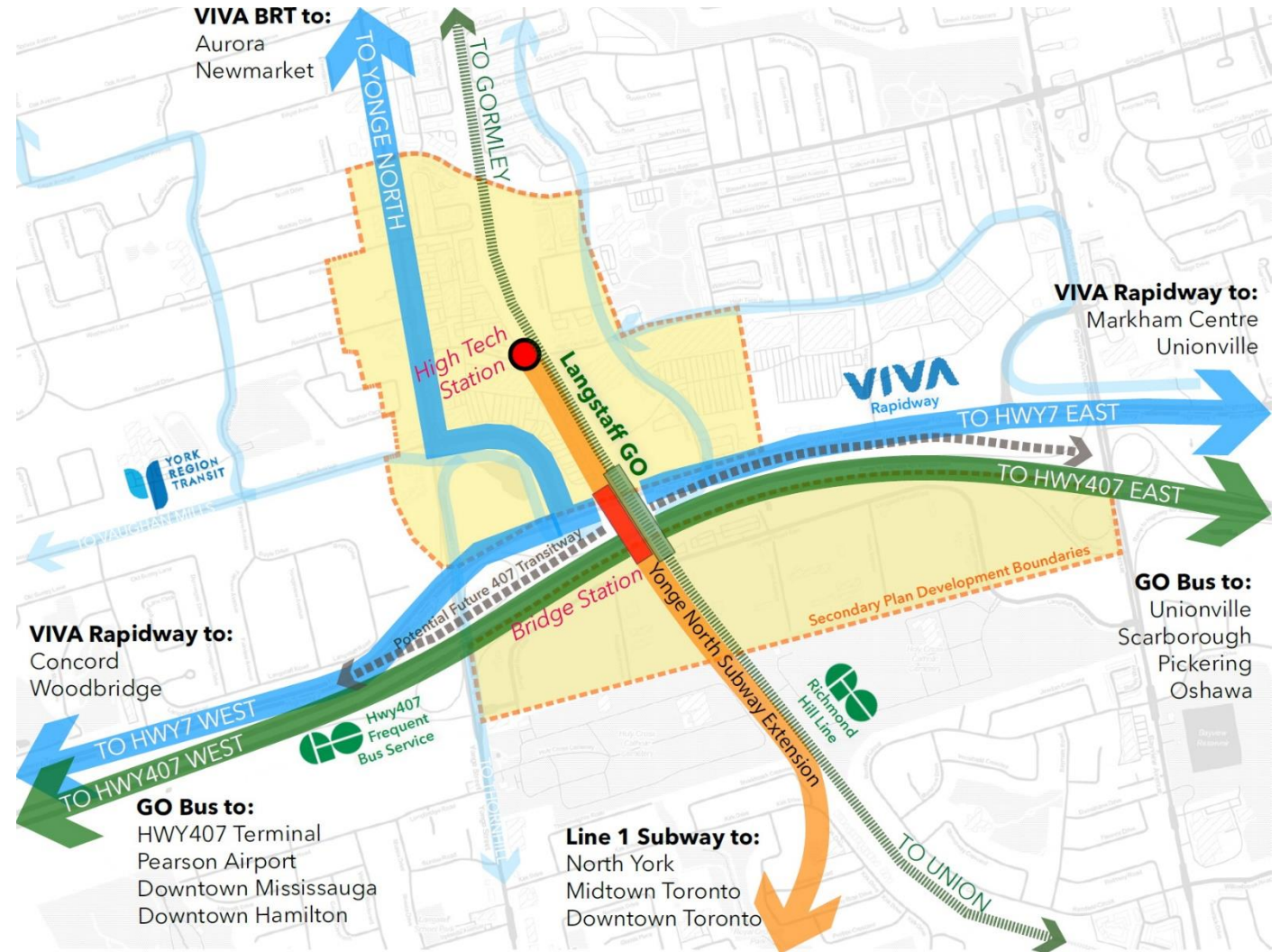
- At-grade subway lines have **been proven around the world** as a way to improve transit connections and strengthen communities
- Reduces the need for **complex, time-consuming, and costly** construction of tunnels and underground stations
- **Cuts down on disruptions** of hydro, natural gas, and water service
- Positions northern stations to provide **better transit connections** and more opportunities for nearby communities to grow



BRIDGE AND HIGH TECH STATION

Bridge Station and High Tech Station will serve the highest density areas to make it faster for riders to use the subway, and better for supporting growth and curbing local traffic congestion.

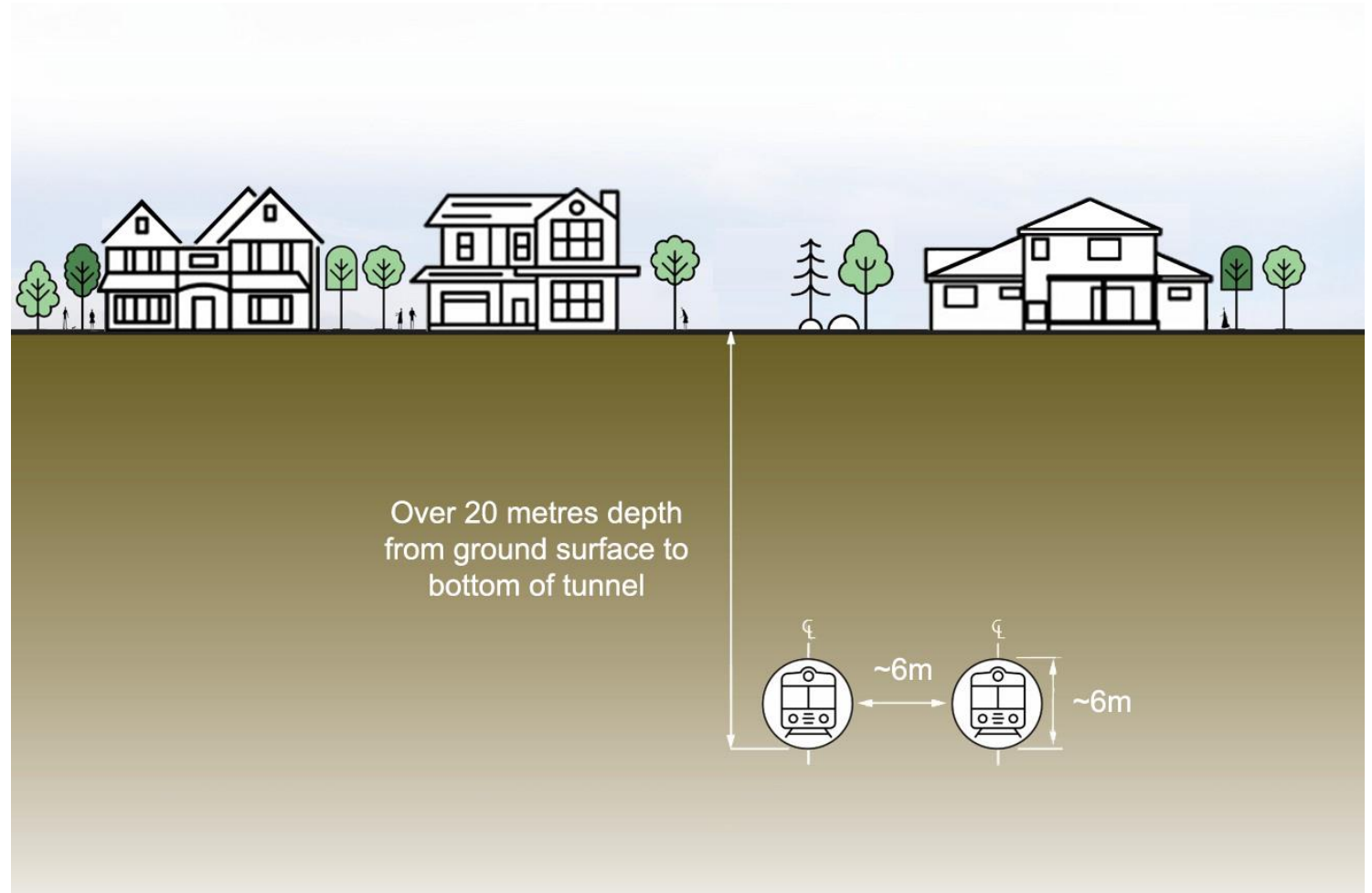
- **Fast and hassle-free** transfers to GO train/GO bus/local transit
- **Convenient access** to the subway at the heart of Richmond Hill Centre and Langstaff Gateway development areas
- More than half of Richmond Hill Centre residents will live within **walking distance** of High Tech Station by 2041
- Bridge Station site preserves nearby development space to allow the area to evolve into a **thriving urban centre**



TUNNEL DEPTH - ROYAL ORCHARD COMMUNITY

Metrolinx is committed to addressing any noise and vibration due to construction and operation of the extension.

- Tunnels are proposed to be built at a depth where there would be **no direct impact** on the homes above
- **Modern, innovative tunneling technology** is available to help minimize impacts through construction and operations
- Exact tunnel depths will be determined through further study.



More detailed information about potential impacts and mitigations will be available as further design work is refined

NOISE AND VIBRATION MITIGATION - CONSTRUCTION

- We are preparing an addendum to the existing **environmental assessment** (EA) that will cover off any changes to existing conditions since that EA was completed and evaluate the updated route.
 - The EA will study things like:
 - Noise and vibration mitigation
 - Soil and groundwater quality
 - The natural environment
 - Land use
 - Crews are already **collecting ground samples** along the route to inform this work.
- Metrolinx will **identify potential noise and vibration impacts** throughout the design and assessment phases, as well as study possible ways to mitigate these disruptions.
- We are committed to working with our neighbours to address any concerns and develop **mitigation plans**.



NOISE AND VIBRATION MITIGATION - LATEST TECHNOLOGY

We will work with your community to ensure a comprehensive array of measures are in place to address noise or vibration impacts.

These measures include but are not limited to:

- **Resiliently supported rail ties** have an elastic pad under them to prevent them from coming into direct contact with the crushed rock that forms the track bed.
- **Ballast mats** provide a continuous layer of material that prevents vibration from being transmitted into the ground.
- **Floating slabs of concrete** are mounted on pads or steel springs and effectively reduce vibration because they are separated from the primary tunnel structure.
- **Highly resilient fasteners** hold the track onto the under-rail foundation and compress to absorb vibration.

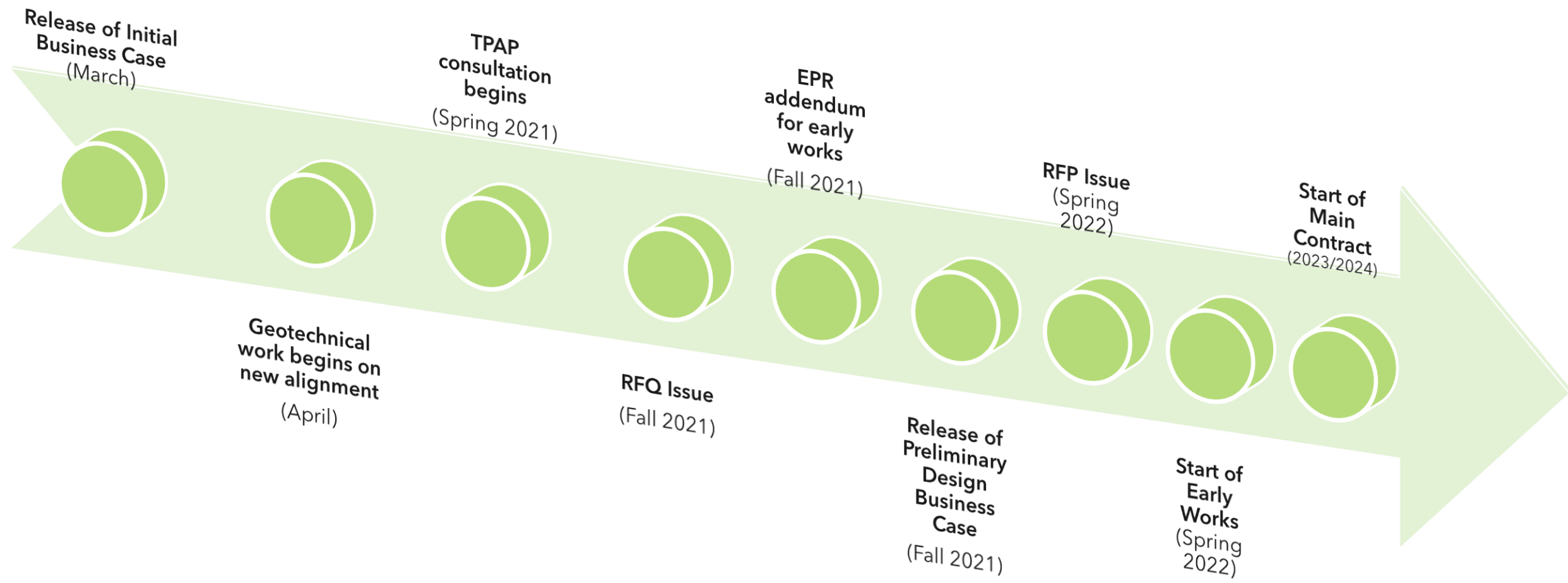


EXAMPLES OF SUBWAYS UNDER HOMES AND ADJACENT TO PUBLIC USES

There are many projects in the world with subways beneath homes and sensitive surface structures

- **Westside Subway Extension Metro Purple Line, Los Angeles, California (opening 2025)**
 - Tunnels directly below single family homes and challenging geologic conditions
 - Tunnel depth 15m to 18m
- **Northgate Link Extension - Seattle Washington (opening 2022)**
 - Tunnels directly below single family homes and Washington University Campus
 - Tunnel depth 20m under residential area
- **Toronto/York Spadina Subway Extension - Toronto/York Region, (2017)**
 - Tunnels directly below York University Campus
 - Tunnel depth average 11m, at York University 15m
- **Canada Line - Metro, Vancouver, British Columbia (2009)**
 - Passes under private residential properties adjacent to False Creek
 - Tunnel depth shallowest 7m to 17m

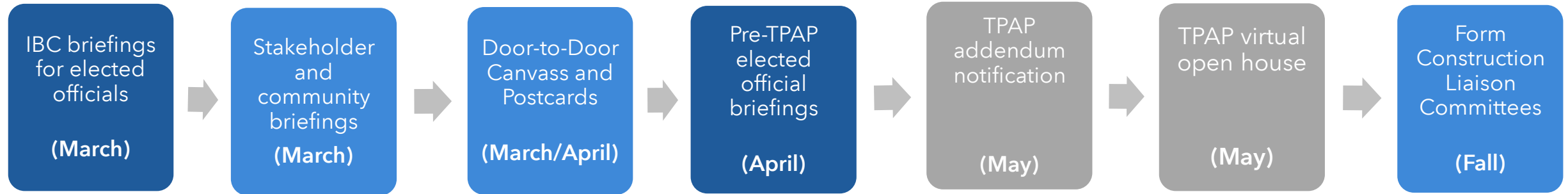
PROJECT MILESTONES



*Dates/timelines are subject to change

Communications, Community and Stakeholder Engagement

COMMUNITY & STAKEHOLDER ENGAGEMENT



OFFICIALS BRIEFINGS

- IBC Briefings for Elected Officials **Ongoing**
- Recent Council Presentations
 - Markham **March 22**
 - Richmond Hill **March 24**
 - York Region **March 25**
 - Vaughan **April 7**
- Pre-TPAP Briefings Elected Officials **April 2021**
- Indigenous Nations **April 2021**
- TPAP Presentations **May 2021**
 - Municipal Partners, Councils, TEO, TTC
- TPAP Update Briefings **June 2021-Jan 2022**

COMMUNITY ENGAGEMENT

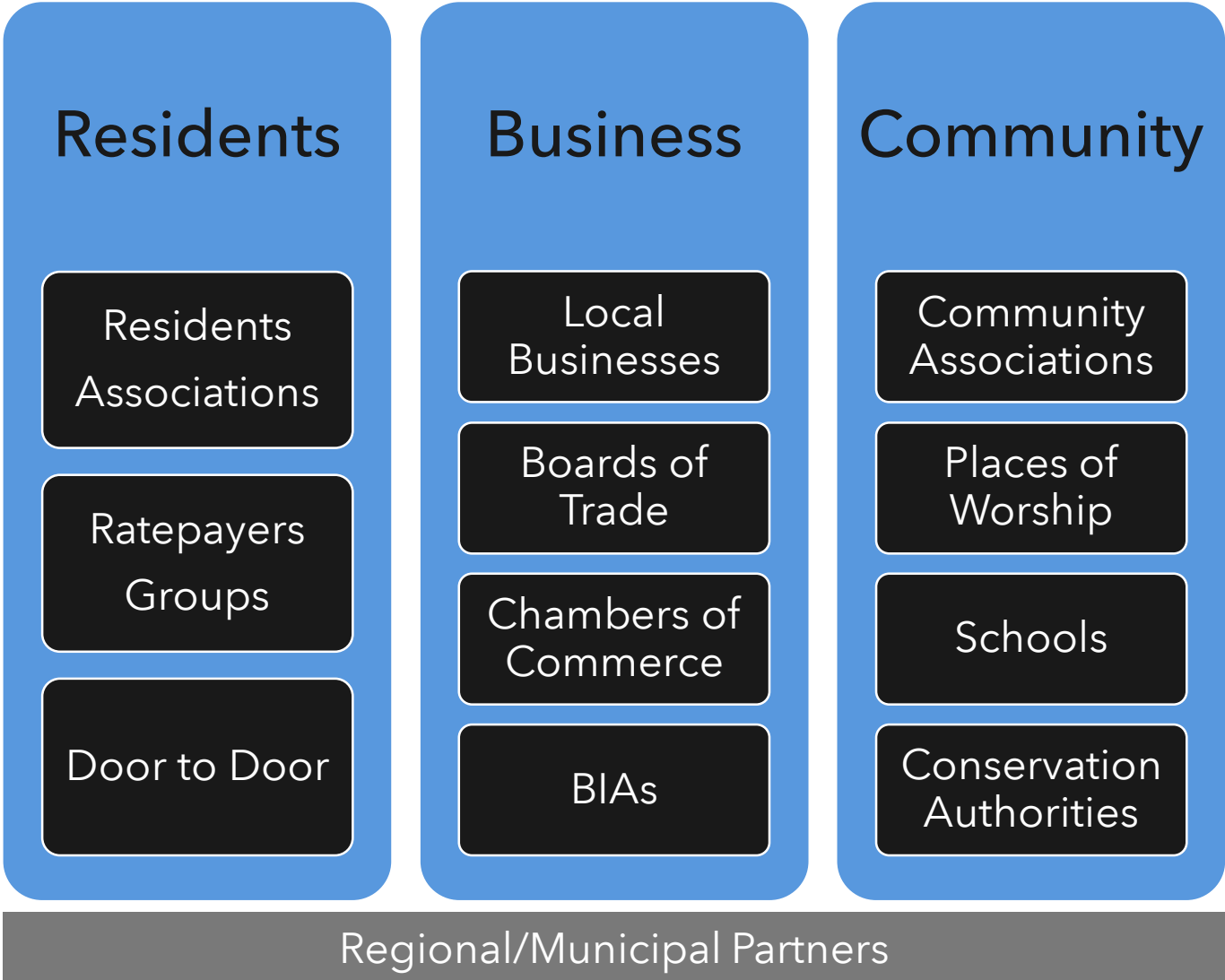
- Project Briefings to Community Groups **Ongoing**
 - Resident Groups, BIAs, Chambers of Commerce
- Door-to-Door Canvasses **Late March/April 2021**
 - Royal Orchard & Bayview Glen communities
 - Willowdale-Newtonbrook community
- Community Virtual Open Houses **April/May 2021**
 - Royal Orchard & Bayview Glen communities
 - Northern York Region
- Project Introduction Post Card **April/May 2021**
- Project Virtual Open House **May 2021**
- Project E-Newsletters **Bi-weekly**
- Form Construction Liaison Committees **Fall 2021**
- Community Walking Tours **Fall 2021**

TPAP PUBLIC CONSULTATION

- TPAP Addendum Notification **April/May 2021**
 - Announces upcoming TPAP
 - Virtual engagement portal
- Stakeholder pre-briefings **Late April/May 2021**
- Newspaper Ad **May 2021**
- Virtual Open Houses **May-Aug 2021**

Collaboration with Communications Partners (Municipal/Regional Communicators, TTC, YRRTC)

COMMUNITY & STAKEHOLDER ENGAGEMENT



Week of April 5:

- Royal Orchard Community Virtual Open House (April 7)
- Bayview Glen Community door-to-door canvass
- Ongoing briefings for resident, business and community groups

Week of April 12:

- Ongoing briefings for resident, business and community groups

Week of April 19:

- Bayview Glen Community Virtual Open House
- Project postcard mail distribution

Ongoing Metrolinx News articles

UPCOMING ACTIVITIES

Field work begins this spring:



- Noise & vibration monitoring
- Exploratory work for tunnels & launch shaft
- Utility investigations

Metrolinx's commitment to keeping communities informed

Residents near planned field work will receive **notification flyers** at least two weeks in advance

Updates on major field work will be distributed regularly via **email newsletter**

Major notices of work will be posted on the **Metrolinx** website

Construction Liaison Committees will open the lines of communication about all aspects of the project

NEXT STEPS

- Virtual Open Houses
 - Royal Orchard Community (April 7)
 - Bayview Glen Community
 - Northern York Region Communities
 - General York Region and City of Toronto
- Geotechnical Surveying in Royal Orchard Community (April 12 - early May)
- Markham Development Services Committee (April 26)
- Environmental Assessment Study

STAY CONNECTED - WE'RE HERE FOR YOU!

Subscribe:

- YongeSubwayExt@metrolinx.com
- 416-202-7000

Project Information:

- [Metrolinx.com/YongeSubwayExt](https://metrolinx.com/YongeSubwayExt)

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Appendix

CREATING CONNECTIONS IN MARKHAM

UNIONVILLE GO STATION

Improving Station Access & Enhanced Accessibility

- 300 new parking spots, replacing stairs with ramps
- Safe pedestrian walkways through the parking lot
- More bicycle storage and New pedestrian tunnels

Enabling More Service

- A second track and a turnaround track so trains can travel both ways on the Stouffville line

Platform Improvements

- Canopies over the platforms with shelters
- A new island platform and a relocated east platform with new snow-melting systems

FORECAST COMPLETION 2021



MOUNT JOY GO STATION

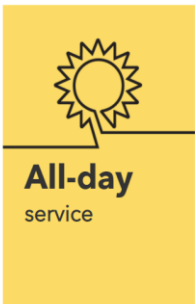
Early Station Improvements

- Enhanced safety and communication features now complete
- Installation of tactile yellow tiles at the edge of the train platform
- New digital signs on the train platform



GO EXPANSION IN MARKHAM

- Future service on the Stouffville line includes **two-way all-day service** between Mount Joy and Union Station, and fifteen minute service or better between Unionville GO Station and Union Station.
- Metrolinx is currently pursuing road-rail grade separations at Kennedy Road and Denison Street.
- Proposed Unionville Storage Siding as part of the New Track and Facilities TPAP



CREATING CONNECTIONS IN YORK REGION

In Construction:

- Bloomington GO Station (new)
- Rutherford GO Station and Grade Separation
- Unionville GO Station
- Lincolnville GO Station
- York vivaNEXT BRT
- Steeles Grade Separation

In Procurement:

- Barrie Contract 2 (Maple GO Upgrades)
- Barrie Contract 3 (King City GO Upgrades)
- Station upgrades at Aurora GO, Centennial GO, Markham GO, Mount Joy GO, East Gwillimbury GO, Stouffville GO
- GO Bus Expansion; Keswick to 404 Terminus at Woodbine

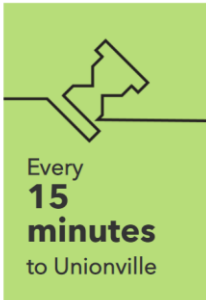
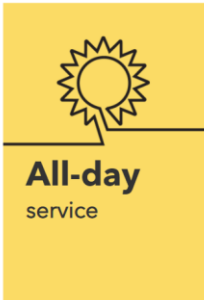
In Early Design:

- McNaughton Grade Separation (Vaughan)
- Wellington Grade Separation (Aurora)
- Network Electrification and infrastructure
- New rolling stock and locomotives



GO EXPANSION IN YORK REGION

- On the Stouffville line, **two-way all-day service between Mount Joy and Union Station**, and fifteen minute service or better between Unionville GO Station and Union Station.
- On the Barrie line, **two-way, all-day fifteen minute service or better between Aurora GO Station and Union Station**
- Parking expansions, station enhancements, grade separations, electrification.



APPROVED REFERENCE ALIGNMENT

| Refined Option 3 Alignment | |
|---|---|
| Strategic Case | |
| Strong Connections | <ul style="list-style-type: none"> 94,100 daily riders¹ |
| Complete Travel Experiences | <ul style="list-style-type: none"> 835,000 person-minutes daily travel time savings compared to BAU 22 minutes saving on a trip from Langstaff Gateway area (Langstaff/Ruggles) to Downtown Toronto (Yonge/Queen) compared to BAU |
| Economic Case | |
| Total Economic Impacts (Benefits) (\$2020, Present Value) | \$3666.5 M |
| Total Costs (\$2020, PV) | \$4386.3 M to \$5135.5 M |
| Net Present Value (\$2020, NPV) | \$-1358.6 M to \$-607.9 M |
| Benefit-Cost Ratio | 0.74 to 0.86 |
| Financial Case (\$2020, PV) | |
| Total Revenue Adjustment | 114.4 M |
| Capital Costs ² | \$4,625.0 M |
| Operating and Maintenance Costs | \$ -39.0 M |
| Total Costs | \$4,447.1 M |
| Deliverability and Operations | |
| Constructability Matters | <ul style="list-style-type: none"> Coordination with the York Durham Sewage System (YDSS) at Steeles East Don River Crossing Construction within the busy Yonge Street corridor Maintaining services on Line 1 during construction Interface with the Highway 7 and 407 Corridor |
| Property Impacts | <ul style="list-style-type: none"> No tunneling under Holy Cross Cemetery |
| Operations | <ul style="list-style-type: none"> Integrated into current Line 1 Operations Fully automated operation allows for higher service frequencies |

PROPOSED MAJOR CHANGES TO PROJECT ELEMENTS CONSIDERED IN IBC

Steeles Station

Moving Steeles Bus Terminal from Below Steeles Avenue to at-grade integrated with development

- Original proposal planned the bus terminal below Steeles Avenue perpendicular to and above the subway station
- Value engineering recommended relocating to at-grade to reduce costs and minimize impacts to YDSS and construction disruption

East Don River

Tunneling below instead of bridging over the East Don River

- Original proposal planned a two level (upper for road - lower for subway) bridge spanning the river valley
- Value engineering recommended tunneling below the watercourse to reduce costs and disruptions during construction

Train Storage Facility

Moving the YNSE Train Storage Facility north of High Tech Road from below ground to at-grade

- Original proposal planned a 3-track, 12 train below ground storage facility
- Value engineering recommended bringing the facility to at-grade in order to reduce costs while maintaining similar functionality

YNSE Alignment

Changing the point where the subway alignment shifts off of Yonge Street

- Original proposal for the alignment to shift east of Yonge Street north of Holy Cross Cemetery
- Value engineering and peer review identified potential benefit increases and cost reductions from bringing the subway to at-grade adjacent to the CN corridor, which will also better serve the central portions of the Richmond Hill Centre and Langstaff Gateway Urban Growth Centre