

TO: Board of Directors

FROM: Kevin Desmond, Chief Executive Officer

DATE: March 2, 2020

SUBJECT: Public Delegation at the December 6, 2019 Board of Directors Meeting

EXECUTIVE SUMMARY

The Board received three public delegations at its December 6, 2019 open Board meeting. Management followed up in writing with the delegation after the meeting.

On December 6, 2019, the TransLink Board of Directors received three public delegations, each speaking on the following topic:

- **Bus Stop Accessibility for People with Vision Loss**
 - The speakers spoke in favour of the recommendations being made to the Board of Directors at the December 6, 2019 Board meeting to improve bus stop accessibility for people with vision loss. The speakers shared their individual experiences and challenges in accessing bus stops on the TransLink system and also experiences with other transit systems in other cities.
 - Management responded to each speaker to confirm that the Board approved the recommendation made by Management in the Bus Stop Accessibility for People with Vision Loss report to the Board of Directors. It was noted that, as a result, over the next three years TransLink will be adding tactile and braille information at approximately 8,500 bus stops, installing tactile walking surface indicators at stops owned, licensed or leased by TransLink, and establishing a wayfinding technology project.

TransLink Strategic Priority: Implement the Mayors' Vision

Fleet and Infrastructure

Phase 2 Mark III status update:

- As of February 2020, 11 of the 14 new MKIIIs have arrived at our Burnaby operations and maintenance facility. Trains 1-7 are in full revenue service while trains 8-11 are in various stages of testing and commissioning.
 - Train 8 has completed stage 3 testing and is in revenue service.
 - Train 9 is in stage 1 testing.
 - Trains 10 and 11 have just arrived and are currently in pre-commissioning stage. It is anticipated that these two trains will be in service in April and June respectively.

Delivery and commissioning of MKIIIs are currently on track in order for BCRTC to meet our planned September 2020 service increase.

Modernize infrastructure to increase capacity and accommodate growth

- BCRTC railway infrastructure department was able to complete over 120 kilometres of running rail grinding for its annual grinding program. 10 kilometres of non-critical grinding in the schedule was not addressed this year but will be included in the 2020 grinding program. BCRTC utilizes a combination of in-house grinding and contracted services to grind and polish the Expo and Millennium lines.
- Work began on two escalators at Granville station along the corridor between the Granville Street entrance and the HBC entrance. These replacements are in addition to the three main escalator replacements that began in May 2018.
- Work began in December for the replacement of two escalators in the south stationhouse at Commercial-Broadway station. It is anticipated that this replacement work will take six months to complete.

These activities are part of the Expo Line Escalator Replacement program, which when finished, will replace 37 escalators at 13 Expo Line Stations by the end of 2023.

Implementation of McNeil recommendations

- The OMC1 power system upgrade project continued in Q4 with foundation and structural work to the OMC1 substation, which is undergoing an expansion to make room for upgraded power equipment critical for existing and future service needs. Work also began on the installation of a second BC Hydro power feed into OMC1. This project reduces the risk of service disruptions by upgrading aging power equipment, while also improving resiliency and system continuity redundancies for critical system elements.

TransLink Strategic Priority: Maintain a State of Good Repair

Safety

Certificate of Recognition (COR) Audit

- BCRTC successfully passed its 2019 COR audit. Our scores for Occupational Health & Safety (91%), and Return to Work/Stay at Work (84%) rose significantly over 2018's COR audit results. COR is a review of safety, training, inspection documentation, site/job observations, and interviews of staff by WorkSafeBC to evaluate an organization's occupational health and safety management system.

Safety campaigns

- BCRTC assisted TransLink Marketing with the launch of a passenger winter safety awareness campaign on trains and in stations to remind customers and employees to slow down and hold on while in trains and on escalators and stairs in order to prevent slip, trips and falls. Safety statistics during the snow events in January showed remarkably low incidents with two customer injuries reported.
- Over the past three years, the SkyTrain passenger injury rate continues to show steady improvement. The 2019 (0.91) injury rate was lower compared to 2017 (1.29) and 2018 (1.06). The last five months of 2019 were all favourable to target for passenger injuries. BCRTC's Passenger Injury Task Force has been established to ensure we continue to improve on this KPI.

Active assailant procedures campaign

- Safety, Environment & Emergency Management toured the Field Operations department to speak to SkyTrain Attendants on the new active assailant protocols, which addresses the threat of an active assailant of any kind by providing awareness, preparation, prevention, and response methods.

Safety building inspections

- This quarter 100% of OMC1 work site safety inspections were completed. This completion rate has been experience every month since July. BCRTC has seen a dramatic increase in this completion rate for 2019 with a 94% completion rate compared to 69% in 2018 and 39% in 2017.

Great Shake Out BC

- BCRTC participated in the provincial Great BC ShakeOut earthquake preparedness exercise on October 17. BCRTC activities also included information shared with employees via our employee portal, work site digital display screens, and email.

Our People

Labour Relations

- In December, BCRTC and CUPE7000 successfully negotiated a new collective agreement for unionized SkyTrain employees. BCRTC completed negotiations with CUPE7000 on December 10. A four year agreement was ratified on December 19 that results in several improvements to wages (including a general labour increase of 3% annually), premiums and other benefits.
- The agreement includes a commitment to implement changes to retiree extended health and dental benefits that is expected to reduce BCRTC's post-retirement benefit obligation.

Employee recognition

- In October, we celebrated service milestones for 28 of our employees who have achieved 25 or more years of service. Included in this group was our first employee to celebrate 35 years of service.

Enterprise charitable campaigns

- In Q4, BCRTC participated in the enterprise United Way employee giving campaign and the Toys for Tots event. Employees raised nearly \$16,000 and donated 400 toys.
- West Coast Express' Santa Train events in December collected over 4,700 toys for local charities.

SkyTrain Attendant refresher training

- BCRTC's Training department continued the STA refresher training in Q4. Topics covered in Q4 included reviews of system rules and medical emergency procedures. Over 270 STAs receive refresher training every quarter to support providing a safe and secure service with excellent customer service.

Maintenance

- Train reliability has seen a significant improvement compared to 2018. This key performance indicator is measured using “Mean distance between service removal”. In 2019, the mean distance traveled before a train was removed from service due to a mechanical or system issue was 236,700 kilometres. This was a 116% improvement compared to 2018. Improved maintenance practices, better collaboration between departments, and increased oversight on repeat failures have all played a part

Railway infrastructure maintenance activities:

Replacements:

- Two full turnout change outs (switches and component rail)
- Three switch machines
- Two running rail plugs

Grinding:

- 7.5 km of mainline track
- 23 switches

Rolling stock maintenance activities this quarter:

Replacements:

- 476 wheelsets lathed/turned
- 24 door operators
- 35 wheelsets changed out
- Six trucks changed out

Inspections:

- 296 train cars inspected. Inspections are performed every 20,000 kilometres.

MK I refurbishment:

- Six MKI cars (floors/seats/stanchions). 108 of 114 cars have had their floors replaced – only six cars are left. 26 cars left to complete sensitive edges modifications. The program is on schedule.

Implement formal asset management plan

- System integrator Request for Proposal for EAM completed its evaluation stage and a successful proponent was recommended.
- Asset data collection work continued for support shops and elevating devices. All planned data collection is on schedule.

Capital & Major Business

Expo-Millennium upgrade program

- Due to the future Broadway subway and Surrey-Langley SkyTrain expansions, an upgrade of SkyTrain’s operations control centre (OCC) is required as the current OCC is not big enough to adequately operate these extensions. Preliminary design work continued in Q4 for the new OCC.
- Design phase of the OMC1 and 2 upgrade to facilitate the Mayors’ Vision continued in Q4; 90% of the design plans for the two facilities is currently complete. Conceptual design planning for OMC 4 continued throughout Q4.
- In order to accommodate future growth, more work spaces need to be made available. At OMC1 storage space will be converted into office space starting Q1 2020.

Expo and Millennium SkyTrain Service

Service delivery

- In Q4, BCRTC successfully delivered 99.72% of scheduled service which is above the target of 99.70%

On-time performance

- Q4 on-time performance (OTP) of 95.9% which was just below the target of target of 96.5%. The main reasons for delays include manual driving training, train time-outs, and a wind storm in October that blew a lot of debris into the guideway.

Overall, this year's OTP of 96.14% was the second highest on-time performance since 2012 with eight months over the target. Nearly achieving our OTP target, despite the snow storms in February, is a testament to SkyTrain's strong performance throughout the year.

SkyTrain service delays

- There were 23 service incidents in the 16-30 minute delay category in Q4. This is above the target of 12 incidents per quarter. The main causes for delays were weather events, train door issues, manual driving, track intrusions, and medical emergencies. There were four delays over 30 minutes in Q4. This is in line with the target set for this category.

While we have seen an increase in this category of delays for 2019, we improved our delay recovery time from an average of 28 minutes to 25 minutes (12% reduction) compared to 2018.

- In total, SkyTrain experienced 88 delays vs 62 in the previous year. 59 (67%) of the delays were caused by internal factors, mainly door issues, and on-board computer timeouts. In 2020 Q2-Q4, the maintenance Division will implement door-related maintenance initiatives and Automatic Train Operation (ATO) software updates to reduce door and ATO-related incidents.

Ridership

- In Q4, SkyTrain recorded its busiest month ever with 10.4 million boardings in October.
- Overall, Expo and Millennium Lines recorded nearly 115 million boarded passenger in 2019. This is 3.6 million more boarded passengers compared to 2018.

Customer experience

- Elevator availability was above target for Q4, with favourable scores from August-December.
- A new customer service walk up centre opened in October. The SkyTrain Assistance Centre at Commercial-Broadway station will enhance the customer experience to the tens of thousands of passengers that pass through this major transit hub on a daily basis by giving customers easier access to transit advice and services with our STAs being at the counter during operating hours.
- Customer complaints for 2019 was significantly better than target. Overall there was 13.8 complaints per million boarded passengers (pmbp), which was better than our target of 15 complaints (pmbp).
- An "Information during disruption" working group is looking at long term and short term improvements. This has already resulted in daily testing of PA equipment, a review of our announcement standards, the development of standard contingency plans and some technical upgrades to ensure our message delivery is more robust.

Implementation of McNeil recommendations

- The PIDS/CCTV/PA project work is currently being performed at the following stations: Gilmore, Brentwood, Holdom, Sperling, Metrotown, Granville, and Royal Oak.

Renewal of SkyTrain cleaning contract

- A new cleaning contractor began service in December. The contractor is responsible for cleaning stations, trains, maintenance facilities and offices. Based on first impressions we are pleased with the quality of our cleaning services and cleaning is more consistent against specification.

2020 Winter Service Event

In January we experienced winter weather conditions between January 9 and January 19. BCRTC implemented its snow plan from the start of this period. The system experienced the heaviest snowfall, lowest temperatures (-8°C), and strongest winds on Tuesday, January 14. The type of snow (dry and cold) was uncharacteristic for what is generally experienced in the Metro Vancouver region.

During the snow plan, all trains are staffed with a SkyTrain Attendant to monitor tracks because intrusion alarms are switched off to avoid false alarms triggered by snow fall which results in emergency braking of trains. The Expo Line experienced a reduced service, while Millennium Line service was halved but the capacity per train doubled with the deployment of four-car trains. In total we operated around 50 trains per day during peak hours, where SkyTrain would normally operate 70 trains.

The Expo Line showed high levels of crowding, not necessarily because of increased demand but because of the reduced service. OTP during this 10-day period was 64.06% and service delivery was 81.85%. The main reasons for these low levels of performance were service delays and adjustments made for weather (25.39%), doors (3.68%), train operations (1.64%), guideway (1.35%) and power issues (1.29%).

Main successes were:

- Staff availability, both in field and maintenance.
- The appointment of a Snow Manager to ensure a coordinated response.
- Recovery to a normal service once the weather returned to normal.

Key lessons learned:

- Improve and update of our winter preparedness checklists; this avoids that lessons learned from the past will be overlooked.
- Improve briefing of managers and frontline staff to increase responsiveness.
- More targeted deployment of staff on platforms; allow a pit-stop approach for de-icing doors and trains.
- Update protocols (e.g. line inspections, use of de-icer fluid, response to power issues). Some protocols were outdated leading to suboptimal responses and possibly unnecessary delays.

Key Performance Indicators – as of December 31, 2019	SkyTrain (excluding Canada Line)			West Coast Express		
	Dec. YTD Target	Dec. YTD Actual	Dec. YTD Last Year	Dec. YTD Target	Dec. YTD Actual	Dec. YTD Last Year
Customer Experience				Customer Experience		
Customer Service Performance Survey – SkyTrain Service Overall (Q3 Results) ¹	8.3	8.4	8.3			
Boarded Passengers (in thousands) ²	117,179	114,854	111,325	2,485	2,607	2,485
Customer Complaints (per million boarded passengers) ³	15	13.8	15.4	98.5	89.0	104.2
Safety				Safety		
Major Passenger Injuries (per million boarded passengers) ⁴	0.95	0.91	1.06	0.4	0.38	1.21
Employee Lost Time Frequency (per 200,000 hours worked) ⁵	4.11	5.8	5.3	0	0	0
Lost Time Incidents	39	50	43	0	0	0
Total Recordable Incident Frequency	34.80	31.58	38.54			
Workplace Inspections Completed	100%	94%	69%			
Operations				Operations		
On-Time Performance ⁶	96.50%	96.14%	96.38%	96.68%	96.02%	96.67%
Percentage of Scheduled Service Delivered ⁶	99.70%	99.41%	99.68%	99.90%	99.81%	99.99%
Service Delays 16 – 30 Minutes ⁷	48	72	46	-	-	-
Service Delays 30 Minutes or more	18	16	16	-	-	-
Finance				Finance		
Operating Cost per Vehicle km ⁸	\$3.48	\$3.48	\$3.20	\$14.37	\$13.82	\$14.00
Operating Cost per Capacity km ⁸	\$0.034	\$0.035	\$0.033	\$0.097	\$0.094	\$0.095

1 The TransLink Customer Service Performance survey is completed quarterly for Expo/Millennium Lines and bi-annually for West Coast Express. BCRTC Q4 results improved slightly over the previous quarter. The highest scores were for having courteous, competent and helpful SkyTrain staff and providing on-time, reliable service. Meanwhile, the lowest scores were for the SkyTrain being crowded, and for delays not being announced and explained.

2 EM Ridership continues to increase overall and was about +3.5M riders (+3.17%) more than in the same YTD period in 2018. Record ridership was seen in October 2019 (10.4M passengers), and was about +7K above the monthly budgeted ridership. However, the boarded passengers in November and December fell short of the respective monthly budgeted ridership. WCE also continues to experience a healthy increase in ridership: +121K passengers (+4.99%) more than in the same YTD period in 2018. There were a record +242K rides in October 2019. Ridership in December 2019 was about 11K short of the December budgeted ridership.

3 EM Complaints rate remained better than the target and was less than 2018 YTD numbers for the same period. WCE complaints rate was down by -14.6% compared with the same YTD period in 2018. Thus sustaining the trend for most of the year in which complaints were below the monthly target of 98.5 complaints per million boarded passengers.

4 EM passenger injuries per million boarded passengers were less than 2018 YTD for the same period. The number of serious injuries in Q4 (21 passenger injuries) was however marginally higher than in Q3 (20 injuries; including 4 in October, 9 in November and 8 in December).

5 There were 11 LTI claims accepted in Q4 compared with 10 in Q3. LTIF YTD as of December is above 2018 YTD and 2019 target. There were 8 injuries in Q4, the same number as in Q3. There were no Lost Time Incident claims for WCE in 2019.

6 Both OTP and Service Delivery were below the 2018 YTD numbers and 2019 targets by only a few percentage points. In Q4, the lowest OTP and service delivery was in October (94.72% and 99.49%) compared with the monthly targets (96.50% and 99.70% respectively). After several CP related delays impacting OTP earlier in the year, WCE OTP improved significantly through Q4. Q4 had the best OTP of all four quarters, and service delivery was 100%

7 Total delays in 2019 were higher than 2018. In total, SkyTrain experienced 88 delays vs 62 in the previous year. 59 (67%) of the delays were caused by internal factors such as door issues, and on-board computer timeouts. In 2020 Q2-Q4, the maintenance Division will implement door-related maintenance initiatives and Automatic Train Operation (ATO) software updates to reduce door and ATO-related incidents.

8 Includes Allocated Costs; excludes 3rd Party Revenues and Depreciation.

For the 12 months ended December 31, 2019 Expo and Millennium operating costs were favourable due to lower labour costs driven by temporary vacancies and lower benefit costs offset by higher overtime, partial deferral to 2020 of train condition assessment, lower property taxes and hydro costs, partly offset by higher maintenance activities and snow and ice removal costs. Operating Cost per Vehicle km were on budget and Operating Cost per Capacity km was slightly unfavourable due to lower kms and capacity mainly from the delay of Mark III cars.

For the 12 months ended December 31, 2019 West Coast Express was favourable largely due to higher contractual performance discounts, lower diesel fuel cost and lower salaries driven by temporary vacancies partially offset by higher maintenance and snow and ice removal costs.



TransLink Strategic Priority: CUSTOMER EXPERIENCE AND PUBLIC SUPPORT

CUSTOMER EXPERIENCE

On-time Performance

- On-time performance for Q4 2019 was slightly higher than Q3 for both Punctuality and Regularity despite Unifor job action taking place last fall. For the service we provided in Q4, Punctuality was 80.5% (0.3% higher than Q3) and Regularity was 78.4% (0.7% higher than Q3).

CMBC Labour Disruption

- On November 4, 2019 CMBC activated the Emergency Operations Center (EOC) in response to Unifor job action. The EOC was activated for four weeks and primarily focused on mitigating labour disruption impacts through proactive measures, providing communications, coordinating operational challenges and planning concepts, and centralizing service impact analysis.

Winter Weather

- In fall 2019, TComm liaised with municipalities to ensure CMBC's priority snow routes were aligned with the Snowy Weather Action Plan (SWAP), and to resolve issues in previously identified problem areas.
- During snow events, additional resources were added on the road and to TComm, three buses were added to the Burnaby Transit Centre (BTC) to assist with SFU service, 60' buses were replaced with 40' for improved traction, and trolley overhead wires were coated with anti-icing fluid in advance.
- Between December 1, 2019 and January 31, 2020, CMBC established bus bridges on 12 occasions to assist during SkyTrain disruptions.
- During snow events, standard 40' buses were outfitted with tire socks on Route 210 (Upper Lynn Valley) and Route 246 (Highland) in North Vancouver and Route 95 (Simon Fraser University) in Burnaby. Tire socks were deployed on four occasions between January 12 and February 4, 2020. In addition, in mid-February, our tire sock designer visited from Germany to discuss modifications that could improve their durability. Testing will take place in the first weeks of March.

Protests Affecting Service

- Ongoing protests caused numerous service interruptions across Metro Vancouver throughout the month of February including shutdown of West Coast Express service on February 13, 14, and 24, 2020. TComm, Transit Supervisors, Transit Security, Customer Information, and depot staff played an integral role in providing assistance in an efficient and effective manner by staying ahead of the evolving situation, providing alternate service options, and assisting customers. Positive feedback from customers was observed on social media.

Bus Speed & Reliability Program

- The Service Design team is working with TransLink System Planning to improve bus speed and reliability by identifying areas of bus delay, developing solutions in partnerships with cities, and funding bus priority projects.
- Service Design staff continue to identify areas of bus delay using Automatic Vehicle Locator (AVL) data and Operator input. Staff is also assisting in the evaluation of applications for TransLink's 2020 municipal funding program which allocates \$3.5M to cities for bus priority projects.

All-door Boarding on Routes 143 and 145

- With the successful implementation of all-door boarding on Route 143 (Burquitlam Station/SFU) and Route 145 (Production Station/SFU) effective September 2, 2019, all articulated buses operating to/from Simon Fraser University now offer all-door boarding.

Electric Bike Policy Update

- In January 2020, CMBC updated its policy to allow customers to travel with an electric bike on the bus bike rack. Due to weight restrictions, scooter-style electric bikes are still not permitted.

Wheelchair-accessible Bus Stops

- As of the end of January 2020, CMBC reached 79.3% for bus stop wheelchair accessibility with 6,656 accessible stops across the system.

Transit Security Presence and Visibility

- Transit Security Officers continue to engage with customers and internal and external stakeholders at loops and exchanges. They focus on the protection of employees, properties, and revenue by providing high-visibility security presence throughout the system including transit centres, rectifiers, and HandyDART.
- In January, Transit Security Officers assisted with the roll-out of RapidBus and its all-door boarding feature with over 10,000 fare checks completed, 160 verbal warnings, and only four fare infractions cited.

Helping Hands Christmas Giving Campaign

- This past holiday season, Transit Security Officer Nathan Chand organized employees from Operations, Transit Security, Transit Police, TComm, and the Transit Supervisor group to collect more than \$3,600 in donations. Accompanied by family, friends, and other enterprise staff, they assembled and handed out over 320 care packages to the homeless in the Downtown Eastside.

Lean Process Improvement Initiatives in Maintenance

- *Reporting Methodology for Lost Service Hours Due to Maintenance* – New processes including new tracking methods and data streams (e.g. TComm data) have been identified as key next steps for further progress under this initiative.
- *Fleet Overhaul (FOH) Rebuild Process for Allison Hybrid Transmission* – More Allison hybrid transmission rebuilds are planned for 2020 using the latest rebuilding processes. Time studies will be conducted to establish standardized times for rebuilding units.
- *FOH Parts Optimization* – By the end of 2019, implemented changes to processes yielded a 67% reduction in overall days observed for buses down for parts originating from FOH. Overdue work orders for inventory repairable items were also reduced by 36%. Further progress is expected in 2020.

Access Transit Service Delivery (ATSD) Update

- *Ridership* – Ridership for HandyDART continued to rise through Q4 2019, culminating in 9,863 trips over budget for December. By year-end, HandyDART had delivered 66,433 trips in 2019 more than 2018. HandyDART trips exceeded the Investment Plan by over 8,842 trips, or 0.06%.
- *On-time performance* – HandyDART on-time performance improved in Q4 ending 2019 at 87.47%. This is slightly higher than the 87.14% on-time performance observed in 2018. Even this small increase is significant given an excessive number of trips were delivered in the last quarter of the year. In December 2019, First Transit increased HandyDART vehicle runs (exceeding budgeted service hours by more than 3,000 in December alone) and maximized taxi utilization (14.77% utilization) to accommodate almost 10,000 unplanned trips.
- *Trip denials* – Denials continue to be at an all-time low, ending 2019 at 0.08% (target: 0.12%).
- *System* – The Trapeze Hosting Amendment was finalized and signed off in November 2019. ATSD then moved forward with an update to the platform to prepare for 2020 upgrades.
- *Travel Training* – In 2019, ATSD participated in 79 Travel Training sessions with a total of almost 4,000 participants. Sessions were held in communities across Metro Vancouver. When asked, “Has today’s presentation made you more likely to use public transit?” the majority (79.31%) of respondents answered positively.
- *Complaints* – ATSD continues to receive a high number of complaints, prompting the roll-out of refresher training for all staff at First Transit in Q1 2020. In addition, the Taxi Association will provide a mandatory one-hour training module for their staff. First Transit is working with the Association to develop and deliver the content.
- *Facilities* – It was identified that ATSD was at risk of losing two HandyDART properties in 2020: North Road in Coquitlam and River Drive in Richmond. The risk has been mitigated for 2020, but ATSD has engaged with TransLink to be part of the real estate study that will be initiated in 2020 to develop a longer-term solution.
- *Lean* – Two additional ATSD managers went through Green Belt training. Their Kaizen projects concerned the HandyDART Cancellation Policy and Subscription Trip processing.

SAFETY

Safe Driving Refresher Program

- Operator & Technical Training developed the “Safe Driving Refresher” online learning including a series of videos and e-learning modules for Conventional Transit Operators, with a subset of these offerings planned for Community Shuttle Operators. Video topics include right and left-hand turns and e-learning modules include driving in inclement weather and night conditions. Videos were released via the MyCMBC intranet in December 2019 with the full release of content planned via the MyLearn LMS in late Q2 2020.

One-day Refresher Training Program

- After confirming content scope with internal stakeholders, Operator & Technical Training has begun the design process to launch a “One-day Refresher Training” program for Transit Operators in 2020. There will be separate syllabuses for Conventional Operators and Community Shuttle Operators with both involving instructor-led refreshers on safe driving skills, customer relations, and violent incident prevention. The Conventional refresher program will also include the use of the new bus simulator. Design and developmental work began last year, and program launch is expected in late Q1 2020.

Video-based Route Training

- Operator & Technical Training successfully implemented and delivered several rounds of video-based route training in 2019. The training supported the launch of RapidBus in January 2020, as well as other applicable route movements between depots such as moving Route 555 (Carvolth Exchange/Lougheed Station) to Richmond Transit Centre. Similar training is planned for the launch of the R2 Marine Drive RapidBus in April 2020.

Transit Operator Protection Barriers

- As of year-end 2019, 564 conventional buses were outfitted with Operator Protection Barriers with 468 retrofits to come.
 - *Xcelsior buses* – As of the end of February, 36 Xcelsiors have had barriers installed. By the end of 2020, the 63 buses in our fleet will be complete.
 - *Trolleybuses* – As of the end of February, 26 trolleybuses have had barriers installed. By the end of 2020, the 250 buses in our fleet will be complete.

Transit Operator Assaults Statistics

- CMBC recorded 85 assaults on our Transit Operators in 2019. This is the lowest historical number of incidents and incident rate on record. In addition to the Operator Protection Barriers, the work of the Violence in the Workplace (VIW) committee, Transit Security, and Transit Police will continue to mitigate acts of violence against our front-line employees.
- HandyDART recorded six assaults in 2019. A Violence in the Workplace (VIW) risk assessment for HandyDART Operators was completed by First Transit. Their report was submitted to WorkSafeBC late last year. They concluded that, with current controls in place, workers continue to be at low risk. Their operations, however, do require VIW procedures and training for workers. The approximately 600 affected workers are expected to all be trained by April 2020.
- The 2019 assault rate for West Vancouver Transit trended higher compared to the previous year's results. West Vancouver Transit has approved the implementation of Operator Protection Barriers and established a contract for an installer to retrofit their coaches. All barriers will be installed by December 31, 2020. Thirty-one buses will be retrofitted with barriers, leaving 15 without. Buses chosen for retrofit are Xcelsiors (2012 and newer) and are the buses that spend the majority of time on the road and have many years of useful life left.

Commercial Vehicle Safety and Enforcement (CVSE) Audit

- CMBC recently passed a compliance audit by Commercial Vehicle Safety and Enforcement. CVSE audited elements related to the National Safety Code such as Operator service records, tracking hours worked, drivers' abstracts, violation tickets and disciplinary records, and safety plans.

ENVIRONMENTAL STEWARDSHIP

Low Carbon Fleet Strategy (LCFS)

- Key findings from the LCFS Phase II report and transition options for fleet electrification were presented at the CMBC Board Meeting and TransLink Board Strategy Session in January 2020.
- Phase III scope of work is being finalized and will include the following topics: operational planning, asset specification requirements, and energy management.
- Funding opportunities from the provincial and federal governments to support the path toward fleet electrification are currently being explored.

Facilities Renewable Energy Plan

- The Facilities Renewable Energy Plan for transitioning to the use of 100% renewable energy was presented to the Bus and Facilities Steering Committee in January 2020.
- The plan includes elements of energy efficiency improvements, switching from natural gas fuel to electricity for heat, as well as future on-site electrical generation in the form of solar photovoltaics (conversion of light into electricity using semiconducting materials).
- The next step is to develop an implementation strategy based on three scenarios: conservative, progressive, and aggressive.
- Guidelines for the use of 100% renewable energy in new builds was also developed and will be taken into consideration for the future Marpole Transit Centre.

Battery-electric Bus Pilot

- Battery-electric buses continue to operate on Route 100 (22nd Street/Marpole Loop) for rush-hour service and will slowly transition to all-day service.
- Third-party data logging applications were installed on the buses in December 2019 ahead of the launch of CUTRIC's Data and Evaluation Monitoring Program in January 2020.
- Due to heavy rains throughout the month of December 2019, the vehicles experienced water leakage and circuit board issues that had to be addressed with the manufacturer.
- CMBC is also working to address Transit Operator issues to improve successful charging events.

Employee Electric Vehicle Charging

- Development of an employee electric vehicle charging policy is being led by the Environmental Sustainability team. The policy will help shape the nature and direction of how employees can charge personal vehicles at CMBC facilities. An implementation strategy and draft policy will be reviewed by CMBC leadership in June 2020.

Spills KPI Target

- In 2019, CMBC had a record year-end spill rate of 2.19% spills per million kilometres which is the lowest spills KPI value on record since 2006 and is less than half the 2019 target of 5.9%.
- For 2020, Maintenance Engineering will continue to analyze root causes of spills and implement spill prevention initiatives focusing on new vehicles arriving in 2020 to ensure design or quality control issues that may lead to spills are quickly identified and remedied.

OUR PEOPLE

Mental Health First Aid (MHFA)

- MHFA training was delivered to 227 employees in 2019. A total of 426 have been trained since the program's implementation in mid-2018. With manager approval, MHFA is now available to all employees. Courses are currently being offered bi-monthly. Feedback from participants continues to be positive.

Apprenticeship Program

- The Maintenance Apprenticeship Program currently includes 44 apprentices at various levels.
- In 2020, 23 students are expected to graduate. Five fourth year students have completed their studies at British Columbia institute of Technology and are back at work at CMBC, while another set of five students are going into their fourth year at Vancouver Community College. The remaining students are at various stages and levels of program completion.

Collective Bargaining Update

- Bargaining with Unifor Locals 111 and 2200 concluded with a tentative agreement in late November 2019 following Unifor's 26-day strike activity that consisted of an overtime ban in Local 2200 (Maintenance) and a uniform ban in Local 111 (Transit Operators). The new Collective Agreement was ratified on December 5, 2019.
- Bargaining with CUPE Local 4500 (Maintenance Supervisors, Transit Supervisors, and TComm Supervisors) concluded with a tentative agreement in January 2020. This agreement was ratified on February 10, 2020.
- Bargaining with MoveUP (COPE Local 378 representing office, support, and security staff) concluded on February 24, 2020 with a tentative agreement. This agreement was ratified on March 6, 2020.

Resource Planning: Operations & Contracted Services

- CMBC met its staffing commitment for the launch of RapidBus in January 2020.
- Last year, a Training Task Force convened and resulted in the development of a new syllabus for new Conventional Operator Training aimed at increasing the Operator Training graduation rate. The new syllabus took effect in November 2019 and provides increased, and more value-added, drive time for trainees. Initial graduation rates with the new syllabus are showing strong results.
- With the success of the Bowen Island On-Demand pilot, the Service Design team, working with TransLink's New Mobility team, have begun the selection process for the next pilot location.

OUR ASSETS

SeaBus Terminal Escalator Installation

- At the SeaBus Waterfront terminal, the installation of the new east set of escalators (“down”) and additional elevator was completed in 2019. The west set of escalators (“up”) are currently being installed and the project is expected to be completed by the end of March 2020.

Onboard Technology Assets Program (OTAP)

- The OTAP pilot includes four main projects, including replacing radio systems for improved connection and better coverage; replacing onboard computers and touchscreens with a larger screen and better visuals; adding new routers to improve data communication with TComm; and installing new hardware to improve camera feeds to Security.
- Currently there are 94 buses using the OTAP equipment across all six depots and the pilot has been extended until the end of Q2 2020. The full fleet roll-out is expected to start in Q2 2020 and complete in Q4 2022.
- Regarding piloting collision avoidance technology, the vendors selected are Seon, Lucerix and Rosco (Mobile Eye). Each will set up their system on three buses for a total of nine buses for evaluation. Demo testing is expected to begin in Q1 2020.

Spare Bus Data Insights with International Bus Benchmarking Group (IBBG)

- A joint Clearinghouse Study was launched by the Performance Reporting team and IBBG in August 2019, focusing on best practices related to the Spare Bus Ratio Calculation. The study aimed to gain insights into the collection and use of spare bus data. An additional objective included identification of refinements to IBBG definitions to work towards an improved understanding of performance. IBBG is currently working to finalize its analysis and integrate with CMBC’s findings. Their final report is expected in January 2020.

Financial Results

- CMBC’s Q4 2019 operating costs were \$757.4M with \$18.2M (2.4%) favourable to budget. The favourability was primarily driven by lower fuel costs (lower prices, improved consumption) and unplanned temporary vacancies.

FLEET AND INFRASTRUCTURE

Bus Deliveries: Replacements and Service Expansion

Bus Type	Expansion	Replacement	Total	Notes
CNG 40'	0	47	47	All 47 buses delivered
Community Shuttle (2019)	5	49	54	40 of 54 delivered
Double-decker	5	27	32	22 of 32 delivered
Diesel Electric Hybrid Artic	58	52	110	All 110 buses delivered
Battery-electric	4	0	4	All 4 buses delivered
HandyDART (2019)	10	40	50	Delivered Q2 2019
Nova (2018)	94	10	104	All 104 buses delivered
Highway Coach	0	23	23	All 23 buses delivered

Commissioning of New Buses

- All new articulated hybrid, Nova 40' highway, 40' hybrid and 40' CNG buses for 2019 have been commissioned and placed in revenue service.

Double-decker Buses

- Out of the 2019 order of 32 double-decker buses, 22 have been commissioned and are in service at Richmond Transit Centre. The remaining 10 vehicles are at different stages of the delivery and commissioning process and are expected to be in service by the end of Q1 2020.
- CMBC now has double-decker buses on Routes 301 (Newton Exchange/Brighthouse), 620 (Tsawwassen Ferry/Bridgeport Station), and 555 (Carvolth Exchange/Lougheed Station).
- The next double-decker route is Route 351 (Crescent Beach/Bridgeport Station) in Q3 2020.
- The option for 25 additional double-decker buses has been exercised with Alexander Dennis and the buses are scheduled to begin to arrive in December 2020. The full order is expected to be complete by February 2021. The first buses should enter service in January 2021.

New SeaBus Vessel and 10-minute Service Delivery

- Final modifications will be made to the new SeaBus, the *Burrard Chinook*, which includes improving alignment with the terminals. She is expected to be ready for service in summer 2020.
- The *Burrard Otter II* was drydocked for a week in February 2020 for maintenance, reducing SeaBus service to every 15 minutes (peak periods Monday-Friday).

Marpole Transit Centre (MTC)

- CMBC and TransLink have begun planning for the construction of our newest transit centre, Marpole Transit Centre, located in South Vancouver.
- Functional programming and conceptual design work is expected to be complete by the end of Q1 2020 with the detailed design phase to begin shortly thereafter. The team continues to work closely with key stakeholders such as the municipalities and First Nations.

KEY PERFORMANCE INDICATORS AS OF DECEMBER 31, 2019

KEY PERFORMANCE INDICATORS¹	2019 ANNUAL TARGET	2019 YTD TARGET	2019 YTD ACTUAL	2018 YTD LAST YEAR
TransLink Customer Survey – Bus service overall	8.0	8.0	7.9	7.9
Scheduled Service Delivered	98.5%	98.5%	98.3%	98.7%
Customer complaints per million boarded passengers	105	105	97	106
Customer commendations per million boarded passengers	16	16	15	16
HandyDART denial as a % of trips requested as defined in agreement	0.12%	0.12%	0.08%	0.06%
On-time Performance				
Bus Regularity – frequent service	76.0%	76.0%	78.4%	77.6%
Bus Punctuality – infrequent service	79.0%	79.0%	80.5%	80.3%
Spills per million Kms	5.9	5.9	2.1	5.0
Preventable collisions per million Kms ²	9.9	9.9	10.9	10.4
Operator assaults (CUTA 1-4) per million boarded passengers	0.31	0.31	0.31	0.33
Employee lost time accepted claims per 200,000 hours worked ³	7.6	7.6	8.1	7.7
Pedestrian incidents with verified bus contact per million service hours ⁴	-	-	14.0	15.2
Onboard injury claims per million boarded passengers	3.9	3.9	4.0	4.1
CMBC operating cost per service hour ⁵	\$123.22	\$123.22	\$120.98	\$118.71
Access Transit operating cost per trip ⁶	\$42.23	\$42.23	\$39.19	\$41.34
METRICS				
Access Transit trips provided (thousands)				
HandyDART	1,271	954	1,198	1,166
Supplemental taxi service	102	77	184	149
Total Trips	1,373	1,031	1,382	1,315

¹ Performance measures are for CMBC business operations (Conventional Bus, Community Shuttle and SeaBus) and exclude contracted conventional transit and contracted Community Shuttle.

² As of December 31, 2019; this data is subject to change, due to timing of adjudications. For the twelve months of 2019, CMBC has recorded 1,086 preventable collisions which is an increase from the same period in 2018 (1,017). Operator Training continues with initiatives (e.g. Improving Driver Performance (IDP) program) to reduce preventable collisions.

³ In 2019 CMBC recorded 353 accepted lost time claims at a rate of 8.1 claims per 200,000 hours worked, which slightly higher than our 2018 rate of 7.7. Incidents involving Overexertion/Bodily Motion are the biggest contributor to WorkSafeBC claims, followed by Motor Vehicle Accidents and Acts of Violence. When it comes to injury types, Sprains/Strains are the larger category of all injuries, followed by Mental Health Claims and Bruises/Contusions.

⁴ The target for this metric is unavailable as this metric specifically refers to pedestrian incidents with bus contact that have been verified, as opposed to all types of pedestrian incidents (comprising incidents with verified bus contact, alleged bus contact, and no bus contact). A target at the corporate level is available only for the overall pedestrian incident rate, which is 19.4 pedestrian incidents per million service hours for 2019.

⁵ Excludes TransLink allocated costs.

⁶ Excludes TransLink allocated costs and Taxi Saver Program.



METRO VANCOUVER TRANSIT POLICE REPORT FOR MARCH 2020 TRANSLINK BOARD MEETING

TransLink Strategic Priority: Customer First

- **Qatar Delegation**

In 2022, Qatar will host the FIFA World Cup. In preparation for moving and managing large crowds, Qatar has constructed an elevated rapid transit railway and they are in the process of creating a dedicated transit police force. To learn best practices in transit policing and to assist in developing their transit police force, in February 2020, police delegates from Qatar spent two-days with



the Metro Vancouver Transit Police. In addition to a variety of operational briefings by the senior leadership team, the delegation spent time at several SkyTrain stations, rode trains on the Expo and Canada Lines, as well as the SeaBus, and observed patrol officers at work. The Transit Police Executive were proud of Transit Police Cst. Waled, who assisted with Arabic language interpretation throughout the 2 days. There are over 30 different languages spoken amongst Transit Police Officers.

- **Anti-Sexual Offending on Transit System**

A key operational priority of the Transit Police is promoting anti-sexual offending on transit and conducting thorough investigations of all reports of sexual offences. In 2019, there were 212 reported sex offences (primary and assist files) on the transit system, compared to 261 in 2018. This was a 19% reduction in reported incidents. Two incident examples follow:

Sexual Assault – In December 2019, a young woman boarded a crowded train car at Nanaimo SkyTrain Station. While on the train, she felt a hand grope her buttocks several times. When she looked at the man next to her, she saw his hand near the spot where she had been touched. The woman asked another passenger to push the onboard alarm for her. When the train arrived at Commercial-Broadway Station, both the victim and the suspect got off. The victim immediately spoke to a SkyTrain Attendant to advise what happened and pointed out the suspect. The SkyTrain Attendant broadcast information for responding Transit Police, who were already on patrol at the station and arrived moments later. They spoke with the victim and then conducted a search of the area. The suspect was located on the pedestrian overpass and arrested. During the investigation, Transit Police found that the subject had an outstanding warrant for Sexual Assault, resulting from an incident on a bus in

June 2019. Transit Police arrested the suspect for the warrant and he was also charged with a second count of Sexual Assault relating to the second incident.

Indecent Act – In January, on a late night train at Waterfront Station, a passenger used the SMS texting number to contact Transit Police dispatch. The passenger reported that a male had been exposing his genitals for approximately 5 minutes while on the train. Transit Police met the train at Bridgeport Station and located the male matching the description. The male was arrested for the indecent act and released on an appearance notice.

Anti-Groping Campaign – Transit Police has launched annual anti-sexual offending campaigns since 2013. A new collaboration was the Anti-Groping Campaign initiated by the Vancouver Police Department in partnership with the Metro Vancouver Transit Police and Barwatch. That campaign commenced in November 2019 and it is, in large part, directed towards those offenders who seem to feel that they can get away with groping other people without repercussions. The message is that groping is a sexual offence and that every report of groping will be taken seriously and thoroughly investigated; offenders will be held accountable. Transit Police is appreciative of the support provided by TransLink in putting up posters and adding LCD screen messages in various

places on the transit system.



Addressing sexual offending on the transit system continues to be one of the top priorities for the Transit Police. Passengers have the right to safe travel without fear of unwanted, inappropriate touching. Transit Police encourages riders who are a victim of a sexual offence to text Transit Police directly at 87 77 77 or call 604-515-8300.

- **Supporting Vulnerable People**

Protecting and assisting vulnerable persons is a Strategic Objective within the Transit Police Strategic Plan, in particular providing support to those exhibiting safety related mental health issues. Transit Police Officers work closely with the TransLink operating companies, community and health care partners, and Jurisdictional Police to:

- Support vulnerable people and those in a mental health crisis on transit;
- Prevent suicide occurring on the transit system; and
- Effectively manage the impacts of suicide on the SkyTrain operations; and

- Effectively support staff impacted by the response to suicide calls.

In 2019, Transit Police Officers made 231 apprehensions under the *Mental Health Act* (“MHA”). (A police officer may apprehend and immediately take a person to a physician for examination if satisfied from personal observations, or information received, that the person is acting in a manner likely to endanger that person's own safety or the safety of others, and is apparently a person with a mental disorder.) In 2019, there was a 17% increase in mental health apprehensions from 2018. For the 2019 events, 82% of the individuals were committed, held, or self-admitted at hospital. Only 0.5% went to police cells. Dealing with the full range of suicidal behaviour and crisis-related incidents (e.g., sudden deaths) places significant demands on police resources as well as triggers the need for critical incident defusing.

If you are in a mental health crisis on transit, or you're worried about the mental health of someone else, let us know.

Call 604.515.8300
Text 87.77.77

Call 911 in emergency



Mental Health Incident

In November 2019, Transit Police received a report from a Canada Line Attendant (“CLA”) of a potential suicidal male who had gone onto the tracks at Vancouver City Center Station. The CLA persuaded the male to exit the guideway and noted that he was crying and indicated that he was not okay. Transit Police attended the station; however, the subject had already left. A description and obtained image of the person were subsequently broadcast by the Transit Police to patrol officers as well as to the various transit operations control centres and Vancouver Police. Additional Transit Police patrols were made of the area as well as Granville SkyTrain Station, which were negative. A couple of hours later, Transit Police received another report from the Canada Line operations control centre of the same person running around inside the guideway at Waterfront Canada Line Station. Transit Police attended the platform and located the male and, upon assessment, apprehended him under the *Mental Health Act*. The male was transported to hospital and certified by a physician.

There was a 40% increase in disturbed person files from 2018 to 2019 (181 to 254). Of the 2019 files (shown on the chart below), there were 227 incidents where the subject either expressed suicidal ideation or attempted suicide. Tragically, there were 2 suicides on the SkyTrain system in 2019. Fortunately, there were successful interventions in the other instances. Transit staff, such as station attendants and transit control centers, play an important role in helping identify persons with suicidal ideation/attempts on the transit system and notifying the Transit Police, or taking initial action.

Chart 1 – Transit Police / Disturbed Person Files

Year	Total Disturbed Persons Files	Suicidal Ideation	Suicide Attempted	Suicides	Transit Police Intervention
2019	254	203	24	2	39

Beyond the tragic loss of life, suicides on the transit system have economic and social costs, with service disruptions impacting transit users directly, as well as others using transportation infrastructure. Further, there often is psychological trauma to customers, staff and first responders witnessing such incidents or possible injuries when trains are braked in response.



responders witnessing such incidents or possible injuries when trains are braked in response.

The Transit Police actively participates in mental health public campaigns, such as the “#BellLetsTalk” Day and the “Share It. Don’t Wear It” campaign. The Transit Police provides regular training to transit operators, station attendants and supervisors on crisis de-escalation, suicide prevention, and mental health support. The Transit Police Patrol Support Section is available to help support vulnerable transit riders and link them with resources, and to help transit staff in planning appropriate response to emerging situations.

All transit staff can play a role by encouraging persons to seek support and to report concerns by calling or texting Transit Police, or 911, if there is an emergency. Research shows that each suicide prevented is important from a human, societal and economic perspective. Additionally, it assists in mitigation of potentially significant costs and the disruptive impact when a suicide takes place in the transit environment.

TransLink Strategic Priority: State of Good Repair

- **Performance Measurement Culture**

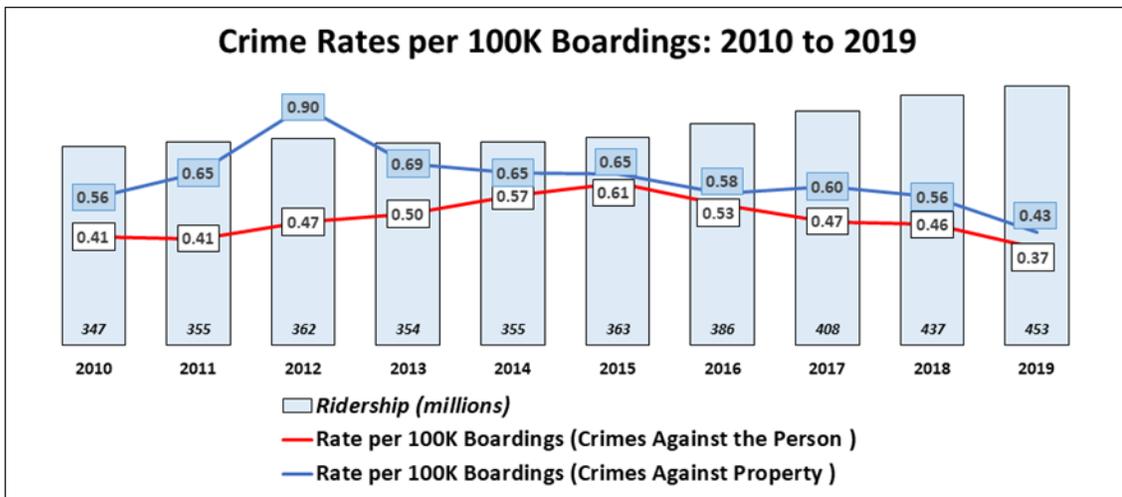
Transit Police is an intelligence-led and data-driven police agency, and gathers comprehensive statistics in relation to crime and organizational performance. Transit Police shares statistical and performance information with the public, TransLink and stakeholders through a variety of tools. A snapshot of key statistics for 2019 as compared to 2018, follows:

Transit Crime and Safety Statistics	2019	2018	% Change
Crimes Against Persons/100,000 Boarded Passengers <i>(primary and assists)</i>	.369	.466	-21%
Crimes Against Property/100,000 Boarded Passengers <i>(primary and assists)</i>	.430	.564	-24%
Other Criminal Code Violations/100,000 Boarded Passengers <i>(primary and assists)</i>	.263	.466	-43%
Provincial Violation Tickets (“VT”)	15,666	16,438	-5%
Arrests - Warrants Executed (All)	1086	954	14%
Arrests - New Charges¹	734	780	-6%

¹ Arrest means an actual arrest and all other cases where charges were recommended to Crown Counsel.

Total S. 28 Mental Health Act Apprehension Files	231	197	17%
Sexual Offences (primary and assists)	212	261	-19%
SCBCTA Fare Bylaw Infractions	16,443	14,495	13%

When comparing 2019 to 2018, both Crimes Against Persons per 100,000 Boarded Passengers and Crimes Against Property per 100,000 Boarded Passengers have decreased. The chart below shows the historical trending for rates of Crimes Against Persons and Crimes Against Property in relation to the rate of ridership.



Criminal Warrant Arrests

Reducing crime and disorder on transit and the surrounding community is Strategic Objective #1 of the Transit Police Strategic Plan. In 2019, Transit Police Officers made 1086 arrests for outstanding criminal warrants, which included RCMP, Municipal Police and Transit Police issued warrants from BC and elsewhere. The number of warrant arrests for the 2019 is 14% higher than in 2018. (The volume of warrant arrests continues to be significant when comparing to the 591 criminal warrant arrests made by Transit Police in 2015.)

Many warrant arrests arise from on-view work of Transit Police Officers in their Community Service Areas (assigned patrol area), calls for service, confirming identity incidental to criminal arrest or during enforcement of a provincial statute offence (such as misuse of a fare gates). However, Transit Police Officers also familiarize themselves with offenders and criminals of concern or offenders wanted through law enforcement intelligence sharing, regional BOLFs (Be on the Look Out For), and the Transit Police Offender Management Program.

Misuse of Fare Gates and Provincial Violation Tickets (“VTs”)

There was a 13% increase in Fare Infraction Notices (“FINs”), a TransLink bylaw, issued by the Transit Police in 2019 as compared to 2018. The number of Violation Tickets (VTs) decreased by 5% when comparing 2019 to 2018. The volume of VTs is associated to Transit Police Officers’ active observations and enforcement of the provincial offences regarding the misuse of fare

gates², which was new legislation in 2017. The enforcement of the amended *Greater Vancouver Transit Conduct and Safety Regulation* positively contributes to TransLink's efforts to strengthen public confidence in the transit system and transit passengers' feelings of safety and security.

Of critical importance to the safety of transit customers and staff, and the general public, is how the process of confirming an offender's identity allows Transit Police to learn whether there is a criminal record or conditions of release, and if there are any outstanding warrants to be executed. Executing outstanding warrants contributes positively to the work of our Jurisdictional Police partners and their offender management and community safety and crime reduction efforts. An example of warrant arrest follows.

Arrest for Outstanding Warrants – At 12:15 a.m. on December 11, 2019, Transit Police were on patrol at Scott Road Station in Surrey, when they observed a man follow another passenger through the fare gate, without tapping fare media. When Transit Police were speaking with male to identify him for the Violation Ticket, he became nervous and evasive. The man then jumped on his bike in an attempt to get away. Transit Police were able to catch up to the man and place him under arrest. The police records revealed that the man was a prolific offender, with 11 outstanding warrants, covering over 20 charges. He was also wanted on eight, non-returnable, out-of-province warrants and found to be breaching several court order conditions at the time of the arrest.

² The amended *Greater Vancouver Transit Conduct and Safety Regulation* came into effect March 2017. A person who commits an offence under the *Regulation* can be issued a violation ticket in the amount of \$173. The new offences are intended to focus on "disorderly behavior", instead of the loss of fare revenue. Neither the Transit Police Officer nor the offender needs to be inside the **fare paid zone** to issue a ticket to a person who commits an offence under s. 8(4) of the *Regulation*. Because the person has committed an "offence", the Officer has lawful authority to briefly detain the person outside of the fare paid zone. Persons who do not "tap in/tap out" will contravene section 8(4)(d) – "going through a fare gate that was not opened by that person." Accordingly, Transit Police can issue a ticket on that basis.

TO: Board of Directors

FROM: Simon Tang, Vice President, Major Projects

DATE: February 28, 2020

SUBJECT: Broadway Subway Project (BSP) Status Update

EXECUTIVE SUMMARY

The Province's Request for Proposal (RFP) technical submission for the Broadway Subway Project (BSP) was closed on January 31, 2020 and the evaluation is in progress. The commercial submission closure will be in March 2020. It is expected that the Preferred Proponent will be announced in mid 2020.

Canada Line Concession Agreement Amendment (CAA #14) negotiations with InTransit BC led by TransLink to confirm acceptability of the BSP RFP technical requirements for the integrated Broadway-City Hall station has been executed.

BSP Support Agreement (SA) finalization is pending.

Advance works to support the BSP including the trolley overhead line relocation to accommodate bus route changes, procurement of three 60-foot buses in support of bus operations during construction, and the fibre optic design for system connectivity are progressing on course.

PURPOSE

The purpose of this report is to provide an update of the current progress and upcoming milestones relating to BSP.

BACKGROUND

The BSP will be an approximately six-kilometre extension to the Millennium Line SkyTrain from VCC-Clark Station to Arbutus Street via a primarily underground alignment beneath the Broadway corridor. The Project will include six new stations. A future phase of investment is required to further extend rapid transit to the University of British Columbia.

Full capital funding confirmation for the BSP was announced on September 4, 2018 by the Federal and Provincial governments. The Province was announced as the delivery agency for the \$2.83 billion project and will own the assets upon completion. TransLink will operate and maintain the extension similar to the rest of the SkyTrain system. The Province as the delivery agency assumes all responsibility for delivery risks, including cost and schedule overrun. A Memorandum of Understanding and Transfer Agreement was signed and effective October 31, 2018 to formally transfer the Project to the Province and outline TransLink's future role.

ON-GOING WORKS

BSP Support Agreement (SA)

TransLink's scope on BSP SA includes: 1) ensure a successful and seamless system integration with the region's SkyTrain service, 2) ensure a safe and reliable service launch, 3) operations and maintenance of the SkyTrain system, 4) provisions of bus services during construction, 5) customer access and notification including smart card and fare installation as well as system wayfinding and, 6) coordination with InTransit BC for the Canada Line integration at Broadway-City Hall station.

The parties (Province and TransLink) intent to enter into a SA which will include provisions documenting the roles and responsibilities of the Province and TransLink and relevant funding details. The Province issued first draft of the SA to TransLink for review in July 2019.

TransLink/BCRTC Support Services on BSP Budget

The budget of \$84.25M for the TransLink/BCRTC Support Services on BSP has been approved by Capital Management Committee on January 30, 2020. This will in turn be the budget in the BSP SA.

BSP Integrated Broadway-City Hall Station with Canada Line

Canada Line Concession Agreement Amendment (CAA #14) negotiations with InTransit BC, led by TransLink, to confirm the acceptability of the BSP RFP technical requirements has been executed. Negotiations of the commercial terms for the corresponding Design Build and Operation and Maintenance changes are in progress.

LATEST PROGRESS AND UPCOMING MILESTONES

RFP

The Province issued the RFP for the BSP engineering, procurement, construction/management in June 2019 as per schedule. The RFP for technical portion of the project closed on Jan 31st, 2020 and the evaluation of the technical submissions is in progress. The commercial submission closure will be in March 2020. It is expected that the Preferred Proponent will be announced by mid 2020.

Advanced Works currently delivered by TransLink

1. Trolley Overhead Infrastructure relocation to accommodate bus route change in support of bus operations during BSP construction is on course. After the relocation, overhead lines that affect BSP will be decommissioned progressively from July to August 2020. Early works are currently being carried at Route 16 (12th Avenue – Arbutus to Granville), Route 17 (12th Avenue – Oak to Cambie) and Route 14 (MacDonald - 4th Avenue to Broadway). The following milestones are scheduled for the next quarter:
 - i. Route 16 – Start Testing & Commissioning
 - ii. Route 17 – Completion of CMBC TOH Feeder and Running Wires Installation and Start Testing & Commissioning

- iii. Route 14 – Completion of CMBC TOH Feeder and Running Wires Installation and Start Testing & Commissioning
2. Funding for the design of the Fiber Optic Cable from Operation Maintenance Centre 1 (OMC1) to Loughheed Town Centre Station (LH) to complete the systemwide infrastructure for the Millennium Line extension to BSP has been approved by the Capital Management Committee. The design consultant has been selected and user requirement meetings have commenced. 90% Design report and 100% Tender ready package are expected to be complete by Q2 2020.
3. BC Hydro installation of power supplies for tunnel boring machine and early feeds to the future propulsion power substations at four locations (Arbutus, Oak, Main and VCC-Clarke) along the proposed alignment have been completed.
4. Three 60-foot buses are required during the construction of BSP. RFP for bus procurement was issued by TransLink in November 2019 and was closed in January 2020. Currently, the bids are being reviewed and the contract award will be in March 2020.

CURRENT ISSUES AND MITIGATIONS

Arbutus Transit Exchange

Some concerns have been raised by the public about the planned Arbutus Transit Exchange (a key component of the BSP) regarding its proximity to existing schools. With the Province leading the on-going meetings and discussions, TransLink is actively working to provide information and reassurance with special interest groups.

SkyTrain Advanced Radio Systems (STARS)

The STARS project was initiated in December 2017 to replace the existing SkyTrain radio system which is reaching its end-of-life. Some of the existing network parts were also found to be obsolete.

Another previous issue was related to the capacity of the existing Operations and Maintenance Radio (OMR) to support testing and commissioning activities for BSP. Since the STARS project team has now identified a preferred technology solution which could be delivered before testing and commissioning for BSP, this issue should now be resolved.

New Operation Control Centre (OCC)

There is a risk that the new OCC could not be completed on time to support the BSP testing and commissioning. Currently, it is assumed that BSP would need at least 18 months for testing and commissioning prior to the opening. Mitigation plan is now in place to implement a temporary OCC at Operations Maintenance Center 2 (OMC 2) for BSP testing and commissioning in case the new OCC is not ready.

SkyTrain Customer and Operations Telecommunications (SCOT)

SCOT consists of equipment and software to manage and transmit voice and data communication between the OMC, trains and stations. In the event that the voice and data communication component of SCOT is not ready for BSP testing and commissioning, the current fallback plan is to have the existing Train Radio Information Management System (TRIMS) extension from the existing OCC to either the

temporary OCC at OMC 2 or to the new OCC for BSP testing and commissioning. Further investigation is required to confirm whether it is feasible to have all the existing systems extended from the existing OCC to the new OCC.

CUSTOMER IMPACTS AND COMMUNICATIONS UPDATE

TransLink is working closely with the Ministry of Transportation and Infrastructure and the City of Vancouver to execute a robust communications strategy to support early works activities, including the installation of new trolley wires along three bus routes to maintain access to transit along the Broadway Corridor during construction. The plan includes notifying neighbours and keeping our customers aware of the progress through our website, social medial channels and Customer Information. There is no significant impact to the community for the reporting period.

TO: Board of Directors

FROM: Sany Zein, Vice President, Infrastructure Management & Engineering

DATE: February 27, 2020

SUBJECT: Pattullo Bridge Condition Monitoring Report

EXECUTIVE SUMMARY

This report provides an update on condition monitoring activities on the Pattullo Bridge. TransLink continues to closely monitor and inspect the condition of the Bridge and take corrective action where appropriate. The wind and seismic monitoring system entered operations in February 2020. Recent and on-going activities include:

- *Condition Inspection* by the Ministry of Transportation and Infrastructure and WSP Global Inc.;
- *Railing Inspection* by COWI North America Ltd, Mott MacDonald Canada Ltd., and Mainroad Contracting Ltd;
- *Deck Condition Monitoring and Repairs* by Mainroad Contracting Ltd. and WSP;
- *Winter Monitoring and Survey* by Northwest Hydraulic Consultants;
- *Wind and Seismic Warning System* project by PBX (Design) and Mainroad Contracting Ltd. (Construction); and
- *Emergency Management Plan* by Mott MacDonald Canada Ltd.

PURPOSE

This recurring status report provides an update on condition monitoring activities on the Pattullo Bridge. The previous report was issued in November 2019.

BACKGROUND

The Pattullo Bridge is 82 years old. Most of the structural components have passed the predicted design life, and some are reaching the end of their useful life. Temperature fluctuation, rainfall, wind, river action, live traffic loads and the aging of the steel and concrete components all contribute to the condition of the bridge. The Province is leading the Patullo Bridge Replacement Project, which will construct a new bridge as well as decommission the existing bridge.

With responsibility for the safety and operations of the existing bridge, TransLink monitors the condition of the structure closely through regular inspections, and regularly consults with experienced bridge engineers. Management then performs the necessary maintenance and repairs in response to the inspection findings.

DISCUSSION

Recent and on-going inspection activities are listed in Table 1.

Table 1: November 2019 to February 2020 Pattullo Bridge Ongoing Inspections and Monitoring

REFERENCE	ACTIVITY	CONSULTANTS / PARTNERS	STATUS
1	Condition Inspection	Ministry of Transportation and Infrastructure (Ministry) Mott MacDonald Canada Limited (Mott) – design consultant	2019 inspection completed 2020 inspection - TBD
2	Railing Inspection	COWI North America Ltd. (COWI) – inspection consultant Mott MacDonald Canada Limited (Mott) – design consultant Mainroad Contracting Ltd. (Mainroad)	2018 inspection - completed in Q3. Railing repairs – completion in Q2 2020. 2020 inspection – TBD
3	Deck Condition Monitoring and Repairs	Mainroad Contracting Ltd. WSP Global Inc. (WSP) – deck consultant	Ongoing deck monitoring - biweekly
4	Winter Monitoring Survey	Northwest Hydraulic Consultants	Monthly monitoring – ongoing . Winter Survey – completed in Q1 2020.
5	Wind and Seismic Warning System Implementation	PBX Engineering Ltd. (PBX) Mainroad Contracting Ltd. (Mainroad)	Completed Q1 2020
6	Emergency Management Plan	Mott MacDonald Canada Limited (Mott) – design consultant	Draft EMP – Q1 2020

A summary of each of these activities is provided as follows:

1. Condition Inspection

Each year, the BC Ministry of Transportation and Infrastructure (Ministry) performs a condition inspection of the Pattullo Bridge with the aid of a snooper truck. The 2019 inspection was completed in July 2019 and the Condition Inspection Report was completed in Q4 2019. TransLink has retained Mott MacDonald Canada Limited (Mott), structural consultants, to review the findings of the inspection and to advise of any areas of immediate concern. Based on findings and trends of past annual inspections, the condition of identified deterioration has remained relatively stable.

Given the expectation that the Bridge will be replaced by 2023 as part of the Pattullo Bridge Replacement Project being undertaken by the Ministry, TransLink's objective is to keep the bridge operational until replacement, rather than long-term asset preservation. As such, annual monitoring and close-proximity inspection of selected structural components will continue until the Bridge is decommissioned. If there is observed acceleration in the amount of deterioration, particularly, severe section loss in select components, or indications of overstressing, additional investigations and/or repair will be performed.

2. Railing Inspection

In Q3 2018, COWI North America Ltd. (COWI) completed an inspection of the railings on both sides of the Bridge. A total of 606 railing posts were inspected and assigned deficiency ratings based on their observed conditions. Of the 606 posts inspected, 128 posts were classified as needing immediate repair or replacement.

Based on the findings of the inspection, documented in the *Pattullo Bridge Railing Inspection* report, TransLink is currently working with Mott and Mainroad to design and repair all railings requiring immediate attention. The work varies from addressing individual posts to replacing nuts and bolts at connections. Railing repairs began in Q2 2019. To date, all railing repairs required on the west side of the Bridge have been completed. Subject to weather, all remaining repairs on the east side of the Bridge are expected to be completed by Q2 2020.

TransLink will continue to monitor and repair or replace the railing posts as needed. An inspection of all bridge railings, as part of the annual program, will be scheduled once all repairs have been completed. A tracking spreadsheet is used to track the condition of each railing post on the structure.

3. Deck Condition Monitoring and Repairs

The reinforced concrete deck of the Pattullo Bridge is in an active and advanced state of deterioration, primarily due to corrosion of the reinforcing steel. While repairs to the north portion of the deck between Pier 0 and Pier 9 were completed in the summer of 2016, the risk of pothole formation still exists, particularly for the south approach of the Bridge (Pier 9 to Pier 29).

To ensure the entire deck remains functional and safe for operations, bridge deck experts from WSP conduct bi-weekly walk-through inspections from the deck, ground and catwalk levels. Signs of pothole formation are monitored and flagged for future interventions during overnight lane closures or during full bridge closures. No new significant repairs are currently anticipated in 2020.

In addition to the top surface of the deck, extensive corrosion-related damage is also occurring to the bottom surface (soffit). Debris netting is currently in place to protect the public and other infrastructure, including the railway tracks, from concrete falling from the deck soffit. A close proximity inspection was

conducted on the Main Span by WSP using the Ministry's snoop truck on July 31, 2019. Overall, it was found that the bridge deck of the Main Span remains in sound and serviceable condition.

TransLink will continue to monitor the condition of the deck. If required, additional targeted inspections will be scheduled for Q3 2020.

4. Winter Monitoring and Survey

The Pattullo Bridge is situated in the narrowest part of the river, which experiences large tidal fluctuations. This elevates the risk to the Bridge from scour and erosion. To proactively address risks arising from changing river hydraulics, Northwest Hydraulic Consultants Ltd (NHC) conducts bi-annual surveys, once after peak of freshet and once during the winter, to monitor the condition of the pier protection and to identify whether any repairs are required. The recent winter monitoring survey was conducted in January 2020, coinciding with the lowest winter tides, and the monitoring report is expected in Q2 2020.

Preliminary results of the survey indicate that scouring has been observed to occur around Pier 6. At present, NHC does not consider immediate repairs to be necessary but will closely monitor the area for further changes. Due to upcoming in-river works required for building the new Pattullo Bridge, NHC has been conducting monthly bathymetric surveys since February 2019 to support the Pattullo Bridge Replacement Project and the CN Rail Bridge Improvements adjacent to the Pattullo Bridge. Any changes to the condition at Pier 6 will be monitored during these monthly surveys and reported to TransLink.

TransLink will also continue working with the Pattullo Bridge Replacement team and with CN Rail to monitor and manage the impacts of the planned projects on the existing Pattullo Bridge. NHC will continue to provide monthly monitoring, and the 2020 freshet monitoring will be done in July 2019.

5. Wind and Seismic Warning Systems

The Pattullo Bridge is more than 80 years old and was not designed to meet current wind and seismic loading standards that would apply to a new bridge constructed today, and as a result, may be vulnerable in a seismic or hurricane-level wind event.

To improve safety for Bridge users, an advance seismic warning and wind monitoring system has been implemented. The construction of the System was completed in December 2019, and the System went live February 2020, following testing activities that occurred in early Q1 2020.

The wind warning system monitors and measure wind speeds at the bridge, and a seismic warning system senses an earthquake in progress and provide alerts up to one minute prior to damaging ground waves reaching the bridge. The System involves the following:

- Seismic activity and wind warning sensors;
- Traffic control devices, including traffic gates, traffic signals, and warning signs for pedestrians and vehicle traffic; and,
- Communication and monitoring devices to provide warnings and perform closures.

The Project Team has engaged internally and externally with first responders and the TransLink Enterprise Emergency Planning Working Group. Information and training are being provided to both groups.

6. Emergency Management Plan

In 2018, a Pattullo Bridge Emergency Management Plan (EMP) was prepared by Mott. The EMP achieved the following:

- Identified key roles and responsibilities of the response team, consisting of TransLink staff, the bridge operations and maintenance contractor, and structural engineers;
- Identified incident triggers for bridge closures, such as pier impact, bridge deck failure, or seismic activity;
- Established key contact lists, including municipal stakeholders, first responders, and permitting authorities;
- Established the traffic control plans to close all accesses to the Pattullo Bridge from both the City of New Westminster and the City of Surrey; and
- Identified the placement of 10 Portable Changeable Message Signs (PCMS) and the appropriate messaging for public information dissemination.

With the implementation of Wind and Seismic Warning Systems, work is currently being undertaken to refine the EMP to include practices and protocols required to support automated and manual closures for seismic and wind events respectively. The protocols and tools developed as part of the Pattullo EMP will be shared with all members of the response team. It is expected that a draft of the revised EMP, which will be reviewed annually to ensure information remains current, will be completed by Q1 2020.

Customer Impact and Communications

To minimize impacts on the public, all required lane and bridge closures will be scheduled between 10:00 pm and 5:00 am, when volumes on the bridge are lowest. A full closure of the bridge may be required for training of the Wind and Seismic Warning Systems. Other than the upcoming training event, no other planned work is expected to substantively impact the public in 2020.

A robust communications plan has been developed to utilize all available channels in support of major milestones, including any ongoing inspection and maintenance work, testing and launching that is expected to have an impact on the public.

Financial Impacts

All monitoring, inspection, and repair work is being performed under existing approved operating and capital funds.

TO: Board of Directors

FROM: Sany Zein, Vice President, Infrastructure Management and Engineering

DATE: February 27, 2020

SUBJECT: Surrey Langley SkyTrain Project Update

EXECUTIVE SUMMARY

In December 2018, the Mayors' Council and TransLink Board directed Management to proceed with development work for a SkyTrain on Fraser Highway project and to initiate a planning process to refresh the South of Fraser Rapid Transit Plan. The available budget for this scope is \$30 million, with target completion in spring 2020.

The Surrey Langley SkyTrain (SLS) project development work is progressing on-schedule and on-budget. In January 2020 the Mayors' Council and the TransLink Board endorsed the final draft business case and directed it to be submitted to senior government for their approval. The draft business case describes the full Surrey to Langley project, and recommends construction in stages consistent with available funding. Stage 1 consists of 7 kilometers from King George to Fleetwood with four new stations at a cost of \$1.63b. The draft business case contemplates that Stage 1 will be delivered by TransLink using a Design Build Finance (DBF) procurement model.

In anticipation of business case approval and an enabling Investment Plan, Management is proceeding with preparing procurement documents with a target to launch procurement in July 2020.

PURPOSE

This report provides an update on the project development work for the Surrey Langley SkyTrain (SLS) Project.

BACKGROUND

In December 2018, the Mayors' Council and Board directed Management to proceed with development work for a Surrey Langley SkyTrain project, and to initiate a planning process to refresh the overall South of Fraser Rapid Transit Plan. A budget of \$30 million was approved for this purpose in January 2019.

The project development work is progressing on-schedule and on-budget and emphasis is now on preparation for procurement. With the business case complete and under review by senior government, current activities include drafting of the Project Agreement (PA), the Municipal Access Agreement (MAA), RFQ, Utilities Agreements (UAs) and RFP documents. Environmental reviews, First Nations consultation and public engagement activities continue.

The outcomes of the project development phase have been documented in the project business case. In January 2020, the Mayors' Council and the TransLink Board endorsed the final draft business case and directed it to be submitted to senior government for their approval. The draft business case describes the full Surrey to Langley project, and recommends construction in stages consistent with available funding. Stage 1 extends SkyTrain approximately 7 kilometers from King George to Fleetwood with four new stations at a cost of \$1.63b. The draft business case provides that Stage 1 will be delivered by TransLink using a Design Build Finance (DBF) procurement model.

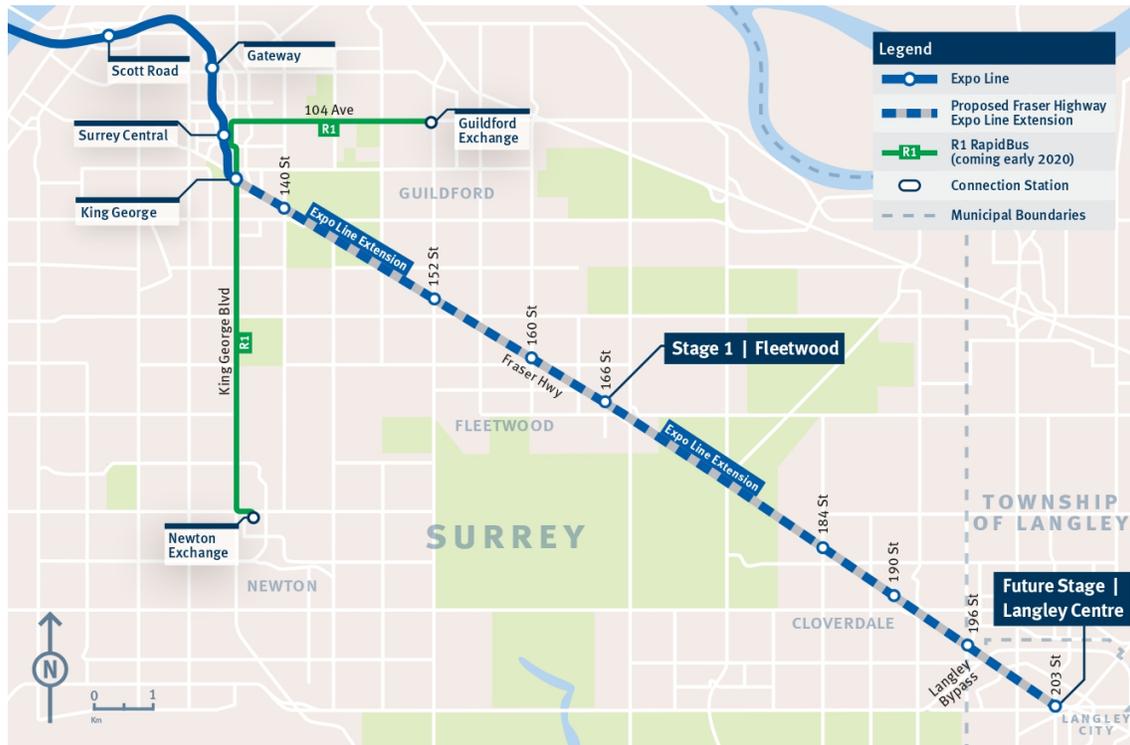


Figure 1 – Proposed extensions with stages and station locations

Upon securing approval by the federal and provincial governments as well as the TransLink Board and Mayors' Council through an enabling Investment Plan, a procurement process (approximately 18 months in duration) would be launched, followed by construction, testing and commissioning (approximately 4 years in duration). The adoption of the enabling Investment Plan is targeted for June 2020, with procurement launch scheduled for July 2020.

DISCUSSION

On January 30, 2020, the Mayors' Council endorsed the final draft business case and directed it to be submitted to senior government. Management transmitted the business case and associated funding application documentation with a request for approval before June 2020.

Management is advancing the project consistent with direction from the Mayors' Council. Upcoming milestones include:

- Preparing the procurement documents for a SkyTrain on Fraser Highway to be ready to initiate the procurement process following an approval of the business case and supportive investment plan;
- Preparing an implementation strategy that allows the sequencing of rapid transit south of the Fraser consistent with available and anticipated funding;
- Continuing studies to support the project environmental screening review;

- Finalizing a governance structure for project procurement and delivery;
- Refining the reference design concept as required in preparation for procurement; and
- Negotiating a Municipal Access Agreement (MAA) with the City of Surrey.

PUBLIC AFFAIRS

The project public affairs plan includes elected official briefings, meetings with key stakeholders, First Nations consultation, and opportunities for public input. Two rounds of public engagement are complete. The most recent round of engagement occurred from November 1 to 17, 2019 and provided opportunities for input on the reference design, scope of the project environmental review, and other matters. Input was received through an online survey, in-person feedback at five open houses in Surrey and Langley, and a telephone town hall. Feedback is helping the project team refine the project design and confirm the scope of the Environmental Screening Review.

The second round of engagement revealed significant interest in the project with:

- over 2,000 attendees at the five open houses;
- over 8,000 survey responses; and
- over 5,000 participants in a live telephone town hall with the SLS project director.

To complement in-person and online feedback, TransLink commissioned a market research survey to obtain statistically- representative responses. The survey found that the level of support for the project remains high at 77%.

Planning is underway for a third round of engagement in Spring 2020.

TO: Board of Directors

FROM: Christine Dacre, Chief Financial Officer

DATE: March 19, 2020

SUBJECT: 2020 Business Plan, Operating and Capital Budget

PROPOSED RESOLUTION:

That the TransLink Board of Directors:

1. Approve the proposed 2020 Business Plan, Operating and Capital Budget as attached to this report as Attachment 1; and
2. Directs Management to provide the Board of Directors with 2020 Business Plan, Operating and Capital Budget contingency planning information in light of the COVID-19 pandemic at the next meeting of the Board of Directors.

PURPOSE

The 2020 Business Plan, Operating and Capital Budget Report attached to this report as Appendix 1 was presented to the Finance and Audit Committee at its March 17, 2020 meeting. After discussion, the Committee approved the resolution for recommendation to the Board as set out above.

ATTACHMENTS

APPENDIX 1 - 2020 Business Plan, Operating and Capital Budget Report

TO: Board of Directors

FROM: Christine Dacre, Chief Financial Officer

DATE: March 2, 2020

SUBJECT: 2020 Business Plan, Operating and Capital Budget

PROPOSED RESOLUTION:

That the TransLink Board of Directors approve the proposed 2020 Business Plan, Operating and Capital Budget as attached to this report as Attachment 1.

EXECUTIVE SUMMARY

The 2020 Business Plan, Operating and Capital Budget is focused on achieving the initiatives set out in the 2020 year of the 2018 - 2027 Investment Plan: Phase Two of the 10-Year Vision and continues the work set out in Phase One of the Investment Plan. It has been developed with the following three main priorities for the enterprise: (1) Implementing the Mayors' Council's 10-Year Vision; (2) Maintaining a State of Good Repair; and (3) Enhancing Customer Experience.

The 2020 Budget reflects increased on-going expenses of \$143.4 million compared to the 2019 budget, mainly due to: service expansion across all modes, contractual labour increases, inflation and state of good repair maintenance initiatives.

PURPOSE

The purpose of this report is to request the Board of Directors approve the 2020 Business Plan, Operating and Capital Budget attached to this report as Attachment 1.

BACKGROUND

The 2020 Business Plan prioritizes increasing and improving region-wide services, maintaining and repairing of the system for safety and reliability, as well as enhancing the customer experience and information services. TransLink is committed to alleviate overcrowding on transit and congestion on major roads with the support of the region's Mayors along with investments from the Province of British Columbia and the Government of Canada. TransLink continues to experience growing ridership, which has increased transit fare revenues. This coming year, however, offers the possibility of slowing ridership growth as a result of the fare increase set for July 2020 and the ride-hailing services coming to the region. Recognizing the variability of its revenue, TransLink will continue to be efficient with its investments.

This Plan was prepared based on initiatives set out for the 2020 year in the 2018 – 2027 Investment Plan: Phase Two of the 10-Year Vision and carries forward initiatives from the Phase One Investment Plan. Transportation improvements in 2020 include significant service increases and capital expansion, maintaining a state of good repair on existing assets and improving the customer experience. TransLink is expanding its services, driven by the needs of the customer and the region, while prudently managing cost pressures. The assumptions used to develop the plan were presented to the Board in September 2019.

DISCUSSION

With guiding principles of improving the quality of existing systems, improving quality of services and expanding the transit system, the 2020 Business Plan, Operating and Capital Budget is supported by three priorities: implement the Mayors' Council's 10-Year Vision (the "Mayors' Vision"), maintain a state of good repair and enhance customer experience.

Implement the Mayors' Vision

We will successfully deliver the capital projects, service expansion and policy initiatives necessary to mobilize the Mayors' Vision.

Maintain a State of Good Repair

TransLink will proactively manage and maintain all assets in a state of good repair to ensure safety and reliability, optimize lifecycle costs, and enhance the customer experience.

Enhance Customer Experience

With a customer first approach, we will build public trust and confidence in TransLink by focusing on growing ridership, engaging stakeholders and delivering the Mayors' Vision.

The 2020 plan focuses on increasing and improving region-wide service; maintaining and repairing of the system for safety & reliability; and enhancing the customer experience and information services. Major initiatives for 2020 within these areas and the three priorities are outlined in the Budget document.

Total consolidated revenues for 2020 are budgeted to be \$2.0 billion. Overall this is consistent with 2019 budget, yet there were notable changes amongst the revenue sources highlighted below:

- Fuel Tax Revenue is higher due to the full year effect of the tax rate increase to \$0.185 per litre in July 2019;
- Property tax revenue includes a 3 per cent increase plus 1.4 per cent from estimated annual development growth;
- Parking Tax revenue higher due to the full year effect of the tax rate increase to 24 per cent in July 2019;
- New development cost charge revenue effective Jan. 1, 2020;
- Transit revenue higher from increased riderhip and a fare increase in July 2020 as approved by the Mayors' Council and Board in the Ten Year Investment Plan to fund expansion; and
- Lower senior government funding due to timing of capital projects.

Expenditures are budgeted at \$1.9 billion which is \$143.5 million higher than the 2019 budget. The primary drivers for this increase are:

- Service expansion across all modes of transportation as adopted in the Phase Two Investment Plan;
 - 6.7% increase in bus service hours, including new RapidBus routes;
 - 2.8% increase in Access Transit trips;
 - 5.6% increase in rail capacity kms.
- Contractual labour and inflationary increases.
- Priority investments to improve safety, security, state of good repair, and support for service expansion;

- Increase of 2 Transit Police support staff for forensic video and investigative assistance;
- Increase of 47 staff at BCRTC. Thirty-three are part of a critical initiative moving from a reactive to a preventative approach to maintenance which will improve service reliability and help ensure we are positioned for continuous improvement and can support future extensions. Fourteen are to support the service expansion focusing on safety, security, and training;
- Increase of 14 staff at CMBC for improved customer experience initiatives and improvements for maintenance and state of good repair;
- Increase of 46 corporate staff, 36 being funded through reductions in professional fees or offset by capital project costs. The remaining 10 positions support the increasing demands on the Human Resources department, Emergency Management, Internal Audits, Continuous Improvement program and a new Finance resource to align and augment capital and long range planning; and
- Increased amortization of capital assets.

The One-time expenditures total \$31.6 million for 2020, consists of the following items:

	2020 Budget \$millions
RapidBus	\$10.9
Feasibility Studies	7.6
Plan Development	2.2
Non-Capitalized items included in Capital Projects	1.7
Flexible Service Piloting Program	1.7
Non-Capitalized items included in BTS Projects	1.6
CAPITAL-M Program Non-Capitalized items	1.6
South of Fraser Rapid Transit Non-Capitalized items	1.0
Mobility Pricing	0.7
Low Carbon Fleet Strategy	0.3
Bus Speed and Reliability	0.3
Sub Total	\$29.6
Corporate Contingency	\$2.0
Total Corporate One-Time	\$31.6

The new Capital Program for 2020 continues the delivery of the Mayors' Vision and focuses on improving customer experience and keeping the overall system in a state of good repair. The table below shows the capital program based upon corporate priorities:

	\$millions
Implement Mayor's Vision	\$181.3
Maintain a State of Good Repair	216.0
Enhance Customer Experience	12.2
Major Road Network / Bicycle Infrastructure	81.8
Ad-Hoc Envelope	10.0
2020 New Capital Program	\$501.3

Risks associated with achieving budgeted results include:

- Overall economic downturn, becoming more significant due to COVID-19;
- Recruiting, retaining and training staff;
- Effects of increased congestion on schedule reliability;
- Capacity constraints to deliver on planned service expansion and capital projects;
- Introduction of ride-hailing services;
- Higher fuel prices;
- Revenue assumptions, including taxable fuel volumes;
- Timing of funding sources; and
- Elasticity resulting from planned fare increase.

Corporate Contingency

TransLink's 2020 budget contingency is \$2 million due to the risks identified above.

Management recommends that the Board approves the proposed 2020 Business Plan, Operating and Capital Budget as attached to this report as Attachment 1.

ATTACHMENTS

Attachment 1: *2020 Business Plan, Operating and Capital Budget Summary*



2020 Business Plan

OPERATING AND CAPITAL BUDGET SUMMARY



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Caution Regarding Forward-Looking Statements

From time to time, TransLink makes written and/or oral forward-looking statements, including in this document and in other communications, in addition, representatives of TransLink may make forward-looking statements orally to analysts, investors, the media and others.

Forward-looking statements, by their nature, require TransLink to make assumptions and are subject to inherent risk and uncertainties. In light of uncertainty related to financial, economic and regulatory environments, such risks and uncertainties, many of which are beyond TransLink's control and the effects of which can be difficult to predict, may cause actual results to differ materially from the expectations expressed in the forward-looking statements.

1. Business Plan Summary

The South Coast British Columbia Transportation Authority, TransLink, is Metro Vancouver's regional transportation authority and its service region includes 23 municipalities on the traditional territory of 45 First Nations communities. TransLink delivers a wide range of services and programs to plan and provide for the transportation needs of residents, businesses and visitors in the region. This includes Bus, SkyTrain, SeaBus, HandyDART, West Coast Express and Transit Police. TransLink also shares responsibility for the Major Road Network and walking and cycling infrastructure with its local government partners.

Since 2016, the Metro Vancouver region has seen consistent ridership growth year over year. To meet this increasing demand for the years to come, TransLink's 2020 Budget, specifically targets investment in the expansion and maintenance of the system and prioritizes customer experience and the efficient management of funds.

The 2020 Budget is built on three priorities:

- Increasing and improving region-wide service,
- Maintaining and repairing of the system for safety & reliability, and
- Enhancing the customer experience and information services.

TransLink is currently implementing Phase Two of the 10-Year Vision to alleviate overcrowding on transit and congestion on major roads. TransLink is able to deliver these improvements with the support of the region's Mayors along with investments from the Province of British Columbia and the Government of Canada. Phase Two of the Investment Plan prioritizes expanding and improving the region's transportation network.

Metro Vancouver residents and visitors are relying more on transit as a mode of transportation, which explains why ridership has grown by 3.6 per cent in 2019. Since 2016 ridership has grown 17.3 per cent. New developments and increased service continue to drive a positive brand impression from Metro Vancouver residents.

TransLink's plan for 2020 is to bolster growth with smart investments. These are investments that will work towards maintaining the current system while expanding new service. The 2020 Budget priorities will be achieved through the following initiatives:

Increasing and Improving Region-Wide Service

- Implementing over 364,000 conventional bus service hours.
- Launching five new RapidBus (formerly B-Line) routes (two replacement and three new routes).
- Expanding SkyTrain service with 14 new Mark III trains, and 12 new Canada Line trains.
- Developing the Transport 2050 Strategy and furthering public engagement.
- Developing a climate action plan.
- Upgrading two and constructing one Operations and Maintenance Centres.

Maintaining and Repairing of the System for Safety & Reliability

- Renewing technology in the management systems.
- Delivering an Emergency Response Plan and formalizing the Safety Management System.
- Expanding the retail amenities to enhance the customer experience and improve perceived safety and security.

Enhancing the Customer Experience and Information Services

- Developing the online HandyDART reservation system for customers to book, change and cancel trips online.
- Expanding Conventional Bus and Community Shuttle fleet with 95 new vehicles.
- Expanding and replacing 52 new HandyDART vehicles.
- Improving bus speed and reliability to address growing congestion.
- Furthering the development of safety campaigns.
- Revamping the TransLink website to optimize the customer experience.
- Formalizing an Emergency Management and Communications program.

Driven by the needs of customers and the region, TransLink is expanding its services while prudently managing cost pressures. Delivering these widespread service improvements creates some operational and budgetary challenges. The expansion of services creates space constraints on the depots and the need to hire more employees. The additional population growth in the region causes congestion that negatively affects bus speed and reliability. There is also a region-wide priority to expand in a sustainable manner. TransLink will continue to mitigate these challenges by managing its resources through diligent oversight and governance practices.

Funding for expansion of the system and major new capital projects has been secured through the support of the Mayors' Council and the federal and provincial governments. Growing ridership has also increased revenues from transit fares. However, this coming year offers the possibility of slowing ridership growth as a result of the fare increase set for July 2020 and the ride-hailing services coming to the region. Recognizing the impact this may have on revenue, TransLink will continue to monitor these effects and be efficient with its investments.

2. 2020 Key Priorities

With guiding principles of improving the quality of existing systems, improving quality of services and expanding the transit system, the 2020 Business Plan, Operating and Capital Budget is supported by three priorities aimed to implement the Mayors' Vision, maintain a state of good repair and enhance the customer experience.

Priority One: Implement the Mayors' Vision

We will successfully deliver the capital projects, service expansion and policy initiatives necessary to implement the Mayors' Vision.

- Implement an additional 364,000 Conventional Bus service hours, an additional 38,000 Access Transit trips and five RapidBus routes to accommodate growth and provide more service to customers.
- Commission one new SeaBus vessel (Burrard Chinook) and full year implementation of 3-vessel 10-minute service during peak hours.
- Test, commission and deliver 14 new Mark III trains and 12 new Canada Line Trains.
- Develop Phase Three of the Mayors' Vision that includes Bus, Rail and HandyDART network improvements.
- Develop the Transport 2050 Strategy and a climate action plan.
- Negotiate, implement and monitor agreements for the Surrey-Langley SkyTrain and the Broadway Subway projects.
- Finalize design and commence construction for the Operations and Maintenance Centre Upgrades and Storage Facility.

Priority Two: Maintain a State of Good Repair

TransLink will proactively manage and maintain all assets in a state of good repair to ensure safety and reliability, optimize lifecycle costs and enhance the customer experience.

- Implement various training for Transit Operators to promote employee safety to continue developing a safe and effective workforce.
- Continue to retrofit buses with Operator Protection Barriers.
- Support major technology renewal projects, such as Enterprise Asset Management, Daily Operations Management System, Enterprise Health and Safety System and Onboard Technology Asset Program.
- Develop an Information Technology (IT) Cost Optimization Roadmap.
- Deliver an Emergency Response Plan through the IT Disaster Recovery and Business Continuity Program.
- Upgrade and enhance existing TransLink retail assets to maximize revenue opportunities.
- Migrate TransLink's safety program to a formal Safety Management System.
- Continue to strengthen effective response and recovery from major disasters.

Priority Three: Enhance Customer Experience

With a customer first approach, we will build public trust and confidence in TransLink by focusing on growing ridership, engaging stakeholders and implementing the Mayors' 10-Year Vision.

- Introduce the ability for customers to book, change and cancel HandyDART trips with our online reservation system.
- Receive and commission 95 expansion and replacement conventional buses and Community Shuttle vehicles and 52 expansion and replacement HandyDART vehicles.
- Improve on bus speed and reliability to address growing congestion.
- Implement the new customer experience program to gain customer insights and strategies as well as recognize customer service excellence.
- Improve SkyTrain service frequency and quality, such as service expansion of Expo and Millennium Lines and Canada Line as well as snow plan enhancements.
- Expand Anti-Sexual Offending Campaign with greater direct outreach for schools.
- Implement two additional Transit Police Explosive Scent Detection Dog Teams, bringing a total of eight teams.
- Launch TransLink responsive website to optimize customers' mobile experience and a Customer Experience Dashboard.
- Expand retail amenities along the transit system to enhance customer experience.
- Focus on pedestrian and cyclist safety with external campaigns to encourage customer safety.
- Develop a formal Emergency Management and Communications program.

To deliver the priorities set in the **2020 Business Plan, Operating and Capital Budget**, funding will be obtained through various sources. Funding for capital projects include the Greater Vancouver Regional Fund (GVRF), Canada Line funding, Building Canada Fund, Public Transit Infrastructure Fund (PTIF) and Investing in Canada Infrastructure Program (ICIP). Funding sources supporting current operations as well as service expansion include property taxes, motor fuel taxes and transit revenues. The main risks associated with these funding sources include higher fuel prices in the region driving lower fuel tax revenues, reaction from transit users resulting from the planned fare increase, effects of the potential introduction of ride-hailing services, an overall economic downturn as well as the capacity to deliver on service expansion and capital projects.

3. 2020 Financial and Operating Summary

CONSOLIDATED REVENUES AND EXPENSES					
Twelve months ending December 31 (\$ thousands)	2018 ACTUAL	2019 BUDGET	2020 BUDGET	Change	
				Incr/(Decr)	%
Revenue					
Taxation	819,354	874,526	943,443	68,917	7.9%
Transit	638,015	669,274	723,160	53,886	8.1%
Government transfers					
Senior Government Funding	245,632	327,967	199,547	(128,420)	(39.2%)
Golden Ears Bridge Tolling Replacement	57,866	60,072	62,366	2,294	3.8%
Investment income	53,203	52,850	54,300	1,450	2.7%
Amortization of deferred concessionaire credit	23,273	23,337	23,337	-	-
Miscellaneous	19,982	12,517	17,059	4,542	36.3%
Sub Total Continuing Operations	1,857,325	2,020,543	2,023,212	2,669	0.1%
Gain/(Loss) on Disposal	(34)	(122)	-	122	(100.0%)
Total Revenue	1,857,291	2,020,421	2,023,212	2,791	0.1%
Expenditures					
Bus Operations	732,971	784,454	830,684	46,230	5.9%
Rail Operations	309,195	326,870	355,432	28,562	8.7%
Transit Police	38,308	40,845	42,513	1,668	4.1%
Corporate Operations	96,795	102,133	118,338	16,205	15.9%
Roads & Bridges	91,210	94,691	127,541	32,850	34.7%
Amortization of tangible capital assets	197,854	226,513	244,307	17,794	7.9%
Interest	183,459	185,118	185,252	134	0.1%
Sub Total Continuing Operations	1,649,792	1,760,624	1,904,067	143,443	8.1%
Corporate - one-time	22,029	70,576	31,625	(38,951)	(55.2%)
Total Expenditures	1,671,821	1,831,200	1,935,692	104,492	5.7%
Surplus for the year	185,470	189,221	87,520	(101,701)	(53.7%)

2020 Budget Highlights

The 2020 budget results in an \$87.5 million surplus on a Public Sector Accounting Board (PSAB) basis. This represents a decrease of \$101.7 million (53.7 per cent) from the 2019 budget. This is mainly due to lower Government Transfers, which is driven by the timing of the capital projects supported by Senior Government Funding, higher contributions to support municipal capital infrastructures and higher amortization of capital assets as a result of projects being completed.

Increases in expenditures are driven by expansion across all modes, contractual labour increases, inflation and state of good repair maintenance initiatives.

Revenues are also increasing due to the expansion of services and increased ridership as well as additional taxation revenue as approved in the 10-Year Vision.

Corporate one-time costs are budgeted at \$31.6 million and relate to continued investments in implementing Phase Two of the Investment Plan, including the RapidBus expansion and feasibility studies.

4. Key Performance Indicators and Drivers

Financial Indicators

FINANCIAL INDICATORS					
As at December 31 (\$ thousands)	2018	2019	2020	Change	
	ACTUAL	BUDGET	BUDGET	Incr/(Decr)	%
Unrestricted cash and investments ¹	578,195	474,155	365,929	(108,226)	(22.8%)
Capital assets	5,079,162	6,005,480	6,204,409	198,929	3.3%
Net direct debt ²	(2,371,421)	(2,653,871)	(2,757,744)	103,873	3.9%
Indirect P3 debt ³	(1,542,890)	(1,512,459)	(1,480,140)	(32,319)	(2.1%)
Total net direct debt and indirect P3 debt	(3,914,311)	(4,166,330)	(4,237,884)	71,554	1.7%
Gross interest cost as a % of operating revenue ⁴	11.8%	11.3%	10.5%	(0.8%)	(7.1%)

¹ Accumulated funding resources as calculated under the SCBCTA Act is the amount of resources available to fund future operations

² Includes bonds, debentures, capital leases, short-term debt net of sinking funds and debt reserve deposits

³ Includes Deferred concessionaire credit for Canada Line and Contractor liability for Golden Ears Bridge (GEB)

⁴ Operating revenue includes transit, taxation, operating transfers from Provincial government and miscellaneous income (2018 restated to include GEB tolling replacement revenue)

TransLink's unrestricted cash and investment balances reflecting accumulated funding resources available for supporting operations, are budgeted to decrease by \$108.2 million (22.8 per cent) compared to the 2019 budget. The decrease is due to deployment of cash for investments in facilities.

Planned capital asset increases during 2020 is expected to result in a net increase of \$198.9 million (3.3 per cent) in capital assets. Significant projects include Expo and Millennium Line upgrades, Conventional Bus expansion and replacement, rail fleet expansion and refurbishment, station upgrades, RapidBus developments and rail infrastructure projects including the Surrey-Langley SkyTrain.

Net direct debt is expected to increase by \$103.9 million (3.9 per cent) in comparison to the 2019 budget due to increased borrowing to finance planned capital spending net of senior government funding.

Indirect P3 debt relating to the Canada Line and Golden Ears contractor liability is expected to decrease by \$32.3 million (2.1 per cent) due to amortization and principal payments.

The gross interest cost as a percentage of operating revenues at 10.5 per cent is 0.8 percentage points lower than the 2019 budget and is well below the policy level of 20 per cent.

Operating Indicators

OPERATING INDICATORS					
Twelve months ending December 31	2018	2019	2020	Change	
	ACTUAL	BUDGET	BUDGET	Incr/(Decr)	%
Scheduled Transit Service					
Overall Performance Rating (out of 10)	7.8	8.0	8.0	-	-
Service Hours	6,857,115	6,994,799	7,357,338	362,539	5.2%
Operating Cost Recovery ¹	58.1%	56.6%	56.9%	0.3%	0.5%
Operating Cost per Capacity Km ^{2,3}	\$0.086	\$0.096	\$0.095	(\$0.001)	(1.0%)
Complaints per million Boarded Passengers	95.4	87.5	89.9	2.4	2.8%
Access Transit Service					
Number of Trips	1,315,418	1,373,000	1,411,000	38,000	2.8%
Operating Cost per Trip	\$41.34	\$41.06	\$40.76	(\$0.30)	(0.7%)
Number of Trips Denied	729	1,648	2,235	587	35.6%
Operator Complaints as a percentage of trips	0.12%	0.05%	0.08%	0.03%	60.0%
Service Complaints as a percentage of trips	0.07%	0.10%	0.09%	0.01%	10.0%
Ridership (thousands)					
Boarded Passengers	437,376	443,731	468,445	24,714	5.6%
Journeys	262,626	267,653	283,000	15,347	5.7%
Average Fare per Journey	\$2.35	\$2.50	\$2.56	\$0.06	2.4%

¹ Includes operating costs of Bus, Rail, Transit Police and Corporate On-going. Excludes amortization and interest expense.

² Includes operating costs of Bus, Rail, and Transit Police. Excludes amortization and interest expense.

³ Restated 2019 Budget to adjust Capacity Km for the Expo, Millennium and Canada Lines to conform with current year presentation.

Scheduled Transit Service

The targeted overall performance rating from our customers is to reach 8.0 for the full year of 2020.

Conventional system service hours for both Bus and Rail Operations are projected to increase by over 362,000 hours across the region. This includes the annualized impact of 2019 service improvements and 2020 service expansion improvements to reduce congestion and increase service reliability.

Operating cost recovery is budgeted to increase to 56.9 per cent representing a 0.3 per cent increase compared to 2019 budget. The improvement is mainly a result of operating cost efficiencies where the anticipated transit revenue growth from increased ridership exceeds the cost of service expansion.

Operating cost per capacity kilometre is expected to decrease by 1.0 per cent over the 2019 budget due to growing capacity kilometres as a result of fleet expansion, the introduction of double decker buses and increased usage of Mark III trains that offers larger capacity.

Although the complaints per million boarded passengers are budgeted to increase by 2.4 (2.8 per cent) over the 2019 budget, it is expected to decrease by 0.7 (0.8 per cent) compared to the 2019 actuals. Fewer complaints are expected compared to 2019 as a result of various initiatives being undertaken to improve the customer experience. TransLink remains focused on enhancing the customer experience as one of its key priorities and will continue to evaluate and improve on the level of customer complaints.

Access Transit Service

Access Transit trips are planned to increase by 38,000 trips (2.8 per cent) to provide increased services for passengers unable to use conventional public transit without assistance, as committed in Phase Two of the Investment Plan.

Although Access Transit will incur contractual rate increases, the operating cost per trip compared to 2019 budget is expected to decrease by \$0.30 (0.7 per cent) as a result of Access Transit delivering more trips while maintaining overhead and fixed costs relatively consistent with 2019.

Ridership

Boardings represent each time a passenger enters a fare paid zone including transfers. Boardings are 5.6 per cent higher than the 2019 budget.

Journeys represent a complete transit trip regardless of the number of transfers. For 2020, journeys are 5.7 per cent higher than the 2019 budget.

The average fare per journey is expected to increase \$0.06 (2.4 per cent) mainly due to the planned increase across all fare products effective July 1, 2020 and projected product mix.

With the recent approval of ride-hailing services in British Columbia, TransLink is at risk of lower ridership than anticipated in 2020. Management will monitor the ride-hailing impact and adjust the forecast accordingly during the year.

Key Drivers

Ridership

Ridership journeys are used in estimating the fare revenue. Journeys are assumed to grow by 3.6 per cent over the forecasted 2019 year-end, which is 5.7 per cent higher than the 2019 budget. This is mainly due to increased ridership from service expansion, economic growth and higher gasoline prices.

Households

Household projections are based on estimates from BC Stats. BC Stats provides annual household estimates for the Metro Vancouver region. The number of households in the Metro Vancouver region is expected to grow by 1.1 per cent in 2020 when compared to the 2019 budget. Household growth impacts both transit and taxation revenues.

Interest rates

Interest rates for the budget are based on forecasts from major Canadian chartered banks, the Ministry of Finance, BC Budget Fiscal Plan 2019-2020 to 2021-2022 and TransLink credit spread and issue costs. Short-term borrowing rates are expected to be 0.1 percentage points higher and long-term borrowing rates are expected to be 0.85 percentage points lower than forecasted 2019 year-end interest rates.

Inflation

The Consumer Price Index growth assumptions for the 2020 budget is 2.1 per cent based on the BC Ministry of Finance.

Taxable fuel consumption

Fuel consumption volumes are used to estimate fuel tax revenue. Fuel volume projections are developed based on an internally developed forecast and vehicle fleet trends which considers the total number of vehicles, average distance driven and fuel economy in the region as well as leakage of fuel caused by cross-border purchases outside the Metro Vancouver region.

Diesel and gasoline volumes are expected to decrease by 1.4 per cent and 4.5 per cent, respectively, as compared to the forecasted 2019 year-end. As diesel volumes represent 17.8 per cent of taxable fuel volumes in the 2020 budget, combined fuel volumes are forecasted to decrease by 4.0 per cent over the forecasted 2019 year-end. Management will continue to monitor fuel trends and leading indicators and will adjust the forecast if necessary.

Hydro cost

BC Hydro sets out electricity rate increases which impact propulsion power for SkyTrain and Trolley Buses along with facility utility costs. In 2020, rates are expected to increase by 2.0 per cent. Rate increases take effect in April of every year.

Gasoline and Diesel prices

Fuel prices affect operating costs for revenue and non-revenue buses as well as West Coast Express Trains. Fuel prices are estimated using fuel vendor and US Energy Information Administration forecasts adjusted for Canadian prices, taxes and price differentials. Natural gas rates are fixed through to the fall of 2021.

Revenue Vehicle insurance

Bus fleet insurance rates are expected to increase by 6.8 per cent on April 1, 2020, based on claims experienced to date and the expected basic rate increase from ICBC.

Assumptions

The following table highlights the financial impact of changes in key assumptions used to develop the 2020 budget:

2020 BUDGET ASSUMPTIONS			SENSITIVITIES		
			RATE / VOLUME	Change	Impact (\$ millions)
Background Assumptions					
Real GDP Growth			2.30%		
Employment rate			1.00%		
Hydro Cost Increase			2.00%		
Population	thousands		2,693		
Households	thousands		1,067		
Operating Assumptions with Sensitivity Analysis					
Revenue					
Regional Fuel Consumption					
Gasoline	millions of litres		1,734.0	1 per cent +/-	3.2
Diesel	millions of litres		376.2	1 per cent +/-	0.7
Ridership	millions of journeys		283.0	1 per cent +/-	7.2
Expense					
Diesel cost					
Operational Diesel Use	dollars per litre		1.55	\$0.10 +/-	3.2
	millions of litres		31.66	1 per cent +/-	0.5
Gasoline cost					
Operational Gasoline Use	dollars per litre		1.68	\$0.10 +/-	0.4
	millions of litres		4.37	1 per cent +/-	0.1
Interest rate					
	Short term		2.50%	0.5 per cent +/-	0.6
	Long term		2.90%	0.5 per cent +/-	2.3
Inflation					
	General		2.10%	0.5 per cent +/-	0.4
	Materials		2.10%	0.5 per cent +/-	0.4
	Electricity		2.00%	0.5 per cent +/-	0.1

5. Consolidated Revenues

CONSOLIDATED REVENUES					
Twelve months ending December 31 (\$ thousands)	2018 ACTUAL	2019 BUDGET	2020 BUDGET	Change	
				Incr/(Decr)	%
Taxation					
Fuel	351,338	368,904	390,389	21,485	5.8%
Property & Replacement	373,727	402,744	417,386	14,642	3.6%
Parking Rights	73,201	81,301	89,207	7,906	9.7%
Development Cost Charges	-	-	24,600	24,600	100.0%
Hydro Levy	21,088	21,577	21,861	284	1.3%
Transit	638,015	669,274	723,160	53,886	8.1%
Government transfers			-		
Senior Government Funding	245,632	327,967	199,547	(128,420)	(39.2%)
Golden Ears Bridge Tolling Replacement	57,866	60,072	62,366	2,294	3.8%
Investment income	53,203	52,850	54,300	1,450	2.7%
Amortization of deferred concessionaire credit	23,273	23,337	23,337	-	0.0%
Miscellaneous ¹	19,982	12,517	17,059	4,542	36.3%
Revenue Before Gain/(Loss) on Disposals	1,857,325	2,020,543	2,023,212	2,669	0.1%
Gain/(Loss) on Disposal	(34)	(122)	-	122	(100.0%)
Total Revenue	1,857,291	2,020,421	2,023,212	2,791	0.1%

¹ Prior year amounts have been restated for a change in presentation to reflect certain recoveries as gross instead of net.

TransLink receives its revenue mainly through taxation, transit fares and government transfers. Total consolidated revenues for 2020 are budgeted to be \$2.0 billion. Although the overall revenue is comparable with 2019, there are some notable changes amongst the revenue sources, namely the introduction of Development Cost Charge (DCC). The DCC is a levy paid by real estate developers for certain types of eligible projects required for the regional transportation system.

2020 Budget vs 2019 Budget

Taxation

TAXATION REVENUES					
Twelve months ending December 31 (\$ thousands)	2018 ACTUAL	2019 BUDGET	2020 BUDGET	Change	
				Incr/(Decr)	%
Fuel	351,338	368,904	390,389	21,485	5.8%
Property & Replacement	373,727	402,744	417,386	14,642	3.6%
Parking Rights	73,201	81,301	89,207	7,906	9.7%
Development Cost Charge	-	-	24,600	24,600	100.0%
Hydro Levy	21,088	21,577	21,861	284	1.3%
Total Taxation	819,354	874,526	943,443	68,917	7.9%

Taxation Revenue is comprised of fuel tax, property and replacement tax, parking rights, development cost charges, and hydro levy.

Fuel tax revenue for 2020 is budgeted at \$390.4 million which is \$21.5 million (5.8 per cent) higher than the 2019 budget. The increase is mainly due to a full year tax rate increase from \$0.17 to \$0.185 per litre which was effective July 1, 2019.

Property and replacement tax revenue is \$417.4 million, \$14.6 million (3.6 per cent) higher than the 2019 budget. This includes an annual 3.0 per cent increase in property tax revenue from existing properties as well as development growth rate of 1.4 per cent. The replacement tax remains at \$18.0 million.

Parking rights tax revenue is \$89.2 million, \$7.9 million (9.7 per cent) higher than the 2019 budget. This reflects the full year effect of the parking tax increase from 21 per cent to 24 per cent effective July 1, 2019 as well as expected growth in parking volumes.

As legislated by the Province of British Columbia and approved in Phase Two of the Investment Plan, DCCs are budgeted at \$24.6 million and are a new funding source in 2020. As new development increases the demand on public infrastructure throughout the transportation service region, the DCCs ensure that a fair share of those capital costs is paid for by new developments.

Transit

TRANSIT REVENUES					
Twelve months ending December 31 (\$ thousands)	2018 ACTUAL	2019 BUDGET	2020 BUDGET	Change	
				Incr/(Decr)	%
Fares	494,749	521,318	567,628	46,310	8.9%
Programs	118,635	122,915	128,565	5,650	4.6%
Total Fare Revenue	613,384	644,233	696,193	51,960	8.1%
Other	24,631	25,041	26,967	1,926	7.7%
Total Transit	638,015	669,274	723,160	53,886	8.1%

Total transit revenue is budgeted at \$723.2 million which is an increase of \$53.9 million (8.1 per cent) compared to the 2019 budget. Fare revenues are expected to increase due to a continued increase in ridership from service expansion, high employment levels and a planned increase in fares on July 1, 2020. The fare increase ranges from \$0.10 to \$0.40 for Single Use and Stored Value products, \$0.25 for DayPasses and \$2.00 to \$10.25 for Monthly Pass products.

Government Transfers

Government transfers include funds received from GVRF, Canada Line funding, Building Canada Fund, PTIF, ICIP and other miscellaneous programs. Revenue from senior government funding is expected to be \$128.4 million (39.2 per cent) lower than the 2019 budget levels mainly due to a reduction in the number and value of projects for which Federal Gas Tax revenue is recognized as a result of the timing of those funded projects. Golden Ears Bridge tolling replacement is budgeted to increase by \$2.3 million (3.8 per cent) as per the agreement with the Province of British Columbia.

Investment Income

Investment income is budgeted at \$54.3 million. The \$1.5 million (2.7 per cent) increase is mainly due to income earned on self-administered sinking funds whose balances have increased to cover increased debt loads, higher balances associated with the Land Reserve Account, partly offset by lower unrestricted cash balances.

Risks and Challenges

Risks related to transit fare revenue include achieving ridership targets and predicting consumer behaviour for the purchase of various fare products. With annual proposed fare increases in July, there is a risk of reduced ridership. There is an additional risk that ridership will decline with the introduction of ride-hailing services resulting in a loss of transit revenue. An economic slowdown could also lead to lower transit fare revenue. TransLink continues to closely monitor any external factors that may impact ridership.

Fuel tax volumes are unpredictable as suppliers have up to 48 months to recover tax paid on exempt volumes for fuel resold outside the transit region. Market changes in the price of crude oil, the increase in usage of zero-emission vehicles, the USD/CAD exchange rate, economic growth and the cost of transportation can also impact the amount of fuel tax collected and remitted to TransLink.

TransLink has limited influence on the operations of our partners that remit our parking rights tax revenue. An increase in parking rates, change in service or change in consumer behavior could negatively impact this stream of revenue.

6. Consolidated Expenses by Segment

CONSOLIDATED EXPENSES BY SEGMENT					
Twelve months ending December 31 (\$ thousands)	2018 ACTUAL	2019 BUDGET ¹	2020 BUDGET	Change	
				Incr/(Decr)	%
Bus Operations ³	732,971	784,454	830,684	46,230	5.9%
Rail Operations	309,195	326,870	355,432	28,562	8.7%
Transit Police	38,308	40,845	42,513	1,668	4.1%
Corporate Operations	96,795	102,133	118,338	16,205	15.9%
Roads & Bridges	91,210	94,691	127,541	32,850	34.7%
Amortization of tangible capital assets	197,854	226,513	244,307	17,794	7.9%
Interest	183,459	185,118	185,252	134	0.1%
Sub Total Continuing Operations	1,649,792	1,760,624	1,904,067	143,443	8.1%
Corporate - one-time	22,029	70,576	31,625	(38,951)	(55.2%)
Total Expenses by Segment	1,671,821	1,831,200	1,935,692	104,492	5.7%

¹ Restated to reflect budget transfers

² Amortization and Interest shown separately to facilitate analysis.

³ Prior year amounts have been restated for a change in presentation to reflect certain recoveries as gross instead of net.

TransLink is responsible for delivering transit services, operating five bridges and providing operating and capital funding for the Major Road Network (MRN) and cycling in Metro Vancouver. With continued service expansion, TransLink focused on efficiency reductions in the 2020 budget to offset the increase in operating costs that are necessary for high-priority initiatives.

Total expenses from continuing operations are expected to increase \$143.4 million (8.1 per cent) over the 2019 Budget. The increase is mainly due to higher operating costs resulting from service expansion contractual labour increases, inflation and state of good repair maintenance initiatives. Additionally, amortization of capital assets is expected to increase as capital projects are completed.

Corporate one-time costs are budgeted at \$31.6 million and relate to continued investments in implementing Phase Two of the 10-Year Vision including the RapidBus expansion and feasibility studies.

Bus Operations

Coast Mountain Bus Company (CMBC) oversees the operations of Conventional and Community Shuttle bus service, SeaBus and Access Transit. By the end of 2020, CMBC's fleet is approximately 2,075 Conventional Buses, Community Shuttle and Access Transit (HandyDART) vehicles. This figure also includes vehicles owned by TransLink but operated by third-party service providers. Bus Operations will span 112.0 million service kilometers, 5.8 million service hours and provide 1.4 million Access Transit trips in 2020.

Initiatives

Priority One: Implement the Mayors' Vision

The 2020 budget includes the following strategic activities to support the 10-Year Vision:

- Provide more service for our customers including:
 - Additional 364,000 conventional transit service hours;
 - Five new RapidBus routes;
 - New SeaBus vessel (*Burrard Chinook*) and a full year of three vessels at ten-minute service intervals during weekday peak periods; and
 - Additional 38,000 Access Transit trips;
- Actively participate in planning and development of Phase Three of the Investment Plan; and
- Plan for new facility needs including the Marpole Transit Centre (MTC) and HandyDART.

Priority Two: Maintain a State of Good Repair

In 2020, CMBC will undertake the following initiatives to ensure safe and secure operations and keep the transit infrastructure in a state of good repair:

- Move the dial on employee and customer safety, including:
 - Provide new online Safe Driving Refresher e-learning for Transit Operators;
 - Provide new one-day Pro-active Refresher Training Program for Transit Operators;
 - Provide new enterprise Health and Safety System;
 - Focus on pedestrian and cyclist safety with external campaigns; and
 - Continue to retrofit buses with Operator Protection Barriers;
- Execute Maintenance Trades Recruitment Plan; and
- Support major technology renewal projects such as Enterprise Asset Management and Daily Operations Management System.

Priority Three: Enhance Customer Experience

In 2020, CMBC will undertake the following initiatives in support of the customer experience:

- Work on bus speed and reliability initiatives to address growing congestion;
- Introduce ability for customers to book, change and cancel HandyDART trips online; and
- Receive and commission 95 expansion and replacement Conventional Buses and Community Shuttle vehicles and 52 expansion and replacement HandyDART vehicles.

Risks and Challenges

Coast Mountain Bus Company has identified the following risks and challenges:

- Recruitment – Recruiting tradespeople as well as recruiting and training enough Transit Operators to meet expansion and ongoing operations requirements is an ongoing challenge.
- Schedule reliability – The ability to maintain schedule reliability due to increased congestion is a challenge. CMBC may not be able to maintain existing service levels and deliver upon Investment Plan expansion commitments if demand outpaces expansion, congestion increases and bus-loading times continue to lengthen.
- Depot capacity restraints – CMBC’s depots, including HandyDART, are currently either at or over capacity and this may affect service. This risk is exacerbated by factors such as fleet diversification, long lifecycles for depot construction and increasing ridership.
- Safety – The incidence of safety incidents is increasing at CMBC worksites. This is mainly due to increased ridership and service, limited space at bus loops and exchanges, congestion and the ongoing danger from trolley wire theft.

- Fuel costs – Fuel prices may fluctuate from the assumptions used in the budget. CMBC has a proactive fuel management strategy to help mitigate market price changes and achieve budget stability. This includes active monitoring, predictive modelling and the ability to enter into fixed-price hedging agreements.
- Inclement weather – Abnormal inclement winter weather conditions could result in snow clearing, salting and other vehicle maintenance costs significantly beyond the budgeted expenditure (based on long-range average annual events and costs). Winter conditions also result in increased motor vehicle accident damage as well as employee and customer injuries such as slips and falls.

CMBC constantly monitors these risks through daily operations and maintenance, as well as various steering committees, asset management tools and regular reporting to senior management.

2020 Budget vs 2019 Budget

BUS OPERATIONS BY CATEGORY					
Twelve months ending December 31 (\$ thousands)	2018 ACTUAL	2019 BUDGET ¹	2020 BUDGET	Change	
				Incr/(Decr)	%
Administration	16,501	20,209	25,084	4,875	24.1%
Contracted Services	78,158	77,689	80,121	2,432	3.1%
Fuel and Power	55,140	63,543	62,818	(725)	(1.1%)
Insurance	17,891	22,629	23,150	521	2.3%
Maintenance, Materials and Utilities ²	85,114	77,428	80,480	3,052	3.9%
Professional and Legal	2,768	3,923	4,309	386	9.8%
Rentals, Leases and Property Tax	13,114	15,624	16,085	461	3.0%
Salaries, Wages and Benefits ²	464,284	503,411	538,636	35,225	7.0%
Total Expenses by Category	732,970	784,456	830,683	46,227	5.9%

¹ Restated to reflect budget transfers

² Prior year amounts have been restated for a change in presentation to reflect certain recoveries as gross instead of net.

The Bus Operations 2020 operating budget of \$830.7 million is \$46.2 million (5.9 per cent) higher than the 2019 budget. This consists of increases in CMBC costs to operate conventional service, Community Shuttle and SeaBus \$36.4 million (5.6 per cent), Access Transit \$1 million (1.6 per cent), other contracted bus services \$1.1 million (4.9 per cent) and allocated costs \$3.1 million (5.6 per cent) mainly due to higher Information Technology (IT) costs relating to software licensing and network infrastructure as well as inflationary increases in property taxes and rent.

The CMBC 2020 operating budget increase is primarily due to additional staff related to the 2020 service expansion plus the full year impact of 2019 service changes. In addition, there are increases to contractual labour and economic increases and insurance rates.

- Salaries, wages and benefits is expected to increase by \$35.2 million, which is mainly due to additional operators and other staff wages and salaries related to service expansion, contractual increases and other step and merit pay progression increases. \$2.5 million of total salaries expense is recoverable from warranties; the recovery amount is presented in miscellaneous revenue.

- Fuel and power cost are expected to decrease \$725 thousand mainly due to lower prices and improved consumption rates, partly offset by additional service expansion in 2020.
- Insurance premiums are expected to increase \$521 thousand mainly due to rate increases.
- Maintenance, materials and utilities are expected to be \$3.1 million lower mainly due to fewer battery replacements and engine rebuilds as most of the work related to these campaigns was completed in 2019, partly offset by an increase in maintenance costs related to expanded service hours in 2020. \$8.6 million of total maintenance expense is recoverable from warranties; the recovery amount is presented in miscellaneous revenue.

Access Transit is expected to be \$1 million higher than 2019 budget mainly due to contractual rate increases and an increase in number of trips.

Contracted transit services is expected to be \$2.4M higher than 2019 budget mainly due to contractual rate increases and additional service hours for Contracted Community Shuttle and West Vancouver.

Service Assumptions

The 2020 budget is the third year in Phase Two of the Investment Plan. Year over year conventional transit service hours are expected to increase 6.7 per cent, conventional transit service kilometres are expected to increase 4.7 per cent and HandyDART is funded for an additional 38,000 trips (2.8 per cent increase).

The major impacts to service include:

- Full year impacts of the service improvements, changes and expansion implemented in 2019;
- 2020 service expansion improvements across the region including five new RapidBus routes, one new SeaBus vessel; and
- Improved service on different bus routes and running time adjustments to address service reliability.

The following table shows the service levels at CMBC Operations:

BUS OPERATIONS					
Twelve months ending December 31	2018 ACTUAL	2019 BUDGET	2020 BUDGET	Change	
				Incr/(Decr)	%
SERVICE HOURS					
CMBC Operations	5,022,683	5,185,937	5,542,834	356,897	6.9%
Conventional Bus	4,463,820	4,616,916	4,972,469	355,553	7.7%
Community Shuttle	546,630	555,972	556,652	680	0.1%
SeaBus	12,233	13,049	13,713	664	5.1%
Contracted Transit Services	255,630	236,312	243,751	7,439	3.1%
West Vancouver	135,101	113,922	119,717	5,795	5.1%
Contract Community Shuttle	120,529	122,390	124,033	1,643	1.3%
Conventional Transit Service Hours	5,278,313	5,422,249	5,786,585	364,336	6.7%
SERVICE KILOMETRES					
CMBC Operations	98,132,881	101,842,807	106,781,862	4,939,055	4.8%
Conventional Bus	86,811,027	90,093,422	95,537,690	5,444,268	6.0%
Community Shuttle	11,156,484	11,572,968	11,059,052	(513,916)	(4.4%)
SeaBus	165,370	176,417	185,120	8,703	4.9%
Contracted Transit Services	5,540,094	5,139,769	5,251,820	112,051	2.2%
West Vancouver	2,837,204	2,420,848	2,432,265	11,417	0.5%
Contract Community Shuttle	2,702,890	2,718,921	2,819,554	100,633	3.7%
Conventional Transit Service Kilometres	103,672,975	106,982,576	112,033,682	5,051,106	4.7%
CAPACITY KILOMETERS					
CMBC Operations	5,011,302,815	5,277,947,980	5,787,714,198	509,766,218	9.7%
Conventional Bus	4,722,025,175	4,975,921,820	5,451,025,723	475,103,903	9.5%
Community Shuttle	223,129,680	231,459,360	265,417,247	33,957,887	14.7%
SeaBus	66,147,960	70,566,800	71,271,228	704,428	1.0%
Contracted Transit Services	195,917,990	175,420,817	189,282,547	13,861,730	7.9%
West Vancouver	141,860,190	121,042,391	121,613,250	570,859	0.5%
Contract Community Shuttle	54,057,800	54,378,427	67,669,297	13,290,870	24.4%
Conventional Transit Service Kilometres	5,207,220,805	5,453,368,797	5,976,996,745	523,627,948	9.6%
ACCESS TRANSIT					
Twelve months ending December 31	2018 ACTUAL	2019 BUDGET	2020 BUDGET	Change	
				Incr/(Decr)	%
Service Kilometres	9,788,597	10,240,000	10,575,600	335,600	3.3%
Access Transit Trips					
Trips - HandyDART	1,166,099	1,271,000	1,309,000	38,000	3.0%
Trips - Taxi Supplement	149,319	102,000	102,000	-	-
Total Access Transit Trips	1,315,418	1,373,000	1,411,000	38,000	2.8%

Rail Operations

British Columbia Rapid Transit Company Ltd. (BCRTC) on behalf of TransLink, maintains and operates two of the three SkyTrain lines in Metro Vancouver, the Expo and Millennium Lines and the West Coast Express (WCE) commuter rail service. In addition, BCRTC also manages the agreement with InTransit BC for the operation and maintenance of the Canada Line.

BCRTC is committed to its employees, the ongoing improvement of the customer experience and supporting TransLink's critical role of planning and managing the region's transportation network. Over the next few years, BCRTC will complete the ongoing investments in existing rail services and support the rail-related projects contained in the Mayors Council's 10-Year Vision for Metro Vancouver Transit and Transportation.

The Rail Operations 2020 business plan aligns its focus areas and objectives with those of TransLink to support an integrated approach to meet the ever-expanding needs of our customers in the Metro Vancouver region.

Initiatives

Priority One: Implement the Mayors' Vision

In 2020, BCRTC will provide the rail elements required to deliver the regional transportation priorities:

- Test, commission and deliver new Mark III trains;
- Prepare for future fleet requirements and service expansion; and
- Focus on integration of assets with operational business needs, including new facilities.

Priority Two: Maintain a State of Good Repair

In 2020, BCRTC will continue to focus on the following areas to continuously improve the current record of safe and secure operations and invest in the future of rail services:

- Improve the safety culture;
- Invest in the health of existing assets;
- Build and renew systems and related processes;
- Ensure prime contractor responsibilities are met;
- Improve environmental stewardship;
- Develop a safe and effective workforce through improved training delivery; and
- Strengthen effective response and recovery from major disasters.

Priority Three: Enhance Customer Experience

In 2020, BCRTC will continue to focus on the following areas in support of the customer experience:

- Improve service quality and frequency;
- Implement rail elements of Customer Experience strategy; and
- Drive business through improved performance management, process improvements and employee engagement.

Risks and Challenges

With a rapid transit system that is over 30 years old in several sections, Rail Operations faces numerous risks and challenges from a maintenance and operational standpoint. Rail Operations has identified the following risks and challenges:

- On-time delivery of an asset management system – required to ensure efficiency in proactive preventative maintenance;
- Competing priorities – there is a risk that too many competing priorities detract resources from normal operations and maintenance duties which will result in inability to meet commitments;
- Ability to move from reactive to preventative maintenance to manage aging infrastructure – unplanned maintenance requirements could impact service;
- Deploying new assets – delay in deploying assets could impact planned service;
- Outdated systems and processes – system failures which could lead to inefficiencies;
- Space constraints including office, fleet storage, maintenance and parking;
- Staff recruitment – could impact our ability to meet commitments; and
- Growing needs of communities and customers base.

BCRTC will continue to monitor these risks through various steering committees, asset management tools and regular reporting to senior management.

2020 Budget vs 2019 Budget

RAIL OPERATIONS BY CATEGORY					
Twelve months ending December 31 (\$ thousands)	2018 ACTUAL	2019 BUDGET	2020 BUDGET	Change	
				Incr/(Decr)	%
Administration	6,045	7,033	6,982	(51)	(0.7%)
Contracted Services	122,814	126,649	141,489	14,840	11.7%
Fuel and Power	16,566	16,997	16,569	(428)	(2.5%)
Insurance	5,024	5,467	5,690	223	4.1%
Maintenance, Materials and Utilities	47,090	44,836	51,820	6,984	15.6%
Professional and Legal	3,505	4,953	4,452	(501)	(10.1%)
Rentals, Leases and Property Tax	1,926	2,226	1,423	(803)	(36.1%)
Salaries, Wages and Benefits	106,225	118,709	127,007	8,298	7.0%
Total Expenses by Category	309,195	326,870	355,432	28,562	8.7%

The Rail Operations 2020 operating budget of \$355.4 million is \$28.6 million (8.7 per cent) higher than the 2019 budget due to the following:

- Contracted Services are expected to increase by \$14.8 million (11.7 per cent) mainly due to Canada Line service expansion and contractual increases;
- Salaries, wages and benefits are expected to increase by \$8.3 million (7.0 per cent) which includes resources to support maintenance state of good repair initiatives, service delivery and peak service increases, safe operations and project delivery as well as contractual and economic labour increases; and
- Maintenance, materials and utilities are expected to increase by \$7.0 million (15.6 per cent) to ensure our assets are in a state of good repair including maintenance for station repairs and service reliability.

Service Assumptions

With the approval of the Mayors' 10-Year Vision, service levels are expected to increase as follows:

RAIL OPERATIONS					
Twelve months ending December 31	2018	2019	2020	Change	
	ACTUAL	BUDGET ¹	BUDGET	Incr/(Decr)	%
SERVICE HOURS					
Expo & Millennium Lines	1,339,207	1,333,091	1,291,257	(41,834)	(3.1%)
Canada Line	202,976	202,836	242,634	39,798	19.6%
WCE	36,619	36,622	36,851	229	0.6%
Rail Operations Service Hours	1,578,802	1,572,549	1,570,742	(1,807)	(0.1%)
SERVICE KILOMETRES					
Expo & Millennium Lines	53,970,051	53,723,552	52,037,646	(1,685,906)	(3.1%)
Canada Line	6,535,871	6,531,344	7,812,782	1,281,438	19.6%
WCE	1,379,678	1,380,019	1,388,621	8,602	0.6%
Rail Operations Service Kilometres	61,885,600	61,634,915	61,239,049	(395,866)	(0.6%)
CAPACITY KILOMETRES					
Expo & Millennium Lines	5,288,200,640	4,697,943,224	4,839,446,132	141,502,908	3.0%
Canada Line	1,091,490,457	927,124,224	1,109,024,462	181,900,238	19.6%
WCE	203,640,532	203,690,804	204,960,430	1,269,626	0.6%
Rail Operations Capacity Kilometres	6,583,331,629	5,828,758,252	6,153,431,024	324,672,772	5.6%

¹ Restated 2019 Budget to adjust Capacity Km for the Expo, Millennium and Canada Lines to conform with current year presentation.

Although the 2020 service plan for Expo and Millennium Lines shows a 3.1 per cent decrease in service hours and service kilometres, the Mark III trains will provide additional capacity. This will mean that we will better meet customer demand and improve service quality by offering 3.0 per cent more capacity kilometres. We will be adding 56 new cars in service by September 2020 and adding frequency during peak hours on the busiest parts of the network. Off-peak service will also benefit from the additional capacity with the Mark III fleet.

Canada Line will integrate 24 new cars with service increases scheduled in January and March 2020.

WCE service levels will increase slightly as a result of an additional day of service in 2020.

Police Operations

Mandated by the Minister of Public Safety and Solicitor General as a Designated Policing Unit, the Metro Vancouver Transit Police ("Transit Police") preserves and protects the public peace throughout the transit

system. Working with local police services, each officer aims to prevent crime and offences against the law, aid in the administration of justice and enforce the laws of British Columbia. The Province established Transit Police in 2005 as the first dedicated transit police service in Canada.

Initiatives

In 2020, Transit Police will continue to implement its 2016-2020 Strategic Plan, its commitment to demonstrate excellence in public transit policing and focus on the following three strategic goals:

- Build a safe and secure transit system;
- Build confidence in the use of public transit; and
- Provide regional services that enhance local policing and community safety.

In supporting the TransLink priority of enhancing customer service, Transit Police will continue to advance implementation of a Tiered Policing Pilot Program to enhance policing resources and improve efficiencies. This will require coordination with the Ministry of Public Safety and Solicitor General (Policing and Security Branch) and other stakeholders to roll out. The proposed Community Safety Officer (“CSO”) team would supplement regular police officers by taking on a range of proposed duties, including providing enhanced peace officer visibility at the major transit hubs, guarding crime scenes, tagging property, fare enforcement and engaging with passengers. The aim is to positively impact perceptions of safety on transit and free up regular police officer resources to focus on responding to calls for service and conducting investigative follow-up. The CSO team would additionally assist the police service in managing the continued increase in police workload created by the Evergreen Extension of the Millennium Line and providing of additional visible resource and officer presence at special events.

In 2020, Transit Police will launch Phase 4 of its anti-sexual offending on transit campaign and include greater direct outreach to schools. This will include continued promotion of “See Something, Say Something” text 87-77-77 service advertisements across the transit system. To better engage and serve transit customers, Transit Police will also pilot a Waterfront Station Community Policing Office. Further, two additional Transit Police Explosive Scent Detection Dog Teams are planned for 2020, bringing the Dog Program complement to eight teams. The teams conduct daily patrols, security sweeps and respond to incidents (supporting transit system resiliency) and assist jurisdictional police with regional safety.

The Transit Police community-based Service Delivery Model (“SDM”) was launched in 2015, which adopted a zone policing model that requires officers to assume ownership of their assigned Community Service Area (“CSA”). There are six CSAs, each with a specific hub and Neighbourhood Police Officer assigned. An external evaluation of the model will be completed in 2020 and the outcomes considered in the planning commencing for the Transit Police 2021-2025 Strategic Plan.

Risks and Challenges

Maintaining sworn officer staffing levels in response to attrition and injury continues to be a challenge. The formation of a new Surrey municipal police department is expected to impact retention in the coming years. In the policing environment, a casual pool of sworn officers does not exist to fill vacancies and/or backfill for injuries. There is a comprehensive process for hiring of police officers and it can be lengthy, particularly for new recruits. The candidate pool for recruits and experienced officers varies month to month and hiring delays may affect overtime costs.

As transit ridership increases and the system expands, stakeholder demands for transit policing services evolve. As well, the significant increase in customer reporting to the text service places additional demands on the Transit Police operations communication centre and need for police response. Transit Police must be proactive in developing and acquiring the necessary civilian and sworn officer resources to support its operations and meet public expectations.

2020 Budget vs 2019 Budget

POLICE OPERATIONS BY CATEGORY					
Twelve months ending December 31 (\$ thousands)	2018 ACTUAL	2019 BUDGET ¹	2020 BUDGET	Change	
				Incr/(Decr)	%
Administration	3,440	3,781	3,577	(204)	(5.4%)
Insurance	49	50	120	70	140.0%
Maintenance, Materials and Utilities	1,486	1,215	1,325	110	9.1%
Professional and Legal	395	374	362	(12)	(3.2%)
Rentals, Leases and Property Tax	1,850	2,193	2,507	314	14.3%
Salaries, Wages and Benefits	31,088	33,232	34,622	1,390	4.2%
Total Expenses by Category	38,308	40,845	42,513	1,668	4.1%

¹ Restated to reflect budget transfers

Police Operations expenditures are expected to increase by \$1.7 million (4.1 per cent) from 2019. The increase is mainly due to the following:

- Salaries, wages and benefits increases are \$1.4 million (4.2 per cent) higher due to contractual labour and economic increases in the Collective Agreement and full year impact of additional Community Safety Officers part of the tiered policing model. \$1.2 million of total salaries expense is recoverable through secondments to other agencies, with the recovery amount presented in miscellaneous revenue;
- Rental costs are \$0.3 million higher due to a full year of rent for additional space at Sapperton; and
- Maintenance, materials and utilities are \$0.1 million higher due to higher IT cloud hosting costs.

These increases are partially offset by lower IT software licencing costs and lower professional fees.

Corporate Operations

The Corporate Operations' key priority is to address the operating needs of the organization with a focus on achieving enterprise-wide priorities, including developing Investment Plans for Phase Three of the 10-Year Vision and the Transport 2050 Strategy as well as focus on health and safety of our customers and employees.

Corporate Operations consists of the following areas: Transportation Planning and Policy, Infrastructure Management and Engineering, Major Projects, Human Resources, Business Technology Services, Strategic Sourcing, Real Estate, Legal, Customer Communications and Public Affairs, Financial Services, Compass Operations and Emergency Planning.

Initiatives

Priority One: Implement the Mayors' Vision

In 2020, Corporate Operations will support the achievement of regional transportation priorities with the following initiatives:

- Develop the Transport 2050 Strategy;
- Develop an updated Investment Plan and begin work on Phase Three of the 10-Year Vision;
- Develop a climate resiliency plan;
- Develop an Enterprise Digital Strategy and Roadmap;
- Implement Bus, Rail and HandyDART service improvements identified in Phase One and Phase Two of the Investment Plans, including the launch of five RapidBus routes and initiation of work on two additional RapidBus routes;
- Develop, design and deliver capital projects including rail systems and facilities to support ridership and expansion, existing and future bus depots as well as Expo and Millennium Upgrade Program;
- Negotiate, implement and monitor Agreements for the Surrey-Langley SkyTrain and the Broadway Subway projects;
- Finalize design and commence construction for the Operations and Maintenance Centre (OMC) 1 and 2 upgrades as well as OMC4 Storage Facility;
- Implement an Open Data Portal in support of the enterprise Data Sharing Policy;
- Implement a regional permit system for oversize/overweight vehicles; and
- Improve regional coordination between public and private sector partners on issues of intra-regional goods movement.

Priority Two: Maintain State of Good Repair

In 2020, the Corporate Operations will continue to focus on the following areas to ensure a state of good repair:

- Develop a Data Quality Management Program and Roadmap;
- Develop an IT Cost Optimization Roadmap;
- Deliver priority programs and projects including:
 - Enterprise Resource Planning (ERP) Program;
 - Onboard Technology Asset Program (OTAP);
 - Daily Operations Management System (DOMS); and
 - Enterprise Health and Safety System.
- Upgrade and enhance existing TransLink retail assets to maximize revenue opportunities;
- Implementation of the Health and Safety Software system across the enterprise;
- Deliver Emergency Response Plan through the IT Disaster Recovery and Business Continuity Program; and
- Migrate TransLink's safety program to a formal Safety Management System.

Priority Three: Enhance Customer Experience

The Corporate Operations will continue to focus on the following areas in support of the customer experience:

- Launch a Customer Experience Dashboard;
- Launch TransLink responsive website to optimize customers' mobile experience;
- Develop a formal Emergency Management and Communications program;
- Expand retail amenities along the transit system to enhance customer experience; and
- Explore opportunities for introducing Compass on HandyDART.

Risks and Challenges

Recruitment and retention continue to be a challenge due to a competitive labour market and a shortage of experienced professionals for specialized roles, resulting in potential delays in meeting internal and external customer expectations. Further, staff turnover is a risk that may lead to a loss of business knowledge and delays due to training of new staff.

Delays in the implementation of projects and initiatives are a risk due to challenges in finding suitable consultants and vendors on a timely basis. Additionally, the implementation cost of complex technical systems may be higher than anticipated.

The risks and challenges are continuously monitored through management oversight and project steering committees.

2020 Budget vs 2019 Budget

CORPORATE OPERATIONS BY CATEGORY					
Twelve months ending December 31 (\$ thousands)	2018 ACTUAL	2019 BUDGET ¹	2020 BUDGET	Change	
				Incr/(Decr)	%
Administration	17,833	19,078	21,179	2,101	11.0%
Contracted Services	11,205	14,043	14,750	707	5.0%
Insurance	197	201	219	18	9.0%
Maintenance, Materials and Utilities	1,995	1,595	2,273	678	42.5%
Professional and Legal	11,155	11,507	11,633	126	1.1%
Rentals, Leases and Property Tax	9,791	9,941	15,662	5,721	57.5%
Salaries, Wages and Benefits	44,619	45,768	52,622	6,854	15.0%
Total Expenses by Category	96,795	102,133	118,338	16,205	15.9%

Corporate Operations are budgeted at \$118.3 million, an increase of \$16.2 million (15.9 per cent) compared to 2019 budget. The increase in operating costs is primarily due to contractual and inflationary labour increases, property tax increases and higher IT software, license and support costs. Budget efficiencies were made via reallocation of expenditures towards contractual obligations and service expansion commitments. TransLink remains committed to achieving budget efficiencies in the future through diligent fiscal management in order to keep delivering on commitments in Phase Two of the Investment Plan.

Roads and Bridges

ROADS & BRIDGES OPERATIONS BY CATEGORY					
Twelve months ending December 31 (\$ thousands)	2018 ACTUAL	2019 BUDGET	2020 BUDGET	Change	
				Incr/(Decr)	%
Administration	4,363	120	75	(45)	(37.5%)
Capital infrastructure contributions	40,416	49,781	80,387	30,606	61.5%
Contracted Services	8,173	5,530	5,827	297	5.4%
Insurance	981	1,224	1,224	-	0.0%
Maintenance, Materials and Utilities	33,155	34,851	36,358	1,507	4.3%
Professional and Legal	2,194	1,749	1,829	80	4.6%
Rentals, Leases and Property Tax	256	67	228	161	240.3%
Salaries, Wages and Benefits	1,672	1,369	1,613	244	17.8%
Total Expenses by Category	91,210	94,691	127,541	32,850	34.7%

The 2020 Roads and Bridges budget of \$127.5 million is \$32.9 million (34.7 per cent) higher than the 2019 budget. The increase is mainly due to higher contributions to support municipal capital infrastructures as committed in Phase Two of the Investment Plan and increased bridge maintenance contract costs.

The Roads and Bridges 2020 budget will support the MRN and Bike Program, Regional Goods Movement Strategy and will deliver Greater Vancouver Urban Freight priorities yield to the following outcomes:

- Administer the municipal funding programs for roads, cycling, seismic upgrades and walking infrastructure projects with the funding approved in Phase One and Phase Two of the Investment Plan;
- Provide the tools to monitor and manage the road network's performance;
- Improve regional coordination between public and private sector partners on issues of intra-regional goods movement;
- Support the continued development of a Regional Road Network Strategy to better define and manage performance of the region's road network;
- Improve regional road network operations including improvement of freight wayfinding and trip planning tools, loading zone operations and incident response; and
- Continue to make progress towards implementing a regional permit system for oversize-overweight vehicles.

Amortization

The 2020 budget for amortization of tangible capital assets is \$244.3 million, an increase of \$17.8 million (7.9 per cent) compared to the 2019 budget. Major attributes for the additional amortization expense include increases in buses, SkyTrain rail cars and Canada Line rail cars to be acquired in 2020, station upgrades as well as rail infrastructure projects.

Interest

Interest expense of \$185.3 million is \$0.13 million (0.1 per cent) lower than the 2019 budget mostly due to higher outstanding gross debt purchased at lower interest rates.

Corporate – One-time

Corporate one-time costs in the 2020 budget are \$31.6 million, mainly consisting of the RapidBus expansion (\$10.9 million), feasibility studies (\$7.6 million), contingency provision (\$2.0 million), Regional Transportation Strategy development (\$2.1 million), Flexible Service Piloting Program (\$1.7 million), operating costs for technology related capital projects (\$1.6 million), Corporate Asset Management initiatives (\$1.6 million), Mobility Pricing (\$0.8 million), Bus Speed and Reliability (\$0.4 million) and other one-time operating costs related to capital projects (\$2.7 million).

7. Investment in Capital Assets

Summary of Capital, by Program (\$ thousands)	Total Project Budget			2020 Capital Cash Flow		
	Gross Cost	Less: Funding *	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
2020 New Capital Program						
Equipment	35,765	-	35,765	17,080	-	17,080
Facilities	63,299	(25,280)	38,019	18,157	(2,753)	15,404
Infrastructure	121,022	(786)	120,236	37,037	(355)	36,682
Technology	32,725	-	32,725	9,315	-	9,315
Vehicles	156,551	(136,261)	20,290	12,195	(8,042)	4,154
Contingency	10,000	-	10,000	10,000	-	10,000
2020 New Capital Program Total	419,362	(162,327)	257,035	103,784	(11,150)	92,635
Active/Approved in Principle (AIP) Capital						
Equipment	236,400	(54,929)	181,471	66,856	(27,310)	39,546
Facilities	182,586	(7,468)	175,117	133,832	(6,396)	127,436
Infrastructure	743,118	(215,012)	528,106	175,405	(111,129)	64,276
Technology	105,971	-	105,971	36,714	-	36,714
Vehicles**	614,968	(550,315)	64,653	183,078	(193,979)	(10,901)
Major Construction	3,624,009	(1,699,494)	1,924,515	187,510	(63,789)	123,721
Active/Approved in Principle (AIP) Capital Total	5,507,052	(2,527,218)	2,979,833	783,395	(402,603)	380,792
Total Capital						
Equipment	272,165	(54,929)	237,236	88,936	(27,310)	56,626
Facilities	245,885	(32,748)	213,136	146,989	(9,149)	142,840
Infrastructure	864,140	(215,798)	648,342	212,442	(111,484)	100,958
Technology	138,696	-	138,696	46,029	-	46,029
Vehicles**	771,519	(686,576)	84,943	195,273	(202,021)	(6,747)
Major Construction	3,624,009	(1,699,494)	1,924,515	187,510	(63,789)	123,721
Contingency	10,000	-	10,000	10,000	-	10,000
Total Capital Total	5,926,414	(2,689,545)	3,236,868	887,179	(413,753)	473,427
Capital Infrastructure Contributions						
2020 New Program	81,896	-	81,896	23,783	-	23,783
Active and Approved in Principle	274,011	-	274,011	45,597	-	45,597
Capital Infrastructure Contributions Total	355,907	-	355,907	69,380	-	69,380
All Projects	6,282,321	(2,689,545)	3,592,775	956,559	(413,753)	542,807

* The funding sources include Federal Gas Tax, Build Canada Fund, PTIF, ICIP, City of Vancouver and City of Richmond.

**The 2020 capital cash flows from Senior Government funding are expected to exceed 2020 gross cash flows due to a timing difference of when the funding is received and expenditures are incurred. In certain instances, the 2020 funding cash flows include recoveries for expenditures incurred in 2019 and 2020.

Overview

TransLink’s capital program is aligned with our current priorities of enhancing customer experience, ensuring a state of good repair and implementing the Mayors’ Vision. The current capital program continues to support the delivery of the 10-Year vision, while also addressing emerging state of good repair investments needed to ensure existing assets serve customers and stakeholders safely, effectively and efficiently. Capital projects have been planned and prioritized through an integrated review process across the enterprise that measures impact on strategy, customer experience, stakeholder value, business effectiveness and other factors.

The table above highlights capital projects grouped into asset categories and includes capital infrastructure contributions as per TransLink’s current mandate of addressing regional Major Road Network (MRN) needs. The budget for the 2020 new capital program is \$419.4 million plus \$81.9 million for Capital Infrastructure Contributions.

The projected 2020 cash flow for all projects is \$956.6 million, with \$103.8 million for the 2020 New Capital Program, \$783.4 million for existing capital programs and \$69.4 million for Capital Infrastructure Contributions. The net cash impact in 2020 after senior government funding is \$542.8 million.

2020 New Capital Program

The 2020 New Capital Program is intended to continue the delivery of the Mayors’ Vision, as well as deliver key milestones for major projects. The program is also intended to improve customer experience and keep the overall system in a state of good repair.

Fleet expansion and replacement projects are anticipated to be funded by the GVRF at approximately 90%. Other funding for the 2020 program year includes \$25.3 million from City of Richmond for Capstan SkyTrain Station Project and \$600 thousand for the Trolley Overhead State of Good Repair program from the City of Vancouver. The net capital for the 2020 new capital program is currently forecasted at \$257.0 million.

Table 1: 2020 New Capital Program (\$ thousands)

2020 New Capital Program, Project Details		Total Project Budget			2020 Capital Cash Flow		
Classification and Program Name	Program Description	Gross Cost	Less: Funding*	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
Equipment							
Automatic Train Control Program	Replacement of Millennium Line (Lougheed to VCC) Automatic Train Control (ATC) computers and data communication equipment at end of useful life.	18,170	-	18,170	2,428	-	2,428
Compass Vending Machine Spares**	Purchase of 10 Compass Vending Machines to establish a spare inventory to mitigate the risk of flood, fire and vandalism events.	1,966	-	1,966	-	-	-

2020 New Capital Program, Project Details		Total Project Budget			2020 Capital Cash Flow		
Classification and Program Name	Program Description	Gross Cost	Less: Funding*	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
PIDS/CCTV/PA Project	To fund expansion of Passenger Information Displays (PIDS), Closed Circuit TVs (CCTV) and Public Announcement (PA) systems.	14,700	-	14,700	14,652	-	14,652
CMBC Hoist Asset Renewal Program**	Replacement of hoist equipment at the Surrey, Vancouver, and Burnaby Transit Centres that have reached end of asset service life.	929	-	929	-	-	-
Equipment Total		35,765	-	35,765	17,080	-	17,080
Facilities							
Capstan Station Project	Phase 2 of the proposed Richmond Capstan Station on the SkyTrain Canada Line includes the construction, testing and commissioning of the new station.	45,905	(25,280)	20,625	5,000	(2,753)	2,247
PowerSmart Upgrades	Implement PowerSmart Upgrades (PSU) relating to Energy Conservation Measures (ECMs) for the 307 Columbia St. building and parking area.	159	-	159	153	-	153
SilverTree Marpole Transit Centre	Engineering design work related to the Marpole Transit Centre (MTC) in support of mobilizing the Mayors' Vision.	12,485	-	12,485	8,740	-	8,740
Facility Upgrades to Accommodate Double Decker Buses	The upgrade of Hamilton Transit Centre to allow for repairs after Motor Vehicle Accidents (MVA) and major maintenance of the double decker bus fleet.	2,650	-	2,650	2,507	-	2,507
Facility Retrofit Projects - Burnaby Transit Centre (BTC) Stores	Address hazardous materials abatement and carousel storage system replacement at Burnaby Transit Centre (BTC) building.	2,100	-	2,100	1,757	-	1,757
Facilities Total		63,299	(25,280)	38,019	18,157	(2,753)	15,404
Infrastructure							
Bi Directional Antenna (BDA) Install	Improve signal strength of the emergency radio frequencies used by regional first responders.	199	-	199	199	-	199
Braille and Tactile Information at Bus Stops	Install bus stop identifiers in the form of dual-format braille and tactile signage, to allow customers with vision loss to identify bus stops and related transit information.	7,000	-	7,000	698	-	698

2020 New Capital Program, Project Details		Total Project Budget			2020 Capital Cash Flow		
Classification and Program Name	Program Description	Gross Cost	Less: Funding*	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
Expo Line Station Escalators	Phase 3 implementation to secure the Supply and Installation of six American Public Transportation Association (APTA)/Transit grade escalators. These are for two escalators at Surrey Central SkyTrain Station, one escalator at 22nd Street SkyTrain Station, and three escalators at West Coast Express.	16,200	-	16,200	2,474	-	2,474
Expo Line Surrey Power Rail Replacement	Replacement of 8.6km of power rail on the Expo Line; from the east of Scott Road station to King George which has reached end of asset service life.	12,500	-	12,500	1,432	-	1,432
Farebox Replacement	Replacement of bus fleet farebox equipment which is at end of useful service life.	21,233	-	21,233	9,735	-	9,735
Running Rail Replacement	Replacement of running rail and rail pads on Expo and Millennium Lines which have reached the end of asset service life.	8,110	-	8,110	1,855	-	1,855
TransLink Owned Bicycle Infrastructure	Rehabilitate and upgrade regional cycling routes, bike parking at transit facilities and install bike counters across the region.	6,300	-	6,300	3,319	-	3,319
Elevating Device Asset Renewal Program	The Asset Renewal Program (ARPg) includes elevating devices (elevators and escalators) currently maintained at all Expo and Millennium SkyTrain and West Coast Express (WCE) stations as well as units at the Operations and Maintenance Centres, including replacement of seven Expo Line elevators as prioritized in the Escalators and Elevators asset renewal program.	14,100	-	14,100	6,160	-	6,160
Paving Replacement Asset Renewal Program	Asset Renewal Program (ARPg) for rehabilitation of Asphalt pavement at Richmond Transit Centre, Bridgeport Exchange and Production Way stations.	1,370	-	1,370	53	-	53
Trolley Overhead (TOH) State of Good Repair Replacement	Continued investment in the Trolley Overhead (TOH) program in state of good repair replacements.	5,320	(600)	4,720	4,464	(355)	4,109
BCRTC Payroll, Scheduling and Timekeeping	Implementation and integration of payroll solution for WCE and BCRTC organizations due to software end of useful life.	3,770	-	3,770	1,324	-	1,324

2020 New Capital Program, Project Details		Total Project Budget			2020 Capital Cash Flow		
Classification and Program Name	Program Description	Gross Cost	Less: Funding*	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
SkyTrain Customer and Operations Telecommunications (SCOT) Upgrade	Modernize train communications and complete integration of all SkyTrain Customer and Operations Telecommunications Subsystems to address obsolescence issues and support train expansion.	10,000	-	10,000	561	-	561
Noise Mitigation Solution	Installation of customized rail dampers on sections of the Expo and Millennium Lines, to mitigate high noise levels experienced on the railway lines.	4,000	-	4,000	1,569	-	1,569
Investments in Transit Priority RapidBus Corridors	Implement transit priority measures, upgrades to bus stops, terminals and depot improvements to accommodate service for various new and existing RapidBus lines.	6,367		6,367	3,184		3,184
Bus Speed and Reliability	Provide funding to municipalities to improve bus speed and reliability infrastructure.	4,553	(186)	4,553	10		10
Infrastructure Total		121,022	(786)	120,236	37,037	(355)	36,682
Technology							
BCRTC Software Application Renewal Program	Migration of enterprise software applications to SQL server for data resiliency and usability.	850	-	850	843	-	843
IT Infrastructure Refresh	Continued investment in technology infrastructure to renew capital leases, replace owned assets, accommodate new headcount and provide for growth.	7,075	-	7,075	3,169	-	3,169
TransLink Analytics Program	Ongoing analytics program, supporting provision of analytics into TransLink to enhance decision making.	500	-	500	75	-	75
Enterprise Health and Safety System	Implement a technology solution to manage occupational and non-occupational incidents, medical files and return to work processes, claims management, audit management and risk management across TransLink Enterprise.	2,600	-	2,600	1,237	-	1,237
Finance Enterprise Resource Planning (ERP)	Implementation of a Finance and Supply Chain Enterprise Resource Planning (ERP) business solution.	18,600	-	18,600	2,488	-	2,488
Technical Drawings and Library Management System (TDLS)	Implement a solution to manage technical drawings and documents across TransLink Enterprise and to replace the BCRTC Library Management System.	3,100	-	3,100	1,503	-	1,503

2020 New Capital Program, Project Details		Total Project Budget			2020 Capital Cash Flow		
Classification and Program Name	Program Description	Gross Cost	Less: Funding*	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
Technology Total		32,725	-	32,725	9,315	-	9,315
Vehicles							
Conventional Bus Expansion**	Purchase thirty articulated 60' hybrids, thirty-nine 40' hybrids, and nine 40' electric expansion buses.	111,790	(100,611)	11,179	-	-	-
HandyDART Expansion**	Purchase ten HandyDART vehicles which will allow TransLink to implement service expansion as per the Mayors' Vision.	1,610	(1,449)	161	-	-	-
HandyDART Replacement**	Procure and replace forty-two HandyDART vehicles which have reached end of asset service life.	6,550	(5,895)	655	-	-	-
MKI refurbishment	Refurbishment of thirty-six MK I 500-800 series cars in order to allow the continuity of safe, reliable and comfortable SkyTrain services.	17,700	(13,275)	4,425	10,722	(8,042)	2,681
Transit Police NRV Expansion	Expand the Metro Vancouver Transit Police by three vehicles to maintain operational fleet levels.	175	-	175	175	-	175
BCRTC Service Support Vehicle Replacement	Procurement and replacement of BCRTC Service Support Vehicles including three road-going vehicles (two SkyTrain and one WCE), five forklifts, and one emergency power generator trailer.	800	-	800	800	-	800
Community Shuttle Replacement – 2020**	Procure sixty-two Community Shuttle buses to replace existing shuttles that will reach the end of their useful service lives in 2021.	14,101	(12,691)	1,410	-	-	-
Community Shuttle Expansion – 2020**	Purchase nine Community Shuttle vehicles to support the service expansion throughout Metro Vancouver as per Phase 2 Investment Plan of the 10-year vision.	2,600	(2,340)	260	-	-	-
CMBC Service Support Vehicle (SSV) Replacement	Purchase and outfit of eighteen replacement Service Support Vehicles (SSV) for CMBC as replacement for asset at end of service life.	1,225	-	1,225	498	-	498
Vehicles Total		156,551	(136,261)	20,290	12,195	(8,042)	4,154
Contingency							
Capital Program Contingency	Capital Program Contingency	10,000	-	10,000	10,000	-	10,000
Contingency Total		10,000	-	10,000	10,000	-	10,000
Grand Total		419,362	(162,327)	257,035	103,784	(11,150)	92,635

*The funding sources include Federal Gas Tax, Build Canada Fund, PTIF, ICIP and the City of Vancouver.

**These projects have no anticipated cash flows until the goods are received from external vendors. The procured items are expected to be delivered starting in 2021.

Active and Approval in Principle (AIP) Projects Underway

Capital projects already approved and underway have a total budget of \$5.5 billion. Anticipated senior government contributions total \$2.5 billion, leaving the net cost forecasted at \$3.0 billion. Spending forecast in 2020 is \$783.4 million with senior government funding of \$402.6 million for net spending of \$380.8 million.

Majority of the spending is for Infrastructure programs (\$175.4 million), Fleet Replacement and Expansion programs (\$183.1 million) and Major Construction Programs (\$187.5 million) and are related to Phase 2 Investment plan.

Table 2: Active and Approved in Principle (AIP) Projects Underway (\$ thousands)

Active and Approved in Principle (AIP) Capital Program Details		Total Project Budget			2020 Capital Cash Flow		
Classification and Program Name	Program Description	Gross Cost	Less: Funding *	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
Equipment							
CMBC Onboard Computer Update and Voice Radio Replacement	Replacement of end of service onboard Computer Update and Voice Radio.	36,000	-	36,000	7,358	-	7,358
TMAC Radio Replacement	Upgrade TMAC Mobile Automated Vehicle Location radio system.	25,600	(4,862)	20,738	6,545	(2,308)	4,237
Bus Security Camera System Replacement	Bus Security Camera System Replacement	21,709	-	21,709	4,800	-	4,800
CCTV Camera System Upgrade on Expo and Millennium Lines**	Replace cameras, equipment and coax cable.	11,615	(11,615)	-	2,547	(9,120)	(6,573)
Railborne Equipment Replacement	Replace five BCRTC rail borne equipment vehicles nearing end-of-life used heavily for inspections, maintenance and capital project support.	4,980	-	4,980	4,005	-	4,005
SeaBus Shore Base Emergency Backup Generators and Transfer Switches	Replace existing emergency power back-up generators and switches at SeaBus North and South Terminals due to end of service life.	610	-	610	584	-	584
Replacement of Hegenscheidt Underfloor Lathe	Replace the Hegenscheidt Wheel Lathe that has reached the end of its service life.	4,710	-	4,710	1,634	-	1,634
Fare Gates Capacity Increase - Priority Stations	Install nine additional fare gates at four priority stations (Waterfront, Richmond-Brighouse, Surrey Central, and King George) to meet adequate level of service thresholds for existing peak demands.	1,902	-	1,902	1,506	-	1,506

Active and Approved in Principle (AIP) Capital Program Details		Total Project Budget			2020 Capital Cash Flow		
Classification and Program Name	Program Description	Gross Cost	Less: Funding *	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
Passenger Address (PA) System Quality Improvement**	Update existing PA speakers and install emergency speakers at stations and in some SkyTrain vehicles.	14,500	(10,861)	3,639	3,855	(6,083)	(2,228)
ATC Existing Equipment Replacement	Replace Automatic Train Control (ATC) equipment to improve system reliability and maintain state of good repair.	46,048	(4,500)	41,548	10,762	(243)	10,519
SkyTrain Physical Security System**	Security Enhancements.	7,704	(7,104)	600	2,187	(6,070)	(3,883)
SkyTrain Customer and Operations Telecommunications Upgrade	Update existing Public Address (PA) speakers at station entrance areas.	14,959	(14,785)	174	4,370	(2,383)	1,987
Operator Protection Barrier Retrofit	Installation of barrier retrofit to protect bus operators from assaults.	3,499	-	3,499	372	-	372
Hoist Replacements	Replace three hoists identified at the Surrey Transit Centre (STC) to align with Sandwell Hoist Replacement Program.	800	-	800	660	-	660
CMBC Facilities Camera Replacement	Replace end-of-life security camera and surveillance systems at CMBC facilities, SeaBus and vessels.	1,600	-	1,600	1,200	-	1,200
Expo Line Traction Power Equipment Upgrade	Replace substation traction power equipment on Expo Line.	10,200	-	10,200	4,591	-	4,591
Investments in Transit Priority RapidBus Corridors	Implement transit priority measures, upgrades to bus stops, terminals and depot improvements to accommodate service for various new and existing RapidBus Lines.	4,374	-	4,374	10	-	10
Replacement of Rotary Grinder #1	Replace rail grinding equipment to ensure timely scheduled grinding under the maintenance program.	7,300	-	7,300	808	-	808
Millennium Line Fire and Life Safety Systems (FLSS) Equipment Replacement	Installation of Fire Safety system in Millennium Line.	9,251	-	9,251	6,104	-	6,104
Mark (MK) III Vehicle Lifting Jacks**	Purchase of additional lifting jacks to support maintenance of MK III SkyTrain vehicles.	2,539	(1,202)	1,337	450	(1,103)	(653)
Replacement of Rotary Grinder #2	Replace rail grinding equipment to ensure timely scheduled grinding under the maintenance program.	6,500	-	6,500	2,508	-	2,508
Equipment Total		236,400	(54,929)	181,471	66,856	(27,310)	39,546
Facilities							

Active and Approved in Principle (AIP) Capital Program Details		Total Project Budget			2020 Capital Cash Flow		
Classification and Program Name	Program Description	Gross Cost	Less: Funding *	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
OMC 2 Completion Project	Expansion of the Operations and Maintenance Centre to facilitate additional industrial workshop space.	2,869	-	2,869	229	-	229
SeaBus Crew Facilities Rehabilitation**	Renovation of end of service SeaBus crew facilities to ensure a state of good repair for work crews.	1,680	(840)	840	390	(972)	(582)
SeaBus Terminals Interior Refurbishment	Detailed design and implementation for Phase 1 upgrades to the passenger environments in North and South SeaBus Terminals.	15,867	-	15,867	8,305	-	8,305
CMBC Roof Access Platform Upgrades	Required to modify the existing gap between the bus roof and the catwalk to meet new safety protocols.	360	-	360	115	-	115
STC Bodyshop Exhaust Reels	Implementation of exhaust reels within the Surrey Transit Centre to reduce fleet downtime.	450	-	450	173	-	173
SeaBus Facility Upgrades	Upgrade essential auxiliary spaces and equipment, including the installation of an elevator within SeaBus North Terminal.	2,805	-	2,805	358	-	358
Operations and Maintenance Centre 4 (OMC 4) Land Acquisition	Land acquisition is to purchase land to construct a new facility with the capabilities of storing the expanded fleet of new railcars arriving between 2023 and 2027.	100,000	-	100,000	99,500	-	99,500
Richmond Transit Centre (RTC) Facility Upgrades to Accommodate Double Decker Buses	Retrofits required at RTC for double decker buses purchased.	9,751	-	9,751	6,099	-	6,099
Transit Centre Infrastructure to Support Expansion	Moving from hybrid to diesel buses requires changes to existing infrastructure.	2,501	-	2,501	1,527	-	1,527
CMBC Marpole Transit Centre	Provides for a detailed environmental study, functional programming requirements and other pre-design work.	3,000	-	3,000	720	-	720
SeaBus Maintenance Dock Expansion	Expand maintenance dock from two to three berths to accommodate a new SeaBus vessel purchase.	10,000	-	10,000	8,012	-	8,012
Bus Facility Customer Amenities Improvement Program	Upgrade and maintenance for customer amenities at TransLink's bus facilities and infrastructure.	6,573	-	6,573	1,582	-	1,582
Burnaby Transit Centre South (BTCS) Seismic Upgrade**	Design phase of the upgrades to the BTCS structure to ensure it meets current Building Code seismic standards.	13,257	(6,628)	6,628	28	(5,424)	(5,396)
Facilities Metro Vancouver Transit Police Hub Offices	Acquisition of a front facing hub office space at the Metro Vancouver Transit Police Bridgeport location.	450	-	450	251	-	251

Active and Approved in Principle (AIP) Capital Program Details		Total Project Budget			2020 Capital Cash Flow		
Classification and Program Name	Program Description	Gross Cost	Less: Funding *	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
BCRTC OMC 1 and 2 Space Optimization Modernization	Renovation to optimize and modernize BCRTC's workplace and facilities.	8,000	-	8,000	3,996	-	3,996
OMC Perimeter Security Upgrade	Design and development of the perimeter security upgrade at the Operations and Maintenance Centre.	1,990	-	1,990	1,086	-	1,086
Metro Vancouver Transit Police-Sapperton Facilities Expansion and Renovation	Expansion and renovation of existing office facilities to accommodate additional workplace requirements of the Metro Vancouver Transit Police.	1,003	-	1,003	6	-	6
Burnaby Transit Centre Fleet Overhaul Maintenance Lunchroom Expansion and Electric Shop Upgrades	Fleet Overhaul (FOH) maintenance lunch room implementation	1,530	-	1,530	1,453	-	1,453
TOH Rectifier Building Roof and Envelope Replacement	Replace roof membranes at the Hastings East and Highbury rectifier stations to ensure membrane warranty remains intact for critical equipment.	500	-	500	2	-	2
Facilities Total		182,586	(7,468)	175,117	133,832	(6,396)	127,436
Infrastructure							
Running Rail Replacement	Replace running rail that have reached the end of service life.	8,850	-	8,850	5,176	-	5,176
TransLink Owned Bicycle Infrastructure	Rehabilitate and upgrade regional cycling routes, bike parking at transit facilities and install bike counters across the region.	11,571	-	11,571	7,221	-	7,221
Trolley Over Head (TOH) Metrotown Group Rectifier Replacement	Design and construct rectifier station replacements at Central Park, Willingdon East and Willingdon West rectifier stations.	5,766	(4,725)	1,041	385	(32)	353
SeaBus Ship to Shore and Transfer Ramp Rehab	SeaBus Ship to Shore and Transfer Ramp Rehab	500	-	500	71	-	71
CMBC Transit Centre Infrastructure State of Good Repair**	Replacement of end-of-life hoists at the Burnaby Transit Centre to align with Sandwell Hoist Replacement Program.	5,163	(2,550)	2,613	1,357	(1,472)	(115)
Lonsdale Quay Exchange Upgrade	Design and implementation of improvements to passenger environment in bus loop and North SeaBus Terminal.	10,542	(7,343)	3,199	7,254	(6,564)	690
Nanaimo Bus Loop Upgrades**	Improve bus exchanges as part of region-wide transit facility upgrades.	8,160	(4,450)	3,710	1,950	(2,916)	(966)

Active and Approved in Principle (AIP) Capital Program Details		Total Project Budget			2020 Capital Cash Flow		
Classification and Program Name	Program Description	Gross Cost	Less: Funding *	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
SkyTrain Operation Control Centre (formerly OMC Upgrades)	The design, construction and commissioning of a new/upgraded Operations Control Centre (OCC).	49,999	-	49,999	15,576	-	15,576
Canada Line Capacity Expansion**	Operations and Maintenance Centre (OMC) system upgrades as required to meet updated ridership forecasts and capacity on the Canada Line.	124,334	(95,120)	29,214	34,793	(57,524)	(22,731)
Yard Track Reconditioning	Reconditioning the existing yard tracks and track switches.	3,095	-	3,095	1,653	-	1,653
Elevator Replacement	Upgrade or replace twenty Expo Line elevators, including West Coast Express and Operations and Maintenance Centre yard, as prioritized in the Escalators and Elevators Condition Assessment Services.	1,935	-	1,935	507	-	507
Roofing Replacement Program - Expo Line	Replacement of deteriorated roof membranes at two BCRTC SkyTrain Stations.	1,950	-	1,950	1,513	-	1,513
Canada Line Bus Loops	Design and construction of improvements to Canada Line bus loops.	10,498	-	10,498	90	-	90
Pattullo Bridge Upgrade	Design for structural seismic upgrade work on the Pattullo Bridge.	55,000	-	55,000	1,565	-	1,565
Guideway Closed Circuit TVs Coverage	Upgrades to the Platform Intrusion Emergency Stop (PIES) on the Expo Line and Guideway Intrusion Emergency Stop (GIES) on the Millennium Line, which have reached the end of their service lives.	9,800	(764)	9,036	6,636	(182)	6,454
Expo Line Traction Power Equipment Replacement	Replace and recondition traction power equipment to current technology for fifteen substations.	10,346	-	10,346	5,881	-	5,881
Knight Street Bridge Rehabilitation Project	Rehabilitation of Knight Street Bridge deck to maintain optimal structural condition.	2,000	-	2,000	1,364	-	1,364
New Simon Fraser University Exchange Contribution	Construct a new transit exchange and layover facility at Simon Fraser University to support mutually agreed upon vision for the Simon Fraser University Town Centre and integrated transit hub.	3,185	-	3,185	707	-	707
University of British Columbia (UBC) Diesel Bus Terminal-TransLink Owned Infrastructure	Co-venture with UBC to redevelop a permanent bus loop; as the operating agreement for the temporary bus loop has expired.	1,200	-	1,200	431	-	431

Active and Approved in Principle (AIP) Capital Program Details		Total Project Budget			2020 Capital Cash Flow		
Classification and Program Name	Program Description	Gross Cost	Less: Funding *	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
Skytrain Passenger Information Displays (PIDS) Upgrade	Procurement and replacement of all Platform LEDs and Station Entrance Emergency Information Panels at Expo and Millennium Line stations.	26,449	(12,500)	13,949	13,030	(6,742)	6,288
Power System Upgrades for SkyTrain at OMC	Improve power supply and distribution reliability at Operations and Maintenance Centre (OMC).	17,965	(3,390)	14,575	6,558	(700)	5,858
Automatic Train Control (ATC) System Recovery and Operation Improvements	Improve Automatic Train Control (ATC) system to reduce the occurrence of SkyTrain disruptions and the time needed to recover the disruptions.	5,320	-	5,320	833	-	833
Bus Stop Infrastructure for New Routes	Implementing bus stop infrastructure to improve transit travel times and speeds for new routes.	750	-	750	372	-	372
Commercial Broadway SkyTrain Station Upgrade Construction	Design and construction of Phase 2 Commercial Broadway SkyTrain station development to increase capacity.	81,046	(28,242)	52,804	500	-	500
Expo Line Escalator Replacement - Accelerated Program	To replace the end of service life escalators.	67,320	(14,517)	52,803	13,950	(4,705)	9,245
Westham Island Bridge Rehabilitation - Scour Protection	Rehabilitation of the Westham Island Bridge.	3,320	-	3,320	752	-	752
Burnaby Transit Centre North (BTCN) Garage Renovation**	Design of a replacement garage for the Burnaby Transit Centre North.	8,620	(4,310)	4,310	1,935	(3,892)	(1,957)
Burrard Station	Design and upgrade Burrard Station for capacity and passenger flow.	60,700	(4,200)	56,500	5,337	(3,172)	2,165
Canada Line Capstan Station	Design and construction of a new Canada Line Station at Capstan Way ("Capstan Station") partially funded by the City of Richmond.	3,272	(3,000)	272	980	(665)	315
Expo Line Tunnels Ventilation System Rehabilitation	Condition assessment and design of tunnel ventilation systems requiring repair and upgrade for the Expo Line.	6,165	(951)	5,214	3,724	(479)	3,245
Knight Street Bridge Rehabilitation	Knight Street Bridge structural assessment and detailed design.	2,101	-	2,101	729	-	729
Brentwood SkyTrain Station and bus facilities	Upgrade to improve the weather protection, amenities and elevator at Brentwood SkyTrain station's rail and bus facilities.	7,370	-	7,370	6,453	-	6,453
Burnaby Mountain Gondola Transit	Design, planning and partner engagement for a potential gondola from the Millennium Line to Simon Fraser University Burnaby campus.	3,000	-	3,000	1,825	-	1,825

Active and Approved in Principle (AIP) Capital Program Details		Total Project Budget			2020 Capital Cash Flow		
Classification and Program Name	Program Description	Gross Cost	Less: Funding *	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
Trolley Overhead State of Good Repair	Continue the state of good repair multi-year program to replace 90-100 Trolley Overhead poles per year and associated above and below ground equipment on a priority basis.	4,775	(600)	4,175	2,389	(375)	2,014
Canada Line Bus Loops – Brighthouse**	Design and construction of improvements to Canada line bus stops.	5,500	-	5,500	2,306	(2,708)	(402)
Expo Line Running Rail Replacement - 2019	Replace sections of running rail in Phase I of Expo Line (Burnaby/New West) that are in poor condition.	7,172	-	7,172	4,327	-	4,327
Investments in Transit Priority RapidBus Corridors**	Implement transit priority measures, upgrades to bus stops, terminals and depot improvements to accommodate service for various new and existing RapidBus Lines.	74,705	(11,200)	63,505	4,265	(6,028)	(1,763)
SkyTrain Storage - Coquitlam Vehicle Storage Facility (VSF) Expansion**	Expansion of the SkyTrain vehicle system storage capacity with the construction of additional storage track capacity at the Coquitlam Vehicle Storage Facility Operations and Maintenance Centre (OMC).	21,250	(8,150)	13,100	3,956	(5,283)	(1,327)
Edmonds Operations and Maintenance Centre (OMC) Capacity Upgrade**	Improvements to the SkyTrain Operations and Maintenance Centre at Edmonds.	9,000	(9,000)	-	4,613	(7,690)	(3,077)
PowerSmart Upgrades at Surrey Transit Centre and Port Coquitlam Transit Centre	Implement energy conservation measures to reduce energy consumption, costs and greenhouse gas emissions.	1,200	-	1,200	1,061	-	1,061
Bus Loop Park and Ride Paving	Rehabilitate end of service life driving and parking surfaces at CMBC's transit centres and loops as part of annual pavement rehabilitation program.	700	-	700	664	-	664
Bus Speed and Reliability	Provide funding to municipalities to improve bus speed and reliability infrastructure.	1,524	-	1,524	716	-	716
Infrastructure Total		743,118	(215,012)	528,106	175,405	(111,129)	64,276
Technology							
IT Infrastructure Refresh	Ongoing computer systems and infrastructure lease renewals and replacement.	6,614	-	6,614	3,404	-	3,404
TransLink Enterprise Assets Management	Provide a strategic-level investment decision-support tool for enterprise assets.	6,795	-	6,795	1,594	-	1,594

Active and Approved in Principle (AIP) Capital Program Details		Total Project Budget			2020 Capital Cash Flow		
Classification and Program Name	Program Description	Gross Cost	Less: Funding *	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
Compass System Advancements	Ensure the performance, functionality and capacity of the Compass systems will meet those business and customer requirements that are identified to materially impact operational efficiency or customer satisfaction.	124	-	124	124	-	124
Bus Scheduling and Trip Planning System Update	Update to the Trapeze Software.	3,490	-	3,490	21	-	21
Operations Maintenance Centre 1 (OMC1) 3rd Floor Server Room Upgrade	Upgrade and expansion to the Video Cassette Recorder room at Operations and Maintenance Centre.	1,250	-	1,250	552	-	552
Bus Daily Operations Management System (DOMS) Product Migration Planning	Migrate the DOMS to the vendor's next-generation software product, Trapeze OPS, to ensure that CMBC can maintain reliable conventional bus service delivery.	22,797	-	22,797	11,504	-	11,504
TransLink Mobile App	Improve our customers' digital experience by creating a mobile app for essential customer interactions and information.	1,000	-	1,000	504	-	504
BCRTC Enterprise Asset Management	Implement an Enterprise Asset Management system to enable the effective control of SkyTrain system and maintenance processes.	45,002	-	45,002	10,226	-	10,226
BCRTC Payroll, Scheduling and Timekeeping	Modernizing BCRTC and West Coast Express payroll systems through transition to the Enterprise Payroll Services.	2,141	-	2,141	276	-	276
Enterprise Health and Safety System	Implementation of an enterprise health and safety system for consistent, automated and accurate reporting of incidents and improved management practices.	998	-	998	402	-	402
BCRTC Modernization	Replacing end of service permit control application to improve efficiency and document management.	500	-	500	252	-	252
Finance Enterprise Resource Planning (ERP)	Implementation of a Finance and Supply Chain Enterprise Resource Planning (ERP) business solution.	4,001	-	4,001	2,000	-	2,000
TransLink Software Application Renewal Program	Renewal and replacement of software applications as per the Lifecycle Management and Renewal program.	3,000	-	3,000	1,923	-	1,923

Active and Approved in Principle (AIP) Capital Program Details		Total Project Budget			2020 Capital Cash Flow		
Classification and Program Name	Program Description	Gross Cost	Less: Funding *	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
Transportation Analytics Program	To provide ridership and congestion information and analytics to support BCRTC to optimize network performance through improved planning and operations.	1,500	-	1,500	940	-	940
Enterprise Content Management	Implementation of standardize information management practices to ensure compliance with regulatory requirements and improve information access and retention.	1,000	-	1,000	682	-	682
Responsive Website	Implement prioritized digital technology improvement projects to deliver digital information and services that improve the customer experience.	2,001	-	2,001	75	-	75
Access Transit Trapeze PASS - Additional Modules	Implement additional Trapeze PASS modules for Itinerary Planning Assistant, Web Booking and Operational Performance Monitoring/Reporting.	2,000	-	2,000	1,642	-	1,642
Access Transit Data Centre Re-hosting Migration and Services	Design and development of solutions for hosting, network provisioning and support that will satisfy the required service levels for HandyDART operations.	1,421	-	1,421	255	-	255
Compass Vending Machines (CVM)	Purchase Additional Compass Vending Machines (CVM)	337	-	337	338	-	338
Technology Total		105,971	-	105,971	36,714	-	36,714
Vehicles							
Conventional Bus Expansion	Procure eleven new Conventional 60-foot buses.	16,999	(17,316)	(317)	300	(300)	-
Conventional Bus Expansion	Purchase sixty-eight expansion conventional buses required to implement Phase 2 service expansion.	100,740	(92,424)	8,316	96,510	(88,299)	8,211
100-400 Series MK I Refurbishment Project	Refurbish the original hundred-fourteen Mark I SkyTrain cars to extend service lives by another 15 years.	33,794	(24,360)	9,434	3,832	(2,450)	1,382
CUTRIC Battery Electric Bus Trial	Participation in the CUTRIC trial of high-speed battery electric buses to evaluate viability and impact on the low-carbon fleet strategy.	9,999	(8,592)	1,407	120	-	120
Additional SeaBus Vessel**	Procure a new SeaBus.	28,999	(14,500)	14,499	3,064	(3,691)	(627)

Active and Approved in Principle (AIP) Capital Program Details		Total Project Budget			2020 Capital Cash Flow		
Classification and Program Name	Program Description	Gross Cost	Less: Funding *	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
CMBC Trolley Overhead Truck Replacement	Replacement of six end of service Trolley Overhead trucks to support overhead network maintenance, repair and construction.	2,425	-	2,425	2,395	-	2,395
Conventional Bus Replacement	Replacement of ninety-two - 40-foot buses that have reached the end of service.	70,000	(61,925)	8,075	1,480	-	1,480
Conventional Bus Replacement (Double Decker)	Replacement of twenty-seven end of service 40-foot high floor conventional buses with 27 double-decker low-floor buses.	33,921	(30,000)	3,921	1,591	-	1,591
Conventional Bus Replacements 2020	Replacement of end-of-life 2001 Orion Highway coaches with twenty-five replacement buses.	32,500	(29,080)	3,420	29,432	(26,100)	3,332
HandyDART Vehicle Replacement - 2017	Replace thirty-five HandyDART buses expected to reach end of service by 2017.	4,901	(5,013)	(112)	15	-	15
HandyDART Vehicle Replacement - 2018	Replacement of forty HandyDART vehicles that have reached the end of service.	5,620	(5,605)	15	6	-	6
Community Shuttle Replacement - 2018	Replacement of twenty Community Shuttle buses.	4,100	(3,830)	270	35	(35)	-
HandyDART Vehicle Replacement - 2019	Replacement of forty end of Service HandyDART vehicles.	5,751	(5,200)	551	107	(42)	65
HandyDART Vehicle Expansion - 2019	Purchase ten HandyDART vehicles required to implement the 2019 service expansion.	1,551	(1,350)	201	28	(28)	-
Community Shuttle Replacement - 2019	Replacement of forty-nine end of service Community Shuttle vehicles.	11,999	(10,800)	1,199	1,060	(230)	830
HandyDART Vehicle Replacement - 2020	Replacement of forty-two end of service HandyDART vehicles.	6,450	(6,130)	320	6,333	(6,100)	233
HandyDART Expansion - 2020	Purchase ten HandyDART vehicles for service expansion.	1,600	(1,440)	160	1,574	(1,400)	174
Community Shuttle Expansion - 2019	Purchase nine Community Shuttle vehicles to expand community service.	2,220	(2,000)	220	1,987	(1,768)	219
Mark III Vehicle Procurement**	Purchase of twenty-eight Mark III SkyTrain vehicles to address crowding and service expansion needs.	214,750	(210,000)	4,750	17,928	(49,748)	(31,820)
WCE Fleet Procurement	Procure train cars for expanding service on the West Coast Express rail network.	21,967	(20,750)	1,217	13,797	(13,788)	9
CMBC Service Support Vehicle (SSV) Replacement	Replacement of twenty-three SSV at the end of service.	1,300	-	1,300	10	-	10
CMBC Service Support Vehicle (SSV) Replacement	Replace and introduce sixteen SSV into service for CMBC.	982	-	982	713	-	713

Active and Approved in Principle (AIP) Capital Program Details		Total Project Budget			2020 Capital Cash Flow		
Classification and Program Name	Program Description	Gross Cost	Less: Funding *	TransLink Net Cost	Gross Cost	Less: Funding *	TransLink Net Cost
CMBC Trolley Over Head (TOH) Truck Replacement	Purchase three Trolley Over Head wire maintenance aerial tower trucks to replace three trucks in the Trolley Over Head fleet.	2,400	-	2,400	761	-	761
Vehicles Total		614,968	(550,315)	64,653	183,078	(193,979)	(10,901)
Major Construction							
Evergreen Line - TransLink Contribution	TransLink monetary and in-kind contributions to the design and construction of the Evergreen line by the Province.	398,527	-	398,527	600	-	600
South of Fraser Rapid Transit	Design and development of the proposed Surrey-Langley LRT project to connect the Surrey Central Station to the Langley City Centre; including bridge upgrade as part of early works for the South of Fraser Transit improvements.	1,614,922	(525,448)	1,089,474	81,522	(157)	81,365
Broadway Subway Project Transit Plan	To build bypass Trolley Over Head infrastructure for others during construction.	9,590	(9,590)	-	5,257	(5,257)	-
Broadway Subway Project (BSP)	TransLink and BCRTC support to the construction and operation of the Millennium Line Broadway Extension; including final procurement preparation for the design and construction of Millennium Line Broadway Extension. Design for a new fibre optic cable from Lougheed Station to OMC1 (BSP), OMC1 to Lougheed Highway (OMC4 Project) and OMC1 to Columbia (SLS Project).	114,070	(73,956)	40,114	7,904	(7,904)	-
Expo and Millennium Line Upgrade Program (EMUP) - Infrastructure	Upgrading Expo and Millennium Line stations, Operations and Maintenance Centre, auxiliary systems to address shortfalls in capacity for the existing rapid transit network.	555,300	(355,460)	199,840	51,550	(18,496)	33,054
Expo and Millennium Line Upgrade Program (EMUP) - Fleet	To acquire two hundred and five new cars as part of the EMUP Program to support capacity expansion to meet projected passenger demand.	931,600	(735,040)	196,560	40,677	(31,975)	8,702
Major Construction Total		3,624,009	(1,699,494)	1,924,515	187,510	(63,789)	123,721
Grand Total		5,507,052	(2,527,218)	2,979,833	783,395	(402,603)	380,792

* The funding sources include Federal Gas Tax, Build Canada Fund, PTIF, ICIP and the City of Vancouver.

** The 2020 capital cash flows from Senior Government funding are expected to exceed 2020 gross cash flows due to a timing difference of when the funding is received.

Capital Infrastructure Contributions

TransLink provides capital infrastructure contributions each year to the Metro Vancouver municipalities to fund rehabilitation and minor capital work on the Major Road Network and bike pathways. TransLink is increasing spending in 2020 for Major Road Network upgrades and structure rehabilitation along with additional spending for expanding the regional bike network. Work related to the program will begin in 2020, invoicing will occur approximately one year after completion. TransLink is budgeting capital contribution funding of \$81.9 million to municipalities for road and bike infrastructure. Projects already approved and underway have a budget of \$274.0 million. With the 2020 program of \$81.9 million, capital infrastructure contributions total \$355.9 million.

Table 3: Capital Infrastructure Contribution Projects Planned for 2020 (\$ thousands)

Classification and Project name	Description	Total Project Budget	2020 Capital Cash Flow
2020 New Program			
Major Road Network (MRN) Pavement Rehabilitation	2020 contribution program to member municipalities for pavement rehabilitation.	24,216	23,783
Major Road Network and Bike (MRNB) Capital Program	2020 additional contribution to member municipalities for upgrades to the road network.	22,500	-
Expanding and upgrading the network of municipal designated (Regional) cycling routes (Expansion) (BICCS)	2020 funding for the expansion of the cycling network in the region.	14,940	-
Major Road Network (MRN) Structures - Seismic Upgrades (Expansion)	2020 additional contribution to member municipalities for seismic road network rehabilitation.	14,620	-
Walking Infrastructure to Transit (WITT)	2020 funding for the expansion of the walking infrastructure network in the region.	5,620	-
		81,896	23,783

Table 4: Capital Infrastructure Contribution Projects Currently Underway (\$ thousands)

Classification and Project name	Description	Total Project Budget	2020 Capital Cash Flow
Roberts Bank Rail Corridor Program	The Roberts Bank Rail Corridor (RBRC) Program consists of road and rail improvements that are aimed at enhancing both rail and traffic operations affected by traffic congestion during rail events.	43,400	363
2015 Major Road Network and Bike (MRNB) Capital Program	2015 contribution program to member municipalities for pavement rehabilitation and road and bike infrastructure upgrades.	24,214	958
2016 Major Road Network and Bike (MRNB) Capital Program	2016 contribution program to member municipalities for pavement rehabilitation and road and bike infrastructure upgrades.	23,785	1,949
MRN Pavement Rehabilitation Program	2019 contribution program to member municipalities for pavement rehabilitation.	23,551	234

Classification and Project name	Description	Total Project Budget	2020 Capital Cash Flow
2014 Major Road Network and Bike (MRNB) Capital Program	2014 contribution program to member municipalities for pavement rehabilitation and road and bike infrastructure upgrades.	23,503	219
2018 Major Road Network and Bike (MRNB) Upgrade Minor Capital Funding Program	2018 additional contribution to member municipalities for upgrades to the road network.	21,405	3,051
MRNB Upgrade and 2017 Bicycle Infrastructure Capital Cost (BICCS)	2017 funding for the upgrades to the road network and the expansion of the cycling network in the region.	20,554	6,148
MRN Structures Funding Program (MRN)	2018 additional contribution to member municipalities for seismic road network rehabilitation.	19,501	4,965
2019 MRNB Capital Program/Upgrades	2019 additional contribution to member municipalities for upgrades to the road network.	17,997	5,103
Bicycle Infrastructure Capital Cost Share (BICCS)	2019 funding for the expansion of the cycling network in the region.	15,453	6,465
Bicycle Infrastructure Capital Cost Sharing Funding Program	2018 funding for the expansion of the cycling network in the region.	15,147	7,376
MRN Structures - Seismic Rehab	2019 additional contribution to member municipalities for seismic road network rehabilitation.	13,000	1,629
Walking Infrastructure to Transit Funding Program	2018 funding for the expansion of the walking infrastructure network in the region.	5,001	3,078
2019 Walking Infrastructure to Transit (WITT) Funding Program	2019 funding for the expansion of the walking infrastructure network in the region.	5,000	3,081
2017 Walking Infrastructure to Transit (WITT) Funding Program	2017 funding for the expansion of the walking infrastructure network in the region.	2,500	978
		274,011	45,597

8. Changes in Financial Position

Consolidated Statement of Financial Position			
As at December 31 (\$ thousands)	2019 BUDGET ¹	2020 BUDGET	Change Incr/(Decr)
Cash and cash equivalents	412,488	313,711	(98,777)
Accounts receivable	138,631	154,945	16,314
Loan receivable	190,009	127,997	(62,012)
Restricted cash and cash equivalents and investments	703,714	897,517	193,803
Investments	61,667	52,218	(9,449)
Debt reserve deposits	27,940	28,455	515
Financial Assets	1,534,449	1,574,843	40,394
Accounts payable and accrued liabilities	307,890	264,350	(43,540)
Debt	3,020,180	3,136,790	116,610
Deferred government transfers	1,128,957	1,117,012	(11,945)
Golden Ears Bridge contractor liability	1,033,348	1,024,302	(9,046)
Deferred concessionaire credit	479,111	455,838	(23,273)
Employee future benefits	141,608	145,675	4,067
Deferred revenue and deposits	55,605	63,120	7,515
Deferred lease inducements	14,197	13,512	(685)
Liabilities	6,180,896	6,220,599	39,703
Net Debt	(4,646,447)	(4,645,756)	691
Tangible capital assets	6,005,480	6,204,409	198,929
Supplies inventory	73,363	92,669	19,306
Prepaid expenses	23,596	32,888	9,292
Non-Financial Assets	6,102,439	6,329,966	227,527
Accumulated Surplus	1,455,992	1,684,210	228,218

¹ Restated to reflect Deferred revenue and deposits previously grouped under Accounts payable and accrued liabilities

Financial Assets

Loan receivable represents outstanding proceeds from the 2016 sale of the Oakridge Transit Centre, receivable in annual installments until 2022.

The restricted cash and investments primarily represent unspent government transfers and internally restricted amounts related to self-administered sinking funds, land reserve funds and funds segregated for Transportation Property and Casualty Co. Inc., TransLink's wholly owned captive insurance company. The purpose of the land reserve funds is to allow proceeds from the disposition of real property to be invested back into real property.

Liabilities

Deferred government transfers represent the receipt of capital funding offset by the amortization and revenue recognition for government funding.

The Golden Ears Bridge contractor liability to finance the construction of the Golden Ears Bridge is payable over the term ending June 2041.

Deferred concessionaire credits represent the funding provided by the Canada Line Concessionaire. This balance is amortized to income on a straight-line basis over the operating term of the concessionaire agreement, which will expire in July 2040.

The expected increase in employee future benefits, which represent post-retirement and post-employment benefits, is due to the annual estimated current service cost and related interest. The post-retirement portion of this liability will draw down upon retirement of the employees.

Non-Financial Assets

Planned capital spending during 2020 is expected to result in a net increase of \$198.9 million (3.3 per cent) in capital assets. Significant projects include Expo and Millennium Line Upgrades, Conventional Bus expansion and replacement, rail fleet expansion and refurbishment, station upgrades, RapidBus conventional bus replacements, rail fleet expansion, station upgrades, rail infrastructure projects including the Surrey-Langley Skytrain.

9. Liquidity and Capital Resources

Cash Flows and Liquidity

Unrestricted cash and investments are expected to decrease by \$108.2 million compared to the 2019 budget. The decrease is due to deployment of cash for investments in facilities.

The following table shows TransLink's unrestricted cash and investments.

UNRESTRICTED CASH AND INVESTMENTS			
As at December 31 (\$ thousands)	2019 BUDGET	2020 BUDGET	Change Incr/(Decr)
Cash and cash equivalents	412,488	313,711	(98,777)
Investments	61,667	52,218	(9,449)
Total Unrestricted cash and investments	474,155	365,929	(108,226)

Restricted Funds

The unspent government transfers are used to fund qualifying capital expenditures.

RESTRICTED CASH AND INVESTMENTS			
As at December 31 (\$ thousands)	2019 BUDGET	2020 BUDGET	Change Incr/(Decr)
Unspent government transfers	309,684	363,646	53,962
TPCC's investments	25,907	23,956	(1,951)
Restricted proceeds of real estate sales	29,754	159,324	129,570
Self administered sinking funds	338,369	350,591	12,222
Total Restricted cash and investments	703,714	897,517	193,803

Net Debt

TransLink currently has three main sources of financing its assets: net direct debt, indirect P3 debt and senior government contributions. The latter is represented on the balance sheet as deferred government transfers.

Net direct debt is expected to increase by \$103.9 million due to the issuance of debt, partly offset by sinking fund contributions. The issuance of new debt in 2020 is used to help finance budgeted capital spending net of senior government contributions.

Although net direct debt and indirect P3 debt combined is expected to be \$71.6 million higher than the 2019 budget and remains high, the amount is reflective of the high capital-intensive nature of the organization and rapid growth to meet the transportation needs of the region. The projected net debt ratio of 242.1 per cent is within the debt to revenue policy limit of 300 per cent for the 2020 budget.

FINANCING			
As at December 31 (\$ thousands)	2019 BUDGET	2020 BUDGET	Change Incr/(Decr)
Debt	3,020,180	3,136,790	116,610
Less: Self-administered sinking funds	(338,369)	(350,591)	(12,222)
Less: Debt reserve deposits	(27,940)	(28,455)	(515)
Net Direct Debt	2,653,871	2,757,744	103,873
Golden Ears Bridge contractor liability	1,033,348	1,024,302	(9,046)
Deferred concessionaire credit	479,111	455,838	(23,273)
Indirect P3 Debt	1,512,459	1,480,140	(32,319)
Subtotal Net Direct Debt and Indirect P3 Debt	4,166,330	4,237,884	71,554
Deferred Government Transfers	1,128,957	1,117,012	(11,945)
Accounts payable and accrued liabilities	363,495	327,470	(36,025)
Employee future benefits	141,608	145,675	4,067
Deferred lease inducements	14,197	13,512	(685)
Less: Accounts receivable	(138,631)	(154,945)	(16,314)
Less: Loan receivable	(190,009)	(127,997)	62,012
Other Financing	190,660	203,715	13,055
Total Financing	5,485,947	5,558,611	72,664
Less: Other restricted cash and investments	(365,345)	(546,926)	(181,581)
Less: Unrestricted cash and investments	(474,155)	(365,929)	108,226
PSAB Net Debt	4,646,447	4,645,756	(691)

Appendix I – Consolidated Financial Statements

The following statements are presented in accordance with Canadian Generally Accepted Accounting Principles for local governments, as recommended by the Public Sector Accounting Board of the Chartered Professional Accountants of Canada.

Consolidated Statement of Financial Position

Consolidated Statement of Financial Position			
as at December 31 (\$ thousands)	2018 ACTUAL	2019 BUDGET	2020 BUDGET
Cash and cash equivalents	517,022	412,488	313,711
Accounts receivable	250,598	138,631	154,945
Loan receivable	250,734	190,009	127,997
Restricted cash and cash equivalents and investments	979,894	703,714	897,517
Investments	61,173	61,667	52,218
Debt reserve deposits	29,421	27,940	28,455
Financial Assets	2,088,842	1,534,449	1,574,843
Accounts payable and accrued liabilities	340,268	307,890	264,350
Debt	2,665,085	3,020,180	3,136,790
Deferred government transfers	1,249,094	1,128,957	1,117,012
Golden Ears Bridge contractor liability	1,040,378	1,033,348	1,024,302
Deferred concessionaire credit	502,512	479,111	455,838
Employee future benefits	139,653	141,608	145,675
Deferred revenue and deposits	55,135	55,605	63,120
Deferred lease inducements	12,544	14,197	13,512
Liabilities	6,004,669	6,180,896	6,220,599
Net Debt	(3,915,827)	(4,646,447)	(4,645,756)
Tangible capital assets	5,079,162	6,005,480	6,204,409
Supplies inventory	74,244	73,363	92,669
Prepaid expenses	28,206	23,596	32,888
Non-Financial Assets	5,181,612	6,102,439	6,329,966
Accumulated Surplus	1,265,785	1,455,992	1,684,210

Consolidated Statement of Operations

Consolidated Statement of Operations			
Twelve months ending December 31 (\$ thousands)	2018 ACTUAL	2019 BUDGET	2020 BUDGET
Revenue			
Taxation	819,354	874,526	943,443
Transit	638,015	669,274	723,160
Government transfers			-
Senior Government Funding	245,632	327,967	199,547
Golden Ears Bridge Tolling Replacement	57,866	60,072	62,366
Amortization of deferred concessionaire credit	23,273	23,337	23,337
Investment income	53,203	52,850	54,300
Miscellaneous revenue	19,982	12,517	17,059
Loss on disposal of tangible capital assets	(34)	(122)	-
	<u>1,857,291</u>	<u>2,020,421</u>	<u>2,023,212</u>
Expenses			
Bus operations	732,971	784,454	830,684
Corporate	118,824	172,709	149,963
Rail operations	309,195	326,870	355,432
Roads and bridges	91,210	94,691	127,541
Transit Police	38,308	40,845	42,513
Sub-total Expenses, before Amortization and Interest	<u>1,290,508</u>	<u>1,419,569</u>	<u>1,506,133</u>
Amortization of tangible capital assets	197,854	226,513	244,307
Interest	183,459	185,118	185,252
	<u>1,671,821</u>	<u>1,831,200</u>	<u>1,935,692</u>
Surplus for the year	185,470	189,221	87,520
Accumulated surplus, beginning of year	1,080,315	1,266,771	1,596,690
Accumulated surplus, end of year	<u>1,265,785</u>	<u>1,455,992</u>	<u>1,684,210</u>

¹ Restated to reflect budget transfers

² Reclassification between expenditures and revenue

Consolidated Statement of Changes in Net Debt

Consolidated Statement of Changes in Net Debt			
Twelve months ending December 31 (\$ thousands)	2018 ACTUAL	2019 BUDGET	2020 BUDGET
Surplus for the year	185,470	189,221	87,520
Acquisition of tangible capital assets	(382,466)	(906,645)	(799,323)
Amortization of tangible capital assets	197,854	226,514	244,307
Loss on disposal of tangible capital assets	34	122	-
Net proceeds from disposal of tangible capital	694	-	-
Write-down of tangible capital asset	8,299	-	-
	(175,585)	(680,009)	(555,016)
Change in supplies inventory	(5,287)	(4,153)	(8,425)
Change in prepaid expense	(6,803)	(1,124)	(2,990)
	(12,090)	(5,277)	(11,415)
Decrease (increase) in net debt	(2,205)	(496,065)	(478,911)
Net debt, beginning of year	(3,913,622)	(4,150,382)	(4,166,845)
Net debt, end of year	(3,915,827)	(4,646,447)	(4,645,756)

Consolidated Statement of Cash Flows

Consolidated Statement of Cash Flows			
Twelve months ending December 31 (\$ thousands)	2018 ACTUAL	2019 BUDGET	2020 BUDGET
Surplus for the year	185,470	189,221	87,520
Non-cash changes to operations	(41,402)	(104,720)	40,650
Changes in non-cash operating working capital	6,312	73,783	55,866
Net changes in cash from operating transactions	150,380	158,284	184,036
Purchase of tangible capital assets	(380,763)	(906,645)	(799,323)
Net proceeds from disposal of tangible capital assets	694	-	-
Net changes in cash from capital transactions	(380,069)	(906,645)	(799,323)
Decrease (increase) in restricted cash and investments	(199,654)	169,040	45,215
Decrease (increase) in investments	(222)	-	-
Decrease in debt reserve deposits	3,333	1,445	(560)
Net changes in cash from investment transactions	(196,543)	170,485	44,655
Debt proceeds	400,000	400,000	700,000
Issue costs on financing	(2,331)	-	-
Repayments of debt	(197,425)	(61,706)	(362,655)
Repayments of Golden Ears Bridge contractor liability	(5,179)	(7,030)	(9,046)
Lease inducements received	-	1,653	(685)
Government transfers received for tangible capital additions	324,179	259,403	248,722
Net changes in cash from financing transactions	519,244	592,320	576,336
Increase in cash and cash equivalents	93,012	14,444	5,704
Cash and cash equivalents, beginning of year	424,010	398,044	308,007
Cash and cash equivalents, end of year	517,022	412,488	313,711

Appendix II – Allocated Costs between Operating Companies

TransLink’s methodology for allocating costs to benefitting business units is equitable and consistent with leading practices. TransLink allocates costs to business units (Bus Operations, Access Transit, SkyTrain, West Coast Express and Transit Police) which directly benefit or consume the services or costs.

Business units may be allocated 100 per cent of a cost if it is the only unit benefitting or consuming that cost, or costs can be shared across multiple business units which benefit or consume the cost based on an allocation factor (e.g. headcount, square footage). The charges that are allocated to the business units include: administration, human resources, insurance, rent, property taxes and information technology.

The main drivers for increased allocated costs compared to the 2019 budget are an increase in IT software licensing and network infrastructure costs and additional labour costs related to shared human resource services. In addition, the cost of insurance, property taxes and rent are higher due to rate increases in 2020, partly offset by lower fare media costs as more transit users are switching from one-time paper to the reusable Compass card.

Allocated Cost Breakdown					
Twelve months ending December 31 (\$ thousands)	2018 ACTUAL	2019 BUDGET	2020 BUDGET	Change	
				Incr/(Decr)	%
Shared Services					
Bus Operations	29,441	36,460	39,886	3,426	9.4%
Access Transit	-	111	160	49	44.1%
SkyTrain - Expo and Millenium Lines	2,519	7,551	8,195	644	8.5%
West Coast Express	135	144	124	(20)	(13.9%)
Transit Police	3,109	3,266	3,155	(111)	(3.4%)
Roads & Bridges	3,475	2,740	3,022	282	10.3%
Corporate	(38,679)	(50,272)	(54,542)	(4,270)	(8.5%)
Total Shared Services allocated	-	-	-	-	-
Costs Administered by TransLink and allocated to operating companies					
Bus Operations	15,789	19,480	19,177	(303)	(1.6%)
SkyTrain - Expo and Millenium Lines	5,021	5,730	4,621	(1,109)	(19.4%)
SkyTrain - Canada Line	2,164	2,441	2,468	27	1.1%
West Coast Express	578	436	446	10	2.3%
Transit Police	1,741	2,086	2,433	347	16.6%
Total Costs Administered by TransLink allocated	25,293	30,173	29,145	(1,028)	(3.4%)
Bus Operations	45,230	55,940	59,063	3,123	5.6%
Access Transit	-	111	160	49	44.1%
SkyTrain - Expo and Millenium Lines	7,540	13,281	12,816	(465)	(3.5%)
SkyTrain - Canada Line	2,164	2,441	2,468	27	1.1%
West Coast Express	713	580	570	(10)	(1.7%)
Transit Police	4,850	5,352	5,588	236	4.4%
Total costs allocated to operating companies from TransLink	60,497	77,705	80,665	2,960	3.8%

¹ Restated to reflect budget transfers

To: Board of Directors
From: Christine Dacre, Chief Financial Officer
Date: February 20, 2020
Subject: 2020 Property Tax Bylaw and 2020 Replacement Tax Bylaw

PROPOSED RESOLUTION:

Property Tax Bylaw:

- A. That the TransLink Board of Directors introduces and reads a first, second and third time the “South Coast British Columbia Transportation Authority 2020 Property Tax Bylaw Number 135-2020” attached to the report as Attachment 1; and
- B. That the TransLink Board of Directors reconsiders and finally adopts the “South Coast British Columbia Transportation Authority 2020 Property Tax Bylaw Number 135-2020” attached to the report as Attachment 1.

Replacement Tax Bylaw:

- C. That the TransLink Board of Directors introduces and reads a first, second and third time the “South Coast British Columbia Transportation Authority 2020 Replacement Tax Bylaw Number 136-2020” attached to the report as Attachment 2; and
 - D. That the TransLink Board of Directors reconsiders and finally adopts the “South Coast British Columbia Transportation Authority 2020 Replacement Tax Bylaw Number 136-2020” attached to the report as Attachment 2.
-

EXECUTIVE SUMMARY

The property and replacement tax rates for 2020 are set to target:

- Property tax revenue of \$398.7 million – amount is set based on a 4.4% increase (3% annual statutory increase + 1.4% actual Development Growth) over previous year’s planned property tax revenue.
- Replacement tax revenue of \$18 million – this is a fixed annual amount.
- Year over year consistency in average taxes assessed – while meeting the prescribed British Columbia Hospital District Act Regulation ratio requirements.

Overall assessed property values declined by 5.5%. To achieve current year’s target property tax revenue, property tax rates for Major Industry, Light Industry and Farm decreased while rates for other property classes increased.

The administration of these two taxes is different and therefore separate bylaws are required.

PURPOSE

The purpose of the attached report is to establish property and replacement tax rates for 2020 and to enact the bylaws to bring these rates into effect.

BACKGROUND

TransLink's 2020 budget includes revenues of \$399.4 million from property taxes and \$18 million from replacement taxes to be assessed and collected in accordance with Section 25 of the *South Coast British Columbia Transportation Authority Act* ("SCBCTA Act").

The administration of the property tax and replacement tax is different and therefore separate bylaws are required.

DISCUSSION

TransLink has received and reviewed the 2020 completed property tax assessment rolls from BC Assessment (BCA).

Property Tax

The 2020 property tax revenue to be collected through the rate setting process of \$398.7 million increased from previous year's planned property tax revenue by 4.4% due to the following 2 factors:

- 3.0% is the annual statutory increase allowable under the SCBCTA Act; and
- 1.4% accounts for actual Development Growth (including new construction and zoning) to better reflect growth and development in the region.

The budgeted amount of \$399.4 million is more than the amount to be collected through the rate setting process of \$398.7 million due to expected payments-in-lieu of taxation, partially offset by estimated assessment appeals.

Table 1 – Summary of Property Value Changes by Class:

Property Class	2020 Completed Roll (\$ millions)	2019 Revised Roll (\$ millions)	Total Increase/ (Decrease) (\$ millions)	Year over Year		
				Develop- ment Change	Market Change	Total Change
01 Residential	923,544	996,848	(73,304)	1.5%	-8.8%	-7.4%
02 Utilities	2,041	1,999	42	-0.2%	2.3%	2.1%
04 Major Industry	3,022	2,713	309	3.4%	8.0%	11.4%
05 Light Industry	21,933	19,940	1,993	-1.4%	11.4%	10.0%
06 Business And Other	180,234	175,051	5,183	1.1%	1.9%	3.0%
08 Rec/Non Profit	1,971	2,106	(135)	-5.3%	-1.1%	-6.4%
09 Farm	99	101	(2)	-6.6%	4.2%	-2.4%
Total	\$1,132,845	\$1,198,757	(\$65,914)	1.4%	-6.9%	-5.5%

*Some amounts may not add due to rounding

Comparing the 2020 completed roll to the 2019 revised roll, Major Industry and Light Industry had overall increases in value of 10% or more while all other classes either had small increases or declined in value.

Looking at Development Growth, Major Industry experienced growth of 3.4%, mostly due to improvements on existing properties while all other property classes experienced little to negative growth.

The recommended 2020 property tax rates comply with the requirements of the SCBCTA Act relating to changes in tax rates tied to the prescribed British Columbia Hospital District Act Regulation ratios. The recommended rates also provide a consistent year-to-year change on property owners' average tax bills.

Table 2 – Property Tax Revenues Summary:

Property Class	2020 Completed Roll (\$000s)	2020 Property Tax Rate (per \$1000)	2019 Property Tax Rate (per \$1000)	Increase / (Decrease) in Property Tax Rates	2020 Revenue Forecast (\$000s)	2019 Revenue Invoiced (\$000s)
01 Residential	\$923,544,388	\$0.2494	\$0.2193	\$0.0301	\$230,375	\$218,609
02 Utilities	\$2,041,460	\$2.2511	\$2.2208	\$0.0303	\$4,595	\$4,438
04 Major Industry	\$3,021,851	\$1.4108	\$1.4694	(\$0.0586)	\$4,263	\$3,986
05 Light Industry	\$21,933,164	\$0.8814	\$0.9467	(\$0.0653)	\$19,332	\$18,877
06 Business And	\$180,234,430	\$0.7755	\$0.7617	\$0.0138	\$139,773	\$133,337
08 Rec/Non Profit	\$1,970,858	\$0.1819	\$0.1734	\$0.0085	\$358	\$365
09 Farm	\$98,506	\$0.3494	\$0.3510	(\$0.0016)	\$34	\$35
Total					\$398,732	\$379,647

*Some amounts may not add due to rounding

Replacement Tax

The SCBCTA Act permits TransLink to collect up to \$18 million as replacement tax on property classes 1, 2, 4, 5 and 6, in proportions determined by the Authority (Section 25 (7.1)).

The 2020 replacement tax rates meet the planned target revenue of \$18 million and provide a consistent year-to-year tax impact on property holders' average tax bills.

The 2020 replacement tax rates have been set to minimize the impact on the average tax bills of property owners. In all property classes, the 2020 replacement tax rate is lower than the 2019 rate except for Residential, which was unchanged.

Table 3 – Replacement Tax Revenues Summary:

Property Class	2020 Completed Roll (\$000s)	2020 Repl Tax Rate (per \$1000)	2019 Repl Tax Rate (per \$1000)	Increase / (Decrease) in Repl Tax Rates	2020 Revenue Forecast (\$000s)	2019 Revenue Invoiced (\$000s)
01 Residential	\$923,544,388	\$0.0023	\$0.0023	\$0.0000	\$2,098	\$2,293
02 Utilities	\$2,041,460	\$0.0874	\$0.0885	(\$0.0011)	\$178	\$177
04 Major Industry	\$3,021,851	\$0.0908	\$0.0919	(\$0.0011)	\$274	\$249
05 Light Industry	\$21,933,164	\$0.0771	\$0.0781	(\$0.0010)	\$1,692	\$1,557
06 Business And Other	\$180,234,430	\$0.0763	\$0.0773	(\$0.0010)	\$13,758	\$13,531
Total					\$18,000	\$17,808

*Some amounts may not add due to rounding

Table 4 – Summary of Combined Property and Replacement Tax impacts:

Property Class	2020 Average Assessment	2019 Average Assessment	2020 Average Property & Repl Tax	2019 Average Property & Repl Tax	\$ Change In Average Tax	% Change In Average Tax
01 Residential	\$1,135,030	\$1,244,722	\$286	\$276	\$10	4%
02 Utilities	\$1,845,804	\$1,727,323	\$4,316	\$4,014	\$302	8%
04 Major Industry	\$18,886,569	\$15,864,836	\$28,359	\$25,014	\$3,345	13%
05 Light Industry	\$5,693,968	\$5,180,493	\$5,458	\$5,376	\$82	2%
06 Business And Other	\$4,361,706	\$4,280,086	\$3,715	\$3,646	\$69	2%
08 Rec/Non Profit	\$2,756,445	\$2,916,464	\$501	\$506	(\$5)	-1%
09 Farm	\$19,969	\$19,642	\$7	\$7	\$0	0%

*Some amounts may not add due to rounding

The average property and replacement taxes have been calculated by multiplying the average assessment values by the corresponding combined tax rates per thousand dollars of assessed values.

The overall impact of the 2020 tax rates (both property tax and replacement tax) for an average residential property will be an increase of approximately \$10 (or 4%) over the prior year. An average business class property will experience an increase of approximately \$69 (or 2%) over the prior year.

RECOMMENDATION

It is recommended that the Board approve and adopt the attached bylaws effective January 1, 2020.

ATTACHMENTS

Attachment 1: 2020 Property Tax Bylaw # 135-2020

Attachment 2: 2020 Replacement Tax Bylaw # 136-2020

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

BYLAW NUMBER 135-2020

A Bylaw imposing Property Tax for the year 2020

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

BYLAW NUMBER 135-2020

A Bylaw imposing Property Tax for the year 2020

WHEREAS pursuant to the *South Coast British Columbia Transportation Authority Act* the Authority must manage and operate the regional transportation system and generate and manage funds for that purpose.

AND WHEREAS the Authority may, by bylaw, assess a tax on the net taxable value of land and improvements in the transportation service region, as defined in the Act, other than land and improvements that are taxable for school purposes only by special act.

AND WHEREAS in assessing the tax the Authority must adopt a variable tax rate system in which individual tax rates are determined and imposed for each property class.

NOW THEREFORE the Board of Directors of the South Coast British Columbia Transportation Authority enacts as follows:

1. This Bylaw may be cited as the “South Coast British Columbia Transportation Authority 2020 Property Tax Bylaw Number 135-2020.”
2. In this Bylaw, “transportation service region” means all municipalities and rural areas located in the Greater Vancouver Regional District and any area added to the Region pursuant to the South Coast British Columbia Transportation Authority Act.
3. There is assessed and levied on the net taxable value of land and improvements in the transportation service region, other than land and improvements that are taxable for school purposes only by special act, a tax at the variable rates set out in Schedule 1 attached thereto.
4. This Bylaw comes into force and takes effect on January 1, 2020.

READ A FIRST, SECOND AND THIRD TIME this March 26, 2020.

RECONSIDERED, PASSED AND FINALLY ADOPTED this March 26, 2020.

Tony Gugliotta, Chair

Jennifer Breeze, Corporate Secretary

SCHEDULE 1 attached to and forming part of
SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY
2020 PROPERTY TAX BYLAW NUMBER 135-2020

<u>PROPERTY CLASS</u>		<u>TAX RATES</u> <u>DOLLARS OF TAX PER \$1,000</u>
01	Residential	0.2494
02	Utilities	2.2511
04	Major Industry	1.4108
05	Light Industry	0.8814
06	Business/Other	0.7755
08	Recreational and Non-Profit	0.1819
09	Farm	0.3494

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

BYLAW NUMBER 136-2020

A Bylaw imposing Replacement Tax for the year 2020

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

BYLAW NUMBER 136-2020

A Bylaw imposing Replacement Tax for the year 2020

WHEREAS pursuant to the *South Coast British Columbia Transportation Authority Act* the Authority must manage and operate the regional transportation system and generate and manage funds for that purpose.

AND WHEREAS the Authority may, by bylaw, assess a tax on the net taxable value of land and improvements in the transportation service region, as defined in the Act, other than land and improvements that are taxable for school purposes only by special act.

AND WHEREAS the Authority may, by bylaw, assess a tax on the net taxable value of land and improvements in the transportation service region if the additional tax generates property tax revenue that is not more than \$18 million in this fiscal year and the additional tax is collected only from property classes 1, 2, 4, 5 and 6 in whatever proportions the authority may determine.

NOW THEREFORE the Board of Directors of the South Coast British Columbia Transportation Authority enacts as follows:

1. This Bylaw may be cited as the “South Coast British Columbia Transportation Authority 2020 Replacement Tax Bylaw Number 136-2020.”
2. In this Bylaw, “transportation service region” means all municipalities and rural areas located in the Greater Vancouver Regional District and any area added to the Region pursuant to the South Coast British Columbia Transportation Authority Act.
3. There is assessed and levied on the net taxable value of land and improvements in the transportation service region, other than land and improvements that are taxable for school purposes only by special act, a tax at the rates set out in Schedule 1 attached thereto.
4. This Bylaw comes into force and takes effect on January 1, 2020.

READ A FIRST, SECOND AND THIRD TIME this March 26, 2020.

RECONSIDERED, PASSED AND FINALLY ADOPTED this March 26, 2020.

Tony Gugliotta, Chair

Jennifer Breeze, Corporate Secretary

SCHEDULE 1 attached to and forming part of
SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY
2020 REPLACEMENT TAX BYLAW NUMBER 136-2020

<u>PROPERTY CLASS</u>		<u>TAX RATES</u> <u>DOLLARS OF TAX PER \$1,000</u>
01	Residential	0.0023
02	Utilities	0.0874
04	Major Industry	0.0908
05	Light Industry	0.0771
06	Business/Other	0.0763

TO: Board of Directors

FROM: Christine Dacre, Chief Financial Officer

DATE: March 3, 2020

SUBJECT: 2019 Statutory Annual Report

PROPOSED RESOLUTION

That the TransLink Board of Directors:

- A. Approves the 2019 Statutory Annual Report mandated by the *South Coast British Columbia Transportation Authority Act*, as present in Attachment 1 to the report; and
- B. Authorizes the release of the 2019 Statutory Annual Report to the Mayors' Council on Regional Transportation.

EXECUTIVE SUMMARY

This report is to present the 2019 Statutory Annual Report to the Board for review and approval, as required by the *South Coast British Columbia Transportation Authority Act* (SCBCTA Act) and for release to the Mayors' Council on Regional Transportation.

PURPOSE

The purpose of this report is to provide the 2019 Statutory Annual Report to the Board for review and approval.

BACKGROUND

Section 7(3) of the *South Coast British Columbia Transportation Authority Act* (SCBCTA Act) requires that TransLink, within 90 days after each fiscal year end (TransLink's fiscal year end is December 31):

- Prepare an annual report as prescribed in section 13.4 of the SCBCTA Act;
- Prepare audited financial statements; and
- Provide a copy of the annual report and audited financial statements to the Mayors' Council on Regional Transportation.

DISCUSSION

Section 13.4 of the SCBCTA Act provides the requirements for reporting on activities for the year which include:

- Summary of operations;
- Audited financial statements;
- Summary of complaints and actions to respond to those complaints;
- Summary of any amendments made to the articles; and
- Summary of board activities.

CONCLUSION

Management recommends that the Board approve the 2019 Annual Statutory Report attached to this report as Attachment 1 and authorize its release to the Mayors' Council on Regional Transportation.



2019 Annual Statutory Report



**SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY
2019 STATUTORY ANNUAL REPORT**

The *South Coast British Columbia Transportation Authority* (TransLink) is required to provide an annual report and audited financial statements to the Mayors' Council on Regional Transportation by March 31st. This report fulfills the reporting obligation to provide:

- A. A summary of operations during the year with comparison to the strategic transportation plan and the applicable service, capital and operational plans;
- B. The audited financial statements for the year;
- C. A summary of the nature of complaints received in the year and actions taken in response to those complaints;
- D. A summary of the results of the customer satisfaction survey process;
- E. Amendments to the articles of the Authority;
- F. A summary of the date, type and outcome of meetings of TransLink's Board of Directors held during the year;
- G. Fare Collection Bylaw; and
- H. A summary of tickets issued and collection under Section 248.

This report should be read in conjunction with the 2019 Accountability Report, in order to get a full understanding of the organization and its financial and operational performance. The 2019 Accountability Report will be posted on TransLink's website.

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EXECUTIVE SUMMARY

Under the *South Coast British Columbia Transportation Authority Act*, TransLink is required to prepare an annual report that includes a summary of operations for the year along with a comparison to the organization's applicable strategic, service, capital and operational plans. This 2019 Statutory Annual Report meets that requirement and includes other reporting obligations such as audited financial statements, complaints and customer satisfaction summaries. This report should be read in conjunction with the 2019 Accountability Report to obtain a full understanding of the organization and the strategic platform that drives its financial and operational performance. The 2019 Accountability Report will be posted on the TransLink website.

TransLink's current strategic plan, applicable to 2019, as defined by legislation, is the 2018-2027 Investment Plan: Phase Two of the 10-Year Vision (the "Plan") approved by the Mayors' Council on Regional Transportation on June 28, 2018. This 2019 Statutory Annual Report makes reference to the 2019 year of the Plan.

A. OPERATIONS SUMMARY

1 Transit Service Levels

The table below provides a summary of conventional transit service hours, Access Transit trips and ridership numbers while comparing 2019 actual results to the Plan.

	Actual 2019	Investment Plan 2019	Fav/(Unfav) Over Plan	% Change
Conventional Transit <i>(thousands of service hours)</i>				
Conventional Bus	4,615	4,599	16	0.3%
Community Shuttle	653	645	8	1.2%
West Vancouver Conventional Bus	118	142	(24)	(17.1%)
SkyTrain Expo and Millennium Lines	1,322	1,337	(15)	(1.1%)
SkyTrain Canada Line	203	186	17	9.1%
SeaBus	13	13	-	-
West Coast Express	37	37	-	-
Total Conventional Transit	6,961	6,960	1	0.0%
Access Transit Trips <i>(thousands of trips)</i>				
HandyDART	1,198	1,271	(73)	(5.7%)
Taxi Supplement	183	102	81	79.4%
Total Access Transit Trips	1,381	1,373	8	0.6%
Ridership				
Ridership (millions of transit journeys)	272	259	13	5.2%
<i>Note: Ridership in this table is based on delivery of total conventional transit service hours and HandyDART Access Transit service.</i>				

Conventional Transit Service Levels

Conventional transit service hours were mainly consistent with the 2019 year of the Plan as a result of the successful execution of service expansion as committed to in the Mayor's Council's 10-Year Vision (the "10-Year Vision"). The expansion increased the bus frequency on specific routes and added new bus routes and additional service hours. Furthermore, Coast Mountain Bus Company (CMBC) took over the operations of a route in West Vancouver, which resulted in a decrease in service hours for West Vancouver Conventional Bus and an increase in service hours in Conventional Bus. More service hours were delivered on Canada Line than what was outlined in the Plan. This is partly offset by a decrease in service hours for the Expo and Millennium Lines which was mainly a result of cancelled trips due to inclement weather and the cancellation of special events.

Access Transit Service Levels

In 2019, Access Transit service trips were slightly above the expansion outlined in the 10-Year Vision. HandyDART vehicles are our primary resource for trip delivery but during peak hours and at times when demand exceeds our fleet capacity, trips are delivered with taxis.

Ridership

Journeys for conventional transit service and Access Transit achieved a record of 272 million in 2019, surpassing the Plan projection by 5.2 per cent. Journeys represent a complete transit trip using Compass fare media or other proof of purchase regardless of the number of transfers. Strong ridership growth in 2019 compared to the Plan was a result of customer improvement initiatives, a strong economy with low unemployment, and – for some months – higher gas prices.

2 2019 Investment Plan Status Report

Phase Two of the 10-Year Vision includes new investments in every mode of transportation – transit, roads, walking and cycling – as well as maintains the existing transportation system in a state of good repair. A status update of the Plan is provided below.

New Transportation Investments in the Phase Two Plan

The Plan expands rapid transit across Metro Vancouver according to the priorities established in the 10-Year Vision. It completes the rapid transit early works investments begun in the 2017-2026 Investment Plan: Update to Phase One of the 10-Year Vision (“Phase One”), including the Broadway Subway Project (“BSP”, formerly the Millennium Line Broadway Extension) and the Surrey-Newton-Guildford Line (SNG). Two significant events occurred related to the rapid transit projects after the Plan was approved. The responsibility for delivery of the BSP was transferred to the Province of British Columbia (Province) and the City of Surrey requested the Plan be amended to swap the SNG Line with the Surrey-Langley line and that this be SkyTrain service instead of Light Rail Transit.

Building New Rapid Transit

- Major Rapid Transit Projects
 - Construction and Operation of the BSP
 - A Request for Proposal (RFP) for the Province’s BSP was issued by the Province in June 2019.
 - Advanced works to support the BSP including the trolley overhead line relocation to accommodate bus route changes in support of bus operations during construction.
 - Surrey Langley SkyTrain (SLS) Project
 - In early 2019, TransLink appointed a SLS team to complete planning, design and engagement activities necessary for project approval.
 - Implemented a public affairs plan which includes two rounds of public consultation.
 - Completed a technical program to develop a reference design concept, construction cost estimate, and delivery schedule.
 - Delivered a business case update to the Board and Mayors’ Council in outlining the cost, benefits and timeline of the proposed SLS project.
 - Developed a supportive policies agreement with the City of Surrey to address land use plans, affordable housing, active transportation connections, and other activities.
 - Undertook joint planning workshops with Board and Mayors’ Council to confirm the approach and scope parameters for the upcoming update to the Plan and Phase 3 of the Investment Plan. The SLS line would be built in 2 phases; the first phase from King George Station to Fleetwood would replace the SNG Line in the Phase 2 Plan and utilize existing senior government funding and the second phase from Fleetwood to Langley would be part of the Phase 3 plan.
 - Received endorsement from the City of Burnaby, Simon Fraser University (SFU) and Mayors’ Council to proceed with further project planning and community engagement for the gondola from the Millennium Line to the SFU Burnaby Campus.
 - Launched a study, established a multi-agency steering committee and commenced technical work on options and modelling for Rapid Transit to University of British Columbia (UBC).

Upgrading the Existing Rail Network

- SkyTrain
 - Successfully implemented 9 per cent more service on the Expo Line and 5 per cent more service on the Millennium Line during peak service with the successful introduction of the new Mark III trains.

- Fully tested, commissioned and placed seven new trains in revenue service and continued to make progress on commissioning three additional trains.
- Issued an RFP to procure 205 new SkyTrain cars for the Expo and Millennium Lines.
- Completed station upgrades at Commercial-Broadway, Joyce-Collingwood, and Surrey Central.
- Upgraded passenger communications in stations with the installation of new Passenger Information Display System (PIDS) signage on platforms and at entrances.
- Received four new SkyTrains in 2019 for the Canada Line which were put through testing and commissioning.
- Upgraded overnight train storage capacity at the Operations and Maintenance Centre (OMC) facility.

New Bus and HandyDART Investments

- Bus
 - Met the service increase commitments in the Plan.
 - Rebranded B-Lines as RapidBus and prepared five new RapidBus' for launch in early 2020.
 - Made improvements to more than 75 routes to address overcrowding throughout the day.
 - Increased bus service by 2.7 per cent over 2018 with 179 buses placed into service, including four electric and 18 double decker buses, and 38 replacement community shuttles.
 - Ordered nine expansion community shuttles.
 - Completed employee and customer amenity upgrades to the following bus exchanges: Maple Meadows, 22nd Street, Marpole, Joyce Collingwood East station, UBC and Guildford.
 - Made progress on employee and customer amenity upgrades on the Nanaimo and Lonsdale exchanges, and construction of the new Canada Line bus exchange at Richmond-Brighouse.
 - Established a bus speed and reliability cost-share program to fund capacity building, pilot projects, planning and design and capital projects.
- SeaBus
 - Retrofitted and put a spare SeaBus into service in September 2019 to meet out commitment to deliver 10-minute peak service.
- HandyDART
 - Completed a Fleet Optimization Study ahead of the next HandyDART procurement cycle.
 - HandyDART trips increased by 10.5 per cent from 2017 to 2019. Number of trips are in line with the Plan.
 - Placed 50 vehicles into service of which 10 were added to increase service and the remainder vehicles were to replace vehicles.

New Road Investments

- Minor capital upgrades
 - Allocated \$18.0 million of the total planned commitment of \$20.0 million earmarked for 2019. \$2.0 million was transferred to 2019 Regional Cycling Infrastructure projects.
- Structure rehab and seismic upgrades
 - Allocated \$24.5 million of the \$32.5 million commitment for 2017-2019 towards 21 rehabilitation and seismic upgrades of structures on the Major Road Network (MRN) including the Granville Bridge Seismic Upgrade. The remaining \$8.0 million will be allocated in 2020.
- Operations, maintenance, and rehabilitation of the Major Road Network
 - Since 2017, TransLink has allocated \$152.0 million for operations, maintenance and rehabilitation of the MRN, \$56.0 million was allocated for 2019.
- TransLink-owned Bridges
 - Retained the services of BC Ministry of Transportation and Infrastructure and consultants to perform condition inspections of TransLink's bridges.
 - Completed construction of structural rehabilitation at Westham Island Bridge.
 - Continued to make progress on the Knight Street Bridge structural rehabilitation detailed design.

New Walking and Cycling Investments

- Walking Access to Transit
 - In 2019, TransLink entered into agreements with municipalities across Metro Vancouver to provide \$5.0 million in regional funding for 69 pedestrian infrastructure projects around transit corridors in line with the 2018 Plan. Since 2017, TransLink has allocated all the \$12.5 million commitment earmarked for 2017-2019.
- Regional Cycling Infrastructure
 - TransLink exceeded the 2019 planned total of \$13.5 million with a \$15.3 million commitment for municipal cycling infrastructure. \$2.0 million was transferred from 2019 Minor Capital Upgrades.
- TransLink-owned Cycling Infrastructure
 - Advanced the planning and procurement of next-generation bike lockers, and the procurement and implementation of TransLink's region-wide bike monitoring program.
 - Made state-of-good-repair improvements on the BC Parkway in Vancouver and Burnaby.
 - Designed comprehensive BC Parkway corridor upgrades, including structural and public-realm improvements, for sections of the BC Parkway through New Westminster.

New Mobility Investments

- New mobility
 - Continued to progress prototyping and piloting for on-demand transit on Bowen Island and Vanpooling with UBC and after evaluation will continue to explore more extensive piloting and/or scaling-up in 2020.
 - Issued a challenge to making the customer experience at transit stops, stations, and exchanges more enjoyable through the 2019 Open Innovation Call which resulted in two pilots that will be launched in 2020.

Manage the System to be More Efficient and Effective for Users

In 2019, TransLink continued to develop and implement a wide range of policies and strategies in order to make the regional transportation network more efficient and effective for more users.

Make Travel Safe and Secure

- Safety and Emergency Planning
 - Development of Emergency Management and Business Continuity System is underway and will now be called a Resiliency Management System which will align with Safety and Environmental Management Systems throughout the enterprise.
 - Through the Resiliency Management System that is being established, hazards and risks are being systematically identified and evaluated. Mitigation strategies are being implemented that include the development of procedures and emergency response plans and conducting employee training.
- Security Operations
 - The Metro Vancouver Transit Police ("Transit Police") continued to implement two dozen initiatives associated with its three Strategic Goals: Deliver a Safe and Secure Transit System, Build Confidence in the Use of Public Transit and Provide Regional Services that Enhance Local Policing and Community Safety. Actions taken included an extensive Anti-Sex Offence Campaign (alongside several community partners) and expanded "See Something, Say Something" Campaign; thousands of safety advertisements placed on transit vehicles, bus stops, exchanges and SkyTrain stations.
 - New Transit Police sub-offices were opened at Commercial/Broadway Station and New Westminster Station.
 - Transit Police executed over 1,000 outstanding warrants of the Jurisdictional Police or Transit Police enhancing the safety of both the transit system and Metro Vancouver region.

- Transit Police – Neighborhood Police Officers were engaged in hundreds of community events, promoting personal safety on transit.
- Transit Police Officers participated in live ‘active assailant’ exercises as part of its anti-terrorism strategy and protection of transit passengers and infrastructure. The six Transit Police explosive detection dog teams responded to suspicious packages and threats on transit and when requested by police partners.
- Technology and Cyber-Security
 - Replaced the system used to monitor, analyze and report on Train Run Time Performance and Train Timetable Planning as part of the British Columbia Rapid Transit Company (BCRTC) Modernization program.
 - Commenced the project to migrate BCRTC to new payroll and employee timekeeping and scheduling systems.
 - Invested in improving the maturity of TransLink’s Cybersecurity business capabilities to ensure the confidentiality, integrity and availability of its information assets.
 - Completed the evaluation for an Enterprise Asset Management for BCRTC with contract negotiations underway.
 - Completed the evaluation for a Financial Management and Supply Chain System for the enterprise with contract negotiations underway.

Make Travel Easy and Informative

- Customer Experience Planning
 - Completed the development of TransLink’s enterprise-wide Customer Experience Plan with implementation of key projects underway.
 - Launched a Customer Experience Executive Steering Committee in 2019 and a Customer First Committee continued to work on influencing and enhancing the customer experience.
- Customer Information and Communication
 - Evolved the Transit Alerting and Messaging System to provide enhancements and expansion of customer alerts and messages through SMS, email, the TransLink Alerts page on our website and across the new Passenger Information Display Signage and Digital Kiosks.
 - Installed 111 PIDS on the SkyTrain network and 94 RapidBus PIDS on the Bus network.
 - Launched a new responsive website in 2019 which included an upgraded trip planner, integration with google maps, and updated alerts and advisories page.
 - Completed the Expo-Millennium Line Wayfinding retrofit. Placement and plans for the Canada Line retrofit completed during the third quarter of 2019 and ready for implementation in 2020.
 - Launched Customer Information Live Chat on the website to allow real-time digital customer support.
 - Introduced American Express (Amex) payments at all points of sale including Compass vending machines and launched Amex contactless payments (a Canadian first) directly at all faregates and on buses enabling seamless travel for customers to tap to pay with Amex cards.
- Public Art
 - As part of the Capture Photography Festival, TransLink installed “Skwxwú7mesh Nation Basketball” by photojournalist Alana Paterson at the Stadium- Chinatown SkyTrain Station.
 - New public art, produced by Tania Willard of Secwépemc and settler heritage, was installed at the Commercial-Broadway Station.
- Accessibility
 - Researched and engaged with customers and stakeholders towards implementing Compass on HandyDART and improving the registration process.
 - CMBC’s Access Transit Service Delivery group delivered travel training programs, focusing on groups and training-the-trainer opportunities.

Make Travel More Efficient and Reliable

- Transit Network Performance
 - Commenced consultation on 12 proposed changes to improve existing routes including Fraser Highway and South Surrey-Bridgeport and introduce new routes including the Phibbs-Metrotown Express Bus and River District.
 - Implemented extensive transit priority measures on RapidBus corridors which benefits all buses that travel on those corridors and made spot improvements, such as red paint at bus stops, on other bus corridors.
 - Continued to develop the On-Road Fleet Storage and Maintenance Plan which will ensure that the operational needs of the growing bus and rail fleet are met.
- Road Network Performance
 - Continued to develop the Regional Road Network Performance Monitoring Program, including the beta version of the Regional Road Performance Monitoring dashboard and report.
- Harmonizing Regulations
 - As of December 2019, the overall level of harmonization with the regional definition of a heavy truck and vehicle weights and dimensions standards is 80 per cent with 18 jurisdictions fully or substantially harmonized.
 - Harmonization of requirements for permit trucks (i.e., oversize—overweight trucks) is complete.
 - The Regional Transportation Advisory Committee (RTAC) endorsed the new Regional Permit Policies and Procedures Manual (RP3M) in November 2019.
 - The RTAC endorsed several initiatives to support multi-jurisdictional permitting, including: developing an implementation strategy for a multi-jurisdictional permit system; and collecting dimensional clearance data and evaluating structures to pre-screen certain truck routes for over size-over weight vehicle use to expedite the permit review process.
 - Following the launch of a BETA version of the Commercial Vehicle Route Planner (CVRP) and positive stakeholder feedback, TransLink is partnering with the BC Ministry of Citizens' Services' to develop and deliver a full production version of the CVRP. Work to develop the App is underway.
- Low-Carbon Fleet
 - Completed Phase 2 of the Low Carbon Fleet Strategy including a peer review with findings and recommendations to be presented to the Board and Mayors' Council in early 2020.

Price the Transportation System to Reduce Congestion and Overcrowding, Improve Fairness, and Support Transportation Investment

- Payment
 - New services and security features have been implemented at Compass Card website in April to improve customer experience.
 - Enrolled new members in Compass for Organizations providing employer subsidized transit benefits to the employees of these companies.
- Transit
 - Commenced implementation work, including exploration with Province on future low-income fare discount programs.
- Parking
 - Through monitoring the utilization of all TransLink owned and managed park-and-ride lots and bike parkades, developed proposals to consider adjusting prices upwards where capacity was oversubscribed and adjusting prices downwards where capacity was underutilized.
- Roads
 - Progressed on result of the report of the Mobility Pricing Independent Commission which included: understanding the complexities of equity; considering accessibility or access to destinations; understanding the impacts on households, businesses, and on regional planning; and exploring mitigating measures, such as caps, rebates, exemptions, discounts and tax shifts.

Partner to Make It Happen

TransLink collaborates with a broad range of partners and stakeholders in order to maximize the value and effectiveness of the transportation services and infrastructure and to achieve the best regional planning outcomes.

Align Transportation and Land Use

- With Partner Agencies
 - Worked with local and regional partners to complete Lougheed Long-term Transit Corridor Plan and multimodal Area Transport Plan for Maple Ridge-Pitt Meadows.
 - Actively participated in Metro Vancouver’s Regional Planning Advisory Committee (RPAC) and other Metro Vancouver initiatives, including the Regional Industrial Lands Strategy, RPAC Housing Sub-committee, and RGS Urban Centers framework review.
 - Completed Phase One of public engagement for the Regional Transportation Strategy (RTS) update Transport 2050 which garnered a record breaking 31,700 responses and over 4,000 ideas submitted
 - Conducted the first Policymakers’ Coordination Forum workshop with executives at TransLink, Metro Vancouver and the Province
- With Real Estate and Commercial Partners
 - Launched state-of-the-art touch-screen commuter information kiosks with real-time trip information, location-specific alerts and commuter information across SkyTrain and West Coast Express Stations, SeaBus terminals, Park and Ride locations and bus loops.
 - Successfully installed and commissioned ATM’s following upgrade of three major station upgrade projects (Surrey Central, Joyce East and Joyce West)
- Develop and Implement Project Partnership Agreements
 - Monitored the framework and program for the BSP developed in partnership with City of Vancouver, Province and Metro Vancouver.
 - Developed a Supportive Policies Agreement with City of Surrey which lays out commitments to developing land use plans for the local communities on the corridor that are consistent with higher order transit investment and exceed the population and job forecasts in the project business case.

Innovate Through New Partnerships

- With Goods Movement Partners
 - Improved regional road network operations including freight wayfinding and trip planning tools with the launch of a BETA version of a route planning App and positive stakeholder feedback. TransLink partnered with the BC Ministry of Citizens’ Services to develop and deliver a full production version of the App. Work to develop the App is underway with a targeted launch by end of Q1 2020.
 - Supported Metro Vancouver and municipalities to protect industrial and employment lands with good access to transportation networks through consultation with the Greater Vancouver Urban Freight Council and other key stakeholder groups throughout the development of the Regional Industrial Lands Strategy.
 - Worked with the Greater Vancouver Gateway Council to develop a coordinated communications strategy.
- With New Mobility Partners
 - In partnership with Modo Car Share, Evo Car Share, and bike-share provider Mobi by Shaw Go, developed and launched a basic and partial Mobility-as-a-Service prototype focusing on an integrated registration, vehicle access, invoicing and payment solution for all four transportation services with a single Compass Card.
 - In partnership with Poparide, launched a campaign to encourage people who commute by car to consider using the Poparide app to find a carpool partner.

Funding

New funding sources are needed to expand the transportation system and serve the rapidly growing population and increasingly urban region.

- Transit fare rates increased across all modes of transit on July 1, 2019. Refer to Section 6 for the new short-term fare rates.
- Parking tax increased from 21 per cent to 24 per cent on July 1, 2019.
- Property tax increased by 5.3 per cent in 2019 and included an increase of \$10.0 million to Standard Property Tax revenues in 2019 as outlined in the Plan.
- In March 2019, TransLink and the Province received approval for \$493.2 million of federal funding for the Expo and Millennium Upgrade Projects under the Investing in Canada Infrastructure Program. TransLink and the Province is currently working on completion of the Overarching Funding and Governance agreement and the Ultimate Recipient Agreement related to the Investing in Canada Infrastructure Program.
- The Government of Canada announced a one-time doubling of the Federal Gas Tax Fund transfer as part of the 2019 Federal budget. The portion of this one-time transfer allocated to the Greater Vancouver regional fund was \$138.0 million.
- The fuel tax increase from \$0.17/L to \$0.185/L was implemented on July 1, 2019.

3 2019 Financial Plan

The Plan identifies operating expenditures over the next ten years (2018-2027) as well as how those expenditures will be funded from established revenue sources. These revenues and expenditures take into account commitments made, services and programs provided and assumptions using the accounting standards as recommended by the Public Sector Accounting Board (PSAB). The table below compares the 2019 actual results to the 2019 Year of the Plan.

<i>(\$ millions)</i>	Actual 2019	2019 Year in the Plan (June 28, 2018)	Fav/(Unfav) Over Plan	% Change
Revenue				
Taxation				
<i>Fuel tax</i>	403.1	419.0	(15.9)	(3.8%)
<i>Property tax</i>	382.7	384.7	(2.0)	-
<i>Parking Rights</i>	81.9	77.5	4.4	5.6%
<i>Hydro levy</i>	21.4	21.6	(0.2)	(0.9%)
<i>Replacement tax</i>	17.8	18.0	(0.2)	(1.1%)
Transit	685.4	640.8	44.6	7.0%
Government transfers				
<i>Senior Government Funding</i>	338.4	238.5	99.9	41.9%
<i>Golden Ears Bridge Tolling Replacement Revenue</i>	60.1	60.1	-	-
Investment income	58.0	51.4	6.6	12.8%
Amortization of deferred concessionaire credit	23.3	23.3	-	-
Miscellaneous revenue	9.0	6.5	2.5	39.3%
Sub Total Continuing Operations Revenue	2,081.1	1,941.5	139.7	7.2%
Gain/(loss) on disposal	0.5	(0.5)	1.0	208.7%
Total Revenue (PSAB)	2,081.6	1,941.0	140.6	7.2%
Expenditures				
Bus Operations	758.9	764.3	5.4	0.7%
Corporate Operations	103.3	94.5	(8.8)	(9.3%)
Rail Operations	324.2	332.5	8.3	2.5%
Roads and Bridges	95.1	149.6	54.5	36.5%
Transit Police	40.9	40.9	0.0	0.0%
Amortization of tangible capital assets	212.9	253.1	40.2	15.9%
Interest	195.0	192.1	(2.9)	(1.5%)
Sub Total Continuing Operations Expenditures	1,730.3	1,827.1	96.8	5.3%
Corporate - onetime expenditures	18.2	11.8	(6.4)	(54.8%)
Total Expenditures (PSAB)	1,748.5	1,838.9	90.4	4.9%
Surplus for the period (PSAB)	333.2	102.2	231.0	226.1%
Accumulated Surplus¹, beginning of the year	1,265.8	1,296.8	(31.1)	(2.4%)
Accumulated Surplus¹, end of the year	1,598.9	1,399.0	199.9	14.3%

¹ The Accumulated Surplus is derived under Public Sector Accounting Standards and does not represent cash

Revenues:

Total 2019 revenue at \$2.1 billion was \$140.7 million favourable to the 2019 year in the Plan. Fuel tax revenue was \$15.9 million (3.8 per cent) unfavourable to the Plan due to the timing of legislation for the increase in fuel tax from \$0.17 to \$0.185 which was anticipated by Spring of 2019 but enacted on July 1, 2019. This was offset slightly by Parking Rights Tax, which was favourable to the Plan by \$4.4 million (5.6 per cent) due to higher than expected parking volumes. Property and replacement tax, hydro levy and parking rights tax revenue for 2019, were mainly consistent with the Plan.

Transit revenue at \$685.4 million was \$44.6 million (7.0 per cent) favourable to the Plan as ridership growth continued to exceed expectations and there continued to be higher program participation. In addition, other transit revenue was favourable to the Plan mainly due to higher advertising revenue, higher than anticipated occupants which resulted in more property rental income and higher than anticipated carbon credits.

Government transfers were \$99.9 million (41.9 per cent) favourable to the Plan primarily due to timing of planned projects. The majority of the positive variance is mainly due to timing differences in deliveries of replacement bus projects, which have shifted the recognition of the corresponding government transfers revenue from 2018 into 2019. This was partly offset by government transfers from the Capstan Station project, which have been deferred to future years due to delays in project initiation.

Investment income was \$6.6 (12.8 per cent) million favourable to the Plan primarily due to higher cash and investment holdings.

Miscellaneous income at \$9.0 million was \$2.5 million (38.9 per cent) favourable to the Plan mainly due to higher labour recoveries from external parties.

There was a \$0.5 million gain on disposal of assets in 2019 as compared to a \$0.5 million loss in the Plan. This due to the unexpected gain on disposal of land in 2019 which was not included in the Plan versus the estimate for the loss on disposal of BCRTC capital spares which was included in the Plan but did not materialize during the year.

Expenditures:

Bus Operations expenditures for 2019 were \$758.9 million, \$5.4 million (0.7 per cent) favourable to the Plan mainly due to lower radio costs and telecommunication costs, lower vehicle maintenance costs, lower contracted services costs incurred on the delivery of the bus route to West Vancouver as CMBC now delivers this route under their service plan and lower labour costs due to temporary vacancies. These were partly offset by an increase in vehicle insurance premiums and higher diesel prices than what was included in the Plan.

Corporate Operations operating expenditures were \$8.8 million (9.3 per cent) unfavourable to the Plan mainly due to higher employee future benefit costs, increases in labour and contractual adjustments and higher than anticipated technology costs.

Rail Operations were \$8.3 million (2.5 per cent) favourable to the Plan mainly due to lower maintenance costs due to the deferral of the station coating program, lower Employee Future Benefits costs and lower service costs than what was included in the Plan for West Coast Express.

Roads and Bridges were \$54.5 million (36.5 per cent) favourable to the Plan mainly due to capital infrastructure contribution deferrals, timing of project delivery, lower bridge maintenance costs and lower contractor payments due to the elimination of tolls and saving due to vacancies. These savings were partly offset by the reclassification of \$14.5 million RapidBus construction costs which were allocated from Corporate One-Time.

Transit Police expenditures for 2019 were comparable to the Plan.

Amortization expense was \$40.2 million (15.9 per cent) favourable to the Plan mainly due to timing differences in completion of planned projects. Additionally, changes in the estimated useful lives of the Richmond and Vancouver Transit Centre as compared to the Plan also contributed to the positive amortization variance.

Interest expense was \$2.9 million (1.5 per cent) higher than the Plan due to a loss on upfront settlement of a bond interest forward contract mostly offset by a combination of lower than planned amounts of borrowing and lower than planned interest rates.

Corporate One-time expenditures were \$6.4 million (54.8 per cent) higher than the Plan mainly due to the acceleration of the project completion timeline for the RapidBus Program, additional costs of new projects not reflected in the Plan and timing differences for the feasibility studies, partly offset by the timing of Bus Speed and Reliability program and Mobility Pricing program.

4 2019 Capital Program

Schedule 1

Schedule 1 below lists the projects that were included in the 2019 Capital Program as Approved in Principle (AIP) and indicates their current status. The schedule includes activity related to new capital projects in 2019 including any carry forward AIP projects from 2018.

Project and Program Titles (\$ thousands)	2019 Approved in Principle (AIP)	Specific Project Approval (SPA) during the year		Current Project Status as at December 31, 2019 (cumulative AiP and SPA's to date – December 31, 2019)				
	Budget	Approval Date	Budget	Budget	Actual Cost to Date	Forecast to Complete	Final Forecast Cost	Estimated Completion Date
Equipment								
Automatic Train Control (ATC) Existing Equipment Replacement - Stage 4	27,480	19-Sep-19	23,490	27,480	-	27,478	27,478	31-Dec-23
Bus Security Camera System Replacement ¹	20,000	-	-	-	-	20,000	20,000	31-Dec-23
CMBC Asset Purchases	570	7-Mar-19	731	731	625	15	640	31-Jan-20
CMBC Facilities Camera Replacement ¹	1,600	-	-	-	-	1,600	1,600	28-Feb-21
CMBC Onboard Computer Update and Voice Radio Replacement ¹	36,000	-	-	-	-	36,000	36,000	31-Dec-24
Expo Line Traction Power Equipment Upgrade ¹	10,200	-	-	-	-	10,200	10,200	30-Sep-22
Fare Gates Capacity Increase - Priority Stations	1,902	13-Jun-19	949	1,902	-	1,910	1,910	31-Mar-21
Hoist Replacements ¹	800	-	-	-	-	800	800	31-Jan-21
Replacement of Hegensheidt Underfloor Lathe ¹	4,710	-	-	-	-	4,710	4,710	30-Jun-22
Replacement of Rotary Grinder #2	6,500	12-Dec-19	9,045	9,045	-	9,045	9,045	30-Sep-22
SeaBus Shore Base Emergency Backup Generators and Transfer Switches ¹	610	-	-	-	-	610	610	31-May-21
TMAC Radio Replacement	3,652	-	-	25,600	8,288	14,288	22,576	31-Mar-22
Equipment Total	114,024		34,215	64,758	8,913	126,656	135,569	
Facilities								
BCRTC OMC 1 and 2 Space Optimization Modernization	8,000	29-Nov-19	3,950	8,000	-	8,086	8,086	30-Sep-21
Burnaby Transit Centre South Fleet Overhaul (FOH) Maintenance Lunchroom Expansion and Electric Shop Upgrades ¹	1,450	-	-	-	-	1,450	1,450	31-Aug-21
Bus Facility Customer Amenities Improvement Program ¹	6,573	-	-	-	-	6,573	6,573	31-Dec-22
CMBC Marpole Transit Centre	3,002	10-Jan-19	3,000	3,000	19	2,981	3,000	31-Dec-20
CMBC Roof Access Platform Upgrades	360	21-Mar-19	360	360	19	342	361	30-Jun-20
Metro Vancouver Transit Police- Sapperton Facilities Expansion and Renovation	1,003	14-Nov-19	160	1,003	-	1,003	1,003	31-Dec-20
OMC Perimeter Security Upgrade	1,990	12-Dec-19	795	1,990	-	1,990	1,990	30-Jun-21

Project and Program Titles (\$ thousands)	2019 Approved in Principle (AIP)	Specific Project Approval (SPA) during the year		Current Project Status as at December 31, 2019 (cumulative AiP and SPA's to date – December 31, 2019)				
	Budget	Approval Date	Budget	Budget	Actual Cost to Date	Forecast to Complete	Final Forecast Cost	Estimated Completion Date
Richmond Transit Centre Facility Upgrades to Accommodate Double Decker Buses	5,350	21-Mar-19	5,750	9,750	3,603	6,207	9,810	31-Dec-20
SeaBus Facility Upgrades ¹	2,805	-	-	-	-	2,805	2,805	31-Dec-23
SeaBus Maintenance Dock Expansion	8,415	11-Jul-19	8,415	10,000	1,238	7,058	8,296	31-Oct-20
SeaBus Terminals Interior Refurbishment - Design and Implementation	14,000	5-Sep-19	110	15,977	1,251	14,781	16,032	31-Mar-22
Surrey Transit Centre (STC) Bodyshop Exhaust Reels	530	16-May-19	450	450	-	452	452	30-Jun-20
Trolley Overhead (TOH) Rectifier Building Roof and Envelope Replacement	500	22-Feb-19	500	500	38	424	462	31-Mar-20
Facilities Total	53,978		23,490	51,030	6,168	54,152	60,320	
Infrastructure								
2018 TransLink Owned Bicycle Infrastructure ¹	6,624	-	-	-	-	6,624	6,624	31-Mar-21
2nd Generation Bike Lockers - Phase 1	-	17-Oct-19	785	785	18	780	798	31-Mar-21
Arbutus to UBC SkyTrain (formerly UBC Extension)	1,000	30-May-19	1,000	1,000	218	782	1,000	31-Dec-20
BC Parkway Temporary Lighting Project	-	5-Sep-19	636	636	7	588	595	30-Jun-20
Burnaby Mountain Gondola Transit	3,000	11-Jul-19	800	3,000	-	3,000	3,000	31-Mar-21
Burrard Station	59,105	16-May-19	7,500	60,700	2,345	58,298	60,643	31-Dec-23
Bus Loop Park and Ride Paving	700	22-Aug-19	700	700	5	699	704	20-Sep-20
Bus Speed and Reliability	2,000	30-May-19	2,000	2,000	-	1,705	1,705	31-Dec-21
Bus Stop Infrastructure for New Routes ²	750	-	-	-	-	-	-	-
Canada Line Bus Loops - Brighthouse	4,000	11-Jul-19	5,500	8,500	155	8,347	8,502	31-May-20
Edmonds OMC Capacity Upgrade ³	3,370	19-Sep-19	1,630	7,260	2,366	4,894	7,260	31-Dec-23
Elevator Replacement	1,935	22-Aug-19	1,935	1,935	-	1,935	1,935	31-Dec-20
Expo Line Escalator Replacement - Accelerated Program	51,893	10-Jan-19	51,893	67,321	19,563	47,731	67,294	31-Dec-23
Expo Line Tunnels Ventilation System Rehabilitation	4,300	-	-	6,165	818	4,959	5,777	31-Mar-21
Guideway Closed Circuit TV (CCTV) Coverage ³	9,020	-	-	780	770	-	770	31-Dec-19
Guildford Exchange Upgrades ³	1,427	-	-	10,673	8,353	1,260	9,613	31-Mar-20
Investments in Transit Priority on RapidBus Corridors (Phase 1)	42,035	5-Sep-19	36,186	45,231	15,378	29,689	45,067	31-Jan-21
Investments in Transit Priority on RapidBus Corridors (Phase 2) ¹	28,000	-	-	-	-	28,000	28,000	31-Dec-23
Knight Street Bridge Rehabilitation-Detailed Design	3,800	7-Mar-19	1,800	2,100	236	1,853	2,089	30-Jun-20

Project and Program Titles (\$ thousands)	2019 Approved in Principle (AIP)	Specific Project Approval (SPA) during the year		Current Project Status as at December 31, 2019 (cumulative AiP and SPA's to date – December 31, 2019)				
	Budget	Approval Date	Budget	Budget	Actual Cost to Date	Forecast to Complete	Final Forecast Cost	Estimated Completion Date
Knight Street Bridge-Sidewalk and Deck Rehabilitation	-	5-Dec-19	2,000	2,000	-	1,999	1,999	31-Dec-22
Metrotown Bus Loop Upgrade ³	3,720	-	-	435	344	-	344	30-Nov-19
New SFU Exchange Contribution ¹	3,185	-	-	-	-	3,185	3,185	31-Dec-22
Noise Assessment of Rapid Transit Lines Phase 1	1,000	7-Feb-19	1,000	2,470	727	1,743	2,470	31-May-21
Phibbs Exchange Upgrade ¹	6,000	-	-	-	-	6,000	6,000	31-Mar-21
Power System Upgrades for SkyTrain at OMC ⁴	10,400	7-Dec-18	10,400	22,565	7,310	16,204	23,514	31-Dec-20
PowerSmart Upgrades at Surrey Transit Centre and Port Coquitlam Transit Centre	1,200	27-Jun-19	1,200	1,200	51	1,140	1,191	31-Jan-21
Roofing Replacement Program - Expo Line	1,950	31-Oct-19	1,950	1,950	-	1,950	1,950	30-Nov-20
Running Rail Replacement	8,850	17-Oct-19	7,800	7,800	-	8,848	8,848	31-Jan-21
SkyTrain Operation Control Centre (formerly OMC Upgrades)	41,680	-	-	50,000	2,544	49,145	51,689	31-Dec-23
SkyTrain PIDS Upgrade	-	12-Dec-19	4,000	30,434	21,573	28,596	50,169	31-Dec-21
2019 TransLink Owned Bicycle Infrastructure ¹	3,200	-	-	-	-	3,200	3,200	31-Dec-22
TOH State of Good Repair	4,775	7-Feb-19	4,775	4,775	2,488	1,782	4,270	31-Mar-21
Westham Island Bridge Rehab-Scour Protection Design	1,000	29-Nov-19	1,000	3,320	1,838	1,515	3,353	31-Dec-20
Infrastructure Total	309,919		146,490	345,735	87,107	326,451	413,558	
Technology								
Access Transit Trapeze PASS - Additional Modules	2,000	29-Nov-19	1,660	1,660	-	2,000	2,000	31-Dec-20
BCRTC Enterprise Asset Management - 2017	5,490	-	-	11,760	4,276	7,564	11,840	31-Dec-23
BCRTC Enterprise Asset Management - 2019 ¹	33,240	-	-	-	-	33,240	33,240	31-Dec-23
BCRTC Modernization ¹	500	-	-	-	-	500	500	31-Dec-21
BCRTC Payroll, Scheduling and Timekeeping	1,500	25-Jan-19	1,500	2,140	1,142	555	1,697	31-Mar-22
Bus Daily Operations Management System (DOMS) Product Migration Planning	25,269	14-Aug-19	6,086	27,435	2,669	24,813	27,482	31-Dec-23
Compass Vending Machines (CVM)	461	4-Apr-19	337	461	-	337	337	31-May-20
Enterprise Content Management ¹	1,000	-	-	-	-	1,000	1,000	31-Mar-21
Enterprise Health and Safety System	500	7-Feb-19	998	998	211	643	854	31-Oct-20
Finance Enterprise Resource Planning (ERP)	4,000	21-Mar-19	920	4,000	769	8,010	8,779	31-Dec-23
IT Infrastructure Refresh	6,200	27-Jun-19	6,614	6,614	441	4,995	5,436	31-Dec-21
OMC 1 3rd Floor Server Room Upgrade ¹	1,250	-	-	-	-	1,250	1,250	31-Mar-22
Responsive Website	2,000	17-Oct-19	2,000	2,000	390	1,255	1,645	31-Dec-20

Project and Program Titles (\$ thousands)	2019 Approved in Principle (AIP)	Specific Project Approval (SPA) during the year		Current Project Status as at December 31, 2019 (cumulative AiP and SPA's to date – December 31, 2019)				
	Budget	Approval Date	Budget	Budget	Actual Cost to Date	Forecast to Complete	Final Forecast Cost	Estimated Completion Date
TransLink Enterprise Asset Management	3,240	14-Aug-19	1,000	6,794	2,143	4,139	6,282	31-Dec-22
TransLink Mobile App ²	1,000	-	-	-	-	-	-	-
TransLink Software Application Renewal Program	3,000	5-Dec-19	2,884	2,884	78	2,660	2,738	30-Jun-21
Transportation Analytics Program	1,500	11-Jul-19	1,500	1,500	82	1,515	1,597	31-Dec-20
Technology Total	92,150		25,499	68,246	12,201	94,476	106,677	
Vehicles								
CMBC Service Support Vehicle Replacement	982	4-Apr-19	982	1,088	-	996	996	31-Oct-20
CMBC TOH Truck Replacement	2,400	4-Apr-19	2,400	2,400	-	2,380	2,380	31-May-21
Community Shuttle Expansion - 2019	2,220	14-Nov-19	2,471	2,471	-	2,471	2,471	31-Dec-22
Conventional Bus Expansion	109,000	30-May-19	100,740	100,740	-	100,740	100,740	31-Jan-21
Conventional Bus Replacements	32,316	2-May-19	32,500	32,500	-	32,439	32,439	31-Jan-21
HandyDART Expansion - 2020 ¹	1,600	-	-	-	-	1,600	1,600	31-Mar-21
HandyDART Vehicle Replacement - 2020 ¹	6,450	-	-	-	-	6,450	6,450	31-Dec-21
Vehicles Total	154,968		139,093	139,199	-	147,076	147,076	
Major Construction								
BSP ³	135,022	14-Nov-19	74,656	84,245	4,478	79,247	83,725	31-Dec-25
Expo and Millennium Line Upgrade Program (EMUP) - Coquitlam OMC 4 Storage Facility	269,600	14-Aug-19	38,700	269,600	815	268,785	269,600	31-Oct-27
EMUP - Fleet	931,600	25-Jul-19	931,600	931,600	726	930,873	931,599	31-Oct-27
EMUP - Infrastructure	296,200	29-Nov-19	18,600	184,900	39	184,861	184,900	31-Oct-27
South of Fraser Rapid Transit (Light Rail Transit) - Implementation ⁵	1,585,720	-	-	-	-	1,585,720	1,585,720	31-Dec-27
SLS Project Development	30,000	14-Jan-19	29,201	29,201	9,582	19,930	29,512	30-Jun-20
Major Construction Total	3,248,142		1,092,757	1,499,546	15,640	3,069,416	3,085,056	
Major Road Network (MRN)								
2019 MRN and Bike Upgrade Funding Program	20,000	30-May-19	17,997	17,997	-	17,997	17,997	31-Dec-22
2019 Walking Infrastructure to Transit (WITT) Funding Program	5,000	30-May-19	5,000	5,000	67	4,999	5,066	31-Dec-23
2019 Bicycle Infrastructure Capital Cost Share (BICCS) Funding Program	13,450	30-May-19	15,269	15,453	-	15,452	15,452	31-Dec-24
2019 MRN Pavement Rehabilitation Funding Program	23,551	30-May-19	23,551	23,551	23,316	234	23,550	31-Dec-20
2019 MRN Structures Rehabilitation and Seismic Upgrade Funding Program	13,000	30-May-19	5,005	13,000	-	13,000	13,000	31-Dec-24
Major Road Network (MRN) Total	75,001		66,822	75,001	23,383	51,682	75,065	
Grand Total	4,048,182		1,528,366	2,243,515	153,412	3,869,909	4,023,321	

(1) These projects are being carried forward to year 2020, see Schedule 1a for details.

(2) These were cancelled projects, see Schedule 1a for details.

Project and Program Titles (\$ thousands)	2019 Approved in Principle (AIP)	Specific Project Approval (SPA) during the year		Current Project Status as at December 31, 2019 (cumulative AiP and SPA's to date – December 31, 2019)				
	Budget	Approval Date	Budget	Budget	Actual Cost to Date	Forecast to Complete	Final Forecast Cost	Estimated Completion Date

(3) These projects had scope reductions, see Schedule 1a for details.

(4) These are projects that received advance approvals in 2018.

(5) The South of Fraser Rapid Transit (Light Rail Transit)-Implementation project was suspended following the Mayors' Council decision to advance the SkyTrain to Langley Project.

Schedule 1a

Schedule 1a below lists the status of TransLink capital programs with project additions, cancellations, disencumbered Approved in Principle projects and projects not yet initiated during 2019.

Project and Program Titles (\$ thousands)	Budget	Reason
Additions		
Business Technology Support (BTS) Office Moves to Metrotown	1,081	In order to meet capacity and project coordination challenges at Sapperton office and 307 Columbia locations, this project was to secure addition lease space at a Metrotown office building to house BTS project team members.
Commercial Broadway Station Commercial Retail Unit (CRU) Services	675	Recent upgrades to the Commercial Broadway station included a dedicated CRU space on the concourse level. The vendor has exercised the option to utilize this space. This project is initiated for TransLink to meet the contractual obligations to the vendor, the project will provide extension of electrical and mechanical services to the area.
OMC Maintenance Capacity Upgrade	6,400	With the development of the EMUP, a need was identified to install additional power capacity at the Edmonds OMC to support the arrival of new fleet. This project was created to support additional power capacity upgrade.
Additions Total	8,156	
Project Cancellation and Scope Reductions		
BSP	17,751	The scope of work to be delivered by TransLink for this project was reduced. Accordingly, budget amount of \$17.8 million has been disencumbered.
Bus Stop Infrastructure for New Routes	750	This project was cancelled as a capital project as the scope of work is delivered under the CMBC Transit Related Road and Infrastructure Program.
Edmonds OMC Capacity Upgrade	1,740	This was a Public Transit Infrastructure Fund (PTIF) eligible project. The scope of work remaining under this AIP has been transferred to a future project. The resources have been reallocated to other PTIF eligible projects in efforts to optimize PTIF funding utilization within set funding timelines.
Guideway CCTV Coverage	4,636	This was a PTIF eligible project. The scope of work remaining under this AIP has been transferred to a future project. The resources have been reallocated to other PTIF eligible projects in efforts to optimize PTIF funding utilization within set funding timelines.
Guildford Exchange Upgrades	1,427	Project budget of \$1.4 million has been disencumbered. This is due to construction cost savings and a reduction in scope associated with the elimination of the Light Rail Transportation project.
Metrotown Bus Loop Upgrade	3,720	Project scope has been reduced to exclude detailed design and implementation. The remaining \$3.7 million implementation budget has been disencumbered.
TransLink Mobile App	1,000	The scope of this project has been consolidated with the Responsive Website project. The budget of \$1.0 million has been disencumbered.
Project Cancellation and Scope Reductions Total	31,024	
Projects Not Initiated		
2018 TransLink Owned Bicycle Infrastructure Program	5,203	This project has an opening AIP of \$6.6 million and transferred an AIP budget of \$785 thousand to the project 2nd Generation Bike Lockers - Phase 1 and transferred \$636 thousand to the project BC Parkway Temporary Lighting Project during the year. The remainder AIP budget of \$5.2 million is contingent on closing a property acquisition with Southern Railway of BC. The project is expected to initiate in 2020.
2019 TransLink Owned Bicycle Infrastructure Program	3,200	This phase of the project is expected to be initiated upon completion of the prior phase noted above.
BCRTC Enterprise Asset Management - 2019	33,240	Project was delayed as it took longer than anticipated to award and finalize the contract for the System Integrator. Project is now expected to initiate in 2020.
BCRTC Modernization	500	This project is on hold until after the completion of the Enterprise Resource Planning Program software procurement. The project will be aligned with the next phase of the BCRTC Asset Management Project. Project is expected to initiate in 2020.

Project and Program Titles (\$ thousands)	Budget	Reason
Projects Not Initiated		
Burnaby Transit Centre South FOH Maintenance Lunchroom Expansion and Electric Shop Upgrades	1,530	This project has an opening AIP of \$1.5 million and received an AIP budget transfer of \$80 thousand from the project STC Bodyshop Exhaust Reels. The feasibility component of this project took longer than anticipated, which delayed the implementation. Project is expected to initiate in 2020.
Bus Facility Customer Amenities Improvement Program	6,573	The project is not initiated to allow potential realignment with Investment Plan. Project is expected to initiate in 2020.
Bus Security Camera System Replacement	20,000	This project will now be delivered in conjunction with the CMBC Onboard Computer Update and Voice Radio Replacement project. This project is expected to initiate in 2020
CMBC Facilities Camera Replacement	1,600	Project was delayed due to internal staff resourcing constraints. Project is now expected to initiate in 2020.
CMBC Onboard Computer Update and Voice Radio Replacement	36,000	This project encountered unexpected technical issues with the vehicle communications systems. The project is expected to initiate in 2020
Enterprise Content Management	1,000	This project was delayed to provide adequate time to review and action the feasibility study recommendations. The project is expected to initiate in 2020.
EMUP - Infrastructure	111,300	This remaining AIP has three components; <ul style="list-style-type: none"> 1. OMC 1 and 2 Maintenance Capacity Upgrades <ul style="list-style-type: none"> o Delays in initiation due to finalizing the concept plan with BCRTC for scope requirement changes. 2. SkyTrain Advance Radio Systems Upgrades <ul style="list-style-type: none"> o Delays due to technology selection process. 3. Station Upgrades – Brentwood <ul style="list-style-type: none"> o Delays due to approval of the rezoning application with the City of Burnaby and works required to be completed by the adjacent development.
Expo Line Traction Power Equipment Upgrade	10,200	Project was delayed due to internal staff resourcing constraints. Project is now expected to initiate in 2020.
HandyDART Expansion - 2020	1,600	This project was delayed to provide adequate time to complete the optimization study. The project is expected to initiate in 2020.
HandyDART Vehicle Replacement - 2020	6,450	This project was delayed to provide adequate time to complete the optimization study. The project is expected to initiate in 2020.
Hoist Replacements	800	Project initiation was delayed until completion of an overall Asset Renewal Program (ARPG) for Hoist replacements. ARPG was completed in Q4 of 2019 and this project is expected to be initiated in 2020.
Investments in Transit Priority on RapidBus Corridors (Phase 1)	5,849	The project is for Wayfinding scope for RapidBus and it was delayed due to rebranding from B-Line to RapidBus. This scope is expected to be initiated in 2020.
Investments in Transit Priority on RapidBus Corridors (Phase 2)	28,000	This project was delayed so resources could be reallocated to ensure the successful completion of the Phase 1 B-Lines (RapidBus), launched in early 2020. The delay will also afford TransLink additional time to ensure adequate public consultation and stakeholder engagement during the early stages of this project.
New SFU Exchange Contribution	3,185	This project was delayed due to challenges during the design and implementation phase. The project is expected to initiate in 2020.
OMC1 3rd Floor Server Room Upgrade	1,250	Part of the Approved in Principle budget was transferred to SeaBus Terminals Interior Refurbishment project. The remainder of the budget will be initiated in 2020.
Phibbs Exchange Upgrade	6,000	This project has been transferred to the BC Ministry of Transportation and Infrastructure (MOTI). MOTI experienced technical issues which delayed their implementation. TransLink remains responsible for providing transit-specific design criteria and standards and development of the transit-related infrastructure with its remaining budget of \$6.0 million. The project is expected to initiate in 2020.
Replacement of Hegensheidt Underfloor Lathe	4,710	Project was delayed due to internal staff resourcing constraints. Project is now expected to initiate in 2020.
SeaBus Facility Upgrades	2,805	The feasibility component of this project took longer than anticipated, which delayed the implementation. Project is expected to initiate in 2020.
SeaBus Shore Base Emergency Backup Generators and Transfer Switches	500	The Approved in Principle budget has an opening balance of \$610 thousand and \$110 thousand has been transferred to the project SeaBus Terminals Interior Refurbishment - Design and Implementation. The project is expected to be initiated in 2020.
South of Fraser Rapid Transit (Light Rail Transit)	1,585,720	The South of Fraser Rapid Transit (Light Rail Transit) project was suspended following the Mayors council decision to advance the SkyTrain to Langley Project. The SLS option business case is to be reviewed and approved in 2020.
Projects Not Initiated Total	1,877,215	

Schedule 2

Schedule 2 provides a comparison of the 2019 cash flow forecast in the 2018 Investment plan to actual spending in 2019. This schedule includes comments for projects with variances greater than \$1 million.

Project and Program Titles (\$ thousands)	2019 Cash Flow (\$ thousands)			Comments on Variances > \$1 Million
	10 Year Plan	Actual Jan 1 - Dec 31 2019	Variance Plan - Actuals	
Equipment				
ATC Existing Equipment Replacement	5,154	4,137	1,017	Variance is due to a change in the scope of the project after incorporating the findings of a previously completed feasibility study. This resulted in an overall reduction of project scope and spending.
CCTV Camera System Upgrade on Expo and Millennium Lines	1,678	8,720	(7,042)	Variance is due to the delay in design and implementation work from prior year. Implementation related cash flows were shifted from 2018 to 2019.
Expo Line Traction Power Equipment Replacement	7,712	101	7,611	Variance is due delay caused by scope and schedule revision to replace entire direct current switchgear lineup at New Westminster substation in order to follow industry best practice, as opposed to replacing only damaged ones caused by a previous fire incident.
Passenger Address System Quality Improvement	6,668	8,489	(1,821)	Variance is due to the delay in design from prior year. The project schedule was realigned, and implementation related cash flows have shifted relative to the investment plan.
SkyTrain Customer and Operations Telecommunications Upgrade	2,807	1,552	1,255	Variance is due to timing delays. Further consultation is required to define the project scope, schedule and budget. Cash flows have shifted from 2019 into future years.
SkyTrain Physical Security System	-	2,086	(2,086)	Variance is due to timing shifts related to the design phase which have shifted cash flows from prior year to 2019 and subsequent years.
TMAC Radio Replacement	-	7,517	(7,517)	Variance is due to a change in project scope, in which the previous scope was expected to be completed prior to 2019. The project is now multi-phase, consolidating other transit management and communication projects, with most of the costs shifting to 2019 and 2020.
Equipment projects with current year variances less than \$1 million	5,335	6,185	(850)	Variances are mainly due to small timing differences between Investment Plan forecasts and actual expenditures in 2019.
Equipment Total	29,354	38,787	(9,433)	
Facilities				
BCRTC OMC 1 and 2 Space Optimization Modernization	7,219	-	7,219	Variance is due to delays in defining project scope causing a delay in delivery of the OMC 1 Shell Space project, thus shifting cash flows from 2019 into 2020 and 2021.
Burnaby Transit Centre South Seismic Upgrade	273	6,220	(5,947)	Variance is due to a change in project scope to include the delivery of the Tire Shop and Fleet Overhaul Building Extension. As a result, overall project budget has increased, and the majority of the cash flows have shifted from 2018 to 2019 and 2020.
Bus Facility Customer Amenities Improvement Program	12,223	-	12,223	Variance is due to delays in defining project scope adjusting from a project-based to program-based approach, which shifted commencement of the project from 2019 to 2020 with all of the costs shifting to subsequent years.
CMBC Marpole Transit Centre	9,376	19	9,357	Variance is due to delays in the project initiation, largely attributable to permitting delays, which have resulted in majority of the cash flows shifting to subsequent years.
CMBC Roof Replacement	-	1,433	(1,433)	Variance is due to a change in schedule to allow the project to be re-tendered to stay within budget. This project previously expected to complete prior to 2019 is now re-baselined shifted cash flows to 2019 and 2020.

Project and Program Titles (\$ thousands)	2019 Cash Flow (\$ thousands)			Comments on Variances > \$1 Million
	10 Year Plan	Actual Jan 1 - Dec 31 2019	Variance Plan - Actuals	
HandyDART Facility Land Acquisition	15,000	-	15,000	The project delayed to better align with the HandyDART service expansion needs of the next Investment Plan.
Sapperton 8th Floor Fit-out	-	2,261	(2,261)	This project was not part of the original Investment Plan and was funded out of the 2019 capital contingency.
SeaBus Maintenance Dock Expansion	7,186	1,164	6,022	Variance is due to longer than anticipated design phase. Construction schedule is realigned and expected to commence in 2020.
SeaBus Terminals Interior Refurbishment - Design and Implementation	14,012	1,077	12,935	Variance is due to change in scope for electrical upgrades shifted cash flows from 2019 into future years.
STC Bodyshop Exhaust Reels	1,375	-	1,375	Variance is due to modifications in scope to reduce the amount of exhaust reels from 5 to 3. As a result, cash flows have shifted from 2019 to 2020.
Transit Centre Infrastructure to Support Expansion	2,419	1,313	1,106	Variance is due to a decrease in project scope and contingency funds not being utilized, which has reduced spending in 2019.
Facilities projects with current year variances less than \$1 million	6,447	6,057	390	Variances are mainly due to small timing differences between Investment Plan forecasts and actual expenditures in 2019.
Facilities Total	75,530	19,544	55,986	
Infrastructure				
Implement Enterprise-Level Regional Demand Management Strategies	1,500	-	1,500	Variance is due to project being cancelled as project scope and cost estimates are not yet defined.
2018 TransLink Owned Bicycle Infrastructure	2,657	-	2,657	Variance due to a delay in agreeing key terms with the Southern Railway of BC for the underlying property acquisition. The cash flows have shifted to 2020.
22nd Street Exchange-Lighting and Passenger Safety Compliance	-	1,674	(1,674)	Variance is due to scope change to expand the area covered by the project to bring the lighting levels in line with current TransLink standards and improve passengers' sense of safety and comfort. This resulted in additional cash flows in 2019.
ATC System Recovery and Operation Improvements	3,508	1,387	2,121	Variance is due to change of project scope resulting in shifted cash flows from 2019 to 2020.
BCRTC Expo Line Roof Replacement	-	5,288	(5,288)	Variance is due to time extensions and additional budget required to complete on all roof replacements. Project cash flows were shifted from 2018 to 2019.
Evergreen Extension Station Bicycle Parkades	-	2,668	(2,668)	Variance is due to schedule shift from that anticipated in the Investment Plan and an overall increase in commodity costs.
Brentwood SkyTrain Station and bus facilities	4,367	545	3,822	Variance is due to delay in receiving municipal approval for the rezoning application. Construction for phase 1 and Phase 2 is re-scheduled and related cash flow is shifted to subsequent years.
BTCN Garage Renovation	527	2,537	(2,010)	Variance is due to delay in project initiation in prior year which shifted the project schedule and related cash flows from 2018 to 2019.
Burnaby Mountain Gondola Transit	1,500	-	1,500	Variance is due to delays in completion of the feasibility study. The capital expenditures anticipated in the Investment Plan is deferred to future years.
Burrard Station	9,364	1,055	8,309	Variance is due to delays in the concept design phase. Concept designs came in at higher than anticipated cost estimates that required the need to revisit the design and implementation strategy. Implementation cash flows have now shifted to subsequent years.
Canada Line Capacity Expansion	20,000	14,395	5,605	Variance is due to revisions in the milestone payment schedule subsequent to the Investment Plan being developed, resulting in shifting the cash flows from 2019 to 2020.
Canada Line Capstan Station	22,012	-	22,012	Variance is due to a delay in negotiations of municipal funding, which shifted implementation to subsequent years. Funding terms were finalized in December 2019.

Project and Program Titles (\$ thousands)	2019 Cash Flow (\$ thousands)			Comments on Variances > \$1 Million
	10 Year Plan	Actual Jan 1 - Dec 31 2019	Variance Plan - Actuals	
CMBC Transit Centre Infrastructure- State of Good Repair	-	2,177	(2,177)	Variance is due to scope and schedule change to include a third articulated bay, resulting in increased overall cash flows as well as shifting cash flows from 2018 to 2019 and 2020.
Commercial Broadway SkyTrain Station Upgrade Construction	-	9,601	(9,601)	Variance is due to project re-baseline caused by construction delays resulting in overall higher than expected project cost in 2019.
Edmonds OMC Capacity Upgrade	1,040	2,319	(1,279)	Variance is due to accelerated design schedule to compensate for previous year delays on the procurement. This has resulted in cash flows shifting from 2018 to 2019.
Elevator Replacement	1,750	-	1,750	Variance is due to delays in project initiation, largely attributable to coordinating stakeholder approval. The associated cash flow shifted to 2020.
Expo and Millennium Line Signage and Station Fixture Replacement	-	1,014	(1,014)	Variance is due to a change in project scope, which now includes Canada Line and West Coast Express stations. Planned expenditures shifted from 2018 to 2019.
Expo Line Escalator Replacement - Accelerated Program	4,860	10,982	(6,122)	Variance is due to redesign and revised project scope for higher grade escalators (APTA) resulting in increased project spending.
Expo Line Running Rail Replacement - 2019	5,046	1,558	3,488	Variance is due to previous delays in 2018, leading to late project initiation. Cash flows shifted from 2019 to 2020.
Expo Line Tunnels Ventilation System Rehabilitation	2,624	665	1,959	Variance is due to longer than expected procurement phase. Cash flows shifted from 2019 to 2020.
Fibre Optic System Upgrade	2,518	635	1,883	Variance is due to the project starting ahead of schedule, which shifted a portion of spending from 2019 to 2018. Cost savings have also been realized through efficiencies and a reduction in project risk.
Golden Ears Bridge Tolling Equipment Replacement	4,433	-	4,433	Variance is due to the project being cancelled in prior year shortly after the Provincial Government discontinued tolling services across the Province effective September 1st, 2017. The renewal tolling equipment is no longer required to replace the end of life equipment operational since 2009.
Guildford Exchange Upgrades	-	7,335	(7,335)	Variance is due to delays in receiving the development permit from the City of Surrey. The project initiation and cash flows shifted from 2018 to 2019.
Investments in Transit Priority on RapidBus Corridors (Phase 1)	1,398	13,610	(12,212)	Variance due to Phase 1 RapidBus (formerly B-Line) expansion being delivered in early 2020. As a result work planned for future years has been executed early with cash flows advanced from future years to 2019.
Investments in Transit Priority on RapidBus Corridors (Phase 2)	1,561	-	1,561	Variance is due to Phase 2 RapidBus (formerly B-Line) being rescheduled in order to successfully complete Phase 1, and to allow for appropriate public and stakeholder engagement in the early stages of Phase 2 before the bulk of the budget is spent.
Joyce-Collingwood Station Upgrade Construction	-	8,529	(8,529)	Variance is due to delays in acquiring the necessary land and tree cutting permits needed to commence Phase 2 construction, resulting in shifting cash flows from 2018 into 2019.
Knight Street Bridge Rehabilitation- Detailed Design	6,015	104	5,911	Variance is due to a substantial portion of the work scope relating to Knight Street Bridge Deck and Sidewalk Rehabilitation shifting to future years, resulting in lower than expected cash flows in 2019.
LIM Rail Retrofit	2,140	-	2,140	Variance is due to delays in contract negotiation. Project timeline and associated cash flow is contingent on market response to Request for Procurement. Cash flows were shifted from 2019 into future years.
Lonsdale Quay Exchange Upgrade	-	4,623	(4,623)	Variance is due to delays in concept design, municipal permitting and construction delays when the project was anticipated to complete prior to 2019 in the Investment Plan. In addition, the overall project budget has increased due to higher than expected construction costs resulting in increased project cash flows in 2019.
Nanaimo Bus Loop Upgrades	-	4,897	(4,897)	Variance is due to delays in resolving design requirements with the City of Vancouver and bus scheduling constraints. This resulted in

Project and Program Titles (\$ thousands)	2019 Cash Flow (\$ thousands)			Comments on Variances > \$1 Million
	10 Year Plan	Actual Jan 1 - Dec 31 2019	Variance Plan - Actuals	
				the project schedule and related cash flows shifting from prior year to 2019 onwards.
New SFU Exchange Contribution	1,075	-	1,075	Variance is due to project scope revised and project schedule shifting due to delays in the design. Project is expected to initiate in 2020 resulting in cash flows shifting from 2019 to 2020.
Pattullo Bridge Rehabilitation Phase 3-Construction	16,892	42	16,850	Variance is due to project scope and schedule revisions resulting in cash flows shifting from 2019 to subsequent years.
Pattullo Bridge Wind Monitoring and Seismic Warning Systems-Design	-	1,786	(1,786)	Variance is due to delays in project expenditures due to longer than anticipated design and procurement phases which moved spending into 2019.
Phase III Power Rail Replacement (5 kms of guideway)	5,000	-	5,000	Project is deferred into 2020 program year. Cash flows were shifted from 2019 into future years.
Power System Upgrades for SkyTrain at OMC	10,400	4,310	6,090	Variance is due to an increase in scope of the project. Construction schedule is realigned and related cash flows were shifted to 2020.
Running Rail Replacement	-	4,879	(4,879)	Variance is due to changes in scope following the request for proposal coupled with a lower rail production rate than initially estimated. Cash flows were shifted from 2018 into 2019.
SeaBus Terminals and Admin Building Envelope Rehab-Construction	-	2,031	(2,031)	Variance is due to delays in the design consultant's proposal in 2017, which extended construction related cash flows into 2019.
Seismic Upgrade South SeaBus Seawall and Skywalk	-	7,435	(7,435)	Variance is due to change in project scope. Cash flows that were originally slated for 2018 and earlier were shifted into 2019 and 2020.
SkyTrain Operation Control Centre (formerly OMC Upgrades)	5,202	1,537	3,665	Variance is due to site selection and optional development work which took longer than expected. Detailed design is expected to be completed by 2020 and associated cash flows are deferred to 2020.
Skytrain PIDS Upgrade	12,645	15,439	(2,794)	Variance is due to an increase in project scope to combine scope with other projects to gain overall efficiencies and synergies. This has resulted in an increase in 2019 cash flows.
SkyTrain Storage - Coquitlam Vehicle Storage Facility (VSF) Expansion	26,351	11,446	14,905	Variance is due to delays in capturing all scope changes and finalizing the concept plan with BCRTC. The associated cash flows shifted from 2019 to subsequent years.
Surrey Central Station Upgrades Construction	-	5,226	(5,226)	Variance is due to design and construction schedule extensions. Project was anticipated to complete prior to 2019 in the Investment Plan. Cash flows shifted from 2018 to 2019.
TOH Metrotown Group Rectifier Replacement	3,749	829	2,920	Variance is due to a change in project scope and project schedule. The reduction in project scope also decreased the overall cash flow required for the project and extended the project schedule. Cash flows shifted from 2019 to 2020.
TOH Rectifier Southlands Replacement	2,500	-	2,500	Variance is due to delays in the project initiation, which have resulted in project deferral to future years.
TOH Rectifier UBC Group (Blanca, Cleveland, Parkway) Replacement	1,611	-	1,611	Variance is due to delays in the project initiation. The project has also been rescope to three projects, which has been deferred to future years.
2019 TransLink Owned Bicycle Infrastructure Program	5,750	-	5,750	Initiation of the 2019 program is awaiting completion of the 2018 program. The 2018 program was contingent on a property acquisition with the Southern Railway of BC which did not take place until late 2019. Cash flows for the 2019 program is now expected to be incurred in 2020 and 2021.
TOH State of Good Repair	1,200	2,488	(1,288)	Variance is due to change of project scope. Three TOH projects were consolidated into this project. This has resulted in an overall increase in project costs.
UBC Diesel Bus Terminal-TransLink Owned Infrastructure	2,250	19	2,231	Variance is due to extended project schedule caused by design changes, resulting in a shift of cash flows to future years.
Yard Track Reconditioning	2,553	3	2,550	Feasibility study for this project revealed greater than anticipated track shutdowns and greater lead times for design and material for preferred option. These findings have resulted in a change to the project schedule and cash flows has shifted from 2019 to 2020.

Project and Program Titles (\$ thousands)	2019 Cash Flow (\$ thousands)			Comments on Variances > \$1 Million
	10 Year Plan	Actual Jan 1 - Dec 31 2019	Variance Plan - Actuals	
Infrastructure projects with current year variances less than \$1 million	8,102	6,083	2,019	Variances are mainly due to small timing differences between Investment Plan forecasts and actual expenditures in 2019.
Infrastructure Total	204,100	161,151	42,949	
Technology				
IT Infrastructure Refresh	3,775	1,618	2,157	Variance is due to supplier delays in available resources and delivery dates for the serialized equipment. Cash flows shifted from 2019 to 2020.
BCRTC Enterprise Asset Management - 2017	-	2,515	(2,515)	Variance is due to project schedule adjustments to align with a larger ERP program which started in 2019. Cash flows shifted from 2018 to future years.
BCRTC Enterprise Asset Management - 2019	11,600	-	11,600	Variance is due to project schedule adjustments to align with a larger ERP program which started in 2019. Cash flows shifted from 2019 to future years.
Bus DOMS Product Migration Planning	3,792	912	2,880	Variance is due to of delays in securing a vendor to complete the work. This resulted in the project schedule and related cash flows shifting from 2019 to 2020.
Compass System Advancements- Proximity Enabled Accessible Entrances	-	2,112	(2,112)	Variance is due to delays in Broadway Station, Surrey Central and Joyce Station upgrades. The fare gate radio-frequency identification (RFID) installation cannot be completed until each of these stations are substantially completed. This has resulted in a shift of the cash flows from 2018 to 2019.
Finance ERP	5,219	769	4,450	Variance is due to project schedule adjustments to align with a larger ERP program which started in 2019. Cash flows shifted from 2019 to future years.
HR Benefits Admin and Life Events Implementation	1,500	-	1,500	Variance is due to resourcing constraints. Project timeline is deferred into 2021.
IT Infrastructure Program 2017	-	1,151	(1,151)	Variance is due to delay in available resources and delivery dates for serialized equipment in 2017 and 2018 which resulted in spending being shifted to 2019.
IT Infrastructure Refresh	5,000	441	4,559	Variance is due to delay in available resources and delivery dates for serialized equipment resulting in a shift in spending to 2020.
Responsive Website	2,000	390	1,610	Variance is due to project being completed in 2 phases which resulted in a shift in cash flows to 2020.
TransLink Enterprise Assets Management	1,751	280	1,471	Variance is due to change in program initiatives. The project is now focusing on developing and maturing asset management practices for the organization's capital program. Cash flows shifted from 2019 to future years.
TransLink Software Application Renewal Program	3,000	78	2,922	Variance is due to of delays in delivering the final product from Vendor. This resulted in the project schedule and related cash flows shifting from 2019 to 2020.
Technology projects with current year variances less than \$1 million	4,544	6,189	(1,645)	Variances are mainly due to small timing differences between Investment Plan forecasts and actual expenditures in 2019.
Technology Total	42,181	16,455	25,726	
Vehicles				
2016 Conventional Bus Replacement	31,274	30,234	1,040	Variance is due to a delay in the delivery of some buses. These buses are expected to be delivered in Q1 2020.
2017 Conventional Bus Replacement	1,815	60,086	(58,271)	Variance is due to an increase in the scope of the project, to purchase an additional 52 diesel electric hybrid powered 60-foot articulated buses. This has resulted in an overall increase in project costs over the project life as well as shift in cash flows from 2018 to 2019.
2018 Conventional 60' Bus Expansion	-	15,432	(15,432)	Variance is due to changing the scope from diesel engines to hybrid vehicle propulsion systems. This scope change delayed the project timeline, and increased the overall project budget. Cash flows have shifted from 2018 to 2019.

Project and Program Titles (\$ thousands)	2019 Cash Flow (\$ thousands)			Comments on Variances > \$1 Million
	10 Year Plan	Actual Jan 1 - Dec 31 2019	Variance Plan - Actuals	
2018 Conventional Bus Replacement	2,939	13,445	(10,506)	Variance is due to delays in the delivery of 17 compressed natural gas buses, in order to allow prioritizing the delivery for 60-foot hybrid buses under other projects. As a result, this has shifted the cash flows from 2018 to 2019.
2019 Conventional Bus Expansion	50,954	69,186	(18,232)	These buses were delivered earlier than expected. Cash flows shifted from 2020 to 2019.
Additional SeaBus Vessel	706	5,302	(4,596)	Variance is due to manufacturing delays. Cash flows shifted from 2018 to 2019 and 2020.
Canada Line Capacity Expansion - Fleet portion	-	26,240	(26,240)	Variance is due to revisions in the milestone payment schedule. Cash flows shifted from 2018 to 2019 and 2020.
CMBC Trolley Overhead Truck Replacement	2,241	-	2,241	Variance is due to the delays in delivery of these vehicles, which are expected to be delivered in 2019 in Investment Plan. As a result, the majority of the cash flows shifted from 2019 and 2020.
Community Shuttle Expansion - 2018	-	1,354	(1,354)	Variance is due to manufacturing delays. This resulted in the delivery of vehicles and cash flows shifting from 2018 to 2019.
Community Shuttle Replacement - 2019	1,139	4,002	(2,863)	Variance is due to the early delivery of shuttles in 2019.
Conventional 40 foot Bus Expansion	-	50,045	(50,045)	Variance is due to changing the scope from diesel engines to hybrid vehicle propulsion systems. This scope change delayed the project timeline, and increased the overall project budget. Cash flows shifted from 2018 to 2019.
Conventional Bus Replacement (Double Decker)	13,045	23,533	(10,488)	Variance is due to the early delivery of shuttles in 2019.
CUTRIC Battery Electric Bus Trial	346	6,657	(6,311)	Variance is due to delays in fabrication and the delivery times of equipment from manufacturers. As a result, scheduled cash flows shifted from 2018 to 2019.
HandyDART Vehicle Replacement - 2017	1,423	-	1,423	Variance is due to the early completion and delivery of shuttles in 2018.
Mark III Vehicle Procurement	63,073	41,824	21,249	Variance is due to fewer spare parts being purchased as well as transferring ownership of some cars to the Province resulting in a refund for the PST paid.
Mark II refurb/overhaul	18,727	-	18,727	Initiation of this project is awaiting completion of a condition assessment study. Project is expected to be initiated in 2021.
West Coast Express (WCE) Fleet Procurement	10,500	165	10,335	Variance is due to unavailability of locomotives to purchase in the market which in turn caused delays in the RFP procurement process and project schedule. Cash flows shifted to 2020.
Vehicles projects with current year variances less than \$1 million	14,293	13,332	961	Variances are mainly due to small timing differences between Investment Plan forecasts and actual expenditures in 2019.
Vehicles Total	212,475	360,837	(148,362)	
Major Construction				
BSP Initial Procurement Readiness	-	3,469	(3,469)	Completion of the BSP initial procurement readiness was delayed to 2019 due to finalizing terms of the transition of the overall BSP to the Province.
BSP - BC Hydro Early Works	-	1,996	(1,996)	TransLink completed certain early works related to the BSP. Variance is due to revisions in project scope and project schedule caused by the transfer of over BSP to the Province resulting in cash flows shifting from prior years to 2019.
BSP - Implementation	237,312	4,478	232,834	Variance is due to change in delivery of the project. The implementation phase of the project is now being delivered by the Province with TransLink providing support services required for the integration with rest of SkyTrain network as well as alternative transportation support during construction.
Evergreen Line - TransLink Contribution	-	1,366	(1,366)	Variance is due to a longer than expected lead time for some of the rail specific equipment. Cash flows shifted from 2018 to 2019 and 2020.

Project and Program Titles (\$ thousands)	2019 Cash Flow (\$ thousands)			Comments on Variances > \$1 Million
	10 Year Plan	Actual Jan 1 - Dec 31 2019	Variance Plan - Actuals	
EMUP - Coquitlam OMC 4 Storage Facility	15,606	815	14,791	Variance is due to a delay in finalizing the conceptual design work. These cash flows have shifted to 2020 and 2021. Related construction schedule has also been realigned to begin in 2022.
EMUP – Other Infrastructure	52,649	39	52,610	The other infrastructure components of EMUP include; <ol style="list-style-type: none"> 1. OMC 1 and 2 Maintenance Capacity Upgrades <ul style="list-style-type: none"> o Delays in initiation due to finalizing the concept plan with BCRTC for scope requirement changes. 2. SkyTrain Advance Radio Systems Upgrades <ul style="list-style-type: none"> o Delays due to technology selection process. 3. Station Upgrades – Brentwood <ul style="list-style-type: none"> o Delays due to approval of the rezoning application with the City of Burnaby and works required to be completed by the adjacent development.
South of Fraser Rapid Transit Procurement Readiness	-	1,915	(1,915)	Variance is due to revisions in project scope and project schedule caused by the suspension of the Light Rail Transit project. Cash flows shifted from prior years to 2019.
South of Fraser Surrey-Newton- Guildford-Advance Works	16,053	3,511	12,542	This project pertained to early works required for the Light Rail Transit option. Variance relates to reduction of project scope to reflect decisions by the Mayors' Council to suspend the Light Rail transit option. Only work that was needed independent of the LRT option was completed.
South of Fraser Rapid Transit (Light Rail Transit)- Implementation	172,257	-	172,257	Implementation of the South of Fraser Rapid Transit (Light Rail Transit) project was suspended following the Mayors' Council decision to suspend the work on the light rail project and advance the SkyTrain line to Langley project.
SLS Project – Project Development	-	9,582	(9,582)	
Major Construction projects with current year variances less than \$1 million	726	896	(170)	Variances are mainly due to small timing differences between Investment Plan forecasts and actual expenditures in 2019.
Major Construction Total	494,603	28,067	466,536	
Major Road Network (MRN) Funding Programs				
BICCS Funding Program	20,720	7,385	13,335	MRN funding programs allow municipalities up to four years to complete construction, and one additional year to invoice TransLink. TransLink payment occurs at project completion. Due to scaling issues caused by the expansion of MRN funding in recent years as well as difficulties in securing vendors in a constrained market, municipalities have been experiencing construction delays on these programs. As a result, municipality-driven projects are being largely completed towards the end of the four-year timeframe which have shifted cash flows into future years.
MRN and Bike Capital Funding Program	28,000	10,743	17,257	
MRN Structures Rehabilitation and Seismic Upgrade Funding Program	21,450	79	21,371	
WITT Funding Program	7,000	936	6,064	
MRN projects with current year variances less than \$1 million	24,059	23,836	223	
Major Road Network (MRN) Total	101,229	42,979	58,250	
Grand Total	1,159,472	667,820	491,652	

5 Transportation Demand Management

Transportation Demand Management (TDM) is coordinated in Metro Vancouver under TransLink's TravelSmart Program. TravelSmart represents partnerships between TransLink, municipalities, various government / non-governmental and industry partners all committed to helping more people choose transit, ridesharing, carpooling, car sharing, cycling and walking in place of single occupancy vehicle trips. Changing behavior is a component of the TDM measures necessary to balance growing mobility expectations against the capacity of our transportation system and the impacts of our travel choices.

Transportation Demand Management is legislated as part of TransLink's mandate in the South Coast British Columbia Transportation Authority Act (under section 4(1) (b)) and TravelSmart was Canada's first integrated transportation demand management program.

The Plan and Regional Growth Strategy 1 (RGS 2013) adopted describe policies to meet the growing demands from an anticipated one million-plus new residents and 600,000 new jobs to the region over the next 30-years. Central to the strategy are goals for denser land use and increased investment in transit and active transportation to create the conditions for reducing the high level of single occupancy vehicle trips in most areas. The Regional Transportation Strategy Framework2 (RTS 2013) responds to the RGS and describes how to "design our communities and transportation systems in such a way that they reduce the distances driven in the region by 33 per cent and make half our trips by walking, cycling and transit". Behavior change measures are essential to the RTS as they provide the motivation, information and support necessary to enable individuals to change their travel habits.

The following summarizes activity and outcomes from the 2019 business year according to the 'target area' headings contained in the 2019 TravelSmart work and program plans.

2019 TravelSmart Headline Results

- Engaged in community outreach encouraging sustainable transportation use at 72+ events and festivals, including the annual PNE. Over 125,000 people boarded the TransLink engagement bus and TransLink garnered more than 2 million positive brand impressions.
- Transit ridership was strategically boosted during the PNE through radio ads, online promotions and a 2 for 1 gate admission for transit customers which was redeemed by over 15,000 people. Ridership on the 5 bus routes to and from the PNE saw a 37 per cent increase in Boardings over prior year.
- Supported the Night Bus District program through in-person promotions and promotions through partnerships with local businesses, industry associations, universities, and local government.
- TransLink worked with Health Authorities, representing 35,000+ employees, to help implement an employer provided benefit which subsidizes transit for their staff in addition to encouraging and implementing other sustainable transportation options including but not limited to carpool programs.
- Delivered a carpool campaign targeting employees and commuters along the Abbotsford – Vancouver corridor in partnership with local provider Poparide.
- Launched Dine the Line, a program in partnership with Tourism Vancouver, to encourage locals and visitors to use transit to explore the region's growing neighbourhood culinary destinations.
- For the first time in the Compass era, TransLink piloted a 5, 4 and 3-day transit passes for more than 1,300 attendees at the Railvolution conference allowing for multi day travel during visitors stay.
- Launched the first initiative aimed at targeting underutilized, high frequency transit routes starting with the 160 bus route, which specifically targeted active seniors during off peak hours. Incentives were provided in partnership with local restaurants, coffee shops and seniors associations.
- Supported the Province on the development and launch of Active Transportation Strategy.
- Co-hosted the Region's first ever Active Transportation conference.

2019 TravelSmart Programs, Partners and Initiatives

- Distributed 50,000+ personal safety reflectors to transit customers through pedestrian safety campaign in partnership with the Insurance Corporation of British Columbia (ICBC), regional police forces, BCRTC and CMBC.
- Developed a partnership with Sport Host BC to ensure TransLink is linked into major sporting events to encourage transit use to and from these events which included the World Rugby 7's.
- Partnered with Hockey Canada during the World Junior Hockey Championship to encourage 350,000 attendees to use transit and promote transit offerings including Tap to Pay inside the stadium which led to a 24 per cent year over year increase in Boardings at Stadium Station during this period.
- Partnered with YVR, Tourism Vancouver and the Port Authority of Vancouver to provide training for tourist and transit ambassadors who interact with visitors to the region. Provided material and digital resources to encourage and provide better customer service encouraging transit use.
- Launched and promoted a School Travel Planning Toolkit for teachers and PAC's.
- Ran the fourth annual "I Love Transit Week" in October, that engages youth to celebrate transit and encourage teachers to use transit for field trips through contests and free bus travel. This year's campaign received over 100 contest entries.
- Delivered the first year of TransLink's new Charitable Donation Program which provides access to transit to those most in need and aims to help overcome barriers to transportation which allow access to community programs and services. The program also supported institutions and emergency services with retired equipment including a donation to Vancouver Fire Services.
- Updated the Regions Museum Bus – a 1957 GMC – highlighting and showcasing the regions rich transit history to thousands of delighted residents through community events.

Cycling Initiatives

- Supported several cycling partner initiatives including education programs, community events and delivered specialized services.
- TransLink delivered the #Biketotransit campaign in association with HUB Cycling, MOBI bikeshare by Shaw Go and Better Environmentally Sound Transportation (BEST), with better than ever results in 2019.
- Taught more than 11,000 students on how to cycle safely through HUB Cycling's education programs which was a 55 per cent increase over 2018.
- Funded 17 Bike to School Courses reaching 1,900 students with on-bike cycling course through their schools which led to a 49 per cent increase in riding during Bike to School week with 11,000 students participating at a record of 124 schools across 17 municipalities.
- In 2019, 30,000 bicycles were parked by the BEST Bike Valet service at 310 community events. In addition, MOBI Bike Share partnered with BEST to park a further 900 bikes at temporary bike valet stations at 13 community events.
- HUB Cycling's Bike to Work Week (BTWW) counted a record 46,000 bikes at a record 138 celebration stations across the Region. There were 3,500 new riders registered in 2019 - a 63 per cent increase on 2018 as well as over 95,000 trips logged during the BTWW – another record.
- Bike to Shop Days ran parallel to BTWW with 2,400 riders registered for the event (35 per cent increase from 2018).
- HUB's Bike the Night attracted 4,450 participants including 740 children under 12 years old. A total of 45 local businesses were promoted at the TransLink sponsored event.

Activity and outcome report

Target Area 1: Strengthen relationships with Municipalities, Non-governmental Organizations (NGO’s) and Corporate Partners through delivery of relevant Transportation Demand Management Programs	
Objectives	Results
Supported stronger municipal partnerships through shared resources, information, campaigns, programs and initiatives.	<ul style="list-style-type: none"> Facilitated TDM Municipal Roundtable meetings with municipal TDM partners to share resources, encourage collaboration and update and report on TransLink/TravelSmart initiatives. Delivered a TDM project grant program for municipalities, to support TDM initiatives. 10 grants were awarded in 2019 including: City of Surrey, Bowen Island, City of North Vancouver, District of North Vancouver, District of West Vancouver, City of Vancouver, Township of Langley, Maple Ridge, New Westminster, and the City of Richmond. 2019 TDM Grant projects included school travel planning, seniors transit education and individualized marketing to targeted areas encouraging sustainable transportation. For 2019, the TDM Project Grant amount was increased from \$75K to \$150K. Some of the 2019 projects included e-bike for a week, cycling education and promotion, school travel planning and attending community events promoting active travel. Attended various municipal celebrations and events to support/celebrate sustainable transportation, including Car Free Day festivals in Vancouver and Port Moody, Canada Day in Surrey, Shipped in North Vancouver and World Festival in Richmond.
Delivered Travel Training for Schools, Workplaces, Seniors and Newcomers across the region	<ul style="list-style-type: none"> Delivered 63 TravelSmart/Transit 101 presentations and workshops to over 5,000 people in schools, workplaces, senior centers and to newcomers. Continued to encourage sign up to Compass for Organizations to encourage workplaces to provide employer provided transit subsidies for commuting. In 2019, we earned sign ups from 14 new companies including Fraser Health and Zymeworks. Supported the Hotel Employee Subsidy study in partnership with the City of Vancouver, SFU, Hotel Association and 11 local hotels.
Increase partnerships with mobility service providers and internal and external stakeholders	<ul style="list-style-type: none"> Ongoing relationship development with mobility services including car, bike sharing services, carpool platforms, cycling advocates, walking advocates, health authorities and regional planning agencies (such as Metro Vancouver). Delivered the annual #biketotransit campaign in partnership with HUB Cycling, BEST and MOBI Bike Share, to encourage the benefits of combining bike

	<p>trips with transit, such as increased access to the transit network.</p> <ul style="list-style-type: none"> Supported New Mobility Department with the launch of a on demand transit pilot program launch at on Bowen Island, Open Innovation Call and New Mobility Forums.
<p>Developed strategic partnerships to strengthen community relations and develop ridership</p>	<ul style="list-style-type: none"> Successful community partnerships delivered in 2019 included Destination Marketing Associations, YVR, Port Authority, Vancouver Marathon Society, Bar Watch, ICBC, DVBCA, United Way, Car Free Day Festivals, TRAMS Historical Vehicle Society, Donnelly Events, BC Lions and World Junior Hockey Championship. Fostered a Regional School Travel Planning working group to advance active youth travel and partner with health authorities, municipalities and service providers. Activated transit and cultural theme wrapped vehicles, alongside marching TransLink staff at three major cultural parades including Chinese New Year, Vancouver Pride and Vaisakhi. Managed co-funded partnership with BC Housing, Greater Vancouver Shelter Society to deliver transit products and training through homeless shelters.
<p>Major Event Partnerships</p>	<ul style="list-style-type: none"> TransLink’s TravelSmart team worked collaboratively with municipalities and event producers to support street festivals, community events, sports, cultural events and civic plaza celebrations to enable communities to celebrate urban life, reclaim streets and explore their cities with sustainable and active transportation. Incentives included admission discounts, pricing support was provided including: wayfinding (getting to the event info, additional transit services, volunteer transit training / tickets, contests promotion, bike valet, and activation.

<p>Target Area 2: Support Enterprise priorities through community outreach including; Compass, Millennium Line Evergreen Extension, service changes and service improvements and customer experience</p>	
<p>Objectives</p>	<p>Results</p>
<p>Enhance the customer experience with education and awareness in the community</p>	<ul style="list-style-type: none"> Working with various stakeholders and partners and at community events, workshops and presentations; the TravelSmart team continues to provide information, encourage use, and educate on sustainable transportation options with focus on Tap to Pay service. Dozens of presentations, workshops and outreach events focused on the education and awareness of Tap to pay and Night Bus services.

<p>Improve the Customer Experience</p>	<ul style="list-style-type: none"> • Partnered with existing customer ambassador programs (YVR Green Coats and Tourism Vancouver) to provide relevant transit and transportation information. • Expanded the number of buskers/musicians performing on the transit system from 53 to 73 with two new performance locations introduced at Metrotown Station and Surrey Central Station.
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Target Area 3: Support Enterprise priorities through customer engagement including; Quarterly Service changes, Area transportation plans, Fare Policy Review

<p>Informed and promoted Quarterly Service Changes</p>	<ul style="list-style-type: none"> • Provided education materials at major transit exchanges to promote and educate on Quarterly Service Changes (delivery of the Plan) and distributed information materials through TravelSmart partners. • Supported promotion and education of revised Night Bus services in partnership with Business Improvement Associations, Bar Watch and Restaurant Associations. • Continued awareness and support of Tap to pay launch at stations and transit hubs and through stakeholder presentations.
<p>Utilized Community Engagement Bus at community events and public outreach activities</p>	<ul style="list-style-type: none"> • Community Engagement Bus and outreach staff participated in large community events providing the public with key messages, travel planning/tips, tools and information related to TransLink projects, products and services. • Some events attended included: Car Free Days in Vancouver, Port Moody and Maple Ridge, Khatsalano Festival, Welcome to Coquitlam, Richmond World Festival, Shipped North Van, and Surrey Fusion Festival. • Enhanced our kid’s activation zone on the Outreach Bus with interactive transit themed activities and games. • Improved logistics on Outreach Bus including access ramps, storage, lighting and games.

6 Short-Term Fares Assessed

Short-term fares for bus, SeaBus, SkyTrain and HandyDART in 2019 are shown in the table below.

Fare Type	Status	Time	Within 1-Zone	Within 2-Zones	Within 3-Zones
Regular Short-Term Fares:					
Cash*	Adult	Regular	\$3.00	\$4.25	\$5.75
		Off-Peak	All Zones — \$3.00		
	Concession	Regular	\$1.95	\$2.95	\$3.95
		Off-Peak	All Zones — \$1.95		
DayPass*	Adult	No restrictions	\$10.50 — valid all zones		
	Concession	restrictions	\$8.25 — valid all zones		
Discounted Short-Term Fares:					
Stored Value*	Adult	Regular	\$2.40	\$3.45	\$4.50
		Off-Peak	All Zones — \$2.40		
	Concession	Regular	\$1.95	\$2.95	\$3.95
		Off-Peak	All Zones — \$1.95		
FareSavers	Adult		All Zones — \$24.00 (10 tickets)		

Buses and HandyDART are all 1-Zone travel daily, every day of the week. FareSavers are only available for sale to HandyDART customers and remain eligible for use only on bus and HandyDART services.

West Coast Express operates on a different fare structure than other transit services. Short-term fares for West Coast Express are shown in the table below.

Fare Type	Status	Within 1-zone	Within 2-zones	Within 3-zones	Within 4-zones	Within 5-zones
Regular Short-Term Fares:						
One-way Ticket*	Adult	\$5.75	\$7.50	\$9.25	\$12.50	
	Concession	\$3.45	\$4.45	\$5.70	\$7.70	
Return Ticket	Adult	\$11.00	\$14.50	\$17.75	\$23.75	
	Concession	\$7.00	\$9.00	\$11.25	\$15.25	
Discounted Short-Term Fares:						
One-way Ticket- Stored Value*	Adult	\$4.90	\$6.35	\$7.75	\$10.50	
	Concession	\$2.90	\$3.70	\$4.80	\$6.45	
Return Ticket- Stored Value	Adult	\$10.75	\$13.75	\$17.00	\$22.75	
	Concession	\$6.75	\$8.50	\$10.75	\$14.50	

*The Canada Line YVR Add-Fare is required. Add-Fare is a short-term fare premium over the applicable fare in the amount of \$2.50 each way, which is collected as a return fare premium of \$5.00 payable at YVR-Airport Station, Templeton Station or Sea Island Centre Station for conventional SkyTrain travel.

7 Borrowings Undertaken in 2019

7.1 Long-term Borrowing

During 2019, TransLink issued its second Green Bond, with a total par value of \$200 million. TransLink has now raised more than \$2.13 billion from investors in the capital market since 2010. There was also a scheduled rate reset on one MFA debt issue in 2019, with a term to maturity of ten years.

The terms of TransLink's long-term debt issuance activity are detailed below:

Issue No.	Amount Borrowed (Note 1)	Coupon Rate (Note 2)	Remaining Term	Maturity Date	Semi-Annual Interest Payments	Principal due on maturity
TL-8 Green (issued on 29-Oct-2019)	\$200,000,000	2.65%	31 Years	29-Oct-2050	\$2,650,000	\$200,000,000

Note 1: Unsecured, par value.

Note 2: Coupon rate fixed to maturity. Effective yield: **2.684%**.

The terms of the MFA Issue 105 (20 Year Loan Amortization) rate resets are detailed in the table below:

Issue No.	Balance Outstanding at Date of Interest Rate Reset (Note 1)	Coupon Rate (Note 2)	Remaining term	Final Maturity Date	Semi-Annual Interest Payments (Note 2)	Annual Sinking Fund Payments (Note 3)
MFA 105	\$89,522,086	2.25%	10 Years	3-Jun-2029	\$1,687,500	\$5,037,263

Note 1: Gross original amount borrowed of \$150 million less the recognized value of this debt's associated sinking fund.

Note 2: Rate reset from 4.90% down to 2.25% on June 3, 2019. This rate is only fixed for the next 5 years till June 3, 2024. Semi-Annual Interest Payments are based on the original \$150 million amount borrowed.

Note 3: Due annually on anniversary date. These payments plus accrued interest in the MFA administered sinking funds are expected to reduce the outstanding balances to zero on maturity.

7.2 Short-term Borrowing – via Commercial Paper Program

On May 13, 2010, TransLink launched a \$500 million Commercial Paper Program backstopped with a line of credit from a syndicate of six Canadian chartered banks. Having this \$500 million program available at favourable interest rates, compared to using a bank facility, provides flexibility in managing TransLink's cash flow needs.

Action	Deal #	Amount	Interest Rate (%)	Transaction Date	Maturity Date	Total Outstanding
Repay	275	(\$30,000,000)		03-Jan-19		\$90,000,000
Issue	278	\$30,000,000	2.21555	03-Jan-19	07-Feb-19	\$120,000,000
Repay	271	(\$30,000,000)		10-Jan-19		\$90,000,000

Action	Deal #	Amount	Interest Rate (%)	Transaction Date	Maturity Date	Total Outstanding
Repay	276	(\$30,000,000)		10-Jan-19		\$60,000,000
Issue	279	\$30,000,000	2.17366	10-Jan-19	14-Feb-19	\$90,000,000
Issue	280	\$30,000,000	2.20202	10-Jan-19	11-Apr-19	\$120,000,000
Repay	277	(\$30,000,000)		17-Jan-19		\$90,000,000
Issue	281	\$30,000,000	2.06895	17-Jan-19	21-Feb-19	\$120,000,000
Repay	278	(\$30,000,000)		07-Feb-19		\$90,000,000
Issue	282	\$30,000,000	1.95380	07-Feb-19	14-Mar-19	\$120,000,000
Repay	279	(\$30,000,000)		14-Feb-19		\$90,000,000
Issue	283	\$30,000,000	1.97073	14-Feb-19	18-Apr-19	\$120,000,000
Repay	281	(\$30,000,000)		21-Feb-19		\$90,000,000
Issue	284	\$30,000,000	1.89866	21-Feb-19	04-Apr-19	\$120,000,000
Repay	282	(\$30,000,000)		14-Mar-19		\$90,000,000
Issue	285	\$30,000,000	1.79680	14-Mar-19	18-Apr-19	\$120,000,000
Repay	284	(\$30,000,000)		04-Apr-19		\$90,000,000
Issue	286	\$30,000,000	1.80727	04-Apr-19	09-May-19	\$120,000,000
Repay	280	(\$30,000,000)		11-Apr-19		\$90,000,000
Issue	287	\$30,000,000	1.84144	11-Apr-19	11-Jul-19	\$120,000,000
Repay	283	(\$30,000,000)		18-Apr-19		\$90,000,000
Repay	285	(\$30,000,000)		18-Apr-19		\$60,000,000
Issue	288	\$60,000,000	1.79680	18-Apr-19	23-May-19	\$120,000,000
Repay	286	(\$30,000,000)		09-May-19		\$90,000,000
Issue	289	\$30,000,000	1.84243	09-May-19	11-Jul-19	\$120,000,000
Repay	288	(\$60,000,000)		23-May-19		\$60,000,000
Issue	290	\$60,000,000	1.81773	23-May-19	27-Jun-19	\$120,000,000
Repay	290	(\$60,000,000)		27-Jun-19		\$60,000,000
Issue	291	\$60,000,000	1.77588	27-Jun-19	01-Aug-19	\$120,000,000
Repay	287	(\$30,000,000)		11-Jul-19		\$90,000,000
Repay	289	(\$30,000,000)		11-Jul-19		\$60,000,000
Issue	292	\$60,000,000	1.78634	11-Jul-19	15-Aug-19	\$120,000,000
Repay	291	(\$60,000,000)		01-Aug-19		\$60,000,000
Repay	292	(\$60,000,000)		15-Aug-19		\$0
Issue	293	\$60,000,000	1.79680	15-Aug-19	19-Sep-19	\$60,000,000
Repay	293	(\$60,000,000)		19-Sep-19		\$0
Issue	294	\$60,000,000	1.79680	19-Sep-19	24-Oct-19	\$60,000,000
Repay	294	(\$60,000,000)		24-Oct-19		\$0
Issue	295	\$60,000,000	1.79680	24-Oct-19	28-Nov-19	\$60,000,000
Repay	295	(\$60,000,000)		28-Nov-19		\$0
Issue	296	\$60,000,000	1.81911	28-Nov-19	30-Jan-20	\$60,000,000

B. AUDITED FINANCIAL STATEMENTS

The 2019 Audited Consolidated Financial Statements will be attached once it has been reviewed by the Finance and Audit Committee and Board of Directors.

C. COMPLAINTS SUMMARY

Corporate Overview

In 2019, TransLink’s combined service hours for the Bus and Rail division (including HandyDART) increased to 6.96 million service hours from 6.86 million service hours in 2018. The number of boarded passengers increased by 3.6 per cent from 437.4 million in 2018 to 452.9 million in 2019. A summary of complaints and customer interactions is provided in Table A below.

While the number of boarded passengers grew, transit service complaints decreased by 3.4 per cent. The decrease can be attributed to expanded service across the region as well as generally improved customer service. In 2019, we also delivered the first year of our 2019-2025 Customer Experience Plan.

“Complaints per million customer interactions” represents the ratio of all complaints from across the Enterprise against the total number of Enterprise-wide customer interactions, allowing us to report out on our performance. For this measure, customer interactions are defined as all Boardings on the transit system and Golden Ears Bridge Crossings. For 2019, Enterprise-wide complaints were 44,047 against a total of 452.9 million customer interactions, resulting in a ratio of 97.2 complaints per million customer interactions compared to 101.4 for 2018.

Table A

Corporate Summary	2019	2018	2017	2016
CMBC	27,552	29,019	26,375	27,995
SkyTrain (Expo and Millennium Lines)	1,582	1,711	1,796	1,518
SkyTrain (Canada Line)	305	233	201	170
West Coast Express	232	259	236	774
HandyDART	3,147	2,763	1,676	1,471
Transit Service Complaints	32,818	33,985	30,284	31,928
Golden Ears Bridge*	N/A	N/A	351	315
TransLink Corporate	11,228	10,370	9,408	7,533
Total Complaints**	44,046	44,355	40,043	39,776
Total Customer Interactions	452,935,076	437,375,700	423,406,928	399,717,623
Complaints per Million Customer Interactions	97.2	101.4	94.6	99.5

* On September 1st, 2017, the Province eliminated bridge tolling throughout the province. Complaints related to bridge tolling are no longer tracked.

** Restated 2016 - 2017 to reallocate CVM complaints from SkyTrain and West Coast Express and “bus was full” complaints from CMBC to TransLink Corporate.

Coast Mountain Bus Company

CMBC saw a 5.1 per cent decrease in total complaints mainly due to service expansion in the region and an improvement in Transit Operator customer service.

A focus on customer experience continued in 2019 and resulted in the following accomplishments:

- Successfully implemented service expansion outlined in the Mayors' Council's 10-Year Vision with increased bus frequency on specific routes, new bus routes, and increased SeaBus frequency during weekday peak periods from every 15 to 10 minutes.
- Launched a new "Hold On" safety campaign to increase customer safety awareness on buses, stairs, and escalators.
- Installed and activated a total of 94 RapidBus PIDS throughout the system.
- Developed and implemented critical alert messaging for customers on 27 new digital kiosks located at various SkyTrain stations and bus exchanges.
- Expanded Live Chat hours to include Saturdays.

For CMBC in 2019, 51 per cent of all complaints involved staff (Transit Operators) and 31 per cent were related to service delivery.

All complaints are logged and assigned a priority code of P1 or P3. P1 complaints are urgent and, in 2019, all were investigated within 48 hours. P3 complaints are less critical and must be resolved within 15 business days. Approximately 95.3 per cent of complaints were closed within 15 business days, which is the same as last year.

SkyTrain — Expo and Millennium Lines

Continuous effort to keep customers informed and moving across the system resulted in an overall decline in the number of complaints of 7.5 per cent. There were 1,582 complaints received in 2019 compared to 1,711 from the previous year.

The decline is mainly attributed to the Stations/Parkways category but more specifically, escalator outages. Compared to 2018, customer complaints regarding inoperative escalator units declined by 62.2 per cent. Similar to escalators, complaints related to elevators also declined by 45.1 per cent. Proactive measures, such as maintenance notifications for elevating devices on the TransLink website and social media, provided advance warning to customers for escalator outages due to scheduled maintenance throughout the system. This assisted customers in electing alternative travel options as needed and optimizing their travel time. Further to regular maintenance on elevating devices to maintain reliability and to ensure passenger safety, the Expo Line Escalator Replacement Project began in mid-2018. This project entails the replacement of 37 escalators at 13 SkyTrain stations along the Expo Line to improve reliability, accommodate higher passenger volumes and improve maintainability.

Aside from improvements with inoperative elevating devices, customer complaints related to announcements also improved with a reduction of 58.8 per cent in complaints compared to 2018. Train Operations continuously strived to provide timely and informative announcements to customers especially during service delays. With the enhancement of staff allocation focused on communications, the delivery of timely and consistent announcements resulted in a strong and positive performance. Commitments to achieve excellence in communications extended to major upgrades such as adding speakers on the Expo Line and replacing nearly 1,000 speakers along the original Millennium Line to improve sound quality.

In regards to train service, there was 35.6 per cent increase in delay-related complaints which is mainly due to the service delay in February as inclement weather reduced the total number of trains in operation which resulted in overcrowding in the trains and stations. To assist customers throughout their journey, SkyTrain Attendants were dispatched to key locations to provide direction and alternative travel options. While customers were

inconvenienced during this period, efforts were recognized and reflected through the highest recorded number of commendations received for the year.

Throughout 2019, work continued on the Expo Line, which included the replacement of rail and rail pads as part of the TransLink Maintenance and Repair Program. The original Expo line has been in service since 1986 and this work ensures that we keep the system in a state of good repair.

SkyTrain - Canada Line

The Canada Line received 305 complaints in 2019 which is a 30.9 per cent increase from the previous year. The majority of the complaints received were related to stations/parkways, trains and customer relations.

There is typically an increase in complaints about trains and customer relations when there are service delays. The Canada Line received 23 complaints regarding the delay in February when passengers had to wait for an extended time before being safely evacuated from a stalled train. The Canada Line Operator has conducted a full review of the winter weather operating procedures to improve the response time in the future. Another major service delay in March resulted in 17 complaints due to multiple stalled trains. In response, a campaign was initiated to address the technical issues associated with cause of the delay.

The warm summer weather experienced in July and August generated complaints about the level of air conditioning onboard the trains. This issue should be improved on the new trains. In addition, there was also an increase in the number of complaints related to track noise and elevator availability in the stations.

In 2019, the Canada Line received 84 commendations related to customer relations.

West Coast Express

West Coast Express received 232 complaints and 33 commendations in 2019. While complaints were down overall, there were three major areas of concern this year. In April alone, more than 40 complaints were in regards to delays associated with CP Track infrastructure work that required both CP and WCE trains to reduce speeds, causing delays to customers. WCE management worked closely with CP Rail to reduce the impacts to WCE service. In September, there were higher than normal volumes of complaints in the Customer Relations area as new riders learned the etiquette of commuter travel. The annual ridership continues to climb with 2019 showing an increase of 4.9 per cent over 2018. That year over year rise appears to have resulted in complaints due to lack of parking at some stations.

HandyDART

HandyDART complaint numbers increased by 13.9 per cent between 2018 and 2019, while the number of trips increased by 5 per cent. Significant increases in complaints were observed in the areas of on-time performance, scheduling and operator behaviour. In 2019, HandyDART delivered more trips than planned, causing strain on the system as significant effort was placed on keeping trip denials low.

Out of all complaints, taxi complaints accounted for 28 per cent, operator-related complaints for 45 per cent and service-related complaints for 27 per cent.

Every complaint is reviewed, and both the complainant and the employee(s) concerned receive a follow-up. A thorough investigation is completed to understand the root cause and then appropriate steps are taken to rectify the situation including actions such as coaching and/or process review. Taxi complaints are reviewed with the taxi company and a similar process is followed.

All complaints are logged and assigned a priority code of “P1” or “P3.” P1 complaints are deemed urgent, and in 2019, all P1 complaints were resolved within 48 hours. P3 complaints are deemed less critical and must be resolved within five business days.

With a goal to improve service, a concerted effort was made in 2019 to engage with HandyDART customers through surveys, community open houses, quarterly newsletters, and outreach calls. In an effort to reduce complaints, HandyDART Operator refresher training was developed and will be rolled out in January 2020. First Transit, the HandyDART service provider, continues to provide customer service training to the taxi companies at no cost to TransLink, and this program will expand in 2020. In addition, discussions with the Taxi Associations, focusing on improving the customer experience, began in 2019.

Lastly, in addition to increases in complaints, HandyDART also received a significant increase in commendations. In 2019, a 65 per cent increase was observed, with the greatest number of commendations relating to HandyDART operator and clerk behaviour.

Detailed Complaint Tables

Tables “B” and “C” show complaints received in 2019, 2018, 2017, and 2016. Table “B” reflects specific transit service complaints for the same period. Table “C” covers TransLink Corporate for the same period.

Table B

Complaints by Transit Service Type			2019	2018	2017	2016
CMBC	Bus 2019*	HandyDART 2019	Total	Total	Total	Total
Service Delivery**	8,395	1,719	10,114	10,753	10,019	9,877
Service Planning	1,604	0	1,604	1,856	1,524	2,731
Staff	13,797	1,428	15,225	17,184	14,332	15,413
Website	183	0	183	161	181	98
Fares/Fare Equipment	0	0	0	0	0	3
Cell Phone/Radio	87	0	87	64	39	51
Accessibility/Racks	535	0	535	421	218	161
Other	2,951	0	2,951	1,343	1,738	1,132
Subtotal	27,552	3,147	30,699	31,782	28,051	29,466

* Includes SeaBus and Community Shuttle, plus the contracted services of Langley, New Westminster Community Shuttles and West Vancouver Transit. Prior year total numbers also include HandyDART.

** Restated 2016 - 2017 to reallocate “bus was full” complaints which are reported under TransLink Corporate starting 2018.

Complaints by Transit Service Type				2019	2018	2017	2016
BCRTC	SkyTrain Expo and Millennium Line	SkyTrain Canada Line	West Coast Express	Total	Total	Total	Total
System Schedule	327	0	77	404	305	77	522
Fares*	0	0	8	8	17	22	18
Stations/Parkways	484	70	49	603	672	400	358
Trains	259	153	22	434	458	1,087	805
Customer Relations	301	53	63	417	531	507	580
Safety/Security	211	29	13	253	220	123	74
Other	0	0	0	0	0	17	105
Sub-Total	1,582	305	232	2,119	2,203	2,233	2,462
Total Complaints (CMBC + BCRTC)				32,818	33,985	30,284	31,928
Boarded Passengers (actual)				452,935,076	437,375,700	408,237,428	386,191,923
Complaints per Million Boarded Passengers				72.5	77.7	74.2	82.7

* Restated 2016 - 2017 to reallocate CVM complaints which are reported under TransLink Corporate starting 2018.

Table C

TransLink Corporate	2019	2018	2017	2016
Policy-Related (Fares, service optimization, advertising, Compass, fare gates, etc.)*	11,228	10,370	9,408	7,533

* Restated 2016 - 2017 to include CVM complaints from BCRTC and “bus was full” complaints from CMBC.

Complaint Handling Through Social Media

TransLink's main social media channels for handling complaints in 2019 were Twitter and Facebook.

Social media enables TransLink to respond quickly to customers on a range of issues and inquiries. This is especially critical when there is a transit service disruption and customers need accurate service information. Responding through social media also has a multiplier effect: the answer is seen by many other customers and people who follow the customers' own social network.

When complaints are made via social media, the Customer Information team responds as quickly as possible and customers are also asked to log their complaint or feedback through the TransLink website.

Twitter

Twitter is TransLink's leading platform for providing near-real-time information and responses to customer inquiries. By the end of 2019, @TransLink had reached 196K followers. This is up from 169k by the end of 2017 and 180k by the end of 2018.

In 2019, TransLink tweeted roughly 118 times per day, which is roughly the same as 2018 (120) and down from previous years (211 in 2017 and 150 in 2016). The reduction in tweets can be attributed to fewer major disruptions on SkyTrain.

The most popular tweets for 2019 were the appearance of double decker buses, the announcement of the end of job action, and a photo of a Tim Horton's box stuck in a Skytrain door.

Facebook

TransLink's Facebook page is used for communicating with customers on transit-related information, sharing photos and videos, and providing information on major service changes or disruptions. At the end of 2019, the TransLink Facebook page was approaching 40K followers. This is compared 34.5K followers in 2018, 31K in 2017 and 26K in 2016.

The top three most engaged posts in 2019 were Tim Horton's box stuck in SkyTrain doors, announcing the agreement with the union representing SkyTrain workers, and introducing the double decker bus.

D. CUSTOMER SATISFACTION

2019 Customer Service Performance Ratings

Table D below summarizes the percentage of customers who gave good-to-excellent service ratings, which is defined as a rating of 8, 9, or 10 out of 10.

All Transit System and mode-specific attribute measures, including overall service, are based on asking customers directly. In other words, overall service is not calculated mathematically from any of the specific service attributes, such as frequency or reliability.

The analysis is segmented into the following groups:

- Transit System (includes people who have ridden the bus, SeaBus or SkyTrain at least once within the last 30 days);
- Bus System (includes all CMBC bus service as well as West Vancouver Transit and contracted Community Shuttle service);
- SeaBus;
- SkyTrain (the SkyTrain segment includes the Expo, Millennium and Canada Lines);
- West Coast Express; and
- HandyDART (with registered HandyDART customers).

Data is from three sources:

- TransLink's Bus, SkyTrain, SeaBus Customer Service Performance Survey interviews adults who have taken transit at least once within the last 30 days in Metro Vancouver. Interviews are conducted daily and by phone;
- TransLink's West Coast Express Customer Service Performance Survey is conducted twice per year (March and September) onboard the West Coast Express train. Surveys are partially administered by an interviewer and may be completed by the individual;
- TransLink's HandyDART Customer Service Performance Survey is conducted once per year in the fall by phone and primarily with past month's users of the service.

Customer Service Performance Summary for 2019 — Transit System, Bus, SeaBus, SkyTrain, West Coast Express and HandyDART

Transit System

In 2019, two-thirds of adult transit riders (65 per cent) gave the system good-to-excellent scores of 8, 9 or 10 out of 10 for overall service. This is one per cent down from last year.

The transit system service attribute that customers remain most critical of is the availability of bus shelters at bus stops throughout the region. Transit bus shelters are primarily managed by the municipalities. About four in ten customers consistently rate this aspect of transit service as being good to excellent (8 out of 10 or higher). However, more than half (54 per cent) of TransLink's customers still feel they are getting good-to-excellent value for the money they spend on transit.

Bus

Nearly two-thirds (65 per cent) of bus riders rated the overall bus service provided in Metro Vancouver as good-to-excellent, which is consistent with 2018.

The top three strengths of the bus service remain: having an operator who drives safely and professionally (85 per cent), feeling safe from crime on board the bus (82 per cent) and having a direct route (80 per cent). Four in five riders gave scores of 8 or higher to each of these attributes.

Overcrowding, frequency of service and on-time reliability remain the three lowest-rated bus service attributes (48 per cent, 50 per cent and 57 per cent, respectively). Most attributes of bus service are consistent with last year.

SkyTrain

In 2019, 77 per cent of SkyTrain customers, which includes Canada Line, gave the overall service good-to-excellent scores, which is consistent with 2018.

Ratings for overcrowding have dipped slightly in 2019 (44 per cent, down from 46 per cent in 2018) as did the ratings for vehicle cleanliness (73 per cent, down from 75 per cent in 2018) and courteous staff (76 per cent, down from 79 per cent in 2018). Most other ratings remained consistent with 2018.

The lowest-rated attribute of SkyTrain service remains the announcement and explanation of delays. However, ratings for announcement of delays have improved by one percentage point over 2018 (39 per cent, up from 38 per cent in 2018).

SeaBus

SeaBus remains a highly rated transit mode with four in five SeaBus customers (83 per cent) rating the service an 8 out of 10 or higher overall. The overall service and most other SeaBus attributes ratings are mostly consistent with last year. However, ratings for two attributes of service are down from 2018: safety from crime (84 per cent, down from 87 per cent in 2018) and SeaBus frequency (65 per cent, down from 69 per cent in 2018).

West Coast Express

92 per cent of WCE riders gave the overall WCE service good-to-excellent scores (up from 90 per cent in 2018). This increase in overall WCE service score can be linked to improved ratings for frequency of service (68 per cent, up from 60 per cent in 2018), on-time reliable service (88 per cent, up from 83 per cent in 2018), good connections with other modes of transit (70 per cent, up from 67 per cent in 2018), value for money (68 per cent, up from 66 per cent in 2018) and delays announced and explained (76 per cent, up from 70 per cent in 2018).

HandyDART

HandyDART Service is another high-rated transit service, with four in five (80 per cent, up from 76 per cent in 2018) riders giving it good-to-excellent ratings for overall service, which is the highest rating it has ever received. Those who gave high ratings state it is primarily due to courteous drivers (95 per cent).

A similar rise in ratings is seen for Service Availability (80 per cent, up from 76 per cent in 2018). Most other attributes continue to achieve very high ratings, especially those related to drivers' skills to assist passengers (94 per cent). Ratings for value for money also remain very high (88 per cent).

Table D - 2019 Customer Service Performance Scores

Attributes	Transit System	Bus System ¹	SkyTrain ²	SeaBus	West Coast Express	Handy DART ³
	Per cent who gave scores of 8, 9 or 10 out of 10					
Overall Service	65	65	77	83	92	80
Value for Money	54				68	88
Good Connections	50				70	
Adequacy of Transit Information — Stops/Stations	53					
Adequacy of Transit Information On-Board — Bus	52					
Adequacy of Transit Information On-Board-- SkyTrain	66					
Adequacy of Transit Information On-Board — SeaBus	57					
Transit Information Availability (On-Board and Stations)					81	
Operation of Service During Convenient Hours	55				46	
Having Enough Bus Shelters	38					
Ease of Getting Information from Telephone Information Line	70					
Ease of Finding Information on Website	59					
Having a Courteous Bus Operator/Having Courteous, Competent and Helpful Staff/Drivers		78	76	90	96	95
Safe and Professional Bus Operator		85				
Feeling Safe from Crime On Board the Bus / SkyTrain		82	80			
Feeling Safe from Crime at the Stop and Transit Exchange /Inside SkyTrain Stations / at SeaBus		77	75	84		
Feeling Safe from Crime (On-Board and Stations)					94	
Feeling Safe from Crime (WCE Parking Lots)					59	
Not Being Overcrowded		48	44	70	59	
On-Time, Reliable Service		57	83	91	88	68
Clean and Graffiti Free Buses / SkyTrain Cars / Vessel / Vehicles and Stations		76	73	82	95	
Having A Direct Route		80				
Trip Duration from the Time You Boarded to the Time You Got Off		74		85	90	
Frequency of Service		50	74	65	68	

Attributes	Transit System	Bus System¹	SkyTrain²	SeaBus	West Coast Express	Handy DART³
Staff Availability			40	66	89	
Delays Are Announced and Explained			39		76	
Enough Parking					36	
Equipment Provides a Safe Ride					96	
Driver's Skills to Assist Passengers Who Have a Physical Disability						94
Feeling Safe from Injury When Riding HandyDART						94
Ease of Booking a Trip on HandyDART						76
HandyDART Vehicle Cleanliness and Good Repair						90
Availability of HandyDART When Needed						80

E. CHANGES TO ARTICLES OF THE AUTHORITY

There were no amendments to the Articles of the Authority in 2019.

F. BOARD SUMMARY

Meeting Date	Board/Committee Meeting	Resolutions/Outcomes
January 18, 2019	Joint Regional Transportation Planning Committee	<ul style="list-style-type: none"> • Approve Terms of Reference and Work Plan • Received report on Rail to UBC • Received report on George Massey Crossing Review • Received report on the South of Fraser Rapid Transit Project
January 21, 2019	Human Resources and Governance Committee	<ul style="list-style-type: none"> • CEO performance objectives, recommended for Board approval
January 23, 2019	Board Meeting	<ul style="list-style-type: none"> • Approved CEO performance objectives
January 31, 2019	Joint New Mobility Committee	<ul style="list-style-type: none"> • Approved Terms of Reference and Work Plan • Received updates on the Regional Transportation Strategy • Received updates on Provincial Ride-Hailing Legislation • Received report on Low Carbon Fleet Strategy
February 2, 2019	Joint Finance and Governance Committee	<ul style="list-style-type: none"> • Approved Terms of Reference and Work Plan • Received report on the 10-Year Vision Implementation • Received updates on various Joint Finance and Governance Committee in camera items • Received updates on the Green Infrastructure Fund
February 6, 2019	Joint Regional Transportation Planning Committee	<ul style="list-style-type: none"> • Received report on Rail to UBC • Received report on the Burnaby Mountain Gondola
March 1, 2019	Joint New Mobility Committee	<ul style="list-style-type: none"> • Received report on the Regional Transportation Strategy
March 6, 2019	Joint Finance and Governance Committee	<ul style="list-style-type: none"> • Received report on the 10-Year Vision Implementation • Received updates on various Joint Finance and Governance Committee in camera items

Meeting Date	Board/Committee Meeting	Resolutions/Outcomes
March 18, 2019	Finance and Audit Committee	<ul style="list-style-type: none"> • 2018 Year End Financial and Performance Report, endorsed for public release • 2018 Audited Consolidated Financial Statements, recommended for Board approval • 2018 Annual Statutory Report, recommended for Board approval • Enactment of South Coast British Columbia Transportation Authority 2019 Property Tax Bylaw Number 129-2019, recommended for Board adoption • Enactment of South Coast British Columbia Transportation Authority 2019 Replacement Tax Bylaw Number 130-2019, recommended for Board adoption • South Coast British Columbia Transportation Authority 2019 Tariff Bylaw Number 131-2019, recommended for Board adoption • South Coast British Columbia Transportation Authority Motor Tax Bylaw Number 132-1029, recommended for Board adoption
March 19, 2019	Planning and Stakeholder Relations Committee	<ul style="list-style-type: none"> • Establishment of a HandyDART Advisory Committee, recommended for Board approval • Endorsement of further project development for Rail to UBC, recommended for Board approval • Endorsed the work program and timelines for implementation of the Transit Fare Review recommendations
March 19, 2019	Human Resources and Governance Committee	<ul style="list-style-type: none"> • Appointment of Conduct Review Advisor, recommended for Board approval • TransLink Drug and Alcohol Policy, recommended for Board approval • CEO amended performance objectives, recommended for Board approval

Meeting Date	Board/Committee Meeting	Resolutions/Outcomes
March 22, 2019	Board Meeting	<ul style="list-style-type: none"> • Approved 2018 Statutory Annual Report • Approved 2018 Audited Consolidated Financial Statements • Adopted South Coast British Columbia Transportation Authority 2019 Property Tax Bylaw Number 129-2019 • Adopted South Coast British Columbia Transportation Authority 2019 Replacement Tax Bylaw Number 130-2019 • Approved South Coast British Columbia Transportation Authority 2019 Tariff Bylaw Number 131-2029 • Approved Motor Fuel Tax Bylaw • Approved HandyDART Advisory Committee • Approved further project development for Rail to UBC • Endorsed the work program and timelines for implementation of the Transit Fare Review recommendations • Approved TransLink Drug and Alcohol Policy • Approved appointment of Conduct Review Advisor • Approved amended CEO performance objectives
April 3, 2019	Joint Regional Transportation Planning Committee	<ul style="list-style-type: none"> • Received updates on the South of Fraser Rapid Transit Project • Received report on SkyTrain Technology and Procurement
April 4, 2019	Joint New Mobility Committee	<ul style="list-style-type: none"> • Received updates on key New Mobility Initiatives • Received updates on the Regional Transportation Strategy
April 5, 2019	Joint Finance and Governance Committee	<ul style="list-style-type: none"> • Received updates on various Joint Finance and Governance Committee in camera items • Received updates on the Phase Three Investment Plan • Received report on the 10-Year Vision Implementation • Received updates on the South of Fraser Rapid Transit Project
April 17, 2019	Board Meeting	<ul style="list-style-type: none"> • Adopted South Coast British Columbia Transportation Authority Motor Fuel Tax Bylaw Number 132-2029
May 15, 2019	Joint Regional Transportation Planning Committee	<ul style="list-style-type: none"> • Received updates on the South of Fraser Rapid Transit Project • Received report on the George Massey Crossing Project • Received updates on Late Night Service Review • Received updates on Interurban Rail Proposal
May 17, 2019	Joint Finance and Governance Committee	<ul style="list-style-type: none"> • Received updates on the Phase Three Plan • Received updates on the South of Fraser Rapid Transit Project • Report received on the 10-Year Vision Implementation • Received report on Low Carbon Fleet Strategy • Received updates on various Joint Finance and Governance Committee in camera items
May 22, 2019	Finance and Audit Committee	<ul style="list-style-type: none"> • 2019 Q1 Financial and Performance Report, endorsed for public release

Meeting Date	Board/Committee Meeting	Resolutions/Outcomes
June 5, 2019	Joint New Mobility Committee	<ul style="list-style-type: none"> • Received updates on Transport 2050 • Received report on Transportation Implications of Proposed Zero Emission Vehicles Mandate • Received reports on Ride-Hailing, Micro-Mobility and Mobility as a Service • Received updates on New Mobility Program
June 6, 2019	Finance and Audit Committee	<ul style="list-style-type: none"> • Subsidiary Board appointments, recommended for Board approval • Amendments to banking resolutions and Financial Risk and Management policies, recommended for Board approval • 2018 <i>Financial and Information Act</i> Filing, recommended for Board approval
June 6, 2019	Board Meeting	<ul style="list-style-type: none"> • Approved 2018 <i>Financial and Information Act</i> Filing
June 7, 2019	Human Resources and Governance Committee	<ul style="list-style-type: none"> • Amendments to the Board Governance Manual, recommended for Board approval
June 11, 2019	Planning and Stakeholder Relations Committee	<ul style="list-style-type: none"> • Endorsed the work program for implementation of the Transit Fare Review recommendations • Independent Transit Service Application – Steveston Shuttle Service (2019), recommended for Board approval • Endorsement of the use of the Regional Long-Range Growth and Transportation Scenarios to support development of Transport 2050 • Appointment of individuals to the HandyDART Advisory Committee, recommended for Board approval • Amendments to the Board Governance Manual, recommended for Board approval
June 12, 2019	Joint Regional Transportation Planning Committee	<ul style="list-style-type: none"> • Received report on the Phase Two Investment Plan – Reallocation of Funds to Ironworkers Express • Received updates on the South of Fraser Rapid Transit Project • Received report on the Interurban Passenger Rail • Received report on the Burnaby Mountain Gondola • Received report on SkyTrain Technology
June 19, 2019	Board Meeting	<ul style="list-style-type: none"> • Approved Subsidiary Board appointments • Endorsed the work program and timelines for implementation of the Transit Fare Review recommendations • Approved banking resolutions and Financial Risk and Management policies • Approved Independent Transit Service Application – Steveston Shuttle Service (2019) • Approved appointment of individuals to the HandyDART Advisory Committee • Approved amendments to the Board Governance Manual

Meeting Date	Board/Committee Meeting	Resolutions/Outcomes
June 20, 2019	Joint Finance and Governance Committee	<ul style="list-style-type: none"> • Report received on the 10-Year Vision Implementation • Received updates on the Phase Three Investment Plan • Received updates on various Joint Finance and Governance Committee in camera items
July 10, 2019	Joint Regional Transportation Planning Committee	<ul style="list-style-type: none"> • Received report on Transport 2050 • Received updates on the South of Fraser Rapid Transit Project • Received updates on 10-Year Vision Major Projects • Received updates on the George Massey Crossing Project
July 17, 2019	Board Meeting	<ul style="list-style-type: none"> • Endorsed the creation of an ad hoc Board Committee • Approved the Executive Compensation Plan for submission to the Mayors' Council
July 18, 2019	Joint Finance and Governance Committee	<ul style="list-style-type: none"> • Report received on the 10-Year Vision implementation • Received updates on the Phase Three Investment Plan • Received updates on the South of Fraser Rapid Transit Project • Received updates on various Joint Finance and Governance Committee in camera items
August 21, 2019	Finance and Audit Committee	<ul style="list-style-type: none"> • 2019 Q2 Financial and Performance Report, endorsed for public release
August 23, 2019	Human Resources and Governance Committee	<ul style="list-style-type: none"> • Discussed in camera compensation items
September 12, 2019	Joint New Mobility Committee	<ul style="list-style-type: none"> • Received reports on Local Coordination of Ride Hailing Legislation, Micro-Mobility, and TransLink Tomorrow • Received updates on Transport 2050
September 16, 2019	Planning and Stakeholder Relations Committee	<ul style="list-style-type: none"> • Independent Transit Service Application – Cypress Village Shuttle, recommended for Board approval
September 16, 2019	Human Resources and Governance Committee	<ul style="list-style-type: none"> • Subsidiary board appointments, recommended for Board approval
September 17, 2019	Finance and Audit Committee	<ul style="list-style-type: none"> • Amendments to banking resolutions, recommended for Board approval • Amendments to Financial Risk and Debt Management policies, recommended for Board approval • 2019 Bond Issuance, recommended for Board approval • Approved extension of external auditor contract
September 25, 2019	Board Meeting	<ul style="list-style-type: none"> • Approved banking resolutions • Approved Financial Risk and Debt Management policies • Approved Independent Transit Service Application – Cypress Village Shuttle • Approved subsidiary board appointments • Approved 2019 Bond Issuance • Endorsed South of Fraser Rapid Transit Strategy refresh and work plan costs

Meeting Date	Board/Committee Meeting	Resolutions/Outcomes
October 9, 2019	Joint Finance and Governance Committee	<ul style="list-style-type: none"> Received updates on the Phase Three Investment Plan Received updates on the South of Fraser Rapid Transit Project
October 16, 2019	Joint Regional Transportation Planning Committee	<ul style="list-style-type: none"> Received updates on Transport 2050 Long-Term Transportation Network Concept Development Received report on Bus Delay Due to Congestion Received report on Phase Three Investment Plan Received report on Surrey-Langley SkyTrain Supportive Policies Agreement
November 9, 2019	Joint Finance and Governance Committee	<ul style="list-style-type: none"> Received updates on the Phase Three Investment Plan Received updates on the South of Fraser Rapid Transit Project Received updates on HandyDART funding
November 13, 2019	Finance and Audit Committee	<ul style="list-style-type: none"> 2019 Q3 Financial and Performance Report, endorsed for public release
November 15, 2019	Joint New Mobility Committee	<ul style="list-style-type: none"> Received New Mobility reports on Low Carbon Fleet Strategy and Intermunicipal Business License for Ride-Hailing Services Received updates on Transport 2050
November 16, 2019	Human Resources and Governance Committee	<ul style="list-style-type: none"> Succession Plan, recommended for Board approval Subsidiary board appointments, recommended for Board approval Appointments to standing and ad hoc committees, recommended for Board approval Appointment of 2019 Vice Chair, recommended for Board approval
November 24, 2019	Joint Meeting of the TransLink Board of Directors and Mayors' Council	<ul style="list-style-type: none"> Report received on the Regional Coordination of Ride Hailing Report received on Transport 2050
November 25, 2019	Finance and Audit Committee	<ul style="list-style-type: none"> Amendments to Credit Agreement, recommended for Board approval
November 26, 2019	Planning and Stakeholder Relations Committee	<ul style="list-style-type: none"> Plan to provide accessible information at bus stops for customers with vision loss, recommended for Board approval
December 6, 2019	Board Meeting	<ul style="list-style-type: none"> Approved Succession Plan Approved subsidiary board appointments Approved appointments to standing and ad hoc committees Approved appointment of 2019 Vice Chair Approved Credit Agreement Amendment Approved plan to provide accessible information at bus stops for customers with vision loss
December 19, 2019	Finance and Audit Committee	<ul style="list-style-type: none"> Endorsement of key 2020 budget expenditure commitments

G. FARE COLLECTION BYLAW

The current version of the Fare Collection Bylaw is shown below.

Definitions

1. In this regulation:

"Act" means the *South Coast British Columbia Transportation Authority Act*;

"pass" means a record that the authority or a related party has issued or recognized as authorization for the person to whom it was issued to enter a fare paid zone or board a transit vehicle that is not a fare paid zone, and includes, without limitation, a transfer, a fare receipt, a monthly pass, any other time-limited pass and a payment card;

"payment card" means a record issued by the authority or a related party if the following apply:

- (a) the person to whom the record is issued can, by paying money to the authority or a related party, create or increase a credit balance on the record;
- (b) the credit balance on the record can be applied by the person to whom the record was issued towards any fare;

"surcharge date", in relation to a ticket, means the later of

- (a) the date that is 180 days after the date of service of the ticket,
- (b) if the person to whom the ticket was issued disputes his or her liability under the ticket in accordance with section 4, the date that is 31 days after the date on which a notice of decision in response to the dispute is provided to that person under section 4 (4), and
- (c) if the person to whom the ticket was issued appeals his or her liability under the ticket in accordance with section 7, the date that is 7 days after the date on which a notice of decision in response to the appeal is provided to that person under section 7 (5);

"ticket" means a ticket issued under section 248 of the Act.

Description of infraction

2. Every word and phrase set out in Column 2 of Schedule 1 to this regulation is authorized to be used on a ticket to describe the infraction of contravening the provision of the Act referred to in Column 1 opposite that word or phrase.

Ticketed amounts

3. (1) For the contravention of a provision of the Act set out in Column 1 of Schedule 1 to this regulation,
 - (a) Column 2 of Schedule 1 sets out the description of the infraction for the purposes of section 2, and
 - (b) Column 3 of Schedule 1 prescribes the fine for the infraction.(2) On the surcharge date applicable to a ticket, a surcharge of \$40 is added to and forms part of the ticketed amount if full payment of the ticketed amount is not made before the surcharge date.
(3) On the date that is 366 days after the date of service of the ticket, an additional surcharge of \$60 is added to and forms part of the ticketed amount if full payment of the ticketed amount is not made on or before that date.

Dispute process

4. (1) For the purposes of section 251 (1) of the Act, a person to whom a ticket has been issued may dispute his or her liability under the ticket
 - (a) within 14 days after the date of service of the ticket, or

- (b) if the authority is satisfied that, due to extenuating circumstances, the person was not reasonably able within that 14 day period to dispute liability under the ticket, within any longer period that the authority may, in writing, specify.
- (2) To dispute liability under a ticket, the person to whom the ticket was issued must, within the dispute period referred to in subsection (1) of this section, provide to the authority, in accordance with subsection (3), a notice of the dispute
 - (a) identifying on which of the grounds set out in section 251 (1) of the Act the person is basing the dispute, and
 - (b) providing any information relevant to the dispute.
- (3) A notice of dispute under subsection (2) of this section must be provided to the authority by
 - (a) mailing it to the head office of the authority, or
 - (b) providing it electronically in the manner set out on the authority's website.
- (4) Within 30 days after receiving a notice of dispute under subsection (2), the authority must
 - (a) decide whether to confirm or cancel the ticket, and
 - (b) provide to the person who submitted the notice of dispute, in accordance with subsection (5), notice of that decision and the basis on which it was made.
- (5) A notice of decision under subsection (4) must be provided to the person who submitted the notice of dispute by
 - (a) mailing the notice of decision to the postal address provided for that person in the notice of dispute, or
 - (b) emailing the notice of decision to the email address provided for that person in the notice of dispute.

Appeal period

- 5. (1) For the purposes of section 253 of the Act, a person who has disputed liability under a ticket in accordance with section 4 of this regulation and Division 3 of Part 12 of the Act may appeal liability under the ticket to an arbitrator
 - (a) within 30 days after the authority provided notice under section 4 (4) of this regulation of the authority's decision, or
 - (b) if the arbitrator is satisfied that, due to extenuating circumstances, the person was not reasonably able within that 30 day period to appeal liability under the ticket, within any longer period that the arbitrator may, in writing, specify.
- (2) A request under subsection (1) (b) for an extension of time within which to appeal liability under a ticket must
 - (a) set out the reason why the person was unable to provide a notice of appeal within the 30 day period referred to in subsection (1) (a), and
 - (b) be provided to the authority by
 - (i) mailing the request to the head office of the authority, or
 - (ii) providing the request electronically in the manner set out on the authority's website.
- (3) Promptly after receiving a request referred to in subsection (2), the authority must provide the request to the arbitrator.
- (4) Within 14 days after receiving a request under subsection (3), the arbitrator must provide notice to the appellant and the authority as to whether an extension of time within which to appeal liability under the ticket has been granted and if an extension is granted, indicate the date before which the notice of appeal must be provided to the authority.

Additional grounds for appeal

- 6. For the purpose of section 253 (c) of the Act, a person may appeal liability under a ticket on the ground that relevant information was not submitted in the dispute procedure.

Appeal process

7. (1) To appeal liability under a ticket, the person to whom the ticket was issued must, within the appeal period referred to in section 5 (1), provide to the authority, in accordance with subsection (2) of this section, a notice of appeal
 - (a) identifying on which of the grounds set out in section 253 of the Act or section 6 of this regulation the person is basing the appeal, and
 - (b) providing any information relevant to the appeal.
- (2) A notice of appeal under subsection (1) must be provided to the authority by
 - (a) mailing it to the head office of the authority, or
 - (b) providing it electronically in the manner set out on the authority's website.
- (3) Promptly after receiving a notice of appeal under subsection (2), the authority must provide the notice of appeal to the arbitrator who has the earliest availability.
- (4) An arbitrator to whom a notice of appeal is provided under subsection (3) may request from the appellant or the authority any additional records or information that the arbitrator considers appropriate and may, in his or her sole discretion, authorize the appellant and the authority to provide the additional records or information to the arbitrator in one or more of the following manners:
 - (a) in person;
 - (b) in writing;
 - (c) electronically.
- (5) After receiving a notice of appeal under subsection (3), the arbitrator must
 - (a) confirm or cancel the ticket, and
 - (b) provide, in accordance with subsection (6), to
 - (i) the person who submitted the notice of appeal, and
 - (ii) the authority notice of that decision and the basis on which it was made.
- (6) A notice of decision under subsection (5) must be provided to the person who submitted the notice of appeal by
 - (a) mailing the notice of decision to the postal address provided for that person in the notice of appeal, or
 - (b) emailing the notice of decision to the email address provided for that person in the notice of appeal.

Cancellation of tickets

8. If a ticket is cancelled under section 4 or 7 and some or all of the ticketed amount of the ticket has been paid to the authority, the authority must refund the amount paid.

Payment of fare

9. For the purposes of section 244 (1) (a) of the Act, a person may satisfy the requirement to pay the fare required by the tariff in any of the following manners:
 - (a) if a pass has been issued to the person and that pass is valid for application to the fare,
 - (i) if a device that can record the use of the pass has been installed or made available by the authority or a related party for the fare paid zone or transit vehicle, by using the pass in such a way that
 - (A) its use is recorded by the device, and
 - (B) if the pass is a payment card, the unpaid portion, if any, of the fare is debited from the pass, or
 - (ii) if there is no such device installed or made available by the authority or a related party for the fare paid zone or transit vehicle but there is a transit employee at the person's entry point to the fare paid zone or transit vehicle, by presenting that pass to that transit employee for inspection;

- (b) if, under the tariff, another form of payment is authorized,
 - (i) if a device that can recognize that form of payment has been installed or made available for the fare paid zone or transit vehicle by the authority or a related party, by using that form of payment in such a way that
 - (A) its use is recorded by the device, and
 - (B) if applicable, the unpaid portion, if any, of the fare is debited from the form of payment, or
 - (ii) if there is no such device installed or made available by the authority or a related party for the fare paid zone or transit vehicle but there is a transit employee at the person’s entry point to the fare paid zone or transit vehicle, by presenting that form of payment to that transit employee for inspection.

Proof of payment

- 10. To comply with section 244 (1) (b) of the Act in relation to a fare, a person must
 - (a) obtain and retain any receipt issued by the authority or a related party for the payment of that fare,
 - (b) if a pass that is valid for application to the fare is used, retain the pass, or
 - (c) if under the tariff another form of payment is authorized and that other form of payment is used, retain that form of payment and obtain and retain
 - (i) any receipt issued by the authority or a related party, and
 - (ii) any record in the person's power or control, whether in electronic form or otherwise, that confirms that the form of payment was used in payment of the fare.

Schedule 1

South Coast British Columbia Transportation Authority Act

Provision	Contravention	Fines
Section 244 (1) (a)	Fare evasion	\$173
Section 244 (2)	Failure to produce	\$173

H. SECTION 248 TICKETS AND COLLECTIONS

The numbers of tickets issued and collected under Section 248 from January 1 to December 31, 2019 are represented in the table below.

	Tickets issued under Section 248 (number)	Collected ticket amounts (\$)
January 1 to December 31, 2019	18,774	1,207,152

To: Board of Directors
From: Christine Dacre, Chief Financial Officer
Date: March 6, 2020
Subject: 2019 Audited Consolidated Financial Statements

PROPOSED RESOLUTION:

That the TransLink Board of Directors:

- A. Approves the 2019 Audited Consolidated Financial Statements attached to this report as Attachment 1; and
 - B. Authorizes the Board Chair and Finance and Audit Committee Chair to sign the approved 2019 Audited Consolidated Financial Statements.
-

EXECUTIVE SUMMARY:

Under the *South Coast British Columbia Transportation Authority Act*, the consolidated audited financial statements must be prepared annually for TransLink within 90 days after the end of each fiscal year. TransLink's fiscal year end is December 31. The 2019 Audited Consolidated Financial Statements are attached.

A full discussion of the consolidated statement of financial position and consolidated statement of operations is discussed in a separate report titled "2019 Year-End Financial and Performance Report".

In the opinion of Management, the attached consolidated financial statements present fairly the financial position and operations of TransLink for the year ended December 31, 2019. Representatives of KPMG will attend the Finance and Audit Committee meeting to provide an overview and respond to any questions on their audit process and findings.

Consolidated Financial Statements
(Expressed in thousands of dollars)

**SOUTH COAST BRITISH COLUMBIA
TRANSPORTATION AUTHORITY**

And Independent Auditors' Report thereon
Year ended December 31, 2019



KPMG LLP
PO Box 10426 777 Dunsmuir Street
Vancouver BC V7Y 1K3
Canada
Telephone (604) 691-3000
Fax (604) 691-3031

INDEPENDENT AUDITORS' REPORT

To the Members of the Board of Directors of the South Coast British Columbia Transportation Authority

Opinion

We have audited the consolidated financial statements of the South Coast British Columbia Transportation Authority (the "Authority"), which comprise:

- the consolidated statement of financial position as at December 31, 2019
- the consolidated statement of operations for the year then ended
- the consolidated statement of changes in net debt for the year then ended
- the consolidated statement of cash flows for the year then ended
- and notes to the consolidated financial statements, including a summary of significant accounting policies

(hereinafter referred to as the "financial statements").

In our opinion, the accompanying financial statements present fairly, in all material respects, the consolidated financial position of the Authority as at December 31, 2019, and its consolidated results of operations, its consolidated changes in net debt and its consolidated cash flows for the year then ended in accordance with Canadian public sector accounting standards.

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the "***Auditors' Responsibilities for the Audit of the Financial Statements***" section of our auditors' report.

We are independent of the Authority in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada and we have fulfilled our other ethical responsibilities in accordance with these requirements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Other Information

Management is responsible for the other information. Other information comprises the information, other than the financial statements and the auditors' report thereon, included in the 2019 Annual Statutory Report and 2019 Year-End Financial and Performance Report documents.

Our opinion on the financial statements does not cover the other information and we do not and will not express any form of assurance conclusion thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information identified above and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit and remain alert for indicators that the other information appears to be materially misstated.

We obtained the information, other than the financial statements and the auditors' report thereon, included in the 2019 Annual Statutory Report and 2019 Year-End Financial and Performance Report documents as at the date of this auditors' report.

If, based on the work we have performed on this other information, we conclude that there is a material misstatement of this other information, we are required to report that fact in the auditors' report.

We have nothing to report in this regard.

Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with Canadian public sector accounting standards, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the Authority's ability to continue as a going concern, disclosing as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Authority or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Authority's financial reporting process.

Auditors' Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists.

Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit.

We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion.

The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Authority's internal control.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on Authority's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditors' report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditors' report. However, future events or conditions may cause the Authority to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- Communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the group entity to express an opinion on the financial statements. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinion.

Chartered Professional Accountants

Vancouver, Canada
[Date]

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Consolidated Statement of Financial Position
(Expressed in thousands of dollars)

December 31, 2019, with comparative information for 2018

	2019	2018
Financial assets		
Cash and cash equivalents	\$ 502,060	\$ 517,022
Accounts receivable (note 7(i))	246,889	250,598
Loan receivable (note 3)	190,009	250,734
Restricted cash and cash equivalents and investments (note 4(a))	1,101,107	979,894
Investments (note 4(b))	61,281	61,173
Debt reserve deposits (note 5)	27,989	29,421
	<u>2,129,335</u>	<u>2,088,842</u>
Liabilities		
Accounts payable and accrued liabilities (note 7(i))	368,232	340,267
Debt (note 6)	2,738,435	2,665,085
Deferred government transfers (note 7(a))	1,188,463	1,249,094
Golden Ears Bridge contractor liability (note 8(a))	1,033,348	1,040,378
Deferred concessionaire credit (note 9(a))	479,239	502,512
Employee future benefits (note 10(b))	143,709	139,653
Deferred revenue and deposits	62,201	55,136
Deferred lease inducements	13,452	12,544
	<u>6,027,079</u>	<u>6,004,669</u>
Net debt	(3,897,744)	(3,915,827)
Non-financial assets		
Tangible capital assets (note 11)	5,381,268	5,079,162
Supplies inventory	84,556	74,244
Prepaid expenses	30,910	28,206
	<u>5,496,734</u>	<u>5,181,612</u>
Commitments and contingencies (note 12)		
Accumulated surplus	<u>\$ 1,598,990</u>	<u>\$ 1,265,785</u>

See accompanying notes to consolidated financial statements.

Approved on behalf of the Board:

Chair

Director

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Consolidated Statement of Operations
(Expressed in thousands of dollars)

Year ended December 31, 2019, with comparative information for 2018

	2019 Budget	2019 Actual	2018 Actual
	(note 2(s))		
Revenues:			
Taxation (note 16)	\$ 874,526	\$ 906,969	\$ 819,354
Transit (note 7(j))	669,274	685,362	638,015
Government transfers (note 7(a))	388,039	398,523	303,498
Amortization of deferred concessionaire credit (note 9(a))	23,337	23,273	23,273
Investment income	52,850	58,024	53,203
Miscellaneous revenue	5,655	9,027	11,894
Gain (loss) on disposal of tangible capital assets	(122)	506	(34)
	2,013,559	2,081,684	1,849,203
Expenses:			
Bus operations	942,587	919,478	867,913
Corporate operations	204,293	147,953	145,675
Rail operations	443,913	446,283	422,185
Roads and bridges	191,650	192,806	189,273
Transit Police	41,895	41,959	38,687
	1,824,338	1,748,479	1,663,733
Surplus for the year	189,221	333,205	185,470
Accumulated surplus, beginning of year	1,266,771	1,265,785	1,080,315
Accumulated surplus, end of year	\$ 1,455,992	\$ 1,598,990	\$ 1,265,785

See accompanying notes to consolidated financial statements.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Consolidated Statement of Changes in Net Debt
(Expressed in thousands of dollars)

Year ended December 31, 2019, with comparative information for 2018

	2019 Budget	2019 Actual	2018 Actual
	(note 2(s))		
Surplus for the year	\$ 189,221	\$ 333,205	\$ 185,470
Acquisition of tangible capital assets	(906,645)	(515,285)	(382,466)
Amortization of tangible capital assets	226,514	212,942	197,854
Loss (gain) on disposal of tangible capital assets	122	(506)	34
Net proceeds from disposal of tangible capital assets	-	743	694
Write-down of tangible capital assets	-	-	8,299
	(680,009)	(302,106)	(175,585)
Change in supplies inventory	(4,153)	(10,312)	(5,287)
Change in prepaid expenses	(1,124)	(2,704)	(6,803)
	(5,277)	(13,016)	(12,090)
Decrease (increase) in net debt	(496,065)	18,083	(2,205)
Net debt, beginning of year	(4,150,382)	(3,915,827)	(3,913,622)
Net debt, end of year	\$ (4,646,447)	\$ (3,897,744)	\$ (3,915,827)

See accompanying notes to consolidated financial statements.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Consolidated Statement of Cash Flows
(Expressed in thousands of dollars)

Year ended December 31, 2019, with comparative information for 2018

	2019	2018
Cash provided by (used for):		
Operating transactions:		
Surplus for the year	\$ 333,205	\$ 185,470
Non-cash changes to operations (note 14)	(129,698)	(41,402)
Changes in non-cash operating working capital (note 14)	90,504	6,312
Cash provided by operating transactions	294,011	150,380
Capital transactions:		
Purchase of tangible capital assets	(514,960)	(380,763)
Net proceeds from disposal of tangible capital assets	743	694
Cash used for capital transactions	(514,217)	(380,069)
Investing transactions:		
Increase in restricted cash and investments	(121,213)	(199,654)
Increase in investments	(108)	(222)
Decrease in debt reserve deposits	1,432	3,333
Cash used for investing transactions	(119,889)	(196,543)
Financing transactions:		
Debt proceeds	200,000	400,000
Issue costs on financing	(1,420)	(2,331)
Repayments of debt	(125,489)	(197,425)
Repayments of Golden Ears Bridge contractor liability	(7,030)	(5,179)
Government transfers received for tangible capital additions	257,955	324,179
Lease inducements received	1,117	-
Cash provided by financing transactions	325,133	519,244
Increase (decrease) in cash and cash equivalents	(14,962)	93,012
Cash and cash equivalents, beginning of year	517,022	424,010
Cash and cash equivalents, end of year	\$ 502,060	\$ 517,022
Supplementary information:		
Interest paid	\$ 187,815	\$ 185,067
Tangible capital assets acquired by capital lease and other adjustments	325	(1,961)

See accompanying notes to consolidated financial statements.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

1. Operations:

The South Coast British Columbia Transportation Authority, formerly the Greater Vancouver Transportation Authority, (the "Authority" or "TransLink") was established in June 1998 as a regional public transportation authority under the South Coast British Columbia Transportation Authority Act (the "Act") to provide for the planning, funding, management and operation of an integrated regional transportation system for the Greater Vancouver region.

2. Significant accounting policies:

(a) Basis of presentation:

The consolidated financial statements of the Authority have been prepared in accordance with Canadian public sector accounting standards as recommended by the Public Sector Accounting Board of the Chartered Professional Accountants of Canada.

(b) Basis of consolidation:

The consolidated financial statements include the accounts of the Authority and its active wholly owned subsidiaries as follows:

- (i) Coast Mountain Bus Company Ltd. ("CMBC") – bus, SeaBus and community shuttle services;
- (ii) British Columbia Rapid Transit Company Ltd. ("BCRTC") – SkyTrain services on the Expo, Millennium and Canada Lines;
- (iii) West Coast Express Limited ("WCE") – commuter rail services;
- (iv) Transportation Property and Casualty Company Inc. ("TPCC") – a captive insurance company which provides insurance liability coverage to the Authority's operating subsidiaries; and
- (v) TransLink Security Management Ltd. ("TSML") – transit police services transferred from the TransLink entity to TSML effective March 4, 2013

All intercompany balances and transactions have been eliminated upon consolidation.

(c) Basis of accounting:

TransLink follows the accrual method of accounting for revenues and expenses. Revenues are recognized in the year in which they are earned and measurable. Expenses are recognized as they are incurred and measurable as a result of receipt of goods or services and/or the creation of a legal obligation to pay. Interest expense is accrued as the obligation is incurred.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

2. Significant accounting policies (continued):

(d) Cash and cash equivalents:

Cash and cash equivalents include highly liquid investments with a term to maturity of three months or less at the date of purchase.

(e) Financial instruments:

Financial instruments are classified into two categories: fair value or cost.

(i) Fair value:

Investments and derivatives that are quoted in an active market and loans receivable are reflected at fair value as at the reporting date. The Authority does not hold any investments or derivatives that are quoted in an active market. Unrealized gains and losses on financial assets are recognized in the Statement of Remeasurement Gains and Losses until such time that the financial asset is derecognized due to disposal or impairment. At the time of derecognition, the related realized gains and losses are recognized in the Statement of Operations and related balances are reversed from the Statement of Remeasurement Gains and Losses. As at December 31, 2019, the Authority does not have any unrealized gains or losses and a Statement of Remeasurement Gains and Losses has not been included in these financial statements.

(ii) Cost:

All other financial instruments are recorded at cost. Gains and losses on financial instruments recorded at cost are recognized in the Statement of Operations when the financial asset is recognized due to disposal or impairment. Sales and purchases of investments are recorded on the trade date. Transaction costs related to the acquisition of investments are included in the cost of the related investments.

Accounts receivable and accounts payable and accrued liabilities are measured at cost using the effective interest rate method. Any gains, losses or interest expense is recorded in the annual surplus depending on the nature of the financial liability that gave rise to the gain, loss or expense. Valuation allowances are made when collection is in doubt.

(f) Supplies inventory:

Supplies inventory is valued at the lower of average cost and net realizable value. Cost includes purchase price, import duties, other net taxes, and transport, handling and other costs directly attributable to acquisition. Net realizable value is the estimated current replacement cost.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

2. Significant accounting policies (continued):

(g) Tangible capital assets:

Tangible capital assets have been recorded as follows:

- (i) Tangible capital assets are recorded at cost, including capitalized interest as described in note 2(h). Cost includes all amounts that are directly attributable to acquisition, construction, development or betterment of the asset, including the purchase price and other acquisition costs such as installation costs, design and engineering fees, legal fees, survey costs, site preparation costs, freight charges, transportation, insurance costs and duties.
- (ii) As part of the establishment of the Authority, certain tangible capital assets contributed by the Province of British Columbia (the "Province") and BC Transit were recorded at the estimated fair value at the date of acquisition based on appraisals carried out.
- (iii) Amortization is provided on the cost less estimated salvage value on a straight-line basis over a period not exceeding the estimated useful lives as follows:

Asset	Years
Land improvements	30
Buildings	30 - 50
Bridges, guideways, stations and tunnels	30 - 100
Other supporting systems (tracks, rail, roads, electrical, drainage, ventilation)	8 - 40
Vehicles and SeaBus	5 - 40
Equipment	5 - 40

(h) Capitalization of interest:

Interest costs directly attributable to construction projects and major capital acquisitions are capitalized from the commencement of the capital outlays until the assets are placed into service.

(i) Major Road Network ("MRN") expenditures:

Part 2 of the Act provides that the Authority must establish a MRN, comprising an integrated system of highways throughout the transportation service region, and the Authority must contribute funds to the municipalities for the purpose of constructing and maintaining any part of the MRN within that municipality if certain conditions are met.

Funding related to operating and maintaining the MRN are expensed under the heading "maintenance, materials and utilities". Funding related to road, cycling and walking infrastructure is expensed under the heading "capital infrastructure contributions" as the related assets are the property of the appropriate municipalities who assume all the rights and obligations.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

2. Significant accounting policies (continued):

(j) Pension plans and employee future benefits:

(i) Pension plan:

The Authority, its subsidiaries and employees make contributions to the Public Service Pension Plan ("PSPP"). These contributions to the PSPP are expensed as incurred.

(ii) Employee future benefits:

Post-retirement and post-employment benefits are available to the majority of the Authority's employees. The cost of post-retirement benefits is actuarially determined, prorated on service and management's best estimate of retirement ages and expected health care costs. The cost of post-employment benefits to disabled employees is actuarially determined based on future projected benefits of currently disabled employees. The obligations under these post-retirement and post-employment benefit plans are accrued as the employees render services necessary to earn the future benefits. The measurement date of the accrued benefit obligation coincides with the Authority's fiscal year. The most recent actuarial valuation of the plans was December 31, 2019. The plans are unfunded and require no contributions from employees. Employer contributions are based upon expected annual benefit payments.

Actuarial gains (losses) on the accrued benefit obligation arise from differences between actual and expected experience and from changes in the actuarial assumptions used to determine the accrued benefit obligation. The net accumulated actuarial gains (losses) are amortized over the average remaining service period of active employees in the consolidated statement of operations. The amortization period of the active employees covered by the post-retirement plan is 11 years (2018 - 11 years) and post-employment plan is 6 years (2018 - 6 years).

(k) Deferred revenue:

The Authority defers the portion of the revenue collected from transit services relating to services not yet rendered. This revenue is recognized in the year in which related services are provided.

(l) Deferred concessionaire credit:

Deferred concessionaire credit represents the funding provided by the Canada Line concessionaire towards the design and construction phases of the Canada Line in exchange for the right to operate the line over the 30 year operating term. This amount is amortized to income on a straight-line basis over the operating term of the concessionaire agreement which commenced in August 2009 and will expire in July 2040.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

2. Significant accounting policies (continued):

(m) Government transfers:

Restricted transfers from governments are deferred and recognized as revenue as the related stipulations in the agreement are met. Unrestricted transfers are recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured.

A significant portion of the Authority's government funding for capital purposes is received from the federal government through the Gas Tax program and other similar programs. Under these agreements, the Authority is required to acquire specific transit assets with the funds. The Authority is also required under certain agreements to maintain the assets over a set holding period and repay funds if the associated assets are sold before the end of the holding period.

(n) Liability for contaminated sites:

Contaminated sites are a result of contamination being introduced into air, soil, water or sediment of a chemical, organic or radioactive material or live organism that exceeds an environmental standard. Liabilities are recorded net of any expected recoveries.

A liability for remediation of contaminated sites is recognized when all the following criteria are met:

- (i) an environmental standard exists;
- (ii) contamination exceeds the environmental standard;
- (iii) the Authority is directly responsible or accepts responsibility;
- (iv) it is expected that future economic benefits will be given up; and
- (v) a reasonable estimate of the amount can be made.

The liability is recognized as management's estimate of the cost of post-remediation including operation, maintenance and monitoring that are an integral part of the remediation strategy for a contaminated site.

(o) Income taxes:

The Authority is a tax exempt corporation, which is exempt from Canadian Federal and British Columbia Provincial income taxes as it is deemed to be a public body performing the function of government in Canada. The Authority's subsidiaries file on the basis that they are exempt from Canadian Federal and British Columbia Provincial income taxes.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

2. Significant accounting policies (continued):

(p) Foreign currency translation:

Transactions of the Authority and its subsidiaries originating in foreign currencies are translated at the rates in effect at the time of the transaction. Monetary assets and liabilities denominated in foreign currencies are translated to Canadian dollars at exchange rates in effect at the statement of financial position dates. Foreign exchange gains and losses are included in income.

(q) Use of estimates:

The preparation of the consolidated financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting period. Significant areas requiring the use of estimates include determination of useful lives of tangible capital assets, percentage of completion of construction-in-progress, allowance for doubtful accounts receivable, obsolete inventory, determination of employee future benefits, liability for contaminated sites, self-insurance liability provisions and provisions for legal contingencies. Actual results could differ from those estimates.

(r) Segment disclosure:

A segment is defined as a distinguishable activity or group of activities of a government for which it is appropriate to separately report financial information to achieve the objectives of the Authority. TransLink has provided definitions of segments used and presented financial information in the segmented format (note 17). Business Technology, Human Resource, Payroll and Administrative Services costs are managed by the corporate segment and allocated among the operating segments, as appropriate. Interest has been allocated based on the allocated depreciation.

(s) Budget data:

The budget data presented in these consolidated financial statements were approved by the Board of Directors on December 6, 2018.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

3. Loan receivable:

In 2016, the Authority sold the Oakridge Transit Centre land for proceeds of \$440,000,000. The Authority received \$66,000,000 of proceeds in 2019 (2018 - \$66,000,000) with the remaining payment due in annual instalments as follows:

	Instalments
January 20, 2021	66,000
January 20, 2022	66,000
January 20, 2023	66,000
Total	\$ 198,000

The instalments are secured by a mortgage on the land sold.

The loan receivable of \$190,009,000 (2018 - \$250,734,000) is the present value of the instalments due as at December 31, 2019 using a discount rate of 2.10% (2018 - 2.10%).

Interest accrues on each instalment if it is not paid one month prior to its due date. Interest accrues at 18.00% per annum, calculated and compounded half-yearly. Provided the purchaser is in compliance with the land sale agreement and related mortgage, the purchaser can prepay all or any part of the remaining instalments at any time without notice, bonus or penalty.

4. Restricted and unrestricted cash and investments:

The Authority holds investments consisting of term deposits, money market instruments, and bonds held at various financial institutions.

All these investments are recorded at amortized cost. The bonds have an average initial term of 196 months (2018 - 191 months) and an average remaining term to maturity of 160 months (2018 - 164 months). All bonds held by the Authority, as at December 31, 2019 and 2018, were rated A or higher.

Details of interest rate and maturity date ranges of the term deposits are as follows:

	2019	2018
Interest rate range	2.30% - 2.95%	1.45% - 2.85%
Maturity date range	January 2020 – December 2021	January 2019 – December 2019

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

4. Restricted and unrestricted cash and investments (continued):

Details of effective interest rates and coupon rates of the government and corporate bonds are as follows:

	2019		2018	
	Effective rates	Coupon rates	Effective rates	Coupon rates
Weighted average rate	3.03%	3.26%	3.05%	3.28%
Interest rate range	1.51% - 4.47%	1.50% - 5.20%	1.51% - 4.47%	1.50% - 5.20%

(a) Restricted cash and cash equivalents and investments:

	2019	2018
Government transfers for capital project funding (i):		
Cash and cash equivalents	\$ 309,029	\$ 377,859
Investments:		
Term deposits and money market instruments	101,532	135,812
Bonds (note 15(b))	22,637	19,866
Total government transfers for capital project funding	433,198	533,537
Self-administered sinking funds:		
Cash and cash equivalents	17,820	2
Investments:		
Term deposits and money market instruments	20,130	-
Bonds maturing beyond one year (note 15(b))	297,080	264,241
Total self-administered sinking funds	335,030	264,243
Land reserve:		
Cash and cash equivalents	111,648	72,762
Term deposits	88,735	72,569
Total land reserve	200,383	145,331
Green Bond proceeds:		
Cash and cash equivalents	108,373	11,688
TPCC (wholly-owned captive insurance subsidiary):		
Bonds (note 15(b))	24,123	25,095
Total restricted cash and investments	\$ 1,101,107	\$ 979,894

(i) Unspent government transfers for capital project funding consists of \$403,571,000 (2018 - \$531,715,000) of Gas Tax funds and \$29,627,000 (2018 - \$1,822,000) of other funding.

(b) Unrestricted investments:

Unrestricted investments are comprised of term deposits and money market instruments in the amount of \$61,281,000 (2018 - \$61,173,000).

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

5. Debt reserve deposits and callable demand notes:

The Authority is required to pay the Municipal Finance Authority of British Columbia ("MFA") debt reserve deposits into a debt reserve fund of 1.00% of the face value of each debenture borrowing from the MFA. These are interest bearing restricted funds administered by the MFA and are only refundable once the respective debt issue has been fully repaid.

If at any time the MFA does not receive sufficient funds to meet payments or sinking fund contributions due on the Authority's debt obligations, the interest and principal payments or sinking fund contributions will be deducted from this debt reserve fund.

In addition to the debt reserve deposit, the Authority is required by the MFA to issue a non-interest bearing demand note for an amount equal to one-half the average annual installment of principal and interest relative to any debt borrowed less the debt reserve deposit. The demand notes payable to the MFA are callable only if, in the event of a default by the Authority or Metro Vancouver (the interposed significant lender over the Authority's long-term debt), there are insufficient funds in the Authority's debt reserve deposit held at the MFA to meet a required interest, principal payment or sinking fund contribution. As the Authority is in full compliance with its debt payments and no such call has been made by the MFA on these demand notes, their face value has not been recorded as a liability on the consolidated statement of financial position. At year-end, the maximum value of the demand notes totaled \$29,343,000 (2018 - \$30,608,000).

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

6. Debt:

	2019	2018
Unsecured commercial paper, due next 12 months	\$ 60,000	\$ 120,000
Unsecured sinking fund bonds held by the MFA, weighted average coupon rate of 3.96% (effective rate 3.98%), maturing at various dates from 2020 to 2036, 10 to 30 year original term	1,099,856	1,149,784
Less: accumulated payments to MFA administered debt sinking funds (including vested and accrued actuarial earnings)	(592,847)	(581,211)
Unsecured serial debenture held by the MFA, coupon rate of 5.10% interest payable semi-annually (effective rate 5.19%), maturing in 2025, principal repayment of approximately \$2 million annually, 20 year original term	16,547	18,939
Unsecured bullet maturity bond series TL-1, face value \$300 million, interest rate 3.80% (effective rate 3.88%), maturing 2020, original 10 year term	299,770	299,539
Unsecured bullet maturity bond series TL-2, face value \$200 million, interest rate 4.65% (effective rate 4.70%), maturing 2041, original 30 year term	198,670	198,640
Unsecured bullet maturity bond series TL-3, face value \$250 million, interest rate 3.85% (effective rate 3.82%), maturing 2052, original 40 year term	251,415	251,445
Unsecured bullet maturity bond series TL-4, face value \$365 million, interest rate 4.45% (effective rate 3.97%), maturing 2044, original 30.5 year term	393,495	394,220
Unsecured bullet maturity bond series TL-5, face value \$215 million, interest rate 3.05% (effective rate 3.06%), maturing 2025, original 10.5 year term	214,942	214,937
Unsecured bullet maturity bond series TL-6, face value \$200 million, interest rate 3.15% (effective rate 3.18%), maturing 2048, original 31 year term	198,729	198,703
Unsecured bullet maturity bond series TL-7 (Green), face value \$400 million, interest rate 3.25% (effective rate 3.31%), maturing 2028, original 10 year term	398,012	397,830
Unsecured bullet maturity bond series TL-8 (Green), face value \$200 million, interest rate 2.65% (effective rate 2.68%), maturing 2050, original 31 year term	198,587	-
Capital leases, weighted average implicit rate of 3.22% (2018 - 3.52%), maturing at various dates from 2020 to 2023	1,259	2,259
	\$ 2,738,435	\$ 2,665,085

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

6. Debt (continued):

The Authority has an unsecured revolving credit facility with a syndicate of Canadian financial institutions totaling \$500 million which will expire on March 23, 2023. The credit facility is to be used primarily as a liquidity backstop of commercial paper and provides for loans at varying rates of interest based on certain benchmark interest rates, specifically the Canadian prime rate and the Canadian bankers' acceptance rate, and on the Authority's credit ratings at the time of drawdown. The Authority is also required to pay commitment fees, which are also dependent on the Authority's credit ratings. This credit facility has no financial covenants or requirement to maintain a specific credit rating and was not drawn upon in 2019.

The Authority's unsecured commercial paper program is backstopped by the abovementioned syndicated credit facility which enables it to issue commercial paper up to a maximum aggregate of \$500 million. As at December 31, 2019, \$60,000,000 (2018 - \$120,000,000), was owed under this commercial paper program at an average interest rate of 1.82% (2018 - 2.03%) and is due for repayment in January 2020 (2018 - January 2019).

The future debt payments, future actuarial interest credit on the MFA sinking fund payments and unamortized premium / issue costs are summarized as follows:

	Commercial Paper	Sinking Fund on Bonds Held by MFA	Serial Debenture Held by MFA	Bullet Maturity Bonds	Capital Leases	Total
Future payments:						
2020	\$ 60,000	\$ 34,700	\$ 2,593	\$ 300,000	\$ 856	\$ 398,149
2021	-	34,700	2,659	-	345	37,704
2022	-	32,698	2,727	-	56	35,481
2023	-	30,278	2,797	-	2	33,077
2024	-	30,278	2,868	-	-	33,146
Thereafter	-	105,015	2,942	1,830,000	-	1,937,957
	60,000	267,669	16,586	2,130,000	1,259	2,475,514
Future actuarial interest	-	240,684	-	-	-	240,684
	60,000	508,353	16,586	2,130,000	1,259	2,716,198
Unamortized premium / (issue costs)	-	(1,344)	(39)	23,620	-	22,237
	\$ 60,000	\$ 507,009	\$ 16,547	\$ 2,153,620	\$ 1,259	\$ 2,738,435

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

7. Transfers from other governments:

(a) Deferred government transfers:

	Balance, January 1, 2019	Contributions received	Interest earned	Recognized as revenue	Balance, December 31, 2019
Capital project funding:					
Canada Line	\$ 477,425	\$ -	\$ -	\$ (23,397)	\$ 454,028
Gas Tax	559,102	149,120	9,202	(286,001)	431,423
Public Transit Infrastructure Fund	134,292	70,700	-	-	204,992
Building Canada Fund	62,822	-	-	(4,464)	58,358
Capstan Station	899	28,076	-	-	28,975
Evergreen Line	6,300	-	-	-	6,300
Transit Secure Fund	4,907	-	-	(684)	4,223
Public Transit Fund	2,098	-	-	(1,934)	164
Public Transit Infrastructure Program	875	-	-	(875)	-
Urban Transportation Showcase	343	-	-	(343)	-
Miscellaneous programs	31	857	-	(888)	-
	1,249,094	248,753	9,202	(318,586)	1,188,463
Operating funding:					
Golden Ears Bridge foregone tolling	-	60,075	-	(60,075)	-
Canada Line Operating Fund (note 9(c))	-	19,221	-	(19,221)	-
Properties Environmental Program	-	426	-	(426)	-
Other cost sharing projects	-	215	-	(215)	-
	-	79,937	-	(79,937)	-
	\$ 1,249,094	\$ 328,690	\$ 9,202	\$ (398,523)	\$ 1,188,463

The balance as at December 31, 2019 of \$1,188,463,000 consists of:

- (i) Unspent Gas Tax funds of \$403,571,000 (2018 - \$531,715,000) and unspent funds for various other projects of \$29,627,000 (2018 - \$1,822,000); and
- (ii) Spent funds of \$755,265,000 (2018 - \$715,557,000) that will be recognized as revenue as the related stipulations in the agreements are met.

(b) Gas Tax funding:

The Authority receives funding annually from the Government of Canada via a Gas Tax funding agreement between the Authority and the Union of British Columbia Municipalities ("UBCM"). The Authority is required to spend the funds on defined tangible capital assets to support the mandate, as prescribed in the agreement.

In 2015, the Authority entered into a new funding agreement with UBCM (the "Agreement").

Under the terms of the Agreement, for tangible capital assets acquired prior to April 1, 2014, the Authority is required to continue to retain title to the ownership of the infrastructure for a period of 10 years, or the useful life of the asset, if less than 10 years. Accordingly, once the contributions are spent on eligible items and the assets are placed into service, the contributions are amortized to revenue over 10 years, or the assets' useful life if less than 10 years.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

7. Transfers from other governments (continued):

(b) Gas Tax funding (continued):

Tangible capital assets acquired on or after April 1, 2014 are not subject to stipulations and the contributions are recognized in revenue when the funds are spent on eligible items.

Receipts and disbursements for the year are as follows:

	2019	2018
Opening balance, unspent funds	\$ 531,715	\$ 405,924
Amount received during the year	149,120	234,750
Interest earned	9,202	9,235
Funding re-invested for early disposal of assets	-	1,681
Amount spent on designated public transit projects	(286,466)	(119,875)
Closing balance, unspent funds	\$ 403,571	\$ 531,715

(c) Canada Line funding:

The Authority has received certain contributions for the Canada Line infrastructure from the Federal and Provincial Governments with the stipulation that TransLink operate and maintain the Canada Line for a minimum of 30 years, equal to the operating agreement with the concessionaire. If the assets are disposed prior to the 30 year term, the Authority is required to refund a portion of the contributions received, the amount of which decreases over time. As such, the Authority recognizes the revenue from the contributors over the holding period of 30 years.

(d) Building Canada Fund:

The Building Canada Fund was established by the Federal Government to provide strategic funding to infrastructure projects managed by Canadian provinces, territories and municipalities. Through an agreement with the Province, the Authority obtains funding from the Major Infrastructure Component of the Building Canada Fund which supports various projects related to public transit. In addition to the federal funds, the Authority also receives provincial funding for certain Building Canada Fund related projects.

Under the agreement, if any of the assets acquired are disposed or used in a manner other than as described in their request for funding, the Authority is required to return a portion of the contribution to the Province as follows:

Portion of contribution refund	Up to 1 year after the project completion date	Reduction in refund each year afterward
Fixed assets (non-movable)	100%	4%
Non-fixed assets (movable)	100%	10%

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

7. Transfers from other governments (continued):

(d) Building Canada Fund (continued):

Accordingly, the Authority recognizes the revenue over the stipulation periods of 10 or 25 years.

(e) Public Transit Infrastructure Fund:

The Public Transit Infrastructure Fund ("PTIF") was established by the Federal Government to provide funding to support the rehabilitation of transit systems, new capital projects, and planning and studies for future transit expansion to foster long-term transit plans. The Government of Canada has entered into a bilateral agreement with the Province, which in turn has entered into an agreement with the Authority to provide senior government funding for eligible projects under the PTIF program.

Under the agreement, if any of the acquired or constructed assets are sold, leased, disposed or used in a manner other than as described in their request for funding for five years after the agreement end date, which has been extended to March 31, 2021, the Authority is required to return a portion of the contribution to the Province.

Accordingly, the Authority recognizes the revenue over the stipulation period of five years.

(f) Evergreen Line:

In 2016, TransLink received \$30,261,000 of Evergreen Line project assets funded by partners of the British Columbia Transportation Financing Authority ("BCTFA"), of which \$7,000,000 was funded by PPP Canada Inc. and has a 25 year holding period stipulation on the related tangible capital asset. If the assets are disposed prior to the 25 year term, the Authority is required to repay a portion of the funding, the amount of which decreases over time.

Accordingly, the Authority recognizes the revenue based on milestones throughout the stipulation period of 25 years.

(g) Capstan Station funding:

On March 21, 2012, TransLink entered into a Funding Agreement with City of Richmond ("CoR") in relation to the design and construction of the Canada Line Capstan Station. The project was divided into three phases: preliminary design, detailed design and construction, and CoR agreed to contribute funding for the three phases totaling \$25,316,600 (subject to inflationary adjustments). On December 16, 2019, TransLink received the total funding from CoR and is required to complete the project within 30 months of the date of receipt.

Accordingly, the Authority will recognize revenue upon completion of the project.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

7. Transfers from other governments (continued):

(h) Golden Ears Bridge foregone tolling revenue:

In August 2017, the Province announced the removal of tolls on the Golden Ears Bridge (the "GEB") effective September 1, 2017. The Authority entered into an agreement with the Province to receive payments for foregone projected toll revenue to 2050, provided that the Authority does not charge users tolls for any new crossings and ensures the continued availability and operation of the GEB. The Authority recognizes the funding as government transfers revenue if these conditions are met.

(i) Working capital balances:

	2019	2018
Trade accounts receivable	\$ 23,086	\$ 19,659
Due from Federal Government	6,401	7,744
Due from Province of British Columbia	208,351	215,298
Due from regional districts	6,846	5,824
Due from other authorities	2,205	2,073
Accounts receivable	\$ 246,889	\$ 250,598

	2019	2018
Trade accounts payable and accrued liabilities	\$ 302,795	\$ 284,132
Due to Federal Government	7,010	6,534
Due to Province of British Columbia	4,385	1,607
Due to regional districts	45,902	39,988
Due to other Authorities	8,140	8,006
Accounts payable and accrued liabilities	\$ 368,232	\$ 340,267

(j) Transit revenues:

Included in transit revenues is \$12,800,000 (2018 - \$11,629,000) of contributions from the provincial government to assist with administering the U-Pass BC program and to offset forgone transit revenues.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

8. Golden Ears Bridge:

(a) Golden Ears Bridge contractor liability:

In 2006, the Authority entered in a fixed-price contract with the Golden Crossing General Partnership (the "GCGP") to design, construct, finance, operate, maintain and rehabilitate the GEB. The contract was executed in March 2006 and terminates in June 2041.

The GEB contractor liability to finance the construction is repaid by the Authority over the operating term as follows:

	2019	2018
Opening balance	\$ 1,040,378	\$ 1,045,557
Interest accretion on contractor liability to last payment date	65,460	65,928
Payments made	(72,490)	(71,107)
Ending balance	\$ 1,033,348	\$ 1,040,378

As the last monthly payment of the year was made on December 8, 2019, the interest accrual from December 9 to 31, 2019 of \$4,022,000 (2018 - \$4,054,000) is included in accounts payable and accrued liabilities.

Capital and interest payments to the GCGP commenced on substantial completion of the project. The nominal (based on 2005 dollars) monthly blended capital and interest payments, prior to escalation for the CPI index, are \$4,792,000.

The obligation to the GCGP bears interest at an effective rate of 6.70% per annum. The effective interest rate is the implicit interest rate, which establishes the net present value of the payment stream equal to the cost of the bridge, considering future payments adjusted by the forecasted CPI index with an estimated annual inflation rate of 2.00%. The estimated payments in the next five years are as follows:

	Capital and interest
2020	\$ 75,977
2021	77,504
2022	79,046
2023	80,632
2024	82,252

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

8. Golden Ears Bridge (continued):

(b) Operating agreement with GCGP:

The Authority also pays the GCGP a monthly Operating, Maintenance, Rehabilitation (“OMR”) fee of \$316,198 (based on 2005 dollars), which escalates based on a CPI index. Including an estimated 2.00% inflation rate per annum, the OMR payments to GCGP in the next 5 years are expected to be as follows:

	OMR
2020	\$ 5,013
2021	5,114
2022	5,215
2023	5,320
2024	5,427

9. Canada Line:

The Canada Line is a light rail rapid transit line that links central Richmond, the Vancouver International Airport and downtown Vancouver. The concessionaire (“InTransit BC”) is contracted to operate the Canada Line from August 2009 to July 2040.

(a) Deferred concessionaire credit:

The deferred concessionaire credit represents contributions made by the concessionaire to design and construct the Canada Line in exchange for the right to operate. This amount is being amortized over the concession term which ends July 2040.

	2019	2018
Opening balance	\$ 502,512	\$ 525,785
Less: amortization	(23,273)	(23,273)
Closing balance	\$ 479,239	\$ 502,512

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

9. Canada Line (continued):

(b) Operating commitments:

Base operating and maintenance payments to the Canada Line concessionaire (with 2003 being the base year), prior to adjustments for operational metrics and inflation, are as follows:

	Each 28-day period
January 2020 to December 2034	\$ 6,462
January 2035	5,289
February 2035 to July 2040	4,117

The total estimated base operating and maintenance payments, excluding taxes, to the concessionaire for each of the next five years adjusted for certain operational metrics and inflation, are as follows:

2020	\$ 120,000
2021	123,000
2022	126,000
2023	129,000
2024	132,000

The base operating and maintenance payments are subject to special events and passenger volume adjustments as well as quality and availability deductions according to the provisions of the contract.

(c) Operating contributions:

The Province of British Columbia has committed to provide funding of \$1,478,000 at each 28 day period to November 2039 related to the Canada Line operating expenses, which is approximately \$19,300,000 per annum subject to quality and availability deductions. The funding received in 2019 was \$19,221,000 (2018 - \$19,174,000).

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

10. Pension plans and employee future benefits:

(a) Pension plans:

The Authority and its subsidiaries contribute to the Public Service Pension Plan (the “Plan” or “PSPP”), which is a multi-employer defined benefit plan, together with other British Columbia public service employers, in accordance with the Public Sector Pension Plans Act.

The British Columbia Pension Corporation administers the Plan, including the payment of pension benefits and other post-retirement benefits, on behalf of the employers and the employees to whom the Act applies. The long-term funding of the Plan is based on the level contribution method. Using this method, employer contribution rates are set out so that, in combination with member contributions, they will fully pay for benefits earned by the typical new entrants to the Plan and will maintain the Plan’s unfunded accrual liability (“UAL”) for funding purposes, if any, as a constant percentage of employer payroll. The actuary does not attribute portions of the UAL to individual employers. Contributions to the Plan are expensed in the year when payments are made. Every three years, an actuarial valuation is performed to assess the financial position of the Plan and the adequacy of plan funding. The latest full actuarial valuation for the Public Service Pension Plan, which was carried out as at March 31, 2017, resulted in a surplus of \$1,895,876,000. The total expense recorded in the consolidated financial statements, in respect of pension contributions to the Plan, amounts to \$50,535,000 (2018 - \$47,920,000). The next valuation will be as at March 31, 2020, with results available in 2021.

(b) Employee future benefits:

(i) Post-retirement:

In addition to the post-retirement benefits provided by the Plan, the Authority, CMBC and TSML continue to provide life insurance benefits to eligible retired employees.

In fiscal 2011, PSPP officially announced that effective April 1, 2012 it will no longer subsidize the Retiree MSP for Retirees and their dependents and extended health benefits for the Retiree’s dependents. As per the COPE collective agreements, the benefits are the responsibility of TransLink and CMBC and therefore, the Authority funds (for eligible retired COPE employees) the remaining cost of MSP and extended health, which is not paid by the PSPP.

In the collective agreement between TSML and the Transit Police Professional Association (“TPPA”) union ratified on November 27, 2014, the parties eliminated the MSP and extended health retiree benefits for new employees. Employees with one complete year of service or more as of November 27, 2014 were eligible for retirement benefits as follows:

- employees with at least 10 consecutive years of service at TSML and eligible to retire on pension with TSML as of December 31, 2018 who elected by May 26, 2015 to retire on or before December 31, 2018.
- all other eligible employees were paid a lump-sum of \$750 per year of service calculated as of November 27, 2014.

BCRTC also sponsors a post-retirement plan which provides MSP coverage, extended health and dental benefits to eligible retired employees.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

10. Pension plans and employee future benefits (continued):

(b) Employee future benefits (continued):

(i) Post-retirement (continued):

The total expense recorded in the consolidated financial statements, in respect of obligations under these plans, amounts to \$6,361,000 (2018 - \$9,820,000).

On December 17, 2019, a letter of understanding was signed by BCRTC and its union to prospectively implement changes to retiree extended health and dental benefits available to employees that will better make use of the benefits provided by the PSPP. The plan amendment, when implemented, is expected to reduce BCRTC's post-retirement benefit obligation.

(ii) Post-employment:

The Authority, CMBC and TSML provide MSP, extended health, dental and life insurance benefits to employees on approved long-term disability leave (post-employment benefits).

BCRTC provides MSP, extended health, dental, life insurance and pension benefits to employees on approved long-term disability leave.

Effective December 24, 2012, WCE employees on approved long-term disability leave receive MSP, extended health, dental and life insurance benefits.

The total expense recorded in the consolidated financial statements for the year, in respect of obligations under these plans, amounts to \$2,132,000 (2018 - \$2,701,000).

(iii) Summary of the Authority's post-retirement and post-employment plans is as follows:

	Post-retirement benefits	Post-employment benefits	Total 2019	Total 2018
Accrued benefit obligation	\$ 97,509	\$ 21,082	\$ 118,591	\$ 105,435
Unamortized net actuarial gain	15,787	9,331	25,118	34,218
Accrued benefit liability	\$ 113,296	\$ 30,413	\$ 143,709	\$ 139,653

The accrued benefit liability is not funded.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

10. Pension plans and employee future benefits (continued):

(b) Employee future benefits (continued):

(iv) The expense for the year is comprised of the following components:

	Post- retirement benefits	Post- employment benefits	Total 2019	Total 2018
Current period benefit cost	\$ 5,180	\$ 4,754	\$ 9,934	\$ 12,326
Plan amendment	4,919	477	5,396	-
Interest cost	3,152	728	3,880	4,064
Amortization of actuarial gains	(6,890)	(3,827)	(10,717)	(3,869)
Net expense	6,361	2,132	8,493	12,521
Actuarially determined payments	(1,674)	(2,763)	(4,437)	(3,770)
Change in accrued benefit liability	\$ 4,687	\$ (631)	\$ 4,056	\$ 8,751

During the year, new collective agreements were ratified between CMBC, BCRTC, and their respective unions. Amendments to their respective benefits plans resulted in the recognition of prior period service costs. These costs have been partially offset against existing unamortized actuarial gains in the amount of \$4,919,000 for post-retirement benefits and \$419,000 for post-employment benefits. The corresponding gains have been included in the above figures for the net amortization of actuarial gains.

(v) The significant assumptions used are as follows:

	2019	2018
Discount rates	2.80% - 2.90%	3.20% - 3.50%
Expected health care cost trend rates	4.00% - 6.10%	3.90% - 6.20%

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

11. Tangible capital assets:

Cost	Balance, January 1, 2019	Additions, net of transfers	Disposals	Balance, December 31, 2019
Land	\$ 410,486	\$ 14,801	\$ (136)	\$ 425,151
Land improvements	40,397	5,531	-	45,928
Buildings	338,565	5,459	-	344,024
Bridges, guideways, stations and tunnels	2,372,044	-	-	2,372,044
Other supporting systems	1,085,948	107,812	-	1,193,760
Vehicles and SeaBus	1,840,077	348,219	(10,131)	2,178,165
Equipment	736,904	37,002	(290)	773,616
Tangible capital projects in progress	318,998	(3,539)	-	315,459
	\$ 7,143,419	\$ 515,285	\$ (10,557)	\$ 7,648,147

Accumulated amortization	Balance, January 1, 2019	Amortization expense	Disposals	Balance, December 31, 2019
Land	\$ -	\$ -	\$ -	\$ -
Land improvements	(21,977)	(1,270)	-	(23,247)
Buildings	(122,724)	(8,221)	-	(130,945)
Bridges, guideways, stations and tunnels	(214,289)	(24,243)	-	(238,532)
Other supporting systems	(283,895)	(40,688)	-	(324,583)
Vehicles and SeaBus	(965,123)	(96,545)	10,057	(1,051,611)
Equipment	(456,249)	(41,975)	263	(497,961)
	\$ (2,064,257)	\$ (212,942)	\$ 10,320	\$ (2,266,879)

Net book value	Balance, January 1, 2019		Balance, December 31, 2019
Land	\$ 410,486		\$ 425,151
Land improvements	18,420		22,681
Buildings	215,841		213,079
Bridges, guideways, stations and tunnels	2,157,755		2,133,512
Other supporting systems	802,053		869,177
Vehicles and SeaBus	874,954		1,126,554
Equipment	280,655		275,655
Tangible capital projects in progress	318,998		315,459
	\$ 5,079,162		\$ 5,381,268

Included in tangible capital assets is capital leased equipment with a net book value of \$5,602,000 (2018 - \$7,996,000).

Interest capitalized during the year amounted to \$4,363,000 (2018 - \$3,257,000).

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

11. Tangible capital assets (continued):

(a) Expo and Millennium Line:

As at December 31, 2019, the net book value of Expo and Millennium Line guideways or system improvements totaled \$400,673,000 (2018 - \$354,642,000) of which \$289,869,000 (2018 - \$253,421,000) relates to improvements on the assets that are leased/licensed from the Province. The guideways are leased/licensed from the Province for nominal proceeds and the Authority is responsible for operations and maintenance. The Expo and Millennium line leases expire on January 29, 2021. Both leases have available renewal options and the agreements provide the Authority with reimbursement of the unamortized cost of capital improvements to the assets that are leased/licensed from the Province should the leases not be renewed. As the Authority expects to either renew the leases or be reimbursed for any unamortized costs, the improvements are capitalized and amortized over their expected useful lives and not the term of the leases.

(b) West Coast Express:

BCTFA leases to TransLink all its interests (owned and otherwise) with respect to the West Coast Express properties and infrastructure. As at December 31, 2019, the net book value of West Coast Express improvements totaled \$3,130,000 (2018 - \$3,375,000).

(c) Evergreen Line:

The Evergreen Line (an extension of the Millennium Line) links neighborhoods in Burnaby, Port Moody and Coquitlam and is operated by TransLink as part of the regional transportation network. The Evergreen Line is funded by the Government of Canada, BCTFA, TransLink and other partners. On October 31, 2016, the Evergreen Line was substantially completed and accordingly, a portion of the Evergreen Line infrastructure ("TransLink Evergreen Line Infrastructure") was transferred from BCTFA to TransLink including stations, guideway and the related systems east of Inlet Centre station (excluding Inlet Centre station) and the vehicle storage facility. As at December 31, 2019, the net book value of Evergreen Line guideways and system owned by TransLink, excluding SkyTrain vehicles, totaled \$317,053,000 (2018 - \$323,929,000).

As BCTFA holds the underlying property rights on which the TransLink Evergreen Line Infrastructure is located, BCTFA and TransLink have agreed to enter into an agreement whereby TransLink may exercise and obtain the benefit of BCTFA's interests to such property rights for a 100 year term on certain terms and conditions, including that if the agreement expires or terminates then BCTFA will reimburse TransLink for the unamortized portion of the initial cost of the TransLink Evergreen Line Infrastructure.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

12. Commitments and contingencies:

(a) Operating leases:

The Authority is committed to annual lease payments in respect of office premises and vehicles, in the following amounts:

2020	\$ 17,769
2021	17,599
2022	17,056
2023	17,180
2024	15,514
	<hr/>
	\$ 85,118

Included in the payment schedule above are certain commitments that extend beyond 2024. Significant commitments beyond 2024 are as follows:

- (i) The Authority has a premise lease with the Brewery District Investments Ltd. for the head office of TransLink and TSML which ends in 2033. The monthly commitment for basic rent and operating costs subsequent to year 2023 ranges from \$831,000 to \$889,000.

(b) WCE - lease and operating commitments:

In connection with operating the Commuter Rail System, the operating commitment for WCE include train operations, office lease, rolling stock maintenance, land leases and miscellaneous services.

The following summarizes the WCE operating commitments:

2020	\$ 16,050
2021	10,427
2022	10,375
2023	10,520
2024	8,191
	<hr/>
	\$ 55,563

Subsequent to 2024, monthly operating commitments for WCE are \$456,000 for 2025.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

12. Commitments and contingencies (continued):

(c) Operating commitment with Cubic Transportation System Inc.:

The Authority has a contract with Cubic Transportation Systems Inc. ("Cubic") to operate its transit fare system. The contract expires in January 2026 with the Authority having the option to extend the term of the contract for an additional 5 years.

Base payments to Cubic under the contract terms for operations and maintenance are adjusted periodically based on a CPI index.

The projected base payments adjusted for inflation are as follows:

	Fixed component
2020	\$ 13,663
2021	14,276
2022	14,852
2023	15,389
2024	15,987
	<u>\$ 74,167</u>

Subsequent to 2024, the fixed monthly base payments are \$1,267,000 for 2025. Additionally, an amount of \$8,100,000 is payable in 2025 should the Authority choose not to extend the contract.

(d) Natural gas supply contract:

The Authority has entered into multiple fixed price natural gas purchase agreements for varying terms up to October 2021. The approximate total payment relating to these agreements is as follows:

	Contract Amount
2020	\$ 1,679
2021	1,442
	<u>\$ 3,121</u>

(e) Major Road Network ("MRN") Capital Funding:

The Authority has signed several funding agreements with municipalities on major MRN projects. At December 31, 2019, the net amount of MRN capital infrastructure contributions committed and not paid is \$91,706,000 (2018 - \$59,310,000). This amount will be paid to the municipalities upon completion of their projects.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

12. Commitments and contingencies (continued):

(f) Lawsuits and claims:

As at December 31, 2019, a number of lawsuits and claims, arising in the ordinary course of business, have been initiated against the Authority. Management is of the opinion that sufficient provisions net of any recoveries have been recorded in the financial statements for any lawsuits and claims made against the Authority, except as noted below.

A number of lawsuits commenced against TransLink and/or its subsidiary, in relation to the Canada Line project remain outstanding. The Authority does not believe that reasonable estimates of any potential losses can be estimated at this time and therefore, no provisions have been made in the consolidated financial statements for the following:

- A class action lawsuit filed by Cambie area merchants, where no specific amount has been claimed at this time. The trial of the first phase of this class action concluded April 2, 2015. Reasons for Judgment were delivered November 6, 2015. The main claims of the merchants for damages for the tort of nuisance were dismissed. The Court's decision allows for a certain claim of lesser value, injurious affection to property interests, to be advanced. The number of claims that may be advanced in the future is approximately 100; the amount of these claims cannot be estimated at this time. Three test cases for assessment of compensation for injurious affection were heard at trial in April 2018 by the BC Supreme Court, and judgement issued by the BC Supreme Court, awarding damages in the aggregate amount of \$181,040, has been appealed by TransLink. The appeal was heard by the Court of Appeal on October 7, 2019. Judgement was reserved and has not yet been released.
- A lawsuit filed by a number of Cambie area merchants, where no specific amount has been claimed at this time.
- Two additional lawsuits each filed by individual Cambie area merchants, where no specific amount has been claimed at this time.

Once a reasonable estimate of the potential liability, if any, is determined, a provision will be recognized.

(g) Other capital and inventory commitments:

At December 31, 2019, \$265,421,000 (2018 - \$486,448,000) has been contractually committed for other capital projects and inventory.

(h) Letters of credit:

As at December 31, 2019, the Authority has issued letters of credit to the City of Richmond and the City of Surrey totaling \$3,910,000 (2018 - \$2,787,000) which expire in 2020.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

13. Contractual rights:

The Authority is entitled to future revenues based on contracts and agreements it has entered into by year-end to fund operating costs, capital expansion and debt repayment. These include, but are not limited to, funding agreements for Canada Line, Golden Ears Bridge foregone tolling, Gas Tax, PTIF and the U-Pass BC program. The following summarizes the amounts receivable expected under all such contracts and agreements over the next five years:

2020	\$	370,563
2021		323,130
2022		328,098
2023		338,594
2024		190,982
	\$	1,551,367

The annual amounts beyond 2024 range from \$27,746,000 to \$174,603,000 until 2050.

14. Statement of cash flows:

	2019	2018
Non-cash changes to operations:		
Amortization of tangible capital assets	\$ 212,942	\$ 197,854
Amortization of bond premium	(66)	(112)
Amortization of debt issue cost	-	519
Amortization of deferred concessionaire credit	(23,273)	(23,273)
Amortization of deferred government transfers	(318,586)	(224,781)
Amortization of deferred lease inducements net of additions	(209)	58
Write-down of tangible capital assets	-	8,299
Loss (gain) on disposal of tangible capital assets	(506)	34
	\$ (129,698)	\$ (41,402)
Changes in non-cash operating working capital:		
Decrease (increase) in accounts receivable	\$ 3,709	\$ (129,746)
Decrease in loan receivable	60,725	59,463
Increase in supplies inventory	(10,312)	(5,287)
Increase in prepaid expenses	(2,704)	(6,803)
Increase in accounts payable and accrued liabilities	27,965	71,210
Increase in deferred revenue and deposits	7,065	8,724
Increase in employee future benefits	4,056	8,751
	\$ 90,504	\$ 6,312

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

15. Financial instruments:

(a) Credit, interest and foreign exchange risk:

Unless otherwise noted, it is management's opinion that the Authority is not exposed to any significant credit or interest rate risk as a result of its financial instruments.

The Authority is exposed to minimal credit risk as the majority of its accounts receivables are due from government sources.

Interest rate risk related to the Authority's debt will be subject to the market interest rates at the date of refinancing, but this risk is mitigated by spreading maturities of borrowings over multiple years and also regularly making contributions to sinking funds in order to repay all long-term bullet debt over a pre-determined amortization period.

During the year, the Authority entered into an interest rate hedging contract to lock in the 30-year Canada benchmark yield at a nominal amount of \$150,000,000. Settlement of the contract resulted in a realized loss of \$10,500,000 which has been recorded in interest expense.

The Authority's operations are all based in Canada and exposure to foreign exchange fluctuations is not significant.

There has been no change to any of the risk exposures from 2018.

(b) Fair values:

The fair values of certain debt and assets are represented in the table below. Management considers term deposits and money market instruments carrying amounts to approximate fair values. For all other classes of financial instruments presented in these consolidated financial statements, management considers the carrying amounts approximate the fair values.

	Fair values	Amortized cost
2019		
Restricted investments:		
Government transfers for capital projects - bonds	\$ 22,885	\$ 22,637
TPCC - bonds	24,284	24,123
Self-administered sinking funds - bonds	320,545	297,080
2018		
Restricted investments:		
Government transfers for capital projects - bonds	\$ 19,906	\$ 19,866
TPCC - bonds	24,921	25,095
Self-administered sinking funds - bonds	266,575	264,241

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

16. Taxation revenue:

	2019	2018
Fuel tax	\$ 403,081	\$ 351,338
Property tax	382,748	355,838
Parking sales tax	81,871	73,201
Hydro levy	21,461	21,088
Replacement tax	17,808	17,889
	<u>\$ 906,969</u>	<u>\$ 819,354</u>

17. Segmented information:

(a) Bus operations:

Fixed route bus services, SeaBus service and custom transit are delivered through TransLink's wholly-owned subsidiary, Coast Mountain Bus Company Ltd., and various contractors that operate the Community Shuttle routes, West Vancouver Blue Bus, and HandyDART. The Bus operations represent the operating costs and the allocated depreciation and interest costs.

(b) Corporate operations:

TransLink corporate is the organization's head office, responsible for organizational leadership and oversight, and the development and undertaking of TransLink's strategic transportation and financial plans. Other functions centralized at the corporate office include capital project approvals, legal services, information systems, human resources, corporate finance, transportation systems planning, internal audit, marketing, real estate services and the transportation demand management program.

(c) Rail operations:

Automated light rail and commuter train services are provided by TransLink's wholly-owned subsidiaries, British Columbia Rapid Transit Company Ltd. and West Coast Express Ltd., and through the concession agreement for the Canada Line. The Rail operations represent the operating costs and the allocated depreciation and interest costs.

(d) Roads and bridges:

TransLink owns and operates the Knight Street Bridge, Pattullo Bridge, Westham Island Bridge, and the Golden Ears Bridge. In partnership with the municipalities, TransLink supports the Major Road Network ("MRN"), a network of major roads throughout Metro Vancouver. The MRNs are generally owned by municipalities. TransLink provides funding for the operations, maintenance, and rehabilitation of the MRN, and shares in the costs of eligible capital improvements.

(e) Transit Police:

The South Coast British Columbia Transportation Authority Police Service ("Transit Police") maintains order, safety and security on transit facilities and adjacent areas, and is authorized to enforce laws. The Transit Police coordinate its activities with jurisdictional police as well as other transit security staff.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

Notes to Consolidated Financial Statements (continued)

(Tabular amounts expressed in thousands of dollars, unless otherwise indicated)

Year ended December 31, 2019

17. Segmented Information (continued):

	2019					Total	2018
	Bus operations	Corporate operations	Rail operations	Roads and bridges	Transit Police		
Revenues:							
Taxation	\$ -	\$ 906,969	\$ -	\$ -	\$ -	\$ 906,969	\$ 819,354
Transit	-	685,362	-	-	-	685,362	638,015
Government transfers	-	398,520	-	3	-	398,523	303,498
Amortization of deferred concessionaire credit	-	-	23,273	-	-	23,273	23,273
Investment income	-	58,024	-	-	-	58,024	53,203
Miscellaneous revenue	2,813	3,910	953	2	1,349	9,027	11,894
Gain (loss) on disposal of tangible capital assets	-	506	-	-	-	506	(34)
	2,813	2,053,291	24,226	5	1,349	2,081,684	1,849,203
Expenses:							
Administration	19,371	22,532	5,426	157	3,860	51,346	49,543
Capital infrastructure contributions	-	-	-	37,310	-	37,310	40,416
Contracted services	76,093	15,298	125,727	5,371	-	222,489	220,349
Fuel and power	51,343	-	16,412	-	-	67,755	71,706
Insurance	21,821	251	5,246	1,013	104	28,435	24,142
Maintenance, materials and utilities	72,948	1,999	50,791	48,390	1,851	175,979	163,606
Professional and legal	3,203	23,637	3,348	1,197	352	31,737	30,768
Rentals, leases and property tax	14,957	11,119	1,287	285	1,965	29,613	26,937
Salaries, wages and benefits	499,129	46,634	116,011	1,360	32,756	695,890	646,654
Write-down of tangible capital assets	-	-	-	-	-	-	8,299
Expenses before amortization and interest	758,865	121,470	324,248	95,083	40,888	1,340,554	1,282,420
Amortization of tangible capital assets	99,851	16,469	75,874	20,079	669	212,942	197,854
Interest	60,762	10,014	46,161	77,644	402	194,983	183,459
	160,613	26,483	122,035	97,723	1,071	407,925	381,313
	919,478	147,953	446,283	192,806	41,959	1,748,479	1,663,733
Surplus (deficit) for the year	\$ (916,665)	\$ 1,905,338	\$ (422,057)	\$ (192,801)	\$ (40,610)	333,205	\$ 185,470

TO: Board of Directors

FROM: Christine Dacre, Chief Financial Officer and Vice President Financial Services

DATE: March 4, 2020

SUBJECT: 2019 Year-End and Performance Report

EXECUTIVE SUMMARY

TransLink's 2019 Year-End and Performance Report presents performance results as at December 31, 2019 compared to the budget and prior year results. In 2019, TransLink's many accomplishments included significantly expanding our fleet, increasing service to meet the demands of growing ridership and launching new and innovative services and initiatives to improve customer experience and to ensure customer safety. These efforts cumulated with TransLink being named the American Public Transportation Association's 2019 Transit System of the Year. TransLink ended the year with a \$333.2 million accounting surplus.

PURPOSE

The purpose of this report is to provide an overview of TransLink's 2019 Financial and Performance results as at December 31, 2019 compared to the established budget and results for last year.

SUMMARY

In 2019 TransLink successfully delivered on our priorities as committed to our customers, notably we:

- Expanded our fleet, commissioning 175 new conventional buses, 38 new community shuttle vehicles, 50 new HandyDART vehicles and 28 new SkyTrain cars into full revenue service;
- Implemented a ten-minute weekday peak service for SeaBus and increased Expo Line and Millennium Line peak hour service by 9 per cent and 5 per cent, respectively;
- Launched multiple new and innovative services to improve the delivery of information to customers by installing Passenger Information Displays SkyTrain stations and RapidBus bus stops, setting up a new SkyTrain Assistance Centre at Commercial-Broadway SkyTrain station, installing digital touch screen kiosks at SkyTrain and Bus exchange locations and replacing the TransLink mobile website with a new, more responsive website; and
- Launched initiatives to ensure customer safety including implementing a more visible "See Something, Say Something" campaign, updating alarm strips on SkyTrain and Canada Line vehicles and launching the "anti-sexual offending" campaign for which Transit Police won the International Association of Law Enforcement Planners' Phil E. Keith Project of the Year award.

For the year ended December 31, 2019, TransLink reported a \$333.2 million accounting surplus. Transit revenues were \$685.4 million which is 7.4 per cent higher than last year - a reflection of continued ridership growth attributable to service improvements and expansion across the system. Legislative increases in motor fuel tax by 1.5 cents per litre, parking rights tax rates from 21% to 24% and a one-time \$10 million increase to property taxes were enacted to fund Phase 2 expansion. Other notable items impacting 2019 results include:

- Lower fuel and power, professional and legal and salaries, wages and benefits expenses which were \$12.7, \$4.2 and \$5.8 million favourable to budget, respectively;
- Higher interest expense, which was \$9.9 million unfavourable to budget, mainly due to the settlement cost of a bond forward contract; and
- Lower unrestricted cash and investments compared to 2018 mainly due to timing of capital spending.

TransLink's capital 2019 program budget was \$5.5 billion, with \$3.3 billion in active projects. The final forecasted costs for these active projects are 0.7 per cent or \$24.1 million below budget.

In addition, an overall improvement was seen in the following operating indicators:

- Scheduled transit service complaints per million boarded passengers decreased by 5.0% due to continued service expansion and service reliability;
- Service hours increased 1.5 per cent and Access Transit delivered an additional 66 thousand trips over 2018 and as a result of service expansion;
- Ridership increased by approximately 3.6 per cent in boardings and 3.7 per cent in journeys over 2018 due to service expansion and overall improvements in transit service; and
- Total cost recovery ratio improved from 58.1 per cent in 2018 to 58.9 per cent in 2018 as revenue growth, driven by record ridership, outpaced operating cost increases as cost efficiencies were realized in fuel, power and maintenance expenses.



2019 Year-End Financial and Performance Report



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Caution Regarding Forward-Looking Statements

From time to time, TransLink makes written and/or oral forward-looking statements, which may appear in this document and in other communications. In addition, representatives of TransLink may make forward-looking statements orally to analysts, investors, the media and others.

Forward-looking statements, by their nature, require TransLink to make assumptions and are subject to inherent risk and uncertainties. In light of the uncertainty related to the financial, economic and regulatory environments, such risks and uncertainties, many of which are beyond TransLink's control and the effects of which can be difficult to predict, may cause actual results to differ materially from the expectations expressed in the forward-looking statements.

1. Financial and Performance Summary

Building Transportation Excellence

TransLink delivers a wide range of services and programs to meet the transportation needs of 2.5 million people in Metro Vancouver. These include Bus, SeaBus, SkyTrain, West Coast Express, and HandyDART services. Guided by a regional mandate, TransLink provides a transportation system that moves people and goods, while supporting the growth strategy, environmental objectives, and economic development of the region.

To meet the challenges of growth and congestion in a way that is affordable and fair, in 2014 the Mayors' Council on Regional Transportation developed the 10-Year Vision for Metro Vancouver Transit and Transportation (the "10-Year Vision"). 2019 marked the third year in Phase One of the 10-Year Vision and the second year in Phase Two of the 10-Year Vision: 2018-2027 Investment Plan (the "Investment Plan").

2019 was a busy and successful year where TransLink focused on continuing the ambitious expansion of transit services throughout the region, investing in critically required maintenance on the system to ensure safety and reliability and enhancing the customer experience. Notably we:

- Increased Scheduled Transit service hours by 1.5 per cent and number of Access Transit trips by 5.0 per cent over 2018;
- Commissioned 175 new conventional buses, 38 new community shuttle vehicles, 50 new HandyDART vehicles and 7 new trains with 4 rail cars each;
- Commissioned four battery-electric buses and two on-route overhead fast chargers, bringing us one step closer to reaching our sustainability goals;
- Showcased Transport 2050, the blueprint for the future of transportation in Metro Vancouver, engaging with the public the region's transportation vision, strategies and priorities between now and 2050;
- Introduced Compass Mini and added American Express to the Tap to Pay program as additional convenient options to use the system; and
- Received the American Public Transportation Association's 2019 Transit System of the Year award.

For the year ended December 31, 2019, TransLink reported a \$333.2 million surplus on a Public Sector Accounting Board ("PSAB") basis. This is an increase of \$147.7 million from 2018 and \$144.0 million better than budget.

Ridership growth continues to be driven by service expansion and service improvements committed in the 10-Year Vision combined with high employment levels and fuel prices. While Access Transit services have exceeded the expansion outlined in the Mayors' Vision, it is still unable to meet the increase in the demand for these services. In 2019, TransLink added more communications channels for transit riders by installing new Passenger Information Displays throughout the network and set up customer kiosks to provide better service to the customers.

Looking ahead, 2020 will be a year of intensive project development as TransLink continues to deliver on the planned expansion, invest in maintenance and repairs and improve customer experience by creating enhancements to the system. TransLink will build on 2019's progress toward realizing the vision of creating a better place to live, built on transportation excellence.

Key Priorities

The accomplishments of 2019 are based on the three main priorities: 1) Implement the Mayors' 10-Year Vision, 2) Ensure a state of good repair and 3) Improve customer experience and public support. The following table highlights the accomplishments in 2019.

Priority One: Implement the Mayors' Council's Vision

We will successfully deliver the capital projects, service expansion and policy initiatives necessary to implement the Mayors' Council's Vision.

- Commissioned a total of 175 new conventional buses, 38 new community shuttle vehicles and 50 new HandyDART vehicles into full revenue service.
- Received vehicles and delivered route training to operators for the launch of four new RapidBus routes in January 2020.
- As a result of service expansion, 25 classes of operator training were delivered for 648 new Transit Operator Trainees with 451 trainees successfully graduating into service in 2019.
- Implemented a ten-minute weekday peak service for SeaBus with the existing fleet and successfully recruited a crew to support expanded service levels.
- Commissioned a total of seven new trains with four rail cars each, into full revenue service, bringing the total rail car fleet to 314.
- Implemented service expansion with 9.0 per cent more service on the Expo Line and 5.0 per cent more service on the Millennium Line during peak hours.
- Completed the Guildford Exchange and 22nd Street Exchange construction and continued construction work on Nanaimo Station Exchange, Lonsdale Quay Exchange, and Brighthouse Bus Exchange.
- Completed the Phase 1 design of the SeaBus Terminals Interior Refurbishment and continued to work on the SeaBus Terminals exit ramp replacement.
- Various measures were undertaken to modernize the Expo and Millennium Lines infrastructure:
 - Completed the construction of the Operations and Maintenance Centre (OMC 3) and progressed to the testing phase.
 - Design for OMC 4 and the Operations Control Center is complete, design for OMC 1 & 2 is 70.0 per cent complete.
- Surrey Central Station and Phase II of Joyce-Collingwood Station upgrades were completed.
- BC Hydro early works for propulsion power and construction of the Broadway Subway Project were completed. The relocation of trolley overhead infrastructure to accommodate bus route changes during construction are approximately 80.0 per cent complete.
- Participated in the electric-battery bus demonstration and integration trial of the Canadian Urban Transit Research & Innovation Consortium with the deployment of four battery-electric buses and two overhead chargers.

Priority Two: Maintain a State of Good Repair

TransLink will proactively manage and maintain all assets in a state of good repair to ensure safety and reliability, optimize lifecycle costs and enhance the customer experience.

- Installed three new radio consoles in the Transit Communications Center (T-Comm) and equipped 94 buses with the new radio system.
- Completed installation of new fareboxes on Community Shuttle fleet and receiver vaults to collect revenue from the fareboxes.
- Completed lighting and mechanical retrofit projects at the Richmond Transit Centre and Vancouver Transit Centre respectively and installed an energy efficient compressor at the Surrey Transit Center.
- Completed roll out of the 8,000-kilometre internal Preventative Maintenance program at all transit centers, in accordance with Commercial Vehicle Safety Enforcement requirements.
- Completed repaving work at the Marpole Bus Loop, Port Coquitlam Transit Centre and Maple Meadows Exchange.
- Successfully replaced 6.2-kilometre running rail along with 5,900 rail pad assemblies.
- Numerous upgrades were made to the Trolley Overhead Infrastructure and various transit centers.
- Launched a new Visual Management Centre at BCRTC in 2019 to monitor performance metrics.
- Completed construction of the Seismic Early Warning and Wind Monitoring System, with the launch anticipated in early 2020.

Priority Three: Enhance Customer Experience

With a customer first approach, we will build public trust and confidence in TransLink by focusing on growing ridership, engaging stakeholders and implementing the Mayors' Council's 10-Year Vision.

- Installed and activated 111 Passenger Information Displays (PIDS) at 14 SkyTrain stations on Expo and Millennium Lines as well as 94 PIDs at RapidBus bus stops, completed setting up a new SkyTrain Assistance Centre manned by attendants at Commercial-Broadway SkyTrain station and installed 27 digital touch screen kiosks at SkyTrain and Bus exchange locations in 2019.
- The TransLink mobile website was replaced with a new, more responsive website with new features including a map-based trip planner, new fare calculator, improved feedback form and alerts sign-up.
- Implemented a Shared Mobility Compass Card Pilot project with ride-sharing and bike-sharing organizations.
- Initiated the following improvements to SkyTrain stations and bus exchanges:
 - Delivered new public art at the Commercial Broadway, Surrey Central, 22nd Street and Joyce-Collingwood stations.
 - Completed Phase 1 of BC Parkway priority lighting in the Royal Oak area.
 - Finalized BC Parkway Intersection improvement study and Advanced BC Parkway Design Guidelines development.
 - Advanced Customer Washroom Implementation Strategy development.
- Carried out construction at the Columbia, Edmonds, Evergreen and Dunsmuir SkyTrain tunnels to enhance wireless coverage.
- Implemented a more visible “See Something, Say Something” campaign, updated alarm strips were installed on SkyTrain and Canada Line vehicles. Launched the “anti-sexual offending” campaign for which Transit Police won the International Association of Law Enforcement Planners’ Phil E. Keith Project of the Year award.
- Completed training in vapour scent explosive detection for the Transit Police Explosive Scent Detection Dog Teams for conducting security sweeps.
- Conducted eight live “Active Assailant” exercises for Transit Police Officers and established a Transit Police threat response protocol.
- Launched a Bait Bike Project to address bike thefts at transit bike storage facilities and racks.
- Launched joint operations with jurisdictional Police to tackle shoplifting from businesses nearby stations, where transit is being used by the offenders to leave the area.
- Transit Police produced a tri-fold card to help communication between Transit Police Officers and persons who are deaf or hard of hearing, in consultation with the Western Institute for the Deaf and Hard of Hearing.
- Developed 11 instructional videos geared towards passengers with disabilities. Negotiations were held with taxi associations to improve service, including a premium for wheelchair service and mandatory training for all drivers doing HandyDART trips.

2. 5 Year Summary

TransLink continues to maintain financial strength to support the long-term vision and enable expansion. Financial and operating indicators are measured and monitored throughout the year.

TransLink's discipline and financial management practices have resulted in continued improvements in unrestricted cash and investments, with a strong balance of \$563.3 million as at December 31, 2019. The primary reason for the large reserve has been to provide additional liquidity ahead of the anticipated larger capital spend under Phase 2 of the 10-Year Vision. Conscious and proactive decision making has set up the organization for success by creating financial capacity and ensuring TransLink is on the right track for managing the financial horizon.

TransLink's robust borrowing program provides an ability to go directly to the capital markets with a solid reputation as a good investment, meaning greater cost certainty for debt management. It provides assurance to the credit rating agencies and investors and provides flexibility to TransLink to use both short-term and long-term financing.

TransLink has an expanding Capital Program with strong oversight. Tangible capital assets grew to \$5.4 billion as at December 31, 2019 from \$5.1 billion as at December 31, 2018. At the end of 2019, the total capital program budget was \$5.5 billion, with \$3.3 billion in active projects. For the active capital projects, final forecasted costs for these projects are 0.7 per cent favourable to budget.

Ridership has continued to grow, with 272.4 million journeys overall, a 3.7 per cent increase from 2018. TransLink's ongoing commitment to deliver on service expansion has resulted in continuous service hour increases with 7.0 million service hours delivered in 2019, a 1.5 per cent improvement over 2018. Efficiency gains and effective service optimization initiatives have resulted in an improvement in the cost recovery rate from 58.1 per cent in 2018 to 59.7 per cent in 2019.

Key financial and operating indicators are shown in the following table provide a five-year historical summary.

5 YEAR PERFORMANCE TRENDS								
Year ended December 31 (all numbers in millions unless otherwise stated)	2015	2016	2017	2018	2019	COMPARISON TO 2018 ⁹		Compound Annual Growth Rate (CAGR) ⁹
						Fav / (Unfav)	%	
FINANCIAL INDICATORS								
Unrestricted cash and investments ¹	271.9	333.4	485.0	578.2	563.3	(14.9)	(2.6%)	20.0%
Tangible capital assets	4,606.6	4,868.0	4,907.2	5,079.2	5,381.3	302.1	5.9%	4.0%
Net direct debt ²	1,989.9	2,149.8	2,220.7	2,371.4	2,375.4	(4.0)	(0.2%)	(4.5%)
Indirect P3 debt ³	1,623.3	1,598.1	1,571.3	1,542.9	1,512.6	30.3	2.0%	1.8%
Total net direct debt and indirect P3 debt	3,613.2	3,747.9	3,792.1	3,914.3	3,888.0	26.3	0.7%	(1.8%)
Gross interest cost as a % of operating revenue	12.4%	12.0%	12.2%	11.9%	11.5%	0.4%	3.4%	1.9%
OPERATING INDICATORS								
Scheduled Transit Service								
Overall performance rating (out of 10)	7.5	7.6	7.7	7.8	7.8	-	-	1.0%
Service hours	6.3	6.3	6.7	6.9	7.0	0.1	1.5%	2.7%
Total Cost recovery ratio ^{4,5}	53.6%	54.7%	55.9%	58.1%	58.9%	0.8%	1.4%	2.4%
Operating cost per capacity kilometre ^{*6}	\$ 0.084	\$ 0.085	\$ 0.084	\$ 0.086	\$ 0.089	\$ (0.003)	(3.7%)	(1.5%)
Complaints per million boarded passengers *	98.9	98.7	93.4	95.4	90.6	4.8	5.0%	2.2%
Access Transit Service								
Number of trips (thousands)	1,205	1,227	1,250	1,315	1,382	66	5.0%	3.5%
Operating cost per trip*	\$ 40.64	\$ 40.95	\$ 42.73	\$ 41.34	\$ 39.26	\$ 2.08	5.0%	0.9%
Number of trips denied (thousands)	1.6	3.6	1.4	0.7	1.4	(0.7)	(96.2%)	3.0%
Complaints per 100,000 boarded passengers*	99.7	107.7	120.2	187.3	201.8	(14.5)	(7.7%)	(19.3%)
Ridership								
Boarded passengers (system)	364.3	386.2	408.2	437.4	452.9	15.6	3.6%	5.6%
Revenue passengers (system) ⁸	238.8	n/a	n/a	n/a	n/a			
Journeys (system) ⁸	n/a	234.2	247.8	262.6	272.4	9.8	3.7%	5.2%
Average fare per revenue passenger (scheduled)*	\$ 2.06	n/a	n/a	n/a	n/a			
Average fare per journey (scheduled)*	n/a	\$ 2.24	\$ 2.31	\$ 2.35	\$ 2.42	\$ 0.07	3.0%	2.6%
REGIONAL INDICATORS								
Population of Service Region	2.51	2.56	2.59	2.62	2.69	0.07	2.7%	1.8%
Employment of Service Region	1.29	1.36	1.40	1.43	1.47	0.05	3.4%	3.3%

* Per unit calculation

¹ This represents the accumulated funded resources as calculated under the SCBCTA Act and is the amount of resources available to fund future operations

² Includes bonds, debentures, capital leases, short-term debt net of sinking funds and debt reserve deposits

³ Includes Deferred concessionaire credit for Canada Line and Contractor liability for Golden Ears Bridge

⁴ Includes operating costs of Bus, Rail, Transit Police and Corporate On-going

⁵ Restated 2017 to reflect year end adjustments

⁶ Includes operating costs of Bus, Rail and Transit Police (excludes Corporate and Access Transit costs)

⁷ Reflects billable crossings only. 2017-2018 comparable data not available due to the elimination of GEB Tolls effective September 1, 2017

⁸ Journeys have replaced revenue passengers as the new ridership methodology, therefore comparative historical figures are not available

⁹ Calculations based on whole numbers

Financial Indicators

TransLink's unrestricted cash and investments is a metric representing the accumulated funding resources as required under the South Coast British Columbia Transportation Authority (SCBCTA) Act. This represents the amount of resources available to fund future operations. The Compound Annual Growth Rate (CAGR) since 2015 is 20.0 per cent. The increase is primarily to provide additional liquidity ahead of the anticipated larger capital spend under Phase Two of the 10-Year Vision. Unrestricted cash and investments have decreased by \$14.9 million from 2018 mainly due to the timing of capital spending.

Capital assets increased from \$4.6 billion in 2015 to \$5.4 billion in 2019. This represents a CAGR increase of 4.0 per cent. Compared to 2018, capital assets increased \$302.1 million (5.9 per cent) mainly due to acquisition of new buses and SkyTrain vehicles for replacement and expansion, and investments in station upgrades and other various infrastructure and system improvements.

Net direct debt has increased by \$385.5 million since 2015, a 4.5 per cent CAGR increase, to help finance capital projects. Compared to 2018, net direct debt increased by \$4.0 million (0.2 per cent) as the rate of borrowing to finance expected capital spending has outpaced maturing debt.

Indirect P3 debt declined by \$110.7 million or 1.8 per cent CAGR since 2015. Compared to 2018, Indirect P3 debt decreased by \$30.3 million (2.0 per cent) mainly due to amortization of the Canada Line deferred concessionaire credit.

Gross interest costs as a percentage of operating revenues decreased from 12.4 per cent to 11.5 per cent over the five-year period due to lower interest rates and higher operating revenues. Compared to 2018, TransLink's gross interest costs as a percentage of operating revenues continued to decrease from 11.9 per cent to 11.5 per cent due to revenue growth continuing to outpace growth in interest cost. The ratio continues to be well within TransLink's 20.0 per cent policy limit.

Operating Indicators

Scheduled Transit Service

The overall performance rating which measures the average customer satisfaction across the entire system has been improving over the five year period, from a 7.5 out of 10 rating in 2015 to a 7.8 rating in 2019. The 2019 ratio remains the same as last year. Improvements throughout the past five year period are mainly due to:

- Continued progress on service expansion and service reliability including implementing 10-minute weekday SeaBus service and commissioning new buses and trains;
- Installation of Passenger Information Displays and setup of customer kiosks at SkyTrain and Bus Exchange locations to increase communications with customers to provide information and advice about travel plans; and
- Expansion of the system-wide use of "See Something, Say Something" campaign and enhanced public safety campaign and community outreach to increase public safety awareness.

Service hours increased by 1.5 per cent in 2019 over 2018 mainly as a result of service expansion for bus service to address overcrowding. Over the past five years, service hours has increased by a CAGR of 2.7 per cent as a result of service expansion, scheduling efficiencies and service optimization.

The total cost recovery ratio measuring the percentage of direct operating costs covered by transit revenues increased by 2.7 per cent in comparison to 2018 as revenue growth, driven by record ridership,

outpaced operating cost increases. Lower fuel, power and maintenance costs year over year also contributed to improvement in this ratio. The increase to the cost recovery ratio over the past five years by a CAGR of 2.7 per cent is mainly due to the increasing revenue trend since 2015.

Operating costs per capacity kilometre has increased by 1.5 per cent CAGR over the five-year period. Compared to 2018, this metric was 3.7 per cent higher mainly due to labour increases as a result of contractual increases and the new Employer Health Tax.

Complaints per million boarded customers decreased by 5.0 per cent in 2019 from 2018. This is mainly attributed to improvements in Transit Operator customer service and continued efforts to provide timely and consistent transit information to our customers. Over the last five years, complaints per million boarded customers have decreased by a CAGR of 2.2 per cent due to ongoing improvements in service expansion, safety and reliability.

Access Transit Service

An additional 66,424 trips were delivered in 2019 as compared to 2018, which represents an increase of 5.0 per cent. This is mainly due to the expansion committed in the Investment Plan. Over the last 5 years, the number of trips delivered has increased by a CAGR of 3.5 per cent.

Trip denials have decreased by 3.0 per cent CAGR since 2015. However, trip denials have increased from 0.7 thousand denials in 2018 to 1.4 thousand denials on 2019. This is mainly due to the increase in demand in 2019 exceeding our fleet capacity.

The decrease in operating costs per trip of 5.0 per cent from 2018 is due to a change in service providers. The contract terms for the new provider include standards tied to financial levers and more rigorous reporting and monitoring requirements, providing greater oversight and accountability for HandyDART's operations. Since 2015, the CAGR for operating cost per trip has improved by 0.9 per cent.

Complaints per one hundred thousand boarded passengers have increased by 7.7 per cent from 2018. Due to the increase in demand, HandyDART delivered more trips than planned in 2019, causing strain on the system and resulting in more passengers per HandyDART vehicle and increased use of taxis. With a goal to improve service, a concerted effort was made in 2019 to engage with HandyDART customers through surveys, community open houses, quarterly newsletters, and outreach calls. HandyDART Operator refresher training will be rolled out in January 2020 and the service provider will expand its customer service training to the taxi companies in 2020.

Ridership

A Boarding represents each time a passenger enters a fare paid zone using Compass fare media or other proof of payment including transfers. Boardings for Scheduled Transit Service and Access Transit achieved a record of 452.9 million in 2019, growing by 5.6 per cent CAGR over the five-year period and 3.6 per cent over 2018.

Journeys represent a complete transit trip using Compass fare media or other proof of payment, regardless of the number of transfers. Journeys for Scheduled Transit Service and Access Transit also achieved a record of 272.4 million growing by 3.7 per cent over 2018.

Strong ridership growth in 2019 is a result of improved transit service and strong economic growth with low unemployment. Ridership growth slowed in the second half of the year following the July 1, 2019 fare

increase. Growth was also negatively impacted in November and December by the labour actions in the Bus and Rail divisions.

The Average Fare per Journey in 2019 was \$2.42 which is \$0.07 (3.0 per cent) higher than 2018 mainly due to the fare increases rolled out on July 1, 2019.

3. Consolidated Statement of Operational Analysis

CONSOLIDATED REVENUES AND EXPENSES Year ended December 31 (\$ thousands)	YEAR OVER YEAR				ACTUAL TO BUDGET		
	2019	2018	Change		2019	Budget Variance	
	ACTUAL	ACTUAL	Fav/(Unfav)	%	BUDGET ²	Fav/(Unfav)	%
Revenue							
Taxation	906,969	819,354	87,615	10.7%	874,526	32,443	3.7%
Transit	685,362	638,015	47,347	7.4%	669,274	16,088	2.4%
Government transfers	398,523	303,498	95,025	31.3%	388,039	10,484	2.7%
Investment income	58,024	53,203	4,821	9.1%	52,850	5,174	9.8%
Amortization of deferred concessionaire credit	23,273	23,273	-	-	23,337	(64)	(0.3%)
Miscellaneous revenue	9,027	11,894	(2,867)	(24.1%)	5,882	3,145	53.5%
Sub Total Continuing Operations	2,081,178	1,849,237	231,941	12.5%	2,013,908	67,270	3.3%
Gain (Loss) on disposal of tangible capital assets	506	(34)	540	(1588.2%)	(122)	628	(514.8%)
Total Revenue	2,081,684	1,849,203	232,481	12.6%	2,013,786	67,898	3.4%
Expenses							
Bus Operations	758,865	724,883	(33,982)	(4.7%)	777,820	18,955	2.4%
Corporate Operations	103,260	96,795	(6,465)	(6.7%)	102,132	(1,128)	(1.1%)
Rail Operations	324,248	309,195	(15,053)	(4.9%)	326,870	2,622	0.8%
Roads and Bridges	95,083	91,210	(3,873)	(4.2%)	94,691	(392)	(0.4%)
Transit Police	40,888	38,308	(2,580)	(6.7%)	40,845	(43)	(0.1%)
Amortization of tangible capital assets ¹	212,942	197,854	(15,088)	(7.6%)	226,513	13,571	6.0%
Interest ¹	194,983	183,459	(11,524)	(6.3%)	185,118	(9,865)	(5.3%)
Sub Total Continuing Operations	1,730,269	1,641,704	(88,565)	(5.4%)	1,753,989	23,720	1.4%
Corporate One-time	18,210	22,029	3,819	17.3%	70,576	52,366	74.2%
Total Expenses	1,748,479	1,663,733	(84,746)	(5.1%)	1,824,565	76,086	4.2%
Surplus for the Year	333,205	185,470	147,735	79.7%	189,221	143,984	76.1%

¹ Amortization and Interest shown separately to facilitate analysis

² Budget reallocated due to approved contingency

TransLink ended the 2019 year with a \$333.2 million surplus. The increase over the prior year is mainly attributed to higher fuel and property tax revenues as well as higher funding by the Federal Gas Tax. Transit revenues continue to exceed expectations as a result of continued ridership growth, a robust economy and high employment rates.

Expenses have increased by 5.1 per cent from 2018, due to the service expansion for Conventional Bus and SkyTrain. Expenses were favourable to budget as a result of lower fuel prices and contract costs, fewer maintenance and repair costs as well as vacancy savings.

Details of the variances are provided in the following analysis.

Consolidated Revenues – Comparison to 2018

CONSOLIDATED REVENUES		YEAR OVER YEAR		
Year ended December 31 (\$ thousands)	ACTUAL		Change	
	2019	2018	Fav/ (Unfav)	%
Taxation	906,969	819,354	87,615	10.7%
Transit	685,362	638,015	47,347	7.4%
Government transfers				
Senior Government Funding	338,451	245,632	92,819	37.8%
Golden Ears Bridge Tolling Replacement Revenue	60,072	57,866	2,206	3.8%
Investment income	58,024	53,203	4,821	9.1%
Amortization of deferred concessionaire credit	23,273	23,273	-	-
Miscellaneous revenue	9,027	11,894	(2,867)	(24.1%)
Sub Total Continuing Operations	2,081,178	1,849,237	231,941	12.5%
Gain (Loss) on disposal of tangible capital assets	506	(34)	540	1,588.2%
Total Revenue	2,081,684	1,849,203	232,481	12.6%

The SCBCTA Act provides TransLink with access to revenue sources that are used to fund the provision and support of transportation services. Revenues are mainly comprised of taxation, transit fares and government transfers. Total revenues increased from \$1.8 billion in 2018 to \$2.1 billion in 2019, mainly due to increased government transfers, taxation revenue and transit revenue.

The strong economy, high employment rates and high gas prices have led to higher demand for public transportation. Service expansion implemented throughout 2019 led to record ridership levels with 452.9 million boardings and 272.4 million journeys.

Taxation

TAXATION REVENUES		YEAR OVER YEAR		
Year ended December 31 (\$ thousands)	ACTUAL		Change	
	2019	2018	Fav/ (Unfav)	%
Fuel tax	403,081	351,338	51,743	14.7%
Property tax	382,748	355,838	26,910	7.6%
Parking Rights tax	81,871	73,201	8,670	11.8%
Hydro levy	21,461	21,088	373	1.8%
Replacement tax	17,808	17,889	(81)	(0.5%)
Total Taxation	906,969	819,354	87,615	10.7%

Total taxation revenues were \$87.6 million (10.7 per cent) higher than 2018, mainly due to higher fuel, property and parking rights tax revenues.

Fuel tax revenue increased by \$51.7 million (14.7 per cent) compared to 2018, due in part to the increase in fuel tax rate from \$0.17/L to \$0.185/L which was in effect as of July 1, 2019. Higher fuel consumption of diesel and gasoline in the region also contributed to the growth in fuel tax revenue year over year. In addition, a \$14.5 million adjustment related to prior year sales was identified during the year and reflected in the 2019 results.

Property tax revenue increased by \$26.9 million (7.6 per cent) compared to 2018 due to legislative increases in taxation from existing properties, from new development and construction growth and from a \$10.0 million increase to property taxes that was part of the funding to pay for the Phase 2 expansion.

Parking rights tax revenue increased by \$8.7 million (11.8 per cent) over 2018 mainly due to the rate increase from 21.0 per cent to 24.0 per cent implemented on July 1, 2019.

Transit

TRANSIT REVENUES Year ended December 31 (\$ thousands)	YEAR OVER YEAR			
	ACTUAL		Change	
	2019	2018	Fav/ (Unfav)	%
Fares	533,330	494,751	38,579	7.8%
Program	123,652	118,635	5,017	4.2%
Total Fares	656,982	613,386	43,596	7.1%
Other transit	28,380	24,629	3,751	15.2%
Total Transit	685,362	638,015	47,347	7.4%

Total transit revenue includes fares, program and other transit related revenue such as transit advertising, Park and Ride and fare infraction revenue. Total transit revenue in 2019 was \$685.4 million, an increase of \$47.3 million (7.4 per cent) over 2018.

In 2019, total revenue from fares was \$533.3 million which is \$38.6 million (7.8 per cent) higher than 2018. The increase is a result of the major service expansion rolled out in 2019 as part of the Investment Plan. Total ridership reached an all-time record high of 452.9 million boardings (3.6 per cent increase over 2018) equivalent to 272.4 million journeys across the entire system (3.7 per cent increase over 2018). The fare increase implemented on July 1, 2019 also contributed to the growth in revenue year over year.

Program revenue includes revenues from U-Pass BC and the BC Government Bus Pass programs. In 2019, program revenue totalled \$123.7 million, which is \$5.0 million (4.2 per cent) higher than 2018 mainly due to increased participation in both programs.

Other transit revenue totalled \$28.4 million in 2019, a \$3.8 million (15.2 per cent) increase over 2018. This was mainly due to increased advertising income, higher property rental revenues and an increase in the sale of carbon tax credits.

Government Transfers

GOVERNMENT TRANSFERS Year ended December 31 (\$ thousands)	YEAR OVER YEAR			
	ACTUAL		Change	
	2019	2018	Fav/ (Unfav)	%
Senior Government Funding	338,451	245,632	92,819	37.8%
Golden Ears Bridge Tolling Replacement Revenue	60,072	57,866	2,206	3.8%
Total Government Transfers	398,523	303,498	95,025	31.3%

Government transfers include funds received from the Federal Gas Tax, Canada Line funding, Building Canada Fund, Public Transit Infrastructure Fund and other miscellaneous programs such as the City of Richmond contributions for Capstan Station. In addition, there is funding provided by the Province of BC in lieu of tolling revenue on the Golden Ears Bridge as bridge tolling was eliminated on September 1, 2017.

Total government transfers were \$95.0 million (31.3 per cent) higher than 2018, as there were more Conventional Bus deliveries in 2019, attracting more Federal Gas Tax transfers to fund those projects.

Investment Income

Investment income was \$4.8 million (9.1 per cent) higher than 2018 mainly due to higher interest rates as well as higher cash balance and investment holdings.

Miscellaneous Revenue

Miscellaneous revenue decreased by \$2.9 million (24.1 per cent) from 2018, primarily due to the receipt of a \$4.1 million for a contract penalty payment in 2018.

Gain (Loss) on Disposal of Assets

There has been a gain of \$0.5 million on disposal of assets related to land disposals. This represents an increase of \$0.5 million compared to 2018.

Consolidated Revenues – Comparison to Budget

CONSOLIDATED REVENUES		ACTUAL TO BUDGET		
Year ended December 31 (\$ thousands)	ACTUAL	BUDGET	Budget Variance	
	2019	2019	Fav/ (Unfav)	%
Taxation	906,969	874,526	32,443	3.7%
Transit	685,362	669,274	16,088	2.4%
Government transfers				
Senior Government Funding	338,451	327,967	10,484	3.2%
Golden Ears Bridge Tolling Replacement Revenue	60,072	60,072	-	-
Investment income	58,024	52,850	5,174	9.8%
Amortization of deferred concessionaire credit	23,273	23,337	(64)	(0.3%)
Miscellaneous revenue	9,027	5,882	3,145	53.5%
Sub Total Continuing Operations	2,081,178	2,013,908	67,270	3.3%
Gain (Loss) on disposal of tangible capital assets	506	(122)	628	514.8%
Total Revenue	2,081,684	2,013,786	67,898	3.4%

Total revenue was \$67.9 million (3.4 per cent) favourable to budget mainly due to higher than expected taxation revenue, transit revenue and government funding.

Taxation

TAXATION REVENUES		ACTUAL TO BUDGET		
Year ended December 31 (\$ thousands)	ACTUAL	BUDGET	Budget Variance	
	2019	2019	Fav/ (Unfav)	%
Fuel tax	403,081	368,904	34,177	9.3%
Property tax	382,748	384,744	(1,996)	(0.5%)
Parking Rights tax	81,871	81,301	570	0.7%
Hydro levy	21,461	21,577	(116)	(0.5%)
Replacement tax	17,808	18,000	(192)	(1.1%)
Total Taxation	906,969	874,526	32,443	3.7%

Total taxation revenue for 2019 at \$907.0 million was \$32.4 million (3.7 per cent) favourable to budget.

Fuel tax revenue was \$34.2 million (9.3 per cent) favourable to budget. A \$14.5 million adjustment related to prior year sales to increase fuel tax revenue was identified during the year, and reflected in the 2019 results. Fuel consumption of diesel and gasoline in the region was also higher than expected.

Property tax revenue was \$2.0 million (0.5 per cent) unfavourable to budget due to lower than expected development growth in 2019.

Transit

TRANSIT REVENUES	ACTUAL TO BUDGET			
	ACTUAL	BUDGET	Budget Variance	
	2019	2019	Fav/ (Unfav)	%
Year ended December 31 (\$ thousands)				
Fares	533,330	521,318	12,012	2.3%
Program	123,652	122,915	737	0.6%
Total Fares	656,982	644,233	12,749	2.0%
Other transit	28,380	25,041	3,339	13.3%
Total Transit	685,362	669,274	16,088	2.4%

Total transit revenues were \$16.1 million (2.4 per cent) favourable to budget as a result of record high ridership and increased program participation.

Other transit revenue was \$3.3 million (13.3 per cent) favourable to budget due to increased revenues from property rentals, advertising and sale of carbon tax credits.

Government Transfers

GOVERNMENT TRANSFERS	ACTUAL TO BUDGET			
	ACTUAL	BUDGET	Budget Variance	
	2019	2019	Fav/ (Unfav)	%
Year ended December 31 (\$ thousands)				
Senior Government Funding	338,451	327,967	10,484	3.2%
Golden Ears Bridge Tolling Replacement Revenue	60,072	60,072	-	-
Total Government Transfers	398,523	388,039	10,484	2.7%

Government transfers include funds provided by the Province of BC in lieu of foregone Golden Ears Bridge tolling since September 1, 2017.

Total government transfers were \$10.5 million (2.7 per cent) favourable to budget primarily due to the timing of deliveries for replacement and expansion conventional buses, funded by the Federal Gas Tax.

Investment Income

Investment income was \$5.2 million (9.8 per cent) favourable to budget mainly due to higher than expected interest rates and increased cash and sinking fund balances.

Miscellaneous Revenue

Miscellaneous revenue was \$3.1 million (53.5 per cent) favourable to budget mainly due to the higher than anticipated labour recoveries. The timing of compressed natural gas (CNG) and energy-saving program contributions which were received in 2019 but expected in 2018 also contributed to the favourability.

Gain (Loss) on Disposal of Assets

Gain on disposal of assets was \$0.6 million favourable due to disposal of land not budgeted in the year.

Consolidated Expenses – Comparison to 2018

Year ended December 31 (\$ thousands)	CONSOLIDATED EXPENSES (BY SEGMENT)		YEAR OVER YEAR	
	ACTUAL		Change ¹	
	2019	2018	Fav/ (Unfav)	%
Bus Operations	758,865	724,883	(33,982)	(4.7%)
Corporate Operations	103,260	96,795	(6,465)	(6.7%)
Rail Operations	324,248	309,195	(15,053)	(4.9%)
Roads and Bridges	95,083	91,210	(3,873)	(4.2%)
Transit Police	40,888	38,308	(2,580)	(6.7%)
Amortization of tangible capital assets ¹	212,942	197,854	(15,088)	(7.6%)
Interest ¹	194,983	183,459	(11,524)	(6.3%)
Sub Total Continuing Operations	1,730,269	1,641,704	(88,565)	(5.4%)
Corporate One-time	18,210	22,029	3,819	17.3%
Total Expenses by Segment	1,748,479	1,663,733	(84,746)	(5.1%)

¹ Amortization and Interest shown separately to facilitate analysis

Bus Operations operating expenses were \$34.0 million (4.7 per cent) higher than 2018 mainly due to additional operating costs for service expansion delivered in 2019 as part of the Investment Plan. These costs include impacts of labour, contractual and economic increases. In addition, higher vehicle insurance rates and the new Employer Health Tax have also contributed to the increase in expenses year over year. These increases were partially offset by lower fuel prices, less vehicle maintenance costs and lower contracted services costs.

Corporate Operations expenses increased by \$6.5 million (6.7 per cent) from 2018 mainly due to contractual increases, costs incurred to upgrade the Compass system and refurbish the ticketing devices, and increased telecom, network and software requirements.

Rail Operations operating expenses were \$15.1 million (4.9 per cent) higher than 2018 mainly due to increased staffing to support projects and maintenance initiatives, higher maintenance activities to ensure a state of good repair and contractual and economic increases. These increases were partly offset by lower property taxes.

Roads and Bridges expenses were \$3.9 million (4.2 per cent) higher than 2018 mainly due to \$14.5 million of Rapid Bus construction costs in 2019 that were not present in 2018. This increase was partially offset by lower administration and contracted services costs due to the elimination of Golden Ears Bridge tolling and lower capital infrastructure contributions in 2019.

Transit Police expenses were \$2.6 million (6.7 per cent) higher in 2019 mainly due to wage increases (of which \$1.4 million is recoverable and recorded in miscellaneous revenue), increased employee future benefit costs, the new Employer Health Tax, higher software licensing costs, higher vehicle insurance premiums and increased purchases of police equipment.

Amortization expense increased by \$15.1 million (7.6 per cent) over 2018 as a result of a \$287.4 million increase in depreciable tangible capital assets. Main asset additions in 2019 were new buses for replacement and expansion, new SkyTrain vehicles, station upgrades and other various infrastructure and system upgrades.

Interest expense was \$11.5 million (6.3 per cent) higher than the prior year due to higher outstanding debt and the cost of settling a bond interest forward contract.

Corporate One-time expenses were \$3.8 million (17.3 per cent) lower than 2018. Large one-time costs incurred in 2019 included Rapid Bus Program, Regional Transportation Strategy and feasibility studies.

Consolidated Expenses – Comparison to Budget

CONSOLIDATED EXPENSES (BY SEGMENT)		ACTUAL TO BUDGET		
Year ended December 31 (\$ thousands)	ACTUAL	BUDGET ²	Budget Variance	
	2019	2019	Fav/ (Unfav)	%
Bus Operations	758,865	777,820	18,955	2.4%
Corporate Operations	103,260	102,132	(1,128)	(1.1%)
Rail Operations	324,248	326,870	2,622	0.8%
Roads and Bridges	95,083	94,691	(392)	(0.4%)
Transit Police	40,888	40,845	(43)	(0.1%)
Amortization of tangible capital assets ¹	212,942	226,513	13,571	6.0%
Interest ¹	194,983	185,118	(9,865)	(5.3%)
Sub Total Continuing Operations	1,730,269	1,753,989	23,720	1.4%
Corporate One-time	18,210	70,576	52,366	74.2%
Total Expenses by Segment	1,748,479	1,824,565	76,086	4.2%

¹ Amortization and Interest shown separately to facilitate analysis

² Budget reallocated due to approved contingency

Bus Operations operating expenses were \$19.0 million (2.4 per cent) favourable to budget mainly due to lower fuel prices and lower labour costs as a result of temporary vacancies. Access Transit was favourable due to lower than expected contract costs and lower fuel prices. This was partially offset by higher vehicle insurance premiums and snow removal costs.

Corporate Operations operating expenditures were \$1.1 million (1.1 per cent) unfavourable to budget mainly due to higher credit card settlement fees and the Cubic Asset refresh which was not budgeted for, partially offset by vacancy savings from temporary vacancies.

Rail Operations expenses were \$2.6 million (0.8 per cent) favourable to budget due to lower labour costs from vacancies, deferral of train condition assessments, lower West Coast Express contract services costs, lower than anticipated property taxes and favourable fuel and hydro costs. These savings were partly offset by higher overtime costs, increased train and rail maintenance activities and snow and ice removal costs.

Road and Bridges spending was \$0.4 million (0.4 per cent) unfavourable to budget mainly due to \$14.5 million in Rapid Bus construction costs which were budgeted in Corporate One-time being allocated to Roads and Bridges, partly offset by timing of capital infrastructure contributions to municipalities.

Transit Police operating expenses were \$0.04 million (0.1 per cent) unfavourable to budget mainly due to increased police equipment purchases as well as higher vehicle and facility maintenance costs; offset by vacancy savings.

Amortization expense was \$13.6 million (6.0 per cent) favourable to budget mainly due to delays in revenue vehicle deliveries, changes in the estimated useful lives of the Richmond and Vancouver Transit Centers and timing of project capitalization of station upgrades.

Interest expense was \$9.9 million (5.3 per cent) unfavourable to budget mainly due to lower capitalization of interest due to delays in capital spending and the settlement cost of a bond forward contract. This is partly offset by lower interest rates and reduced borrowings due to the delay in capital spending.

Corporate One-time costs were \$52.4 million (74.2 per cent) favourable to budget mainly due to Rapid Bus construction costs allocated to the Roads and Bridges, the timing of expenditures and delays in the Rapid Bus project, fewer feasibility studies being conducted 2019 than planned, unused operating contingency funding, and delays in the South of Fraser Rapid Transit projects.

Consolidated Expenses by Category – Comparison to 2018

CONSOLIDATED EXPENSES (BY CATEGORY)								
Year ended December 31 (\$ thousands)	2019 Actual			2018 Actual			Ongoing Expenses	
	Ongoing	One-time ¹	Total	Ongoing	One-time ¹	Total	Fav/ (Unfav)	%
Administration	48,570	2,776	51,346	48,181	1,361	49,542	(389)	(0.8%)
Amortization of tangible capital assets	212,942	-	212,942	197,854	-	197,854	(15,088)	(7.6%)
Capital infrastructure contributions	37,310	-	37,310	40,416	-	40,416	3,106	7.7%
Contracted services	222,489	-	222,489	220,349	-	220,349	(2,140)	(1.0%)
Fuel and power	67,755	-	67,755	71,706	-	71,706	3,951	5.5%
Insurance	28,435	-	28,435	24,142	-	24,142	(4,293)	(17.8%)
Interest	194,983	-	194,983	183,459	-	183,459	(11,524)	(6.3%)
Maintenance, materials and utilities	175,763	216	175,979	163,271	335	163,606	(12,492)	(7.7%)
Professional and legal	18,333	13,404	31,737	20,018	10,751	30,769	1,685	8.4%
Rentals, leases and property tax	29,414	199	29,613	26,938	-	26,938	(2,476)	(9.2%)
Salaries, wages and benefits	694,275	1,615	695,890	645,371	1,282	646,653	(48,904)	(7.6%)
Write-down of tangible capital assets	-	-	-	-	8,299	8,299	-	-
Total Expenses by Category	1,730,269	18,210	1,748,479	1,641,705	22,028	1,663,733	(88,564)	(5.4%)

¹ One-time expenses shown separately to facilitate analysis

Ongoing Expenses

Administration costs increased \$389.0 thousand (0.8 per cent) over 2018 mainly due to increased telecom, network and software requirements, as well as higher fare media usage.

Amortization expense increased by \$15.1 million (7.6 per cent) over 2018 as a result of a \$302.1 million increase in depreciable tangible capital assets. Main asset additions in 2019 were new buses for replacement and expansion, new SkyTrain vehicles, station upgrades and other various infrastructure and system upgrades.

Capital infrastructure contributions decreased by \$3.1 million (7.7 per cent) over 2018 mainly due to the timing of capital infrastructure contributions to municipalities.

Contracted services increased by \$2.1 million (1.0 per cent) over 2018 mainly due to higher contractual costs for Compass and Canada Line, costs to upgrade the Compass system and refurbish the ticketing devices, partly offset by lower contracted services incurred on the delivery of a bus route to West Vancouver as CMBC now delivers the route under their service plan.

Fuel and power costs decreased by \$4.0 million (5.5 per cent) over the prior year mainly due to lower fuel prices.

Insurance costs increased by \$4.3 million (17.8 per cent) over 2018 mainly due to higher vehicle insurance rates.

Interest expense increased by \$11.5 million (6.3 per cent) over 2018 mainly due to higher outstanding debt and the cost of settling a bond interest forward contract.

Maintenance, materials and utilities increased by \$12.5 million (7.7 per cent) over 2018 mainly due to higher train and rail infrastructure maintenance costs and \$14.5 million in Rapid Bus construction costs allocated to Roads and Bridges.

Professional and legal fees decreased by \$1.7 million (8.4 per cent) over 2018 mainly due to lower environmental remediation costs for the Oakridge Transit Centre as well as fewer assessments, studies and consulting projects.

Rentals, leases and property tax expenses increased by \$2.5 million (9.2 per cent) over the prior year mainly due to the higher occupancy costs as a result of office expansion and increases in property taxes from increased assessment values and an increase in the number of properties held.

Salaries and wages increased \$48.9 million (7.6 per cent) over the prior year mainly due to increased service levels as a result of bus and rail service expansion, the newly introduced Employer Health Tax, as well as contractual and economic labour increases.

Consolidated Expenses by Category – Comparison to Budget

CONSOLIDATED EXPENSES (BY CATEGORY)								
Year ended December 31 (\$ thousands)	2019 Actual			2019 Budget ²			Ongoing Expenses	
	Ongoing	One-time ¹	Total	Ongoing	One-time ¹	Total	Fav/ (Unfav)	%
Administration	48,570	2,776	51,346	50,296	2,000	52,296	1,726	3.4%
Amortization of tangible capital assets	212,942	-	212,942	226,513	-	226,513	13,571	6.0%
Capital infrastructure contributions	37,310	-	37,310	49,780	-	49,780	12,470	25.1%
Contracted services	222,489	-	222,489	223,911	-	223,911	1,422	0.6%
Fuel and power	67,755	-	67,755	80,540	-	80,540	12,785	15.9%
Insurance	28,435	-	28,435	29,571	-	29,571	1,136	3.8%
Interest	194,983	-	194,983	185,118	-	185,118	(9,865)	(5.3%)
Maintenance, materials and utilities	175,763	216	175,979	155,621	810	156,431	(20,141)	(12.9%)
Professional and legal	18,333	13,404	31,737	22,505	64,579	87,084	4,172	18.5%
Rentals, leases and property tax	29,414	199	29,613	30,051	-	30,051	637	2.1%
Salaries, wages and benefits	694,275	1,615	695,890	700,084	3,186	703,270	5,809	0.8%
Write-down of tangible capital assets	-	-	-	-	-	-	-	-
Total Expenses by Category	1,730,269	18,210	1,748,479	1,753,990	70,575	1,824,565	23,722	1.4%

¹ One-time expenses shown separately to facilitate analysis

² Budget reallocated due to approved contingency

Ongoing Expenses

Administration costs were \$1.7 million (3.4 per cent) favourable to budget mainly due to lower than expected fare media costs as more customers are switching from Single-Use tickets to reusable Compass cards and lower than expected network and software operating costs. The savings were partly offset by higher Compass credit card settlement fees as a result of a higher number of transactions and higher cloud hosting costs.

Amortization expense was \$13.6 million (6.0 per cent) favourable to budget mainly due to delays in revenue vehicle deliveries, changes in the estimated useful lives of the Richmond and Vancouver Transit Centers and timing of project capitalization of station upgrades.

Capital infrastructure contributions were favourable by \$12.5 million (25.1 per cent) primarily due to the timing of capital infrastructure contributions to municipalities.

Contracted services were \$1.4 million (0.6 per cent) favourable to budget mainly due to savings as a result of the contractual performance discount received from West Coast Express's service provider and lower Access Transit operating costs.

Fuel and power costs were \$12.8 million (15.9 per cent) favourable to budget mainly to lower than anticipated prices.

Insurance was \$1.1 million (3.8 per cent) favourable to budget mainly due to lower than expected claims to TransLink's Transportation Property Casualty Company (TPCC).

Interest expense was \$9.9 million (5.3 per cent) unfavourable to budget mainly due to lower capitalization of interest due to project delays and the settlement cost of a bond forward contract, partly offset by lower interest rates and reduced borrowings due to the delay in capital spending.

Maintenance, materials and utilities expenses were \$20.1 million (12.9 per cent) unfavourable to budget mainly due to \$14.5 million in Rapid Bus construction costs which were budgeted in Corporate One-time being allocated to Roads and Bridges, higher train and rail infrastructure maintenance costs, higher snow removal costs as well as the write-off of Mark I trains' obsolete vehicle parts.

Professional and legal fees were \$4.2 million (18.5 per cent) favourable to budget mainly due to delays in the Mark II trains' condition assessment and lower consulting fees.

Rentals, leases and property tax expenses were \$0.6 million (2.1 per cent) favourable to budget mainly due to lower than expected property tax assessments.

Salaries and wages were \$5.8 million (0.8 per cent) favourable to budget mainly due to vacancy savings, partially offset by higher overtime costs a result of vacancy coverage, severance payments and lower salary capitalization due to capital project delays.

4. Capital Program

TransLink's investment in capital assets continues to grow with the focus of supporting enterprise priorities. The capital program is robust and managed with strong governance and oversight. As of December 31, 2019, TransLink's total capital program budget was \$5.5 billion, which includes:

- \$3.3 billion in active capital projects;
- \$310.6 million in Approved-In-Principle (AIP) capital projects;
- \$1.3 billion in substantially complete capital projects; and
- \$324.6 million in capital infrastructure contributions to municipalities.

SUMMARY OF CAPITAL PROGRAM						
As of December 31, 2019 (\$ thousands)	Number of Projects	Total Current Budget	Final Forecast Cost	Forecast Variance to Current Budget		Senior Government Funding (Committed)
				Fav/(Unfav)	%	
Capital Projects						
Active	148	3,317,265	3,293,165	24,098	0.7%	2,010,301
AIP	28	310,595	310,595	-	-	123,188
Subtotal	176	3,627,860	3,603,760	24,098	0.7%	2,133,489
Substantially Complete	67	1,331,480	1,296,466	35,014	2.6%	601,874
Closed	28	158,875	146,892	11,983	7.5%	93,468
Cancelled	7	31,024	31,024	-	-	-
Subtotal	102	1,521,379	1,474,382	46,997	3.1%	695,342
Capital Infrastructure Contributions - Active						
Active	19	324,595	322,152	2,443	0.8%	-
Subtotal	19	324,595	322,152	2,443	0.8%	-
Total Capital Program	297	5,473,834	5,400,294	73,538	1.3%	2,828,831

The capital program is supported in part by \$2.8 billion in committed funding available to TransLink from the Federal Gas Tax Fund, Public Transit Infrastructure Fund (PTIF) and Building Canada Fund (BCF). External funding programs apply to eligible projects within the capital program. For the Federal Gas Tax Fund, TransLink receives approval and funding in advance of project initiation. These funds are held in restricted cash and treated as deferred government transfers until costs are incurred in the approved projects, at which time funds are released to general operating funds and government transfers revenue is recognized. For PTIF and BCF, TransLink incurs the costs of the projects which are recovered through invoicing the Province for the portion that is funded per the respective agreements.

Active and Substantially Complete Capital Projects

As of December 31, 2019, there were 215 active and substantially complete projects with a final forecasted cost of \$4.6 billion. The total cash flows for these projects during the year were \$619.8 million.

SUMMARY OF ACTIVE PROJECTS								
As of December 31, 2019 (\$ thousands)	Number of Projects	Current Budget	2019 YTD Spending	Cumulative Spending to Date	Final Forecast Cost	Forecast Variance to Current Budget		Senior Government Funding (Committed)
						Fav/(Unfav)	%	
Active								
Equipment	19	174,295	37,870	46,598	169,865	4,430	2.5%	43,342
Infrastructure	78	829,989	128,887	234,837	840,600	(10,613)	(1.3%)	322,885
Major Construction	5	487,743	15,781	72,391	476,803	10,940	2.2%	205,439
Technology	21	75,821	13,951	32,192	75,712	109	0.1%	-
Vehicle	25	1,749,417	236,279	510,560	1,730,185	19,232	1.1%	1,438,635
Subtotal (Active Capital Projects)	148	3,317,265	432,768	896,578	3,293,165	24,098	0.7%	2,010,301
Substantially Complete	67	1,331,480	187,050	1,284,134	1,296,466	35,014	2.6%	601,874
Total Active Capital Projects	215	4,648,745	619,818	2,180,712	4,589,631	59,112	1.3%	2,612,176

Active Capital Projects

As of December 31, 2019, there were 148 active projects with expenditures of \$432.8 million in the year of 2019 and \$896.6 million in cumulative spending to date. A comparison of active project budgets against forecasted final costs show a favourable variance of \$24.1 million (0.7 percent).

Infrastructure spending of \$128.9 million for the year ending 2019 includes a total of \$51.7 million spent on SkyTrain system upgrade projects such as escalators, roof replacements, replacing platform LED screens, running rail replacements and expansion of the Coquitlam vehicle storage facility. Also included is \$11.4 million on investments in transit on priority RapidBus corridors. These upgrades will improve customer experience, address system capacity issues and maintain a state of good repair.

Major Construction spending of \$15.8 million for the year ending 2019 includes work on the South of Fraser rapid transit and Broadway Subway projects which will support service expansion. The Broadway Subway project is being delivered by the Province of BC with support from TransLink to achieve seamless system integration with the region's existing SkyTrain service.

Vehicle spending of \$236.3 million for the year ending 2019 includes a total of \$190.9 million spent related mainly to the procurement of Mark III SkyTrain vehicles, Conventional Bus Replacement, Conventional Bus Expansion and Canada Line Fleet Expansion projects. These projects add to the existing rail and bus fleet to support further service expansion and to maintain the fleet in a state of good repair.

Substantially Complete Capital Projects

As of December 31, 2019, there were 67 projects with a total budget of \$1.3 billion deemed substantially complete with \$187.1 million spent year to date. These projects are in the final stages of project activity. The total expected favourable variance for these projects at completion is \$35.0 million (2.6 percent) mainly due to the Metrotown Station and Exchange upgrades, Surrey Central Station upgrades and the 2018 Conventional Bus Replacement project.

Approved in Principle (AIP) Capital Projects

As of December 31, 2019, there were 28 AIP projects remaining to be initiated with a total budget of \$310.6 million. Of the 28 projects, 3 projects with a budget of \$11.7 million were carried forward from 2018 and 25 projects with a budget of \$298.8 million are new in 2019.

SUMMARY OF AIP PROJECTS			
As of December 31, 2019 (\$ thousands)	Number of Projects	Current Budget	Senior Government Funding (Committed)
Capital Projects			
Equipment	7	75,210	22,318
Infrastructure	14	171,345	93,300
Technology	5	55,990	-
Vehicle	2	8,050	7,570
Total AIP Projects	28	310,595	123,188

Significant infrastructure and equipment projects remaining in AIP include Phase 2 investments in the Rapid Bus corridors and SkyTrain facility and systems improvements. Significant technology projects remaining in AIP include Enterprise Asset Management System and Bus Security Camera upgrades.

Closed Capital Projects

As of December 31, 2019, 28 projects with a final cost of \$146.9 million and an approved budget of \$158.9 million were completed and closed. Significant closed projects include Expo Line Propulsion Power Upgrade, South of Fraser Rapid Transit Advance works and Conventional Bus and HandyDART replacements.

Cancelled Capital Projects

As of December 31, 2019, seven AIP projects with a budget of \$31.0 million were cancelled, including three projects totaling \$22.9 million for bus loops and BSP integration, three projects totaling \$7.4 million that will be consolidated into other projects and one that has been determined to be an operating cost.

Capital Infrastructure Contributions

These expenditures consist of contributions to municipalities for the rehabilitation and upgrade of the Major Road Network (MRN) as well as pedestrian and bike pathways. TransLink does not own these underlying assets; therefore, the costs are expensed in the year they are incurred.

As of December 31, 2019, there were 19 active programs with a budget of \$324.6 million. Significant portion of the \$42.9 million contributions in 2019 relates to seismic rehabilitation projects funded under the Major Road Network and Bike Capital Program.

Summary of Infrastructure Contribution Programs						Forecast Variance to Current Budget	
As of December 31, 2019 (\$ thousands)	Number of Projects	Current Budget	2019 YTD Spending	Cumulative Spending to Date	Final Forecast Cost	Fav/ (Unfav)	%
Major Road Network and Bike Capital Program	11	203,334	41,492	120,741	201,085	2,249	1.1%
Major Road Network Structurers Funding Program	2	32,500	79	79	32,479	21	0.1%
Major Road Network Upgrades	3	76,261	0	75,190	75,752	509	0.7%
Walking Infrastructure to Transit	3	12,500	1,408	1,958	12,836	(336)	(2.7)%
Grand Total	19	324,595	42,979	197,968	322,152	2,443	0.8%

5. Changes in Financial Position

Financial Assets

Financial Assets				
As at December 31				
(\$ thousands)	2019	2018	Change	%
Cash and cash equivalents	502,060	517,022	(14,962)	(2.9%)
Accounts receivable	246,889	250,598	(3,709)	(1.5%)
Loans receivable	190,009	250,734	(60,725)	(24.2%)
Restricted cash and cash equivalents and investments	1,101,107	979,894	121,213	12.4%
Investments	61,281	61,173	108	0.2%
Debt reserve deposits	27,989	29,421	(1,432)	(4.9%)
Financial Assets	2,129,335	2,088,842	40,493	1.9%

See the “Liquidity and Capital Resources” section for the discussion on cash and cash equivalents.

The decrease in accounts receivable of \$3.7 million (1.5 per cent) was mainly due to collections for funding from the Provincial government.

Loan receivable represents the net present value of future payments of proceeds from the 2016 sale of the Oakridge Transit Centre. The decrease of \$60.7 million (24.2 per cent) was attributable to the installment payment received during the year, partially offset by interest earned on the outstanding balance.

Restricted Cash and Investments

Restricted Cash and Investments				
As at December 31				
(\$ thousands)	2019	2018	Change	%
Government transfers for capital project funding	433,198	533,538	(100,340)	(18.8%)
TPCC's Investments	24,123	25,095	(972)	(3.9%)
Green Bond Proceeds	108,373	11,688	96,685	827.2%
Land reserve	200,383	145,330	55,053	37.9%
Sub-total	766,077	715,651	50,426	7.0%
Total self administered sinking funds	335,030	264,243	70,787	26.8%
Total Restricted cash and investments	1,101,107	979,894	121,213	12.4%

Restricted cash and investments include unspent government transfers, self-administered sinking funds, land reserve funds, unspent proceeds of green bond issuance and funds segregated for TransLink's Captive Insurance corporation (TPCC). The purpose of the land reserve funds is to allow proceeds from the disposition of real property to be invested back into real property. The land reserve concept is consistent with the Mayors' Council 2012 resolution and the former TransLink Commissioner's comments that the supplemental plan (now known as the Investment Plan) should not liquidate capital assets to fund operations.

The increase in restricted cash and investments was \$121.2 million (12.4 per cent) despite the \$100.2 million decrease of government transfers for capital project funding. All other restricted funds grew due

to the additions to green bond proceeds and the land reserve together with further contributions to the self-administered sinking funds.

Liabilities

Liabilities				
As at December 31				
(\$ thousands)	2019	2018	Change	%
Accounts payable and accrued liabilities	368,232	340,267	27,965	8.2%
Debt	2,738,435	2,665,085	73,350	2.8%
Deferred government transfers	1,188,463	1,249,094	(60,631)	(4.9%)
Golden Ears Bridge contractor liability	1,033,348	1,040,378	(7,030)	(0.7%)
Deferred concessionaire credit	479,239	502,512	(23,273)	(4.6%)
Employee future benefits	143,709	139,653	4,056	2.9%
Deferred revenue and deposits	62,201	55,136	7,065	12.8%
Deferred lease inducements	13,452	12,544	908	7.2%
Liabilities	6,027,079	6,004,669	22,410	0.4%

See the “Liquidity and Capital Resources” section for debt.

The net decrease in deferred government transfer of \$60.6 million (4.9 per cent) was due to revenues recognized as the funding stipulations are met, partly offset by funding received during the period.

The Golden Ears Bridge contractor liability financed the construction of the Golden Ears Bridge and is payable over the term ending June 2041.

Deferred concessionaire credits represent the funding provided by the Canada Line Concessionaire. This balance is amortized to income on a straight-line basis over the operating term of the concessionaire agreement, which will expire in July 2040.

The increase in employee future benefits, which represent post-retirement and post-employment benefits, was due to the estimated current service cost and related interest. The post-retirement portion of this liability will draw down, upon the retirement of the employees.

The increase in deferred revenues and deposits of \$7.1 million (12.8 per cent) was attributable to unearned transit fare revenue and Compass Card deposits received.

Non-Financial Assets

Non-Financial Assets				
As at December 31				
(\$ thousands)	2019	2018	Change	%
Tangible capital assets	5,381,268	5,079,162	302,106	5.9%
Supplies inventory	84,556	74,244	10,312	13.9%
Prepaid expenses	30,910	28,206	2,704	9.6%
Non-Financial Assets	5,496,734	5,181,612	315,122	6.1%

Tangible Capital assets increased by \$302.1 million (5.9 per cent) due to asset additions (net of disposals and transfers) of \$515.3 million offset by amortization of \$212.9 million. See the “Investments in Capital Assets” for discussion on project activities.

Capital Asset Additions

For the year ended December 31, 2019 tangible capital assets increased by a net amount of \$302.1 million which represents \$515.3 million additions to capital assets less the following:

- \$212.9 million of amortization; and
- \$0.2 million in disposals

The addition of \$515.3 million during the year was primarily made up of the following items:

Additions to other supporting systems of \$107.8 million primarily related to:

- \$59.8 million for Canada Line stations, OMC and system upgrades.
- \$27.3 million for Broadway Commercial Skytrain Station upgrades.
- \$7.2 million for Passenger Information Display (PID) upgrades at Skytrain Stations.
- \$5.2 million for Surrey Central Skytrain Station upgrades.

Additions to vehicles of \$348.2 million primarily related to:

- \$257.3 million for expansion and replacement of the conventional bus fleet including 102 60' articulated diesel electric hybrid, 46 40' CNG, 66 40' BAE hybrid, 14 double decker and 1 diesel highway bus.
- \$75.4 million for Mark III Skytrain cars for the Expo and Millennium lines.
- \$6.6 million for expansion and replacement of 50 HandyDart vehicles.
- \$6.5 million for expansion and replacement of 34 Community Shuttle vehicles.

Additions to land and buildings of \$25.8 million related to:

- \$14.8 million for Broadway Commercial Skytrain Station upgrades.
- \$5.0 million for Nanaimo Bus Loop upgrades.
- \$2.9 million for Seabus terminals improvements.
- \$2.3 million for 22nd Street Exchange lighting and other upgrades.

Additions to equipment of \$37.0 million primarily related to:

- \$8.8 Seabus for South Seawall & Skywalk seismic upgrades.
- \$5.0 million for Expo and Millennium Line System signage and fixture replacement.
- \$3.1 million for expanding IT infrastructure and replacing aging IT hardware.
- \$3.0 million for Trolley overhead equipment.
- \$1.5 million for replacing bus cameras and centralized video system.
- \$1.0 million for Expo Line Rail Pads Replacement.

Net reduction to work in progress of \$3.5 million primarily related to:

Capital additions to work-in-progress amounted to \$474.2 million for the year offset by \$477.7 million in transfers of completed projects into their respective asset classes. The main movements for the year related to SkyTrain vehicle purchases, conventional bus purchases and major SkyTrain station upgrades. The impact of these projects is as follows:

- Mark III Skytrain vehicles – addition of \$16.9 million offset by capitalization of \$75.3 million.
- Conventional Buses – addition of \$262.0 million offset by capitalization of \$257.3 million.
- Commercial Broadway and Surrey Central Station upgrades – addition of \$14.8 million offset by capitalization of \$32.5 million

6. Liquidity and Capital Resources

The following table shows TransLink's unrestricted cash and investments.

Unrestricted Cash and Investments				
As at December 31 (\$ thousands)	2019	2018	Change	%
Cash and cash equivalents	502,060	517,022	(14,962)	(2.9%)
Investments	61,281	61,173	108	0.2%
Total	563,341	578,195	(14,854)	(2.6%)

Cash and cash equivalents and investments decreased by \$15.0 million (2.9 per cent) primarily due to the timing of capital spending. TransLink's strong liquidity position is further supported by a \$500.0 million commercial paper program, of which \$60.0 million is outstanding at year end.

Financing

TransLink's debt management policy includes self-imposed debt coverage and debt service coverage limits. Debt coverage policy represents total net debt as a percentage of operating revenue at a maximum of 300.0 per cent; debt service coverage represents gross interest costs (PSAB basis) as a percentage of operating revenue of not more than 20.0 per cent. TransLink continues to remain within these policy limits.

Financing				
As at December 31 (\$ thousands)	2019	2018	Change	%
Debt	2,738,434	2,665,085	73,349	2.8%
Less: Self-administered sinking funds	(335,032)	(264,243)	(70,789)	(26.8%)
Less: Debt reserve deposits	(27,989)	(29,421)	1,432	4.9%
Net Direct Debt	2,375,413	2,371,421	3,992	0.2%
Golden Ears Bridge contractor liability	1,033,348	1,040,378	(7,030)	(0.7%)
Deferred concessionaire credit	479,239	502,512	(23,273)	(4.6%)
Indirect P3 Debt	1,512,587	1,542,890	(30,303)	(2.0%)
Subtotal Net Direct Debt and Indirect P3 Debt	3,888,000	3,914,311	(26,311)	(0.7%)

Debt, which primarily finances capital spending, increased by \$73.3 million (2.8 per cent). This was the result of the second green bond issuance of \$200.0 million, offset by scheduled debt repayments and the repayment of \$60.0 million of commercial paper. As part of TransLink's continuing green bond issuance program, a green bond framework developed in 2018 details what types of projects TransLink will select as eligible for any green bond proceeds, how TransLink will manage the proceeds of any green bond issuances and how it will report on the resulting environmental benefits of these projects once they are operational. As at the end of 2019, \$108.4 million of the proceeds of TransLink's second green bond remains unspent in a restricted account.

Indirect P3 Debt decreased by \$30.3 million (2.0 per cent) through the principal repayment of \$7.0 million of the Golden Ears Bridge contractor liability and the \$23.3 million amortization of the Canada Line deferred concessionaire credits.

Overall, the total debt financing decreased by \$26.3 million (0.7 per cent) primarily through indirect borrowing.

Credit Rating

Maintaining a high-quality credit rating is essential to ensure that TransLink can continue to access capital markets in the most cost-effective manner. The following table summarizes TransLink's current credit ratings and outlooks.

Credit Rating				
As at December 31, 2019 Agency	Commercial Paper	Senior Debt	General Obligation	Outlook
DBRS Limited	R-1 mid	AA	AA	Stable
Moody's Investors Service	Not Rated	Aa2	Aa2	Stable

Under the SCBCTA Act, TransLink's outstanding debt obligations cannot exceed TransLink's borrowing limit of \$5.5 billion. The debt obligations are defined under the SCBCTA Act as the sum of current borrowings of TransLink secured by debentures, bonds, other forms of indentures, capital leases, short-term notes, lines of credit and bank overdrafts, excluding any prepaid financing costs. Any future increases in TransLink's borrowing limits need to be approved by the Mayors' Council (after consultation with Metro Vancouver) through an Investment Plan. During 2018, the borrowing limit was increased from \$4.0 billion to \$5.5 billion based on Phase Two of the 10-Year Vision 2018-2027 Investment Plan, approved on June 28, 2018.

As at December 31, 2019, TransLink's outstanding debt obligation, as defined above, was \$3.31 billion¹.

¹ Debt of \$2.74 billion plus MFA administered sinking funds of \$0.59 billion and net of capital lease reductions since inception, unamortized issue costs and unamortized premiums/discounts of \$0.02 billion.

7. Risk Factors

Financial Risk

The main financial risks TransLink is exposed to are credit, liquidity and market risks.

Credit Risk

Credit risk is the risk of loss resulting from bad debts on accounts receivables and non-performing investments.

(a) Accounts Receivable

The large majority of TransLink's accounts receivables are from the Province of BC (fuel tax, capital, project funding, toll replacement funding and program passes) and the Federal Government (GST rebate). For these balances, collectability risk is not significant.

(b) Loan receivable

The loan receivable is due from Intergulf-Modern Green Development Corp., the purchaser of the Oakridge Transit Centre. The remaining payments are due over approximately the next three years and secured by a mortgage against the property.

(c) Investments Credit

The Investments Credit risk within the treasury function arises from the investments of the cash resources held by TransLink to meet internal liquidity requirements and for general business purposes. TransLink's investment policy identifies authorized investment types, limits asset concentrations, stipulates credit evaluation standards and delegates approval authorities. As these investments are limited to approved, reputable counterparties that are monitored on an ongoing basis, the investment risk is considered low.

Liquidity Risk

Liquidity risk is the risk that TransLink may be unable to meet its financial obligations in a timely manner and at reasonable prices. Liquidity risk is low as TransLink maintains an optimal mix of cash, short-term investments and a \$500.0 million commercial paper program. The commercial paper program is a short-term borrowing facility where TransLink can issue promissory notes with terms to maturity generally ranging from 35 to 91 days. TransLink has a dealer group of six Canadian banks that can buy these promissory notes (more commonly known as commercial paper) and on-sell them to investors. An integral part of this commercial paper program is a standby credit facility of \$500.0 million committed out to March 2023 which acts as a liquidity backstop in the event that some or TransLink's entire dealer group declines to buy its promissory notes.

In addition, TransLink's long-term debt is directly accessed through the Canadian public and private debt capital markets. Another important liquidity risk mitigation measure has been the establishment of a self-administered sinking fund program to provide dedicated and restricted funding. This sinking fund investment portfolio is being built over time to help offset the repayment of TransLink issued bonds.

Market Price Risk

Market price risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market prices. For TransLink, the following are the main types of market risk: interest rate risk, foreign exchange risk, commodity risk and inflation risk.

(a) Interest Rate Risk

Interest rate risk related to TransLink's fixed interest rate long-term debt will be subject to the market interest rates at the date of refinancing. TransLink mitigates this source of interest rate risk by spreading maturities of borrowings over periods currently up to and including the year of 2052 so that only a portion of outstanding debt will mature in any given fiscal year.

(b) Foreign Exchange Risk

TransLink receives all of its revenues in Canadian dollars and also incurs operating expenses and capital expenditures mostly in Canadian dollars. Accordingly, TransLink does not have significant exposure to losses arising from fluctuations in exchange rates.

(c) Commodity Risk

TransLink's commodity risk pertains to the usage of natural gas, electricity, gasoline and diesel to run its fleet of transit vehicles. Commodity risk is considered moderate as the current bus fleet, which a majority is powered by diesel fuel, is expected to be replaced with buses that are powered by more sustainable forms of fuel, such as compressed natural gas and electricity. The increase in fuel source diversity means that diesel fuel will continue to be a much smaller component of TransLink's total operating expenses.

(d) Inflation Risk

TransLink is subject to a certain amount of inflation risk, i.e. the risk that inflation will rise faster than expected. Inflation risk is considered to be moderate.

Business Risk

As the region's multi-modal transportation system, TransLink is exposed to various operational risks. TransLink identifies and manages these risks strategically through its Enterprise Risk Management program using a systematic approach to identify, assess and respond to risks that affect the achievement of its strategic, operational, project and financial objectives. TransLink maintains a comprehensive insurance program that utilizes a combination of insurers and its captive insurance company, the Transportation Property and Casualty Company, to reduce the impact of any potential losses.

Environmental Risk

TransLink and its operating companies use the principles of an Environmental Management System (EMS) to guide informed decision-making and effective management of environmental risk. CMBC and BCRTC both use ISO 14001:2015 as a guideline to manage environmental risk. The EMS is designed to ensure hazards and risks are identified and assessed and controls are implemented to mitigate significant risks. The EMS includes processes for identification and mitigation of environmental risks and regular review of environmental impacts, while continually improving environmental performance.

Labour Relations Risk

The substantial majority of employees across the TransLink enterprise are represented by six bargaining units including Unifor Locals 111 and 2200, the Canadian Union of Public Employees (CUPE) Locals 4500 and 7000, the Canadian Office and Professional Employees Union (MoveUP) Local 387 and Transit Police Professional Association (TPPA).

A three-year agreement has been successfully negotiated between CMBC and Unifor as well as a four-year agreement has been negotiated between BCRTC and CUPE, which represent the employees that have the greatest potential to have an operational impact on service.

CMBC is currently in separate negotiations with MoveUP and CUPE for a replacement agreement as their respective agreements expired on March 31, 2019 and December 31, 2018. TransLink's Agreement with MoveUP expired on March 31, 2019 and negotiations are expected to commence in February 2020. Transit Police's Agreement expired on December 31, 2019 and the parties have agreed to commence negotiations in two to three months.

There is potential for a labour dispute in any of the agreements that are currently expired. The risk to operations is significantly less than that posed by the CMBC and Unifor as well as BCRTC and CUPE job action, hence the contingency planning from the 2019 job action places the enterprise in a significantly more prepared state that further mitigates the risk.

Project Risk

TransLink's capital projects can vary significantly in terms of scope and complexity depending on whether TransLink is maintaining its existing asset base, keeping assets in a state of good repair or undertaking significant capital infrastructure expansion plans for rapid transit lines. Risk areas of capital projects include cost estimates, design assumptions and considerations, scope definition, schedule, market rates for consultants/constructors, indemnities/insurance, project management, property, municipal approvals and the environment. To manage these risks for large projects, TransLink uses an appropriate mix of public-private partnerships to design, build, finance, insure, operate and maintain the capital infrastructure to minimize and/or transfer risks to the private sector. TransLink supplements internal resources and expertise with specialized engineering, design, planning and construction and/or implementation skills as needed to provide the due diligence and oversight required by each project.

TransLink's capital approval process uses a two-stage approach that is aligned with the budget process. The first stage is the identification and definition of the project along with a budgetary estimate that is put forward for approval in principle. The second stage is more rigorous as this involves the creation of a detailed project work plan that includes scope definition, identification of key stakeholders, risk assessment, mapping against corporate objectives and financial details. These processes are supported by the infrastructure and technology project management offices (PMO) from a governance and quality management perspective.

The project applications are reviewed by senior management in the context of the available funding, business priorities and the capital program approved by TransLink's Board as part of the Investment Plan. Specific project approval recommendations are provided by the Capital Management Committee which includes Vice-Presidents from the Corporate Leadership team, including the operating companies. Projects that have moderate to higher risk profiles or are not part of the annual capital program require additional approval from the Executive Capital Oversight Group consisting of the Chief Executive Officer, Chief Financial Officer, the President of BCRTC and the President of CMBC or the Board of Directors.

Project delivery is monitored and reported on a monthly basis to TransLink executives with a focus on budget, scope, schedule, risks and issues. Each project has a project steering committee that includes a project sponsor, a member of the appropriate PMO and additional stakeholder representation as required. During project delivery, procurement risk is reduced through appropriate market review and due diligence, tendering of projects and the use of warranties and delay penalties.

Appendix 1 – Audited Consolidated Financial Statements

The 2019 Audited Consolidated Financial Statements will be attached once it has been reviewed by the Finance and Audit Committee and Board of Directors.

Appendix 2 – Five Year Historical Schedules

5 YEAR CONSOLIDATED REVENUES						Compound Annual Growth Rate (CAGR) 2015-2019
Year ended December 31 (\$ millions)	2015	2016	2017	2018	2019	
Taxation	772.7	825.7	821.3	819.4	907.0	4.1%
Transit	511.4	541.6	591.0	638.0	685.4	7.6%
Government transfers *	228.9	240.5	166.9	303.5	398.5	14.9%
Golden Ears Bridge tollings	48.4	52.1	29.7	-	-	(100.0%)
Investment income	34.4	40.6	50.3	53.2	58.0	14.0%
Amortization of deferred concessionaire credit	23.3	23.3	23.3	23.3	23.3	0.0%
Miscellaneous revenue	6.1	6.4	7.0	11.9	9.0	10.3%
Sub Total Continuing Operations	1,625.4	1,730.2	1,689.5	1,849.3	2,081.2	6.4%
Gain/loss on disposal of tangible capital assets	2.3	422.2	(1.1)	(0.0)	0.5	(31.4%)
Total Revenue	1,627.7	2,152.3	1,688.4	1,849.3	2,081.7	6.3%

* Restricted transfers from governments are deferred and recognized as revenue as the related stipulations in the agreement are met. Unrestricted transfers are recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured. With the elimination of tolls effective September 1, 2017, tolling revenue will be replaced by a provincial government transfer classified as Golden Ears Bridge Tolling Replacement revenue.

Total revenues have grown at a Compounded Annual Growth Rate (CAGR) of 6.3 per cent since 2015 while revenue from Continuing Operations grew at an annual CAGR of 6.4 per cent.

Taxation and transit revenues have grown in-line with population growth and a strong economy. The increase in service and significant investment in assets and technology in the past 5 years have contributed to the growth in transit revenues. Legislative rate increases over the years have also added to the growth in taxation and transit revenues.

Government transfers have had a CAGR of 14.9 per cent since 2015, due to an increase in project spending and related government funding for service expansion and the introduction of Tolling Replacement revenue to account for the elimination of the Golden Ears Bridge tolling on September 1, 2017. The increase in 2019 is a result of higher Federal Gas tax transfers driven by timing of project spending.

Investment income has grown at 14.0 per cent CAGR over the five-year period due to growing investment balances which include the sinking funds and the receivable related to the sale of surplus property.

Miscellaneous revenue has grown at 10.2 per cent CAGR over the five-year period and consists of third party recoveries related to warranties, sales of energy credits, and other recoverable costs.

5 YEAR CONSOLIDATED EXPENSES (BY SEGMENT)						Compound Annual Growth Rate (CAGR) 2015-2019
Year ended December 31 (\$ millions)	2015	2016	2017	2018	2019	
Bus division	643.50	656.5	688.9	724.9	758.9	4.2%
Corporate operations	80.9	91.2	98.0	96.8	103.3	6.3%
Rail division	268.3	265.9	297.4	309.2	324.2	4.8%
Roads & Bridges	71.2	52.5	84.2	91.2	95.1	7.5%
Transit Police	33.1	33.8	37.2	38.3	40.9	5.4%
Amortization of tangible capital assets *	168.3	181.7	192.2	197.8	212.9	6.1%
Interest *	167.9	172.7	181.8	183.5	195.0	3.8%
Sub Total Continuing Operations	1,433.2	1,454.3	1,579.5	1,641.7	1,730.3	4.8%
Corporate and Roads & Bridges One-time	32.1	29.7	12.6	22.0	18.2	-13.2%
Total Expenses by Segment	1,465.3	1,484.0	1,592.1	1,663.7	1,748.5	4.5%

*Shown as a separate line to help facilitate analysis of debt service costs as GAAP statements allocate these amounts to the various segments

Total expenses have grown by a Compound Annual Growth Rate (CAGR) of 4.5 per cent since 2015. Excluding One-time costs, the CAGR is 4.8 per cent. Roads & Bridges costs have increased due to the timing of capital infrastructure contributions to municipalities. Transit Police expenses have increased mainly

due to increased labour costs as a result of additional hiring of Transit Police Officers. Amortization expense has increased mainly due to an increase in depreciable tangible capital assets as a result of service expansion. Bus Operations costs have increased mainly due to increased labour costs as a result of service expansion, higher contracted services and higher vehicle insurance rates. Rail Operations costs have increased mainly due to increase labour costs as a result of service expansion, higher contracted services, and higher maintenance costs to ensure a state of good repair.

5 YEAR CONSOLIDATED EXPENSES (BY CATEGORY)						Compound Annual Growth Rate (CAGR)
Year ended December 31 (\$ millions)	2015	2016	2017	2018	2019	2015-2019
Administration	32.8	38.9	41.7	48.2	48.6	10.3%
Amortization of capital assets	168.3	181.8	192.2	197.9	212.9	6.1%
Capital infrastructure contributions	30.7	3.9	33.4	40.4	37.3	5.0%
Contracted services	203.5	211.7	219.1	220.3	222.5	2.3%
Fuel and power	62.9	56.8	65.5	71.7	67.8	1.9%
Insurance	20.6	21.2	23.8	24.1	28.4	8.4%
Interest	167.9	172.7	181.8	183.5	195.0	3.8%
Maintenance, materials and utilities	121.6	129.9	148.1	163.3	175.8	9.6%
Professional and legal	16.2	25.4	30.6	20.0	18.3	3.1%
Rentals, leases and property tax	40.9	24.7	24.3	26.9	29.4	(7.9%)
Salaries, wages and benefits	567.2	587.3	617.8	645.4	694.3	5.2%
Write-down of tangible capital assets	0.6	0.0	1.2	0.0	0.0	(100.0%)
Sub Total Continuing Operations	1,433.2	1,454.3	1,579.5	1,641.7	1,730.3	4.8%
Corporate One-time	32.1	29.7	12.6	22.0	18.2	(13.2%)
Total Expenses by Category	1,465.3	1,484.0	1,592.1	1,663.7	1,748.5	4.5%

Administration costs have increased by a Compound Annual Growth Rate (CAGR) of 10.3 per cent since 2015 mainly due to an increase in telecom, network and software requirement as well as higher fare media usage. The CAGR for capital infrastructure contributions has increased by 5.0 per cent mainly due to the timing of capital infrastructure contributions to municipalities. The CAGR of insurance costs have increased by 8.4 per cent mainly due to higher vehicle insurance rates and a larger fleet due to service expansion. Maintenance, materials and utilities costs have increased by a CAGR of 9.6 per cent mainly due to higher train and rail maintenance costs, higher costs for hybrid and trolley bus battery replacement, higher building maintenance and janitorial costs, higher hydro cost and higher snow removal costs. The CAGR of rentals, leases and property tax costs have decreased by 7.9 per cent mainly due to the buy-out of West Coast Express rail cars leases in 2015.

Appendix 3 – Operating Indicators

OPERATING INDICATORS						Compound Annual Growth Rate (CAGR) 2015-2019 ⁹
Year ended December 31	2015	2016	2017	2018	2019	
Service Performance Item						
Safety: Customer Injuries (per 1 million boarded passengers)¹						
- CMBC	5.0	5.6	4.7	4.2	3.9	(6.0%)
- Expo & Millennium Lines	1.3	1.1	1.3	1.1	0.9	(8.8%)
- West Coast Express	0.8	0.4	1.3	1.2	0.4	(15.9%)
- HandyDART (per 100,000 boarded passengers) ²	2.3	1.8	1.9	1.7	0.7	(25.7%)
Safety: Employee Lost Time Frequency						
- CMBC (per 200,000 hours worked)	7.1	8.6	8.7	7.7	8.1	3.3%
- Expo & Millennium Lines (per 200,000 hours worked) ³	3.6	3.9	5.1	5.3	5.9	13.1%
- West Coast Express (per 200,000 hours worked)	-	-	8.6	-	-	-
- HandyDART (per 200,000 hours worked)	14.0	18.3	15.8	16.1	13.7	(0.5%)
Safety: CMBC Operator Assaults (per 1 million service hours)	23.5	22.3	20.3	17.7	16.5	(8.5%)
Ridership: Boarded Passengers (thousands)						
- CMBC	241,707	244,992	253,150	273,375	283,663	4.1%
- Expo & Millennium Lines	77,593	93,850	105,117	111,325	114,883	10.3%
- Canada Line	40,972	43,526	46,253	48,716	50,223	5.2%
- West Coast Express	2,649	2,459	2,323	2,485	2,607	(0.4%)
- HandyDART	1,340	1,366	1,395	1,475	1,560	3.9%
Ridership: Revenue Passengers (thousands)						
- Overall System	238,795	n/a	n/a	n/a	n/a	-
Ridership: Journeys (thousands)						
- Overall System	n/a	234,205	247,821	262,626	272,430	-
Vehicle Service Delivery: Percentage of Service Hours Delivered						
- CMBC	99.7%	99.6%	99.6%	98.9%	98.5%	(0.3%)
- Expo & Millennium Lines	99.5%	99.6%	99.6%	99.7%	99.4%	(0.0%)
- Canada Line	100.0%	100.0%	100.0%	100.0%	100.0%	-
- West Coast Express	99.6%	99.7%	98.0%	100.0%	99.8%	0.1%
- HandyDART (% of requested trips delivered)	99.6%	99.4%	99.3%	99.7%	99.8%	0.1%
Vehicle Punctuality: On-Time Performance						
- CMBC (3 minutes late < On-Time < 1 minute early)	78.8%	77.6%	78.3%	80.4%	80.5%	0.5%
- Expo & Millennium Lines (headway + 3 minutes)	95.9%	95.1%	95.3%	96.4%	96.1%	0.1%
- West Coast Express (headway + 5 minutes)	95.6%	95.3%	97.2%	96.7%	96.7%	0.3%
- HandyDART (earlier than and within 15 minutes of Scheduled Pick-Up Time)	89.5%	88.5%	88.0%	87.1%	87.5%	(0.6%)
Vehicle Reliability: Mean Distance Between Failures						
- CMBC	15,486	16,745	18,441	19,768	24,055	11.6%
- Expo & Millennium Lines ⁴	437,320	360,406	372,854	545,152	n/a	n/a
Vehicle Reliability: Mean Distance Between Service Removals						
- Expo & Millennium Lines ⁴	n/a	n/a	n/a	n/a	236,774	n/a
HandyDart Vehicle Productivity						
- Trips per service hour (excludes taxis)	2.0	2.0	1.9	2.1	2.3	3.6%
- Trip Denials	1,613	3,558	1,362	729	1,430	(3.0%)
Environmental						
- CMBC (Spills per 1 Million Km)	9.0	7.2	7.5	5.0	2.1	(30.5%)
- CMBC (Revenue Vehicle Energy Consumption in Gigajoules)	1,838,967	1,843,990	1,899,303	1,974,898	506,477	(27.6%)

¹ The customer injury definition for CMBC and HandyDART represents the number of accepted injury claims arising from on-board incidents inside of the vehicle, while boarding, or as a result of a collision. The customer injury definition for Expo and Millennium Line and West Coast Express represents the number of injuries where the customer is transported to hospital for treatment and the incident is reported to transit staff.

² Restated 2015-2018 to reflect the new injury definition

³ Restated 2017 to align with WorkSafe BC figures.

⁴ In 2019, the indicator Mean Distance Between Failures was replaced by Mean Distance between Service Removals.

Appendix 3 - Operating Indicators (continued)

OPERATING INDICATORS						Compound Annual Growth Rate (CAGR)
Year ended December 31	2015	2016	2017	2018	2019	2015-2019 ⁹
Customer Service: Customer Satisfaction (overall score of 10)						
- Overall System ⁵	7.5	7.6	7.7	7.8	7.8	1.0%
- CMBC	7.7	7.9	7.9	7.9	7.9	0.6%
- Expo & Millennium Lines	8.0	8.1	8.2	8.3	8.2	0.6%
- Canada Line	8.6	8.5	8.6	8.5	8.5	(0.3%)
- West Coast Express	8.1	8.6	8.4	8.9	9.0	2.7%
- HandyDART	8.5	8.5	8.3	8.4	8.4	(0.3%)
Customer Service: Customer Complaints						
- Overall System (per 1 million boarded passengers) ⁵	98.9	98.7	93.4	95.4	90.6	(2.2%)
- Corporate (per 1 million boarded passengers) ⁶	15.6	19.6	23.1	23.8	24.9	12.4%
- CMBC (per 1 million boarded passengers) ⁶	108.9	114.3	104.2	106.2	97.1	(2.8%)
- Expo & Millennium Lines (per 1 million boarded passengers) ⁶	20.9	16.2	17.1	15.4	13.8	(9.9%)
- Canada Line (per 1 million boarded passengers) ⁶	2.4	3.9	4.3	4.8	6.1	26.3%
- West Coast Express (per 1 million boarded passengers) ⁶	335.2	314.7	101.6	104.2	89.0	(28.2%)
- HandyDART (per 100,000 boarded passengers)	99.7	107.7	120.2	187.3	201.8	19.3%
Financial: Operating Costs						
- Overall System (operating cost per capacity km) ⁷	0.084	0.085	0.084	0.086	0.089	1.5%
- CMBC (operating cost per capacity km)	0.119	0.123	0.126	0.128	0.132	2.6%
- Expo & Millennium Lines (operating cost per capacity km)	0.029	0.031	0.031	0.033	0.034	4.8%
- Canada Line (operating cost per capacity km)	0.105	0.106	0.105	0.107	0.110	1.2%
- West Coast Express (operating cost per capacity km)	0.099	0.089	0.092	0.095	0.094	(1.3%)
- HandyDART (operating cost per trip) ⁸	40.64	40.95	42.73	41.34	39.26	(0.9%)
Financial: Operating Cost Recovery						
- TransLink (conventional system) ^{9,10}	53.6%	54.7%	55.9%	58.1%	58.9%	2.4%

⁵ Excludes HandyDART

⁶ Restated 2015-2017 to reallocate Compass Vending Machine complaints from SkyTrain and West Coast Express as well as "bus was full" complaints from CMBC to TransLink Corporate

⁷ Includes Bus, SeaBus, Expo & Millennium Line, Canada Line, West Coast Express and Police operating costs

⁸ 2018 operating cost per trip excludes TransLink allocated costs to Access Transit

⁹ Excludes corporate one-time costs. Restated 2017 to reflect year end adjustments

¹⁰ Calculations based on whole numbers

Appendix 4 – Allocated Costs between Divisions

Allocated Cost Breakdown					
Year ended December 31					
(\$ thousands)	2015	2016 ⁴	2017	2018	2019
Shared Services ¹					
Bus Operations	23,440	25,526	27,240	30,903	36,625
Access Transit ²	972	683	744	-	98
SkyTrain - Expo & Millennium Line	1,108	1,052	2,330	1,458	7,568
West Coast Express	70	66	84	86	162
Transit Police	1,679	1,550	1,883	3,108	3,418
Total Shared Services allocated	27,269	28,877	32,281	35,555	47,871
Costs Administered by TransLink and allocated to subsidiaries ³					
Bus Operations	16,411	18,675	16,530	14,327	16,684
SkyTrain - Expo & Millennium Line	4,770	4,840	5,177	6,082	4,072
SkyTrain - Canada Line	2,215	2,451	2,107	2,164	2,313
West Coast Express	15,725	578	892	627	443
Transit Police	1,793	1,760	1,831	1,742	1,865
	40,914	28,304	26,537	24,942	25,377
Costs Administered by TransLink allocated					
Bus Operations	39,851	44,201	43,770	45,230	53,309
Access Transit	972	683	744	-	98
SkyTrain - Expo & Millennium Line	5,878	5,892	7,507	7,540	11,640
SkyTrain - Canada Line	2,215	2,451	2,107	2,164	2,313
West Coast Express	15,794	644	976	713	605
Transit Police	3,472	3,310	3,714	4,850	5,283
Total costs allocated to Subsidiaries from TransLink	68,182	57,181	58,818	60,497	73,248

¹ Includes Business Technology, Human Resources & Administration costs

² Access Transit allocated costs in 2018 are reflected in Bus Operations

³ Includes property tax, building leases, insurance, and fare media costs

⁴ Restated 2016 figures for year-over-year comparison purposes due to calculation methodology change applied in 2017 (no restatements made for 2015 and prior years)

TransLink's methodology for allocating costs to benefitting business units is equitable and consistent with leading practices. TransLink allocates costs to business units (Bus Operations, Access Transit, SkyTrain, West Coast Express and Transit Police) which directly benefit or consume the service or costs.

Business units can be allocated 100 per cent of a cost if it is the only one benefitting/consuming that cost or costs can be shared across multiple business units that benefit/consume the cost based on an allocation factor (e.g. head count, square footage). The charges that are allocated to the business units include; human resources, administration, rentals and leases and information technology.

The increase in costs allocated to the subsidiaries in the last 5 years correlates with increases in costs overall due to continued investments in technology. In addition, the technology usage at the subsidiaries has increased over the past year.



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TRANS LINK

TO: Board of Directors

FROM: Kevin Desmond, CEO
Sarah Buckle, Director Enterprise Risk and Sustainability

DATE: March 3, 2020

SUBJECT: Low Carbon Fleet Strategy Update and Next Steps

EXECUTIVE SUMMARY

The Low Carbon Fleet Strategy (LCFS) provides a strategy for the transition to an electric bus fleet aligning with our internal greenhouse gas (GHG) targets and the provincial/regional climate goals. As part of the Phase 2 LCFS, a high-level electrification transition plan was developed for our bus fleet¹, including financial analysis and GHG reductions over the 30-year period. The report details three approaches for electrification over the next decade: Cautious, Progressive and Aggressive. Each approach varies in short-term and total GHG reductions, technology and cost risks, and required capital investments.

On February 27, 2020, the Mayors' Council publicly endorsed the "Aggressive" path to support quick action on climate change that will see half of all TransLink's diesel fleet converted to battery electric by 2030 and the remainder before 2050.

PURPOSE

This report provides an update on the funding strategy for the Low Carbon Fleet Strategy (LCFS), next steps for the final phase of work, and the procurement strategy for both the buses and charging infrastructure.

DISCUSSION

A deep dive into the Phase 2 LCFS report and findings was held with TransLink's Board of Directors on January 22, 2020. The Board endorsed the work completed by TransLink staff. Following this meeting, information was presented to the Joint Finance and Governance Committee and the Joint New Mobility Committee in February 2020 for endorsement. The Phase 2 LCFS report² was published following the Mayors' Council meeting on February 27, 2020 (refer to Attachment A).

Funding Strategy

Mayors Council Action

The LCFS was brought to the Mayors' Council public meeting for endorsement on February 27, 2020 (refer to the public Mayors' Council report in Attachment B). The Mayors' publicly endorsed the "Aggressive" path for fleet electrification; however, it is important to note that none of the three proposed LCFS implementation options (Cautions, Progressive, Aggressive) are mutually exclusive. With additional

¹ The LCFS analyzed only replacement buses and does not include expansion buses to be included in the Phase 3 Investment Plan.

² Low Carbon Fleet Transition Plan, dated February 24, 2020. The final LCFS Report was peer reviewed by industry experts coordinated by C40 Cities.

funding in the next Plan, TransLink could switch course from a Cautious or Moderate track to the Progressive track or from the Progressive track to the Aggressive track, for example.

Inter-governmental Strategy

Transitioning to a low carbon fleet requires support from senior government. In December 2019, the federal government made a commitment to work with provinces and territories to introduce new funding to electrify 5,000 buses³ over the next five years. While the federal government remains committed, there is no certainty on how their funding program will be structured to support this transition.

The Province has commitments to reduce the province's GHG emissions by 80% by 2050 under their CleanBC strategy. TransLink has met with various stakeholders at the Province, including the Minister of Environment and Climate Change Strategy, Mr. George Heyman. It appears that the Province is waiting to see how the federal government program will be structured before they publicly announce a program to support fleet electrification.

Other potential funding sources include the Green Infrastructure Fund, Carbon credits through BC's low carbon fuel program, Canada Infrastructure Bank, and other finance and leasing mechanisms. TransLink with support of the Mayors' Council will continue working with provincial and federal leaders to make funding for the LCFS, as well as for the Phase Three Plan of the 10-Year Vision scheduled for approval in early 2021, a priority.

Next Steps

Operational Planning

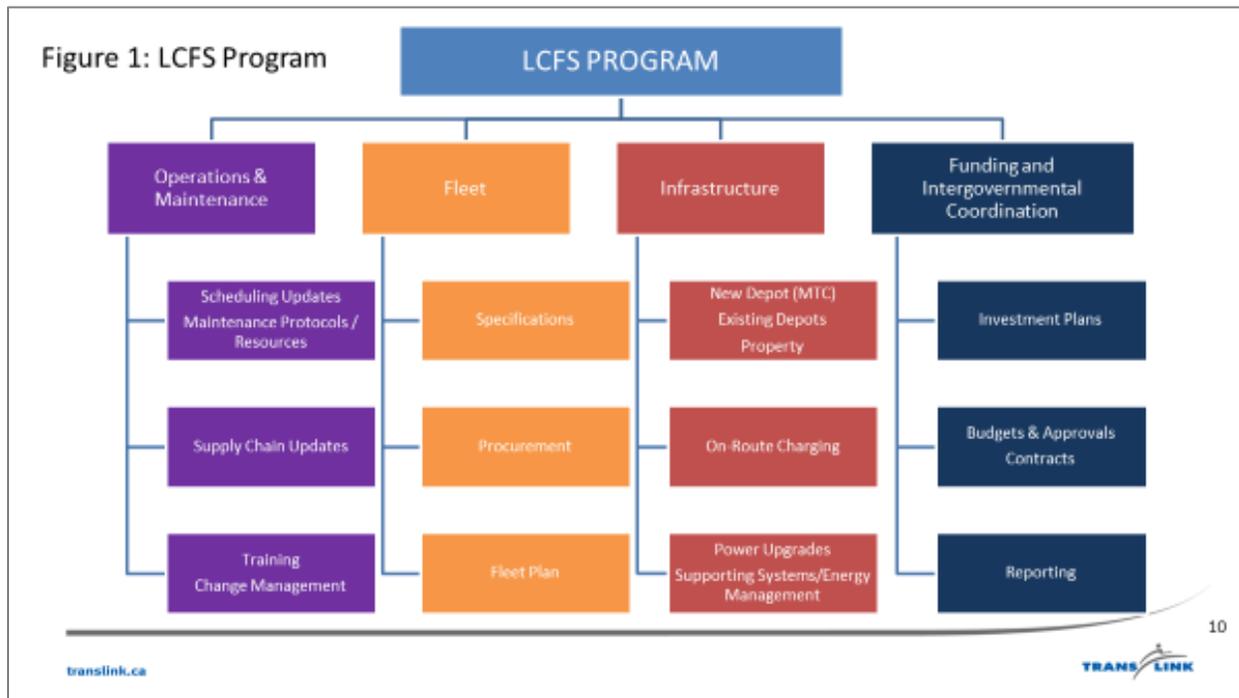
With Board and Mayors' Council's endorsement of the LCFS, the project is moving from strategy to implementation. Staff are currently finalizing the scope of work for Phase 3 which will be the last phase of work. The intent of this phase will be to detail the operational impacts and changes needed to make the transition to electrification successful. Throughout the process, benchmarking the battery-bus/charging industry will continue to ensure the costs and benefits assumptions used in Phase 2 remain relevant. Phase 3 will include but not be limited to:

- Bus scheduling, maintenance and cold weather operations;
- Bus weight permitting;
- Depot design and space considerations;
- Charger monitoring, maintenance and energy management;
- Power upgrades and utility service requirements to support electrification;
- Contingency and resiliency measures for loss of grid power;
- Supply chain and inventory management;
- Skills training, safety training and considerations; and
- External engagement with key stakeholder.

Internal Organizational Structure

The LCFS Program as shown below in Figure 1 is being transitioned from Corporate Sustainability to Infrastructure Management and Engineering (IME). The LCFS Director will report to the LCFS Executive Steering Committee and will be supported by a dedicated team and a working group at the Director/Senior Manager level. The resourcing plan is in development.

³ Zero-emission school and transit buses



Procurement Strategy

Marpole Transit Centre

TransLink is completing functional requirements at Marpole Transit Centre (MTC) and will be moving to conceptual design in March 2020. The LCFS Phase 2 assumed overhead pantograph chargers would be installed at each bus parking space at MTC. The Phase 3 work will help confirm the assumptions made in Phase 2 and inform the design of the charging infrastructure. Following design, the project will move into procurement. At this time, it is assumed that procurement of the charging equipment will be separate from procurement of the buses versus a turnkey solution where the buses and chargers are procured from the same supplier.

Bus Fleet Procurement

There are a number of procurement activities underway for the bus fleet which are described below.

- In January 2020, a Request for Information (RFI) closed for Alternative Fuel Vehicles and Infrastructure. The RFI was a joint initiative with TransLink and BC Transit requesting information from manufacturers or suppliers for alternative fuel technology vehicles and infrastructure, such as battery electric vehicles and hydrogen fuel cell vehicles. The information is currently being reviewed.
- In January 2020, a Request for Proposals (RFP) closed for 60ft Articulated Buses. This RFP was for a base year (55 hybrids) and three option years (70 hybrid and electric propulsion types). This RFP is currently in technical evaluation.
- An RFP for 40ft Battery Electric Buses for operation on Route 100 closed early March 2020. This RFP is for a base year (6 battery-electric buses) and one option (9 battery-electric buses). Technical and commercial evaluations will follow.
- An RFP for 40ft Buses is being developed and is scheduled to be published at the end of April 2020. This RFP will be for all propulsion types for a base year, and three option years.

ATTACHMENTS

Attachment A: *Low Carbon Fleet Transition Final Report (dated February 24, 2020)*

Attachment B: *Public Mayors' Council Report: Update on Low Carbon Fleet Strategy*



Low Carbon Fleet Transition Plan

FINAL REPORT

February 24, 2020

Prepared for:



Prepared by:



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Acknowledgements

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About TransLink & Coast Mountain Bus Company

South Coast British Columbia Transportation Authority (also known as "TransLink") was created by the Greater Vancouver Transportation Authority Act (British Columbia) in 1998. TransLink's mandate is to plan, finance and operate a regional transportation system that moves people and goods efficiently and supports the regional growth strategy, air quality objectives and economic development of the Greater Vancouver Regional District (Metro Vancouver). TransLink's subsidiary, the Coast Mountain Bus Company (CMBC), operates virtually all fixed-route transit bus service in the Vancouver metropolitan area, including in the municipalities of Burnaby, Coquitlam, Delta, Maple Ridge, New Westminster, North Vancouver, Pitt Meadow, Port Coquitlam, Richmond, Surrey, Vancouver, and White Rock.

About M.J. Bradley & Associates

M.J. Bradley & Associates, LLC (MJB&A), founded in 1994, is a strategic consulting firm focused on energy and environmental issues. The firm includes a multi-disciplinary team of experts with backgrounds in economics, law, engineering, and policy. The company works with private companies, public agencies, and non-profit organizations to understand and evaluate environmental regulations and policy, facilitate multi-stakeholder initiatives, shape business strategies, and deploy clean energy technologies.



EXECUTIVE SUMMARY

In 2016 TransLink engaged M.J. Bradley & Associates (MJB&A) to help the agency develop a Low Carbon Fleet Strategy (LCFS) that would produce significant reductions in greenhouse gas (GHG) emissions from the Coast Mountain Bus Company (CMBC) fleet, consistent with local and Provincial goals to achieve an 80 percent reduction in economy-wide GHG emissions by 2050.

The intent of the LCFS project was to develop a technology roadmap – for new bus and fuel purchases between 2020 and 2050 – to achieve the greatest practical GHG reductions, within the constraints of commercial and technical feasibility, projected future service and funding levels, and CMBC service constraints.

This report summarizes the Low Carbon Fleet Transition plan developed during the LCFS process, which relies on electrification of CMBC’s 40-ft and 60-ft transit buses using battery-electric buses. Section 1 provides background information on the LCFS planning process and the existing CMBC fleet and facilities. Section 2 summarizes the recommended high-level electrification strategy, as well as three detailed options for investments between 2020 and 2029 to put the fleet on that path. Section 3 summarizes the operational changes that will be required across the organization to accommodate electric buses. Supporting technical information is included in the Appendixes, including information on the status of the North American electric bus industry (Appendix A), discussion of electric bus charging options (Appendix B), a summary of the CMBC operational analysis that supports the recommended options (Appendix C), and a summary of the life cycle cost analysis (Appendix D).

The Low Carbon Fleet Transition Plan recommends replacement of existing 40-ft and 60-ft transit buses in the CMBC fleet with new battery electric buses at the end of their useful life, beginning with buses purchased in 2021, and delivered in 2023. Three different investment options are provided for the short term, between 2020 and 2029, but all scenarios anticipate only battery bus purchases after 2030, to achieve complete electrification of these fleets by 2050. The plan recommends that CMBC continue to operate 40-ft diesel highway coaches and gasoline shuttle buses, at least in the short term, with conversion of these bus types to battery-electric (highway, shuttle) or potentially fuel-cell electric vehicles (highway) beginning when the technology is more commercially advanced. The transition plan also recommends that CMBC employ both depot- and in-route charging strategies, with depot charging for slower speed routes through

Vancouver, and in-route charging on the higher speed routes through the other municipalities in the region.

Finally, the fleet transition plan recommends that during the transition to electric buses TransLink use low-carbon renewable natural gas (RNG) in existing compressed natural gas buses in the fleet, and also consider using low carbon renewable diesel fuel in existing diesel and hybrid-electric buses when it is commercially available in the Vancouver region.

The recommended plan will reduce annual fleet GHG emissions from the CMBC bus fleet (including 40-ft and 60-ft transit buses, 40-ft highway coaches, and shuttle buses) by 90+ percent from 2007 levels in 2050.

For the initial electrification investments between 2020 and 2029, three different options are provided. These options are characterized as Cautious fleet electrification, Progressive fleet electrification, and Aggressive fleet electrification, as they vary significantly in terms of the pace at which TransLink moves toward fleet electrification in the short term, with resulting differences in risk, cost, and short-term GHG reduction. However, all three options can put the CMBC fleet onto the recommended path to full electrification by 2050. The three potential investment options are summarized in Table 1.

Table 1 Summary of Fleet Electrification Investment Options 2020 - 2029

METRIC		CAUTIOUS	PROGRESSIVE	AGGRESSIVE
Electric Buses Purchased		95	314	635
In-route Chargers Installed		1	4	17
Depot Chargers Installed at		MTC	MTC	MTC and BTC
Routes Electrified	Depot Charging	30% of MTC routes	100% of MTC routes	100% of MTC routes 80% of BTC routes
	In-route Charging	Route 100	Routes 100, 159, 169, 188	Route 100 95% of PTC routes
CAPITAL INVESTMENT 2020-2029 (nom \$ mill)	Buses	\$37	\$110	\$199
	Infrastructure	\$58	\$89	\$248
	TOTAL	\$95	\$199	\$447
Operating Savings 2020 – 2030 (nom \$ millions)		\$27	\$67	\$124

METRIC	CAUTIOUS	PROGRESSIVE	AGGRESSIVE
GHG Reduction 2020 – 2030 (MT)	56,000	137,000	269,000
Annual GHG Reduction 2020 (MT)	9,800	33,600	59,500
Annual GHG Reduction 2030 vs 2007	14%	28%	44%

All three short-term investment options include the opening of the new Marpole Transit Centre in late 2023 or early 2024 as a 100 percent electric-capable depot, which will eventually utilize depot-based overnight charging for all assigned buses. The Aggressive electrification option also includes retrofit and expansion of the Burnaby Transit Centre in the next ten years to accommodate depot-based overnight charging; under the less aggressive options (Cautious, Progressive) this conversion happens after 2030. For these two transit centres the investments required to accommodate depot-based charging will be significant and will include the cost of the chargers and supporting electrical infrastructure, as well as the cost of depot expansion to accommodate a larger bus fleet and the charger installations.

The Low Carbon Feet Transition Plan ultimately envisions in-route charging for all buses operating from Hamilton, Port Coquitlam, Richmond, and Surrey transit centres. For these transit centres required investments at the depot to accommodate electric buses will be modest, but significant investments will be required to install high-power bus chargers at bus exchanges throughout the CMBC service area. Under all three short-term investment options these in-route charger investments begin by 2030, starting with the chargers required for routes 100, 159, 169, and 188.

The Cautious option for recommended electrification investments from 2020 – 2029 requires \$95 million to begin the transition to electric buses. This level of funding would allow TransLink to open MTC as a 100 percent electric-ready depot, and to purchase a total of 95 electric buses and necessary chargers, including 80 buses to be operated from MTC using depot charging, and 15 to be operated on Route 100 using in-route charging. Together with the current pilot fleet of four electric buses and two in-route chargers already installed on this route, this level of investment would allow for complete electrification of Route 100 and electrification of approximately 30 percent of the routes operating from MTC by 2030, putting the fleet on a path to full electrification by 2050.

The Progressive option for electrification investments from 2020 – 2029 requires \$199 million, for the purchase of 314 electric buses and necessary chargers. This level of investment would allow TransLink, by 2030, to fully electrify all routes operating from MTC, as well as Routes 100, 159, 169, and 188. This option would put the fleet on a path to full electrification by 2045.

The Aggressive option for electrification investments from 2020 – 2029 requires \$447 million, for the purchase of 635 electric buses and necessary charging infrastructure. This level of investment would allow TransLink to fully electrify over 50 percent of all CMBC bus routes by 2030¹, and would put the fleet on a path to full electrification by 2040. This option represents the fastest possible fleet electrification transition without retiring buses early.

Annual operating cost savings between 2020 and 2030, which would result from fleet electrification, are projected to be between \$27 million and \$124 million, depending on the investment option chosen. Under all options, after 2024 CMBC is projected to see modest annual savings in bus maintenance costs and significant annual savings in fuel costs. These savings will be balanced by modest annual increases in bus operator labor costs as well as modest new costs for charging infrastructure maintenance.

Depending on the investment option chosen, annual fleet GHG emissions in 2030 are projected to be 14 - 44 percent lower than fleet emissions were in 2007².

Regardless of the investment option chosen, over the next ten years CMBC will need to make significant changes to all aspects of their current operations, to accommodate fleet electrification, including:

- Securing axle weight exemptions from the Province to operate electric buses, which are heavier than current buses in the fleet.
- Making changes to bus schedules and block assignments to accommodate the range limitations of electric buses
- Evolving bus maintenance and overhaul programs to handle electric drive systems
- Developing new tools and procedures to monitor and manage electric bus charging and to manage cold weather operations
- Developing completely new capabilities to maintain and repair electric bus charging infrastructure, and
- Procuring mobile power generation capabilities to ensure that electric buses can operate even if the electric grid is interrupted.

¹ This includes trolley routes

² 2007 is the base year for most local and provincial GHG reduction goals.

The Low Carbon Fleet Transition Plan presented here is based on current commercial electric bus and charger options in North America, and best available estimates of future technology development. The plan acknowledges and accounts for expected improvements in battery technology, and electric bus capabilities, over the next 30 years; nonetheless, the North American electric bus market is rapidly evolving, and there are significant uncertainties related to future costs and capabilities of electric buses. Of particular importance are uncertainties related to future battery costs and energy capacity, which have profound effects on battery bus life-cycle costs. The analysis that informed the Low Carbon Fleet Transition Plan presented here used a conservative view of future battery improvements and other cost reductions for both battery buses and charging infrastructure. If batteries improve more rapidly than projected, total electrification costs will be lower than estimated, and decisions around charging strategy may change for portions of the CMBC route network. Conversely, if batteries improve more slowly than projected total fleet electrification costs will be higher than projected. Future battery improvements and cost reductions will be based on both technology and market developments, including the pace at which other North American transit agencies adopt electric buses.

The plan presented here is also based on current CMBC route configurations and does not include potential future service increases or route changes that have not yet been approved or funded. Any such future changes may necessitate adjustments to the Low Carbon Fleet Transition Plan.

1 Background

This section provides background information about the low carbon fleet transition and investment plan, including the reasons why it was developed, the process used, and descriptions of the current Coast Mountain Bus Company fleet and facilities.

1.1 Purpose of This Project

In 2016 TransLink initiated the Low Carbon Fleet project to develop a technology roadmap for bus and fuel purchases between 2020 and 2050 which could put the Coast Mountain Bus Company (CMBC) fleet on a path to significant GHG reduction, consistent with organizational, local, provincial, and federal policies and goals. These policies and goals are summarized in Figure 1.

Figure 1 Federal, Provincial, and Local GHG Policies

Federal	The federal government has expressed a commitment to achieving net zero carbon emissions by 2050, and is developing a plan to meet this goal
Provincial	The CleanBC program targets a 40 percent reduction in economy-wide greenhouse gas emissions by 2030 (from 2007 levels), a 60 percent reduction by 2040, and an 80 percent reduction by 2050. CleanBC also calls for 100 percent of new car and light-truck sales in the province to be electric vehicles by 2040
Local	Metro Vancouver has carbon neutral goals by 2050 and 45% GHG reduction by 2030
Organizational	In 2018 TransLink formally adopted organizational goals to achieve an 80 percent reduction in GHG emissions from operations by 2050, and to utilize 100 percent renewable energy in all operations by 2050

The project was designed to identify and compare technologies and fuels expected to be commercially available by 2020 that could significantly reduce fleet GHG emissions, and to compare them on a life-cycle cost and emissions basis. The desired outcome of the analysis was to identify an approach that would result in the lowest practical levels of annual GHG emission by 2050, within the constraints of commercial and technical feasibility, projected future service and funding levels, and CMBC service constraints.

1.2 Low Carbon Fleet Strategy Development

In 2016 TransLink engaged M.J. Bradley & Associates (MJB&A) to help the agency develop their Low Carbon Fleet Strategy (LCFS). MJB&A identified two broad strategies for significant GHG reduction from the CMBC bus fleet: 1) use of reduced-carbon renewable liquid and gaseous fuels in conventional buses with internal combustion engines, and 2) vehicle electrification.

Renewable fuel options include hydrogenation-derived renewable diesel (HDRD) as a substitute for petroleum diesel in diesel and hybrid-electric buses, and renewable natural gas (RNG) as a substitute for fossil gas in compressed natural gas (CNG) buses. Vehicle electrification could be accomplished by expanding the existing trolley network or replacing diesel and CNG buses with battery-electric or hydrogen fuel cell electric buses.

See Figure 2 for a summary of projected greenhouse gas (GHG) emissions from 40-ft transit buses in average CMBC service, in terms of carbon-dioxide equivalent mass emissions per kilometer driven (g CO₂-e/km). The values shown in Figure 2 include tailpipe and up-stream emissions, of carbon dioxide as well as methane and nitrous oxide expressed in carbon-dioxide equivalents using their 100-year global warming potential³. Upstream emissions are emissions associated with production and delivery of each fuel. Emissions from trolley and battery electric buses are based on projected electricity use (kWh/km) and current average electric generation emissions (g/kWh) in British Columbia, of which approximately 90 percent is from zero-carbon hydro sources. Emissions from fuel cell buses assume that the necessary hydrogen fuel will be produced from water via electrolysis using electricity from the grid.

As shown, low-carbon renewable fuels can reduce net GHG emissions significantly, but only electrification of a significant portion of the CMBC fleet could achieve the local and provincial goals of an 80 percent or greater reduction in emissions from current levels. All the electrification options could achieve an 80 percent reduction in fleet emissions, but the use of battery-electric buses would produce the lowest level of emissions.

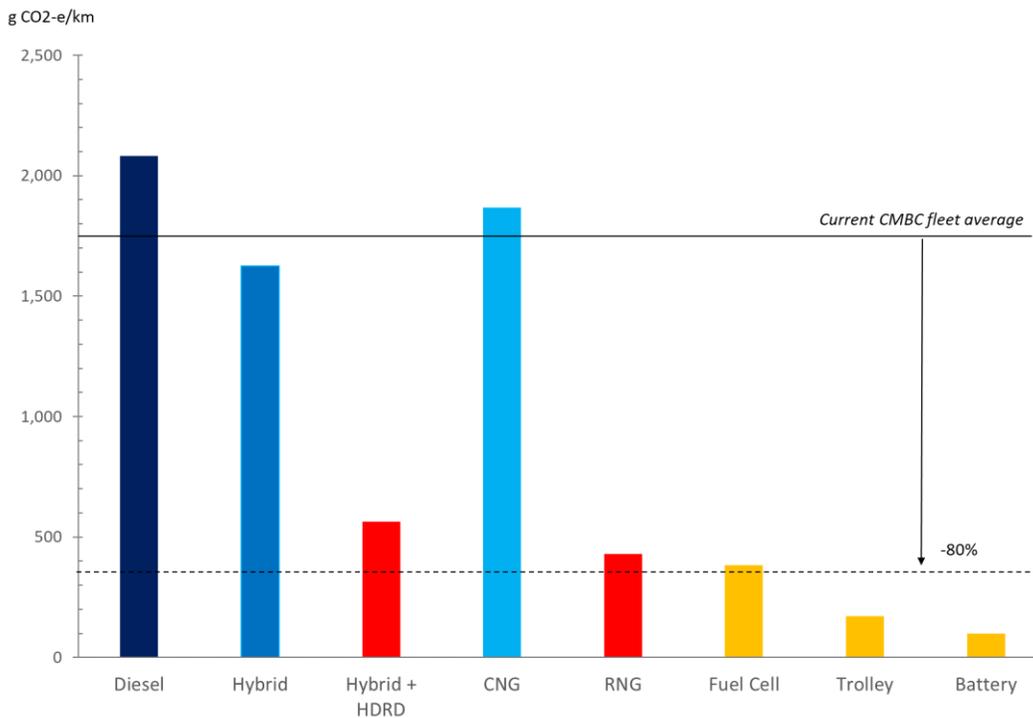
With respect to electrification options, life-cycle cost modeling indicates that the costliest option would be extension of the existing trolley network, due to the high cost of installing and maintaining new trolley overhead power systems. Battery electric buses are the least costly option today, with fuel cell buses less expensive than new trolley routes, but more expensive than battery buses on a life-cycle basis. The cost modeling indicates that for CMBC, life cycle

³ Upstream emissions are from GHGenious 4.03 (regional default BC, 2020 target year). RNG is assumed to be sourced from landfills, and HDRD is assumed to be produced from a mix of canola oil, tallow, and yellow grease. In the Vancouver region approximately 90 percent of electricity is from zero-carbon hydro-electric generation. Tailpipe emissions of CO₂ are based on projected fuel use in average CMBC service, and average fuel carbon content. Tailpipe emissions of CH₄ and N₂O are based on EPA engine certification testing.

costs of battery buses will be lower than life cycle costs of fuel cell buses at least through model year 2030, and likely through model year 2040 or later.

This initial analysis resulted in a primary recommendation that TransLink pursue a long-term strategy to electrify the bus fleet, using battery-electric buses, as this was identified as both the most effective and most cost-effective approach to fleet GHG reduction. The secondary recommendation was to further investigate the use of low-carbon renewable fuels in existing buses as an interim strategy while the fleet turns over to electric buses. RNG is already available locally from Fortis BC. HDRD is available to fuel suppliers in BC for blending with petroleum diesel but is not yet available to retail customers for use in vehicles.

Figure 2 Projected Greenhouse Gas Emissions in CMBC Service, 40-ft Transit Bus



The analysis also identified 40-ft and 60-ft transit buses (80 percent of the fleet) as the primary focus for electrification efforts in the near term (through 2030), with electrification of highway coaches and 26-ft shuttle buses to begin later. This recommendation was primarily based on commercial availability; to-date manufacturers have focused electrification efforts on this “full-sized” segment of the transit bus market, and electric buses are already available as standard products from every transit bus manufacturer that sells into the North American market. To date, smaller electric shuttle buses are only available from a few small, secondary specialty

manufacturers; they are not available from major original equipment manufacturers⁴. In addition, it was recommended not to electrify the 40-ft highway coaches in the CMBC fleet in the near term due to limitations on battery size and range, which are more constraining for highway coaches due to their higher daily mileage accumulation. The Phase 1 analysis recommended that TransLink focus LCFS Phase 2 efforts on electrification of 40-ft and 60-ft transit buses, but periodically re-evaluate whether it would be technically and commercially feasible to begin electrification of highway coaches and shuttle buses.

Electrification of the 40-ft and 60-ft transit buses can reduce total annual CMBC bus fleet GHG emissions (including from highway coaches and shuttle buses) by at least 80 percent. While electrification will require a significant up-front capital investment, the life cycle cost analysis indicated that annual fuel and maintenance cost savings could largely pay back this investment over the next 30 years, resulting in only a small increase in total costs compared to a business as usual scenario of continued replacement of retiring buses with new compressed natural gas and hybrid-electric buses.

CMBC also operates an electric trolley bus fleet, which is powered by an over-head catenary system installed on select routes throughout the city of Vancouver. These buses are already powered by electricity and therefore have virtually equivalent GHG emissions to battery buses. The current trolley fleet has been in service since 2006 and is scheduled for replacement in 2027 – 2028. Due to the projected high cost of trolley bus purchase, and the annual maintenance cost of the trolley overhead system, the possibility of replacing the existing trolleys with battery buses at the end of their service life was evaluated during the low carbon fleet planning process.

The life-cycle cost analysis indicated that replacement of existing trolleys with battery buses may result in life-cycle savings. However, there are significant uncertainties related to future trolley bus costs. In addition, replacement of trolleys with battery buses would require either significant modifications and likely expansion of the Vancouver Transit Center, or the development of in-route chargers in downtown Vancouver – neither of which could easily be accomplished before the current trolleys must be retired. Further, replacement of trolleys with battery buses would not contribute to further fleet GHG reduction. Given all these factors, it was recommended to maintain the current trolley system for the short and medium-term, and to replace the current trolley buses with new trolley buses in 2027-2028.

The recommendation to pursue electrification of the transit bus fleet, beginning with 40-ft and 60-ft buses, was subsequently endorsed by the TransLink Executive, the TransLink Board of Directors, and the TransLink Mayor's Council.

⁴ Smaller shuttle buses are made by different manufacturers than larger transit buses.

In 2018 TransLink re-engaged MJB&A to further develop the long-term fleet electrification strategy, and to develop a Fleet Electrification Transition Plan. The focus of this second phase was further development of battery bus charging strategies and implementation phasing, as well as determining the operational changes required to accommodate electric buses. On a parallel track TransLink engaged AES Engineering to develop conceptual designs for the necessary charging infrastructure to support electric buses. This report summarizes the LCFS Phase 2 analysis - including the operational and cost analysis done by MJB&A and the design work done by AES - and provides options for a detailed electrification implementation strategy over the next ten years.

As a separate effort, TransLink has also advanced the secondary recommendation from LCFS Phase 1 – the interim use of renewable fuels in existing buses. In February 2019 TransLink signed a 5-year contract with FortisBC, for supply of renewable natural gas (RNG) to existing CMBC buses. Available supply from Fortis is not yet sufficient to fuel all CNG buses in the fleet; RNG supply is projected to ramp up over the next few years, with all 299 CNG buses in the fleet operating on RNG as early as 2020.

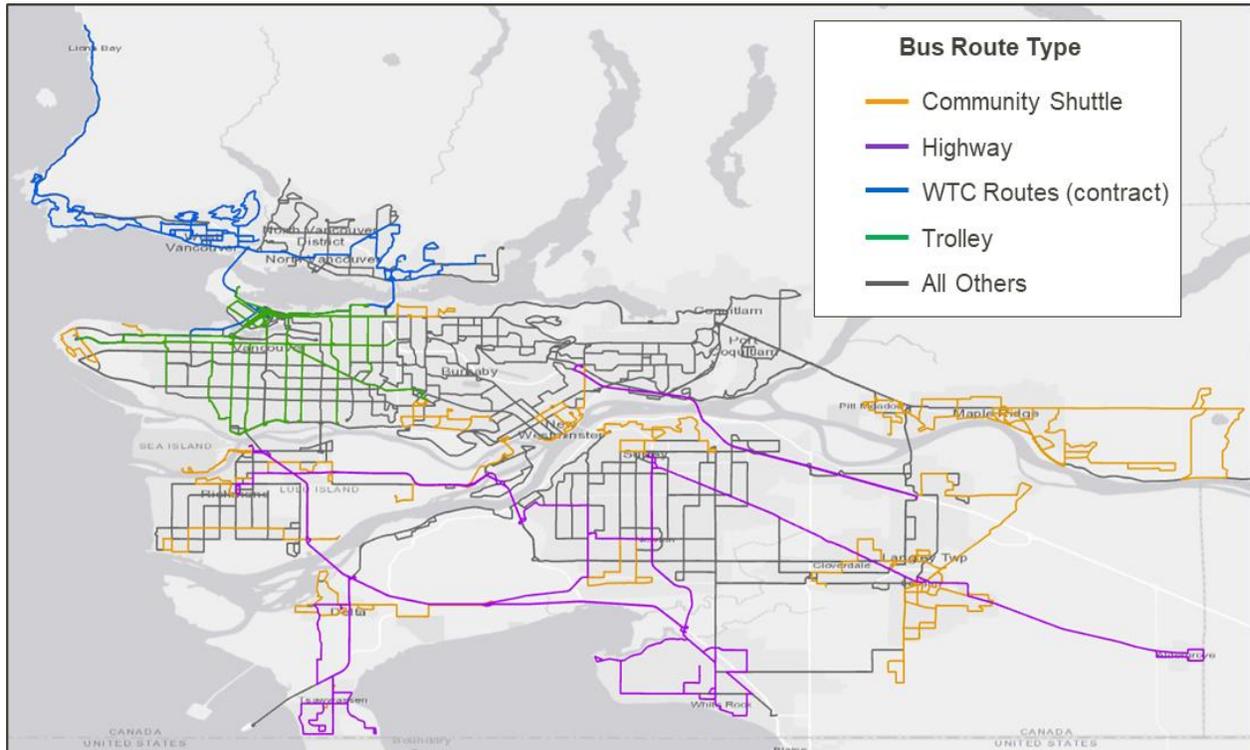
1.3 CMBC Fleet, Facilities, and Service Profile

This section briefly summarizes the current CMBC bus fleet, existing and planned transit centres from which the fleet operates, and the operating characteristics of the bus routes on which the buses operate.

1.3.1 CMBC Bus Routes and Service Profile

CMBC operates scheduled bus service on 128 different fixed routes throughout the Vancouver metropolitan region, including within the municipalities of Burnaby, Coquitlam, Delta, Maple Ridge, New Westminster, North Vancouver, Pitt Meadow, Port Coquitlam, Richmond, Surrey, Vancouver, and White Rock; service in West Vancouver is operated by a private company, under contract to TransLink.

Figure 3 TransLink Bus Routes



CMBC operates regular local and express bus service on major roadways throughout the region using 40-ft and 60-ft buses, and using 26-ft buses, operates local neighborhood “community shuttle” service on constrained roads which would be difficult for larger buses to negotiate. CMBC also operates twelve high-speed “highway” commuter routes which travel on highways between various downtown centers, with few intermediate stops. Within the municipality of Vancouver thirteen routes are equipped with overhead trolley power lines, for operation of rubber-tired electric trolley buses. See Figure 3 for a map of TransLink bus routes.

CMBC bus routes range in one-way length from three kilometers (km) to 45 km. Average scheduled speeds range from 13 kilometers per hour (kph) on downtown Vancouver routes to 67 kph on highway (commuter) routes; system wide average speed is 23 kph.

Service is provided 20 - 24-hours per day. Route headways (time between buses) during peak morning and afternoon commuting periods range from three to 60 minutes on different routes; headways are longer during mid-day and late evening/early morning hours. The total number of scheduled daily one-way trips ranges from about three (highway routes) to more than 170 per route. Approximately 1,250 buses are on the road during peak periods on weekdays.

1.3.2 CMBC Bus Fleet and Maintenance Facilities

CMBC currently has a fleet of 1,672 buses⁵, including 26-ft shuttle buses, 40-ft and 60-ft transit buses, 40-ft highway coaches, and 40-ft and 60-ft trolley buses. The composition of the current CMBC fleet by bus type and propulsion system type is shown in Table 2.

CMBC’s 40-ft and 60-ft transit buses are used on most local and express bus routes, which traverse the entire region on major roadways. Highway coaches are used only on specific high-speed “commuter” routes which operate on highways between various downtown centers, with few intermediate stops. Shuttle buses provide local neighborhood service on constrained roads which would be difficult for the larger buses to negotiate. The trolley buses operate only on specific routes in Vancouver which are equipped with overhead trolley power lines.

The bus fleet ranges in age from less than one year old to 19 years old (model year 2000). Thirty eight percent of the fleet is less than five years old; 22 percent is between five and ten years old, and 40 percent is greater than 10 years old. In order to maintain the fleet in good working order, CMBC has a general policy to retire 40-ft and 60-ft buses after they have been in service for 17 years⁶. As such, CMBC has a long-term need to purchase an average of 130 new buses per year, so that they can retire the oldest buses when they have reached the end of their useful life⁷.

Table 2 CMBC Bus Fleet

Bus Type/Length	Propulsion System					TOTAL
	Diesel	Hybrid	CNG	Gasoline	Electric	
Transit / 40-ft	366	245	299	NA	4	914
Transit / 60-ft	62	156		NA		218
Highway Coach / 40-ft	78			NA		78
Trolley / 40-ft	NA	NA	NA	NA	188	188
Trolley / 60-ft	NA	NA	NA	NA	74	74
Shuttle / 26-ft				200		200
TOTAL	506	401	299	200	266	1,672

⁵ This total includes 45 40-ft transit buses and 89 shuttle buses that are operated by third-party contractors; CMBC is responsible for purchase of new buses for these fleets.

⁶ Shuttle buses are retired after five years.

⁷ This is an annual average – new bus purchases do not necessarily happen every year.

In recent years CMBC has been replacing retiring 40-ft and 60-ft diesel transit buses with compressed natural gas buses and diesel hybrid-electric buses. Both of these bus types have lower fuel costs and lower GHG emissions than diesel buses. In 2018 CMBC also purchased four battery-electric buses, which are being used in a pilot program to further evaluate the technology and to inform future electric bus purchase specifications and operating plans.

CMBC buses are housed at seven transit centres around the region. Each transit centre includes one or more operations and maintenance building(s) with offices; locker rooms, a break area and other facilities for bus operators; storerooms and maintenance shops; and bus maintenance bays equipped with lifts or pits. Each transit centre also includes a bus fueling island and bus wash. At each transit centre buses are parked in outdoor storage areas, typically on parallel “tracks” which hold six to ten buses in a row parked nose to tail. See Figure 4, which shows half of the Burnaby Transit Centre (Burnaby South) as an example; in Figure 4 buses can be seen parked on the left, while the maintenance and operations building is on the right.

See Table 3 for a summary of the capacity, location, and assigned number of buses at each CMBC transit centre⁸. To accommodate expected future fleet growth TransLink and CMBC are in the process of designing a seventh facility – the new Marpole Transit Centre - which is projected to open in later 2023 or early 2024 with a capacity of 300 40-ft buses.

Figure 4 Burnaby South Transit Centre



⁸ This table only includes transit centres directly operated by CMBC. An additional 45 40-ft transit buses and 89 shuttle buses are operated by third-party contractors; all of the 40-ft buses and 20 percent of the shuttle buses operate from the West Vancouver Transit Centre, which is owned by CMBC but operated by a contractor. The other shuttle buses operate from contractor-owned facilities.

Table 3 CMBC Bus Transit Centres

Transit Centre	Location	Maximum Capacity (buses ¹)	Assigned Buses				
			60-ft Transit	40-ft Transit	40-ft Highway	26-ft Shuttle	Trolley
Burnaby (BTC)	Burnaby	312	92	150			
Hamilton (HTC)	Richmond	296	22	163			
Port Coquitlam (PTC)	Port Coquitlam	288	23	89	14	77	
Richmond (RTC)	Richmond	271	59	89	64		
Surrey (STC)	Surrey	285	22	193		34	
Vancouver (VTC)	Vancouver	539		185			262
Marpole (MTC)	Vancouver	300	Planned to open in 2023				

¹ Listed capacity is 40-ft equivalent buses

All of the transit centres operate a mix of different bus types, either 40-ft and 60-ft or 40-ft and 26-ft buses. All CNG buses are assigned to the Port Coquitlam, Hamilton, and Surrey transit centres, as they are the only facilities currently equipped to handle CNG buses⁹. Similarly, all of CMBC’s electric trolleys operate from the Vancouver Transit Centre as it is the only location equipped with a trolley overhead power system.

Most other locations operate a mix of diesel and hybrid-electric buses. Most highway coaches operate from the Richmond Transit Centre, while a few operate from Port Coquitlam, based on the location of the commuter routes they serve. The 26-ft neighborhood shuttle buses operate from the Port Coquitlam and Surrey Transit Centres, based on the locations of the neighborhood routes they serve¹⁰.

⁹ Operation of CNG buses requires a natural gas fueling facility, and special depot safety systems.

¹⁰ Another 89 shuttle buses are operated by third-party contractors from different locations.

2 Low Carbon Fleet Transition Plan

This section summarizes the recommended Low Carbon Fleet Transition Plan, including recommended bus technologies and charging strategies for a complete turn-over of 40-ft and 60-ft transit buses to battery electric buses by 2050. It also details three different options for the specific capital investments that would be required between 2020 and 2029 to put the fleet on the recommended transition path. These options vary in terms of their aggressiveness, cost, and short-term GHG reduction, but all can put the fleet onto the recommended path to full electrification by 2050.

2.1 Full Fleet Electrification 2020-2050

This section provides a high-level overview of the recommended approach to achieving an 80+ percent reduction in CMBC bus fleet emissions by 2050, including the major elements of the technology pathway and projected transition costs.

2.1.1 Technology Pathway

The recommended technology pathway for bus and fuel purchases between 2020 and 2050 includes the following major elements:

- Beginning with buses purchased in 2021¹¹, start to replace retiring diesel and CNG 40-ft and 60-ft transit buses with battery-electric buses. Between 2021 and 2029, TransLink may elect to replace some retiring buses with new hybrid-electric buses, but after 2030 all retiring buses should be replaced with new battery buses to achieve complete electrification of the fleet by 2050
- To charge battery buses, employ both depot-based overnight charging and in-route charging, with depot charging for the lower-speed routes that generally operate in Vancouver, and in-route charging on higher speed routes through the other municipalities. Both the new Marpole Transit Center and the Burnaby Transit Centre are recommended to employ depot charging for 100 percent of assigned buses. Port Coquitlam Transit Centre and Surrey Transit Centre are recommended to employ in-route charging for 100 percent of assigned buses. Hamilton Transit Centre and Richmond Transit Centre are preliminarily recommended to employ in-route charging but may be appropriate for depot-based overnight charging if future battery technology improvements extend available daily range per charge sufficiently.

¹¹ These buses will not be delivered until 2023

- For depot-charged buses provide an average of 50 kW per bus¹² of charging capacity, using overhead-mounted conductive pantograph chargers.
- For in-route charged buses, use 450 kW¹³ conductive pantograph chargers. On average one charger will be required for every eight in-route charged buses, but this will vary by route.
- Continue to assess commercial availability and cost of high-range battery buses and hydrogen fuel cell buses, as potential options for replacing retiring highway coaches. As the next highway coach purchase is not scheduled until 2027, final decisions about the future evolution of this fleet do not need to be finalized until 2025 or later. If long range battery bus and/or fuel cell technology has not sufficiently advanced by 2025, also consider conversion of this fleet to natural gas buses, to operate on RNG, if sufficient RNG fuel supply is available¹⁴.
- Continue to replace retiring 26-ft gasoline shuttle buses with new gasoline buses, at least in the short term. Begin to replace retiring shuttle buses with battery electric shuttle buses when commercially feasible.
- Replace the existing trolley bus fleet with new trolley buses at the end of their useful life, in 2027-2028, and continue to operate the trolley bus system in the short and medium term. After 2040, re-evaluate the option of replacing trolley buses with battery buses in the 2047 - 2048 time frame.

In addition to the above technology pathway for new bus purchases, it is recommended that TransLink continue to increase its use of RNG in existing natural gas buses as additional supply becomes available, and continue to evaluate the commercial availability and cost of renewable diesel fuel, for use in existing diesel and hybrid-electric buses while they remain in the fleet.

¹² This is the average charging capacity required, based on current bus scheduling, which results in available depot charging time of 7 to 10 hours per bus. To increase flexibility, it is recommended that TransLink employ charging systems that link together three charging heads to a single 150 kW inverter block, so that individual buses can charge at rates as high as 150 kW if less than three buses are actively charging.

¹³ This is the maximum charge rate currently supported by most North American bus manufacturers. In addition, due to limitations of the electrical distribution network, utility interconnection costs in many parts of the Vancouver Metro area would be significantly higher for in-route chargers with capacity greater than 500 kW.

¹⁴ Conversion of highway coaches to operate on RNG would require CMBC to install natural gas fueling capability at a fourth transit centre, which would need to be considered in the decision-making process, and may make this option financially infeasible.

2.1.2 Fleet Transition Costs

MJB&A estimated total CMBC bus fleet costs between 2020 and 2050 under a “baseline” scenario and the Aggressive fleet electrification scenario, which results in complete electrification of the 40-ft and 60-ft transit bus fleets by 2040. The modeled electrification scenario represents the fastest possible transition of the CMBC fleet to electric buses. Total net transition costs would be marginally lower than shown below under the less aggressive short term transition scenarios discussed in Section 2.2 (Cautious fleet electrification, Progressive fleet electrification), since electric buses purchased later are assumed to have lower incremental purchase cost, due to battery cost reductions over time.

The baseline scenario assumes that CMBC will continue to replace 40-ft and 60-ft diesel transit buses with hybrid-electric buses when they have reached the end of their useful life (17 years) and will replace retiring CNG buses with new CNG buses. The fleet electrification scenario assumes that beginning with buses retired in 2023, all retiring 40-ft and 60-ft transit buses will be replaced with battery electric buses. Both scenarios assume that the existing trolleys will be replaced with new trolleys in 2027-2028. While the baseline scenario assumes that these trolleys will again be replaced by new trolleys in 2047-2048, the electrification scenario assumes that in 2047-2048 the trolleys will be replaced with battery buses.

The electrification scenario also assumes that all battery buses assigned to BTC, MTC, and VTC will use depot charging, but those assigned to HTC, PTC, RTC, and STC will use in-route charging.

See Figure 5 for a summary of total projected fleet costs for both the baseline and Aggressive electrification scenarios. In Figure 5, total estimated costs are shown in both nominal dollars (including projected inflation) and in net present value terms, assuming a 4 percent discount rate.

Figure 5 Projected CMBC Bus Fleet Costs 2020 – 2050, for Baseline & Electrification

nom\$ millions	BASELINE	ELEC	NPV \$ millions (4% discount rate)	BASELINE	ELEC
CAPITAL			CAPITAL		
Bus Purchase	\$3,896	\$4,130	Bus Purchase	\$2,005	\$2,209
Fueling Infrastructure	\$0	\$1,183	Fueling Infrastructure	\$0	\$594
Depot Expansion	\$0	\$50	Depot Expansion	\$0	\$35
MAINT			MAINT		
Overhauls	\$323	\$285	Overhauls	\$172	\$156
Battery Pack Replace	\$109	\$358	Battery Pack Replace	\$58	\$172
Annual Bus Maint	\$3,565	\$3,363	Annual Bus Maint	\$1,940	\$1,855
Annual Infra Maint	\$146	\$212	Annual Infra Maint	\$79	\$110
FUEL			FUEL		
	\$2,850	\$1,609		\$1,496	\$946
BUS DRIVER LABOR			BUS DRIVER LABOR		
	\$9,949	\$10,121		\$5,482	\$5,560
TOTAL	\$20,838	\$21,311	TOTAL	\$11,233	\$11,638
<i>Difference</i>		\$473 2.3%	<i>Difference</i>		\$405 3.6%

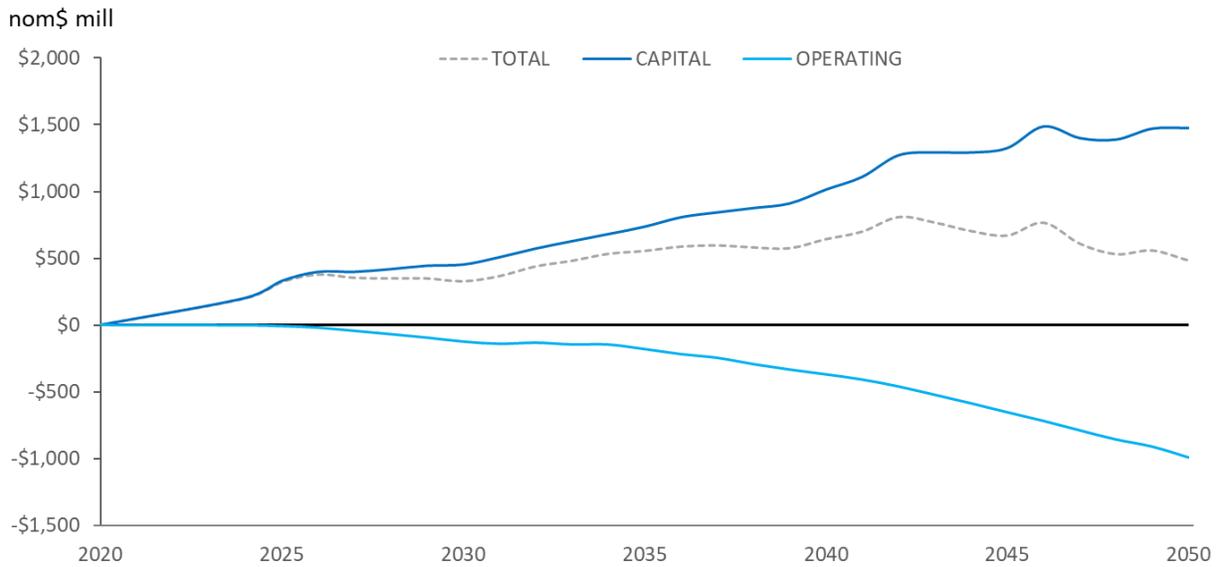
Over the next 30 years, aggressive CMBC fleet electrification is projected to cost \$473 million more than the baseline scenario (nominal \$), or an average of \$15.8 million more per year. Compared to the baseline this is an increase of 2.3 percent. In net present value terms, the incremental cost of fleet electrification is \$405 million, or an increase of 3.6 percent. The difference between the nominal and NPV values has to do with the timing of incremental costs and savings; fleet electrification will require near- and medium-term increases in capital costs but will yield medium- and long-term operating cost savings, primarily in expenditures for fuel.

This reality is seen more clearly in Figure 6, which plots cumulative incremental costs for the fleet electrification scenario over time, relative to the baseline scenario. In Figure 6, the dark blue line is cumulative additional capital costs for purchase of electric buses and charging infrastructure, the light blue line is cumulative net operating cost savings (fuel and maintenance), and the dashed grey line is cumulative net costs for fleet electrification.

The electrification costs shown in Figure 5 and Figure 6 account for projected reductions in battery bus purchase costs of 14 percent for in-route charged buses and 16 percent for depot-charged buses between 2020 and 2050 (in constant dollars). This is based on a projected 40 percent reduction in electric drive train costs and a 50 percent reduction in battery costs (\$/kWh) over this time period. For depot charged buses they also assume that battery energy capacity (kWh/bus) will increase by 33 percent between 2020 and 2050, due to advances in battery energy

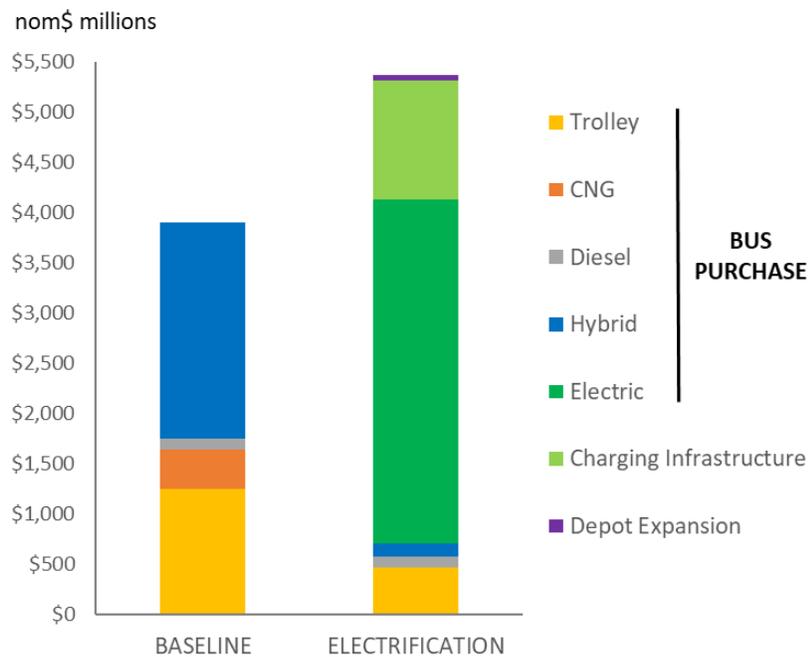
density¹⁵. These assumptions are conservative. If electric bus prices fall more quickly, the net cost of fleet electrification will be lower.

Figure 6 Incremental Fleet Electrification Costs 2020 – 2050, Relative to Baseline Fleet Costs



¹⁵ The assumed increased battery capacity increases bus purchase costs relative to buses with a smaller battery but reduces the number of buses required, due to longer range. The financial analysis indicates that use of the larger batteries for depot-charged buses as they become available reduces over-all net costs.

Figure 7 Capital Costs for Fleet Electrification 2020 – 2050



Through 2050, the modeled fleet electrification scenario will require \$1.47 billion (nom \$) in additional capital funding, compared to baseline fleet replacement with hybrid electric, CNG, and trolley buses¹⁶. However, there will be a net operating cost savings of \$994 million (nom \$), for a net total cost of \$473 million to electrify the fleet. Cumulative net total costs peak at \$800 million in 2042, then fall in future years. After 2050 net savings from fleet electrification are projected to average over \$15 million per year, as annual fuel and maintenance costs savings significantly outweigh the average incremental cost of fleet renewal with new electric buses.

Figure 7 breaks out required capital costs under the baseline and electrification scenarios, highlighting the relative amounts that must be spent on bus purchases and charging infrastructure under the electrification scenario, as well as the relative amounts spent on different bus types under both scenarios¹⁷.

¹⁶ This incremental capital cost does not include any debt financing costs.

¹⁷ The charging infrastructure costs shown in Figure 7 are based on conceptual level designs developed for this project. Total estimated costs include equipment purchase, installation, 10 percent construction contingency, design, project management, and interest costs during construction. Costs are shown in nominal dollars, including projected inflation. For all buses projected charger costs assume overhead pantograph conductive charging, both at the depot and in-route. Estimated costs for pantograph connectors are based on current commercial prices; there are reportedly efforts underway to reduce the cost of overhead pantograph connectors for depot-based overnight charging, but these potential future cost reductions were not included in this analysis.

2.2 2020-2029 Investment Plan

This section provides three options for electrification investments between 2020 and 2029, to begin to implement the recommended Low Carbon Fleet Strategy. The first option could be described as “cautious fleet electrification”- it is the least aggressive and lowest cost option, in recognition that full funding is not yet secured, and that the technology is continuing to evolve rapidly, such that moving at a measured pace may result in lower net costs over the long term. The second option represents a faster pace of investment, representing a “progressive” approach to fleet electrification which achieves greater short-term GHG reductions while still managing technology risk. The third option represents an even faster pace of electrification in the short term, and in fact represents the fastest possible turn-over of the fleet to electric buses without retiring existing buses early. This option represents TransLink and CMBC taking a very aggressive approach to fleet electrification, achieving maximum short-term GHG reductions, but at higher cost over the next ten years, and also incurring a greater level of financial and technology risk in this evolving market.

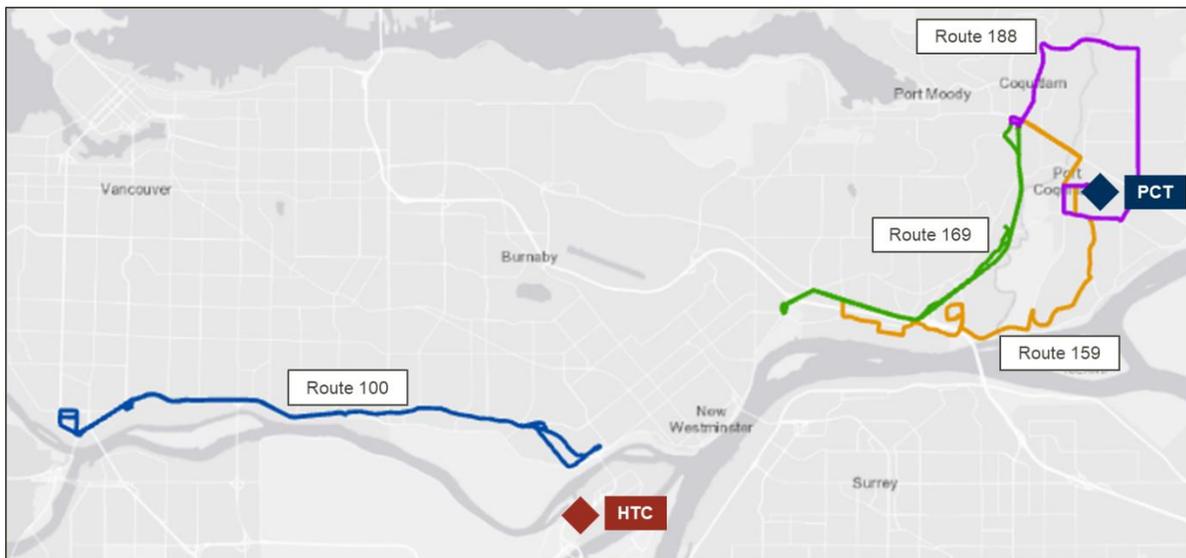
The investment options detailed here are based on current service levels and resulting bus procurement plans to maintain the fleet in a state of good repair. They do not include any service or bus fleet expansions beyond those planned through 2020. Significant service/fleet expansion between 2020 and 2029 may affect one or more of these scenarios, especially the Aggressive fleet electrification option, as it would necessitate development of additional new depot space beyond what is available from expansion of the current BTC property.

Each investment option identifies the scale and timing of specific investments through 2029 to put the fleet on a path to an 80+ percent reduction in annual GHG by 2050; under all three options additional investments will be required after 2029 to fully implement the recommended Low Carbon Fleet Strategy.

Under all three investment options it is recommended that depot charged buses be equipped with battery packs with a minimum name plate capacity of 450- 500 kWh (40-ft) or 600-660 kWh (60-ft)¹⁸ and be equipped with supplemental fuel heaters for cold weather operation¹⁹. In-route charged buses are recommended to be equipped with battery packs with a minimum name plate capacity of 150 kWh (40-ft) or 200 kWh (60-ft) and to be equipped with automated battery thermal management systems to maintain battery temperature within specified range while parked at transit centres overnight in cold weather, using energy from on-board battery packs.

All three options prioritize the new Marpole Transit Centre to open in late 2023 or early 2024²⁰ as a 100 percent electric ready depot, and to be the first location to receive electric buses, which will be depot charged. All three options also include in-route charged buses and charging infrastructure, starting with Route 100, which operates from HTC. The faster-paced Progressive and Aggressive options include in-route charging investments on additional routes, starting with routes 159, 169, and 188, which all operate out of PCT. See Figure 8, for a map of the first routes recommended to be converted with in-route charging.

Figure 8 First Routes to be Converted to Battery Buses with In-route Charging



¹⁸ These pack sizes are projected to be the largest available from most bus manufacturers in the next 5 – 10 years. The financial analysis indicates that larger packs reduce total life cycle costs for depot charging, despite higher bus purchase costs, by reducing the required replacement ratio. If available, TransLink should consider buying buses with larger packs for depot charged buses, but allowable pack size may be limited by Provincial axle weight restrictions.

¹⁹ Current commercially available fuel heaters use diesel fuel, but in the future, it may be possible to use a renewable liquid fuel such as ethanol or methanol.

²⁰ Exact timing of MTC opening is uncertain. Current projections are fourth quarter 2023 or first quarter 2024.

The Aggressive fleet electrification option, which is the most aggressive electrification scenario possible, also requires that in the next ten years the Burnaby Transit Centre be expanded and converted to depot-charging operation. Under the Cautious and Progressive scenarios these investments are not required until after 2030.

In addition to installing charging infrastructure, BTC investments to accommodate fleet electrification include expansion of the bus parking area, to accommodate the additional buses required when implementing depot charging. These additional buses are required due to electric bus range limitations. In order to expand the bus parking at BTC, several existing buildings that house fleet support functions must be removed, and new space to house these functions must be purchased or leased at another location in the Metro Vancouver area.

By design there is significant overlap between the three different investment scenarios, and they are not mutually exclusive. If TransLink begins along one of these paths based on available funding, in later years the pace of electrification could be accelerated to get onto a higher path if additional funding is made available.

In the near term, the most important decision required to get onto any of these fleet electrification paths is to design, then construct, the new Marpole Transit Center to be 100 percent electric ready when it opens in late 2023 or early 2024. If this is done it will provide sufficient depot charging space to maintain either the Cautious or Progressive electrification pace through 2030, with supporting electric bus purchases between 2021 and 2024. To move from Progressive to Aggressive electrification will require a decision to either: 1) expand and retrofit BTC for 100 percent electric operation, or 2) aggressively install in-route chargers along routes operating from PTC, STC and potentially HTC and/or RTC. However, these decisions do not necessarily need to be made today; they could be delayed to 2023 or 2024, without missing an opportunity to pursue more aggressive fleet electrification.

2.2.1 2020-2029 Cautious and Constrained Investment Option

See Table 4 for electric bus purchases, and Table 5 for charging infrastructure investments, required between 2020 and 2029 under the Cautious fleet electrification option. The costs shown in these tables are incremental costs, over and above the projected costs of required bus purchases under the baseline or business as usual scenario²¹. Incremental costs for purchasing 95 electric buses total \$36.8 million²², and infrastructure investments total \$57.7 million, for a total incremental capital cost (above baseline costs) of \$94.5 million to begin implementing the Low Carbon Fleet Transition Plan. These estimated incremental costs for electrification include an assumed reduction in electric bus purchase costs of 6 percent between 2020 and 2030, based on a 20 percent reduction in electric drive train and battery costs (\$/kWh), but also an 11 percent increase in battery capacity for depot-charged buses²³.

Under this investment option MTC would open in late 2023 or early 2024 as a 100 percent electric-ready depot, with 16 40-ft electric buses, with an additional 64 40-ft electric buses added over the next two years, for a total of 30 percent of assigned buses electric through 2030. The depot charger make-ready investment at MTC includes up-sizing the depot electrical supply and installing electrical distribution conduit to every bus parking space. The projects to install chargers at MTC include installation of power modules and pantographs and pulling wire through the installed conduits to power each pantograph.

In 2021 Route 100 would be converted to 100 percent electric operation, with a total of three in-route chargers and 19 electric buses²⁴.

Figure 9 shows the portion of CMBC's route network that would be electrified by the end of 2031 under the Cautious fleet electrification investment option.

See Table 6 for an estimate of annual incremental operating costs between 2020 and 2030 resulting from fleet electrification under the Cautious investment option. Over the next ten years this electrification scenario is projected to reduce bus maintenance costs by \$3.4 million and reduce fuel costs by \$25.9 million compared to continued renewal of the fleet with new hybrid electric and CNG buses as old buses are retired. Bus operator labor costs are projected to

²¹ Under the baseline scenario, TransLink will purchase 433 40-ft and 80 60-ft hybrid-electric buses, and 50 40-ft CNG buses between 2020 and 2029, at an estimated cost of \$597 million (nominal).

²² These incremental costs are additional to the baseline cost of purchasing new hybrid electric buses to replace retiring buses.

²³ The assumed increased battery capacity increases bus purchase costs but reduces the number of buses required due to longer range. The financial analysis indicates that use of the larger batteries reduces over-all net costs.

²⁴ There are currently four electric buses operating on Route 100 with two in-route chargers, as part of a pilot program.

increase by \$0.9 million and estimated new costs for charger maintenance total \$1.2 million. Net operating cost savings are projected to be \$27.1 million, or an average of \$2.7 million per year.

Figure 9 Routes Electrified by 2031 – Cautious Fleet Electrification Option

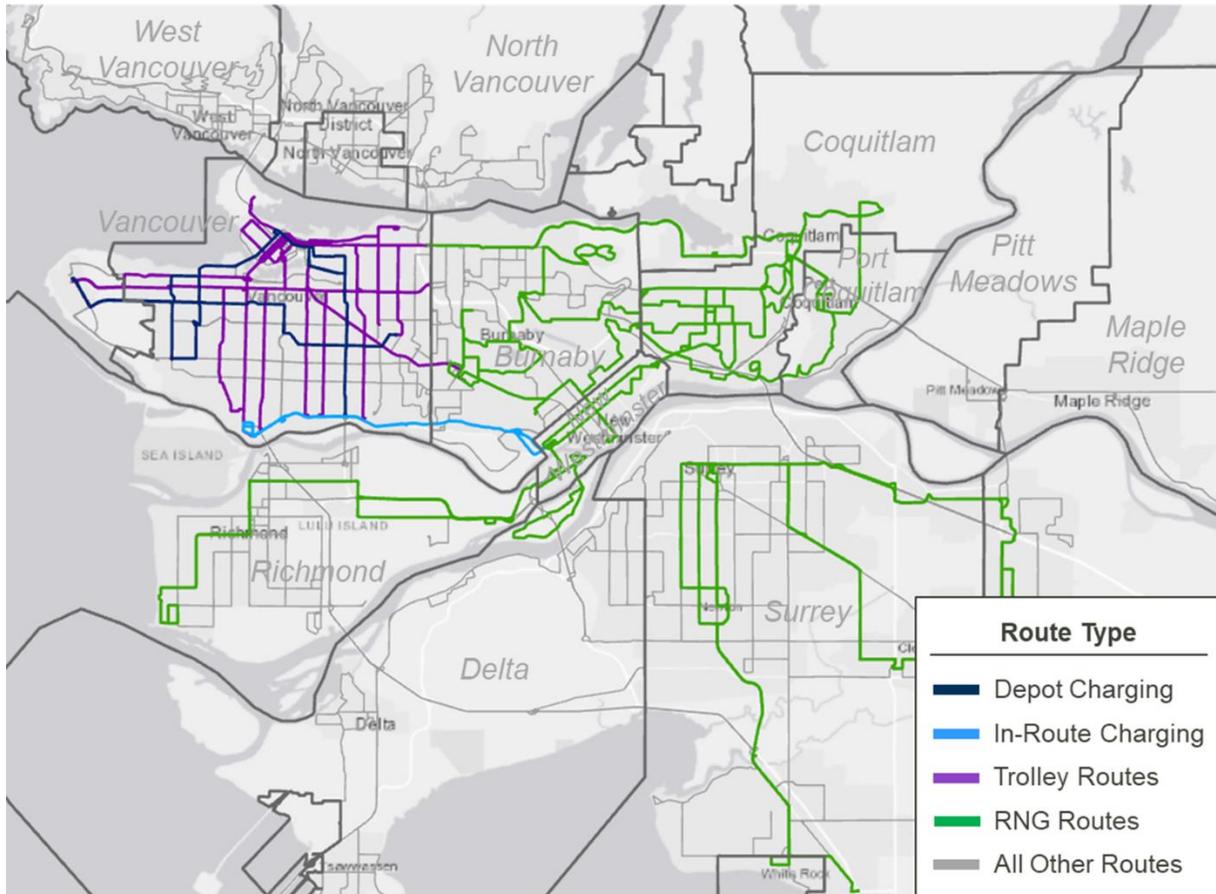


Table 4 Electric Bus Purchases – Cautious Investment Option

Length	Charging Type	Award Year										TOTAL
		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
40-ft	Depot		16	37	27							80
	In-route	15										15
	Total	15	16	37	27							95
INCR COST (nom \$ mill)			\$6.7	\$15.5	\$14.6							\$36.8

Table 5 Depot and Charging Investments – Cautious Investment Option

Purpose	Location	Scope	Award	Completion	Cost (mill nom \$)
Depot Charging	MTC	Make ready for full depot electrification; installation of 16 SAE J3105 chargers	2021	2023	\$43.0
	MTC	Installation of 37 SAE J3105 chargers	2022	2024	\$7.3
	MTC	Installation of 27 SAE J3105 chargers	2023	2025	\$5.4
In-route Charging	Rte 100	Install 1 in-route charger	2020	2021	\$2.0
TOTAL COST					\$57.7

Table 6 Projected Incremental Operating Costs – Cautious Investment Option

Cost Type	million nominal \$											
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	TOTAL
Bus Maintenance	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.02)	(\$0.6)	(\$0.7)	(\$0.7)	(\$0.7)	(\$0.7)	(\$3.4)
Charger Maintenance	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.1	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$1.2
Fuel	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.7)	(\$2.2)	(\$4.2)	(\$4.4)	(\$4.6)	(\$4.8)	(\$4.9)	(\$25.9)
Bus operator Labor ¹	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.1	\$0.2	\$0.2	\$0.2	\$0.2	\$0.2	\$0.9
TOTAL	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.6)	(\$2.2)	(\$4.5)	(\$4.7)	(\$4.8)	(\$5.0)	(\$5.2)	(\$27.1)

¹ Bus operator labor costs increase due to increased dead-head time (depot charging) and additional on-route lay-over time (in-route charging).

2.2.2 2020 – 2029 Progressive Investment Option

See Table 7 for electric bus purchases, and Table 8 for charging infrastructure investments, required between 2020 and 2029 under the Progressive fleet electrification option. The costs shown in these tables are incremental costs, over and above the projected costs of required bus purchases under the baseline or business as usual scenario. Incremental costs for purchasing 314 electric buses total \$110.1 million²⁵, and infrastructure investments total \$89.1 million, for a total incremental cost of \$199.2 million to begin implementing the Low Carbon Fleet Transition Plan. These estimated incremental costs for electrification include an assumed reduction in electric bus purchase costs of 6 percent between 2020 and 2030, based on a 20 percent reduction in electric drive train and battery costs (\$/kWh), but also an 11 percent increase in battery capacity for depot-charged buses²⁶.

Under this investment option MTC would open in late 2023 or early 2024 as a 100 percent electric-ready depot, with 16 electric buses, with an additional 224 40-ft and 40 60-ft electric buses added over the next six years; after 2029 100 percent of assigned buses at MTC would be electric. In 2021 Route 100 would be converted to 100 percent electric operation, with a total of three in-route chargers and 19 electric buses²⁷. In 2029 routes 159 and 169 would be converted to 100 percent electric operation, followed by route 188 in 2031. This will require 19 electric buses and three in-route chargers.

Figure 10 shows the portion of CMBC's route network that would be electrified by the end of 2031 under the Progressive fleet electrification investment option.

See Table 9 for an estimate of annual incremental operating costs between 2020 and 2030 resulting from fleet electrification under the Progressive investment option. Over the next ten years this electrification scenario is projected to reduce bus maintenance costs by \$8.7 million and reduce fuel costs by \$65 million compared to continued renewal of the fleet with new hybrid electric and CNG buses as old buses are retired. Bus operator labor costs are projected to increase by \$3.6 million and estimated new costs for charger maintenance total \$3 million. Net operating cost savings are projected to be \$67.1 million, or an average of \$6.7 million per year.

²⁵ These incremental costs are additional to the baseline cost of purchasing new hybrid electric buses to replace retiring buses.

²⁶ The assumed increased battery capacity increases bus purchase costs but reduces the number of buses required due to longer range. The financial analysis indicates that use of the larger batteries reduces over-all net costs.

²⁷ There are currently four electric buses operating on Route 100 with two in-route chargers, as part of a pilot program.

Figure 10 Routes Electrified by 2031 – Progressive Fleet Electrification Option

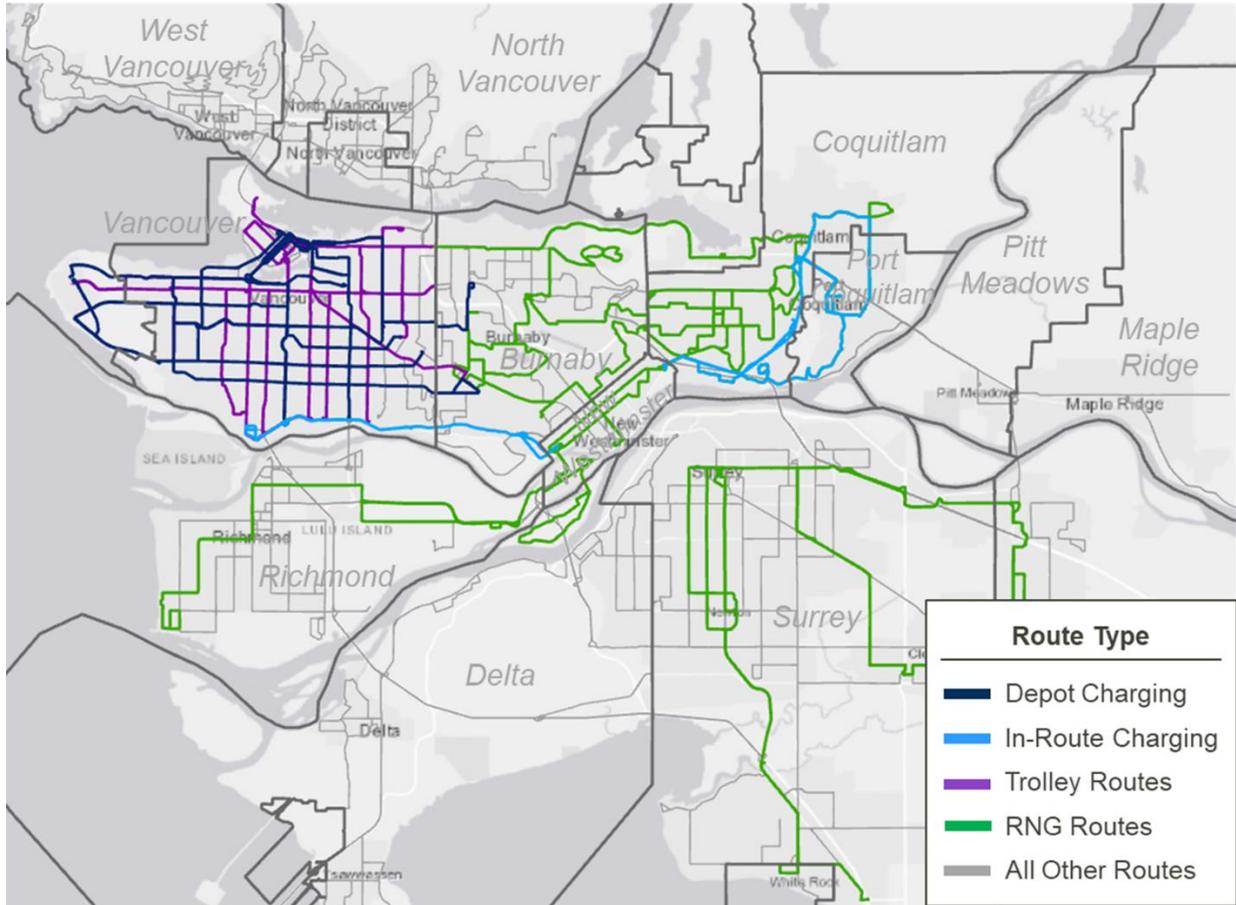


Table 7 Electric Bus Purchases – Progressive Investment Option

Length	Charging Type	Award Year										TOTAL
		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
40-ft	Depot		16	37	40	147						240
	In-route	15							10		9	34
	<i>Subtotal</i>	15	16	37	40	147			10		9	274
60-ft	Depot			5		21			14			40
	In-route											
	<i>Subtotal</i>			5		21			14			40
TOTAL		15	16	42	40	168			24		9	314
INCR COST (nom \$ mill)			\$6.4	\$17.0	\$14.7	\$64.6			\$7.4		\$0.01	\$110.1

Table 8 Depot and Charging Investments – Progressive Investment Option

Purpose	Location	Scope	Award	Completion	Cost (mill nom \$)
Depot Charging	MTC	Make ready for full depot electrification; installation of 16 SAE J3105 chargers	2021	2023	\$43.0
	MTC	Installation of 42 SAE J3105 chargers	2022	2024	\$5.9
	MTC	Installation of 40 SAE J3105 chargers	2023	2025	\$5.7
	MTC	Installation of 182 SAE J3105 chargers	2024	2026	\$25.7
	Route 100	Install 1 in-route charger	2020	2021	\$2.0
In-route Charging	Routes 159, 169	Install 2 in-route chargers	2027	2029	\$3.8
	HTC, PTC, STC	Install SAEJ1772 depot chargers and maintenance area upgrades	2027	2029	\$1.3
	Route 188	Install 1 in-route chargers	2029	2031	\$1.7
TOTAL COST					\$89.1

Table 9 Projected Incremental Operating Costs – Progressive Investment Option

Cost Type	million nominal \$											
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	TOTAL
Bus Maintenance	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.02)	(\$0.7)	(\$1.9)	(\$1.9)	(\$1.9)	(\$2.3)	(\$8.7)
Charger Maintenance	\$0.0	\$0.0	\$0.0	\$0.0	\$0.03	\$0.1	\$0.2	\$0.6	\$0.6	\$0.6	\$0.8	\$3.0
Fuel	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.7)	(\$2.2)	(\$5.0)	(\$12.9)	(\$13.3)	(\$13.9)	(\$16.9)	(\$65.0)
Bus operator Labor ¹	\$0.0	\$0.0	\$0.0	\$0.0	\$0.01	\$0.1	\$0.5	\$0.7	\$0.7	\$0.8	\$1.0	\$3.6
TOTAL	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.6)	(\$2.2)	(\$4.9)	(\$13.5)	(\$13.9)	(\$14.4)	(\$17.5)	(\$67.1)

¹ Bus operator labor costs increase due to increased dead-head time (depot charging) and additional on-route lay-over time (in-route charging).

2.2.3 2020 – 2029 Aggressive Investment Option

See Table 10 for electric bus purchases, and Table 11 for charging infrastructure investments, required between 2020 and 2029 under the Aggressive fleet electrification option. The costs shown in these tables are incremental costs, over and above the projected costs of required bus purchases under the baseline or business as usual scenario. Incremental costs for purchasing 635 electric buses total \$199.1 million²⁸, and infrastructure investments total \$248.4 million, for a total incremental cost of \$447.5 million to begin implementing the Low Carbon Fleet Transition Plan. These estimated incremental costs for electrification include an assumed reduction in electric bus purchase costs of 6 percent between 2020 and 2030, based on a 20 percent reduction in electric drive train and battery costs (\$/kWh), but also an 11 percent increase in battery capacity for depot-charged buses²⁹.

Under this investment option MTC would open in late 2023 or early 2024 as a 100 percent electric-ready depot, with 66 electric buses, with an additional 174 40-ft and 40 60-ft electric buses added over the next three years; after 2026 100 percent of assigned buses at MTC would be electric.

Beginning in 2021 a total of 17 in-route chargers would be installed at up to 10 different locations, to support conversion of Routes 100, 159, 169, 188 and most other routes operating from PTC³⁰ to battery-bus operation using 136 total in-route charged buses. To support these buses minor upgrades are also required at HTC and PTC – to install a small number of depot chargers to support maintenance operations³¹.

Starting in 2024, make-ready infrastructure would be installed at Burnaby Transit Centre (BTC) for 100 percent depot charging at the existing facility, along with 127 depot chargers, so that 127 40-ft electric buses could start operating there in 2026. In 2027, a project would start to expand BTC, to provide bus parking for an additional 100 buses. These additional bus spaces are required because fleet expansion is required to accommodate depot charging at MTC and BTC, due to electric bus range restrictions. This expansion will require that existing buildings that house maintenance support operations be torn down, and that new space(s) in other location(s) be

²⁸ These incremental costs are additional to the baseline cost of purchasing new hybrid electric buses to replace retiring buses.

²⁹ The assumed increased battery capacity increases bus purchase costs but reduces the number of buses required due to longer range. The financial analysis indicates that use of the larger batteries reduces over-all net costs.

³⁰ The exact routes to be converted to in-route charging under the Aggressive scenario are yet to be determined, but routes out of PTC are prioritized for early conversion because they have the highest average daily energy intensity of all routes in the system, and are unlikely to be suitable for depot charging even if battery energy density increases faster than projected. The transit center with the second highest priority for in-route charging due to high daily energy intensity is STC.

³¹ The exact number of chargers needed will vary based on the manufacturer of the buses.

purchased or leased to house these operations.

Figure 11 shows the portion of CMBC’s route network that would be electrified by the end of 2031 under the Aggressive fleet electrification investment option.

See Table 12 for an estimate of annual incremental operating costs between 2020 and 2030 resulting from fleet electrification under the Aggressive investment option. Over the next ten years this electrification scenario is projected to reduce bus maintenance costs by \$17.2 million and reduce fuel costs by \$123.6 million compared to continued renewal of the fleet with new hybrid electric and CNG buses as old buses are retired. Bus operator labor costs are projected to increase by \$10.0 million and estimated new costs for charger maintenance total \$6.9 million. Net operating cost savings are projected to be \$124 million, or an average of \$12.4 million per year.

Figure 11 Routes Electrified by 2031 –Aggressive Fleet Electrification Option

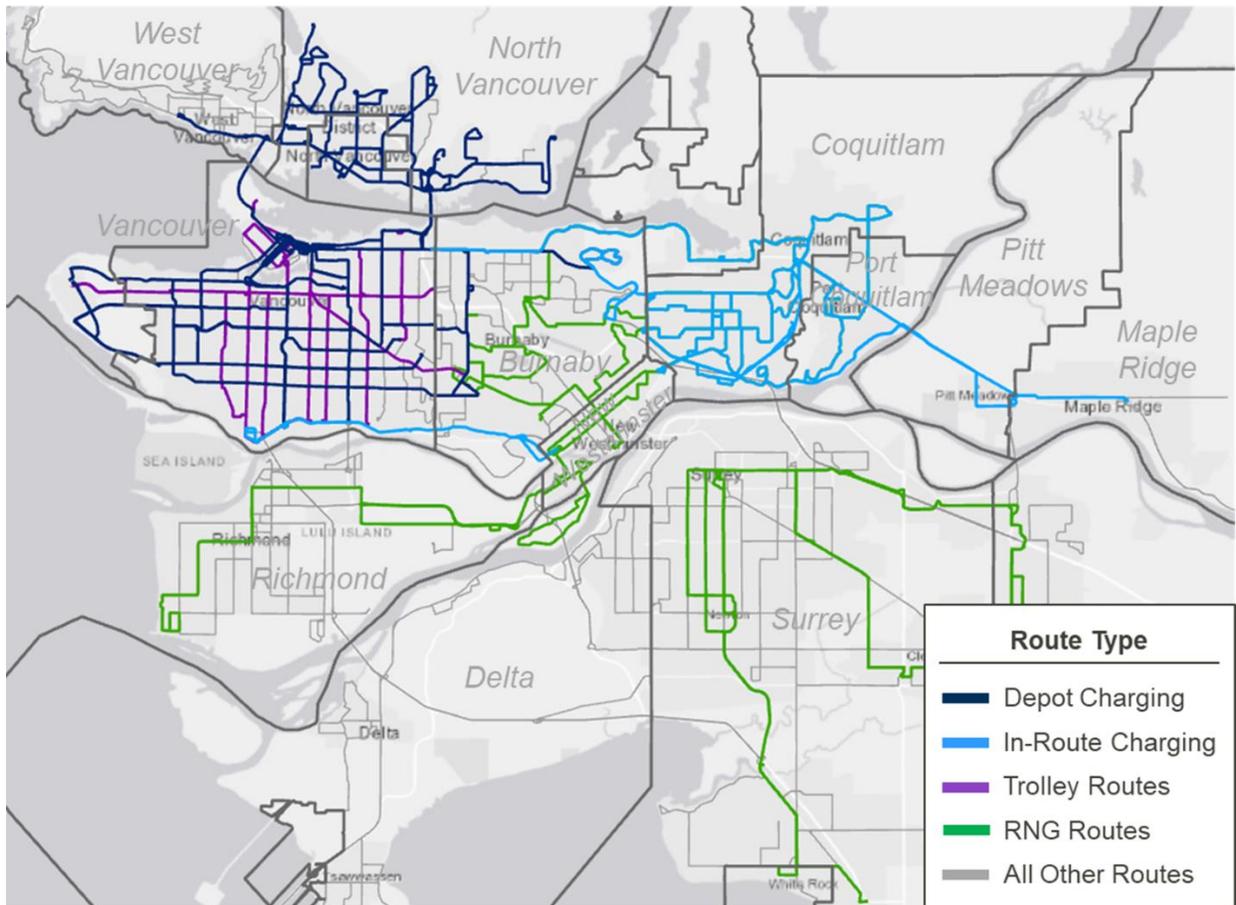


Table 10 Electric Bus Purchases –Aggressive Investment Option

Length	Charging Type	Award Year										TOTAL
		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
40-ft	Depot		66	138	36	127			20		20	407
	In-route	15		7	43	71						136
	<i>Subtotal</i>	15	66	145	79	198			20		20	543
60-ft	Depot			18		45			29			92
	In-route											
	<i>Subtotal</i>			18		45			29			92
TOTAL		15	66	163	79	258			49		20	635
INCR COST (nom \$ mill)			\$24.1	\$59.6	\$14.7	\$71.7			\$21.7		\$7.3	\$199.1

Table 11 Depot and Charging Investments –Aggressive Investment Option

Purpose	Location	Scope	Award	Completion	Cost (mill nom \$)
Depot Charging	MTC	Make ready for full depot electrification; installation of 66 SAE J3105 chargers	2021	2023	\$50.1
	MTC	Installation of 156 SAE J3105 chargers	2022	2024	\$22.0
	MTC	Installation of 58 SAE J3105 chargers	2023	2025	\$8.2
In-route Charging	Route 100	Install 1 in-route charger	2020	2021	\$2.0
	Routes 159, 169, 188	Install 3 in-route chargers	2022	2024	\$3.3
	HTC, PTC	Install depot chargers and maintenance area upgrades	2023	2025	\$5.2
	PTC service area	Install 13 in-route chargers	2023	2025	\$24.6
Depot Charging	BTC	Make ready for full depot electrification; installation of 127 SAE J3105 chargers	2024	2026	\$61.1
	BTC	Depot expansion	2027	2029	\$50.2
	BTC	Installation of 140 SAE J3105 chargers	2027	2029	\$21.7
TOTAL COST					\$248.4

Table 12 Projected Incremental Operating Costs –Aggressive Investment Option

Cost Type	million nominal \$											
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	TOTAL
Bus Maintenance	\$0.0	\$0.0	\$0.0	\$0.0	\$0.1	\$0.3	(\$1.8)	(\$3.8)	(\$3.8)	(\$3.8)	(\$4.3)	(\$17.2)
Charger Maintenance	\$0.0	\$0.0	\$0.0	\$0.0	\$0.1	\$0.4	\$0.6	\$1.4	\$1.4	\$1.4	\$1.5	\$6.9
Fuel	\$0.0	\$0.0	\$0.0	\$0.0	(\$2.6)	(\$6.6)	(\$11.2)	(\$23.8)	(\$24.5)	(\$25.7)	(\$29.1)	(\$123.6)
Bus operator Labor ¹	\$0.0	\$0.0	\$0.0	\$0.0	\$0.2	\$0.4	\$0.6	\$2.0	\$2.1	\$2.4	\$2.3	\$10.0
TOTAL	\$0.0	\$0.0	\$0.0	\$0.0	(\$2.3)	(\$5.5)	(\$11.8)	(\$24.2)	(\$24.9)	(\$25.7)	(\$29.6)	(\$124.0)

¹ Bus operator labor costs increase due to increased dead-head time (depot charging) and additional on-route lay-over time (in-route charging).

2.2.4 Comparison of Investment Options

The three fleet electrification investment options are summarized in Table 13. The Aggressive Investment option (last column) represents the fastest pace of fleet electrification possible – under this scenario all new bus purchases after 2023 are battery electric buses. This option requires the largest capital investment over the next 10 years and the greatest amount of change to CMBC operations, but also produces the greatest reduction in fleet GHG and the greatest operating cost savings through 2030.

Under the other two investment options (Cautious; Progressive) TransLink will continue to purchase hybrid electric buses, along with battery buses, to replace retiring buses through 2027 and 2024, respectively. These options require a smaller capital investment over the next ten years, and fewer changes to CMBC operations, but also result in lower GHG reductions and lower operating cost savings through 2030.

The trend in net operating cost savings under each investment option is shown in Figure 12.

The projected trend in CMBC fleet GHG emissions is shown in Figure 13. Figure 13 includes projected emissions from all CMBC buses, including 40-ft and 60-ft transit buses, highway coaches, and shuttle buses. In Figure 13 all three investment options are assumed to follow the recommended Low Carbon Fleet strategy after 2029 – i.e. beginning in 2030 all new 40-ft and 60-ft transit buses will be battery buses, but TransLink will continue to purchase new diesel

highway coaches. All three scenarios in Figure 13 also assume that gasoline shuttle buses will be converted to battery electric buses between 2035 and 2045³².

As shown, the recommended Low Carbon Fleet strategy results in greater than 90 percent reduction in CMBC bus fleet emissions in 2050 (compared to 2007), regardless of which fleet electrification investment option is chosen for 2020 – 2029. However, greater investment in fleet electrification in the short term will provide greater net GHG reductions over the next thirty years. The Aggressive scenario achieves a 40 percent reduction in fleet emissions in 2027, while the Cautious scenario delays achievement of a 40 percent reduction until 2038. Compared to the Cautious investment option, the Aggressive option is estimated to reduce total fleet GHG emission by an additional 850,000 metric tons between 2020 and 2050.

Table 13 Summary of 2020 – 2029 Fleet Electrification Investment Options

METRIC		CAUTIOUS	PROGRESSIVE	AGGRESSIVE
Electric Buses Purchased		95	314	635
In-route Chargers Installed		1	4	17
Depot Chargers Installed at		MTC	MTC	MTC and BTC
Routes Electrified	Depot Charging	30% of MTC routes	100% of MTC routes	100% of MTC routes 80% of BTC routes
	In-route Charging	Route 100	Routes 100, 159, 169, 188	Route 100 95% of PTC routes
CAPITAL INVESTMENT 2020-2029 (nom \$ mill)	Buses	\$37	\$110	\$199
	Infrastructure	<u>\$58</u>	<u>\$89</u>	<u>\$248</u>
	<i>TOTAL</i>	\$95	\$199	\$447
Operating Savings 2020 – 2030 (nom \$ millions)		\$27	\$67	\$124
GHG Reduction 2020 – 2030 (MT)		56,000	137,000	269,000
GHG Reduction in 2030 (MT)		9,800	33,600	59,500
Annual GHG Reduction 2030 vs 2007		14%	28%	44%

³² This is a conservative assumption – this transition could happen sooner based on commercial availability of battery shuttle buses.

Figure 12 Fleet Electrification Net Operating Cost Savings 2020 – 2030

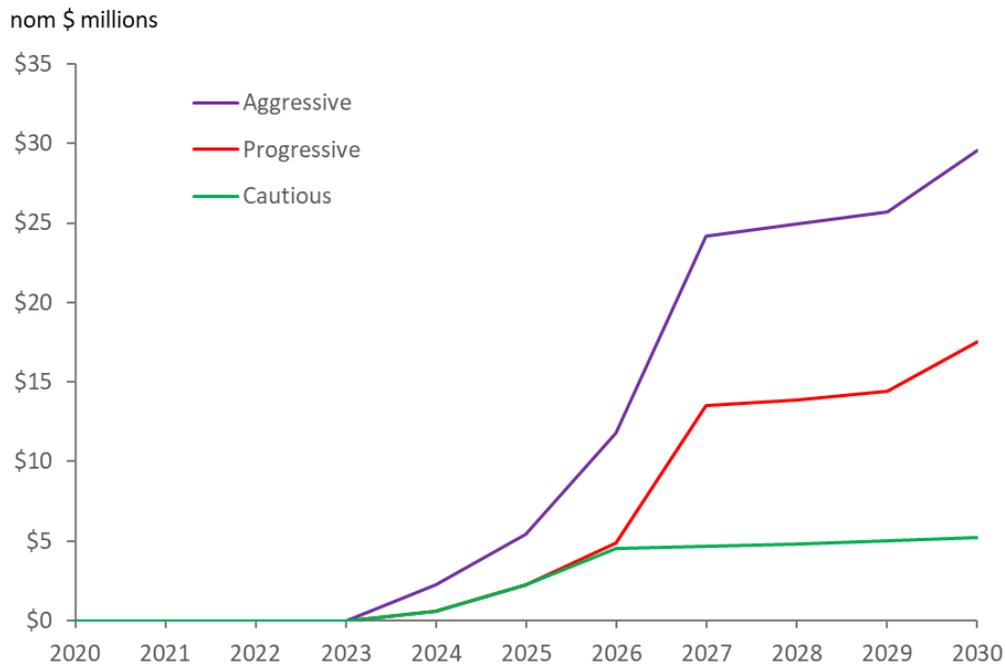
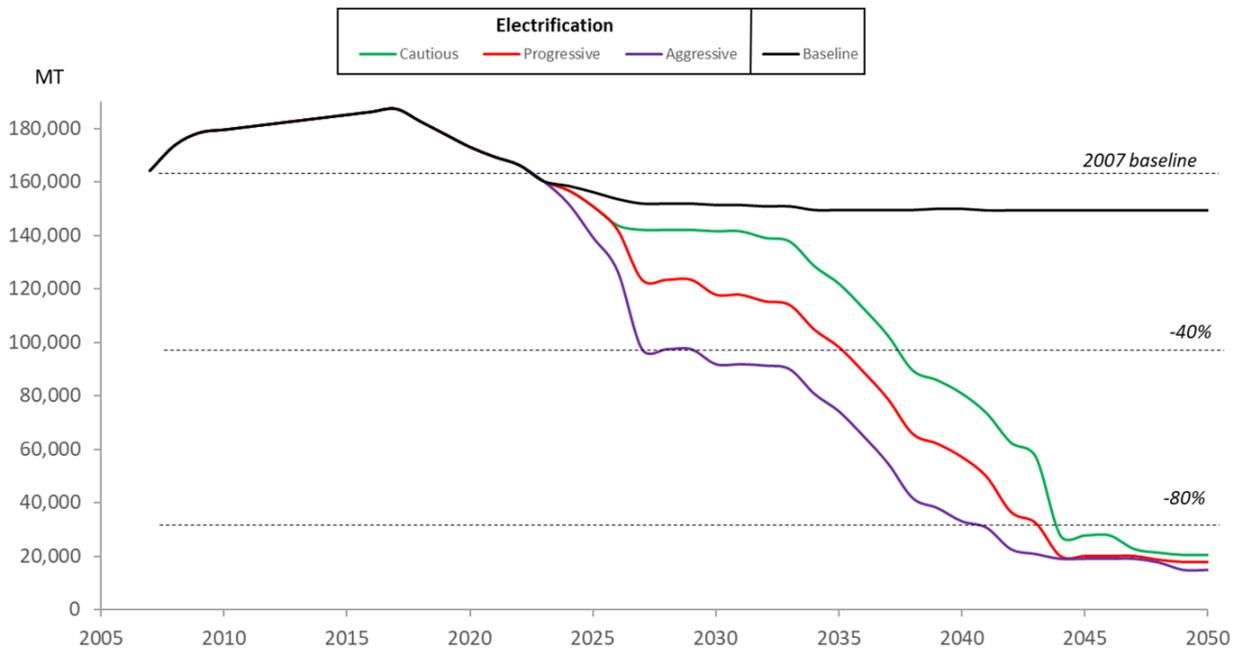


Figure 13 Projected CMBC Fleet GHG Emissions 2020 - 2050



3 Fleet Electrification – Operational Considerations

This section summarizes the major changes to CMBC bus fleet operations that will be required to accommodate battery electric buses under any fleet electrification scenario. Changes will be required to bus schedules, bus maintenance programs, and cold weather operations. CMBC will also need to develop completely new capabilities to regularly monitor bus charging activities, and to maintain and repair charging infrastructure.

3.1 Bus Scheduling

Depot charged buses have limited in-service range before needing to be re-charged. Current scheduling policies result in some daily bus assignments (blocks) that are too long for depot-charged buses to handle on a single charge, given available on-bus battery energy capacity.

Assuming nominal battery pack capacity of 500 kWh for 40-ft buses and 660 kWh for 60-ft buses³³, all daily bus blocks operating from MTC and BTC with depot-charged buses will need to be limited to no more than 11 hours or 220 kilometers between the bus leaving and returning to the transit centre³⁴. This limitation is projected to increase peak bus requirements at these transit centres by 15 percent on average, and to increase dead-head mileage; these increases are accounted for in the bus purchase and charging infrastructure investments, and projections of incremental operating costs, summarized in Tables 4 – 12.

Assuming a charge rate of 450 kW, in-route charged buses will need to charge for an average of approximately 6 minutes per in-service hour during their scheduled lay-overs at one or both route termini, after completing each one-way trip or round trip on the route³⁵. Scheduled lay-over time system-wide is approximately 9 minutes per in-service hour, but during peak periods much of this time is often used for recovery, due to congestion which causes buses to run late. To ensure that in-route charged buses have sufficient charge time, while maintaining on-time performance, an average of approximately 3 minutes will need to be added to scheduled lay-over time for every hour of scheduled running time, for most if not all routes. This additional lay-over time does not need to be added during peak periods, so will only minimally affect peak bus requirements. This additional lay-over time, which will result in additional bus operator paid

³³ Projected industry norm maximum battery size in 2025.

³⁴ One bus manufacturer already offers larger batteries on 40-ft buses. If buses with larger battery packs are used these limits could be extended proportionally.

³⁵ Most routes only require charging at one route terminus (once per round-trip), but a few routes will require charging at each terminus (once per one-way trip). The 450-kW charge rate is the maximum supported by current North American Bus suppliers. In addition, the local utility BC Hydro has advised that based on limitations in the distribution network in parts of the Vancouver Metro region, the use of in-route chargers with greater than 500 kW charge rate would significantly increase their cost to provide service interconnections.

hours, is accounted for in the projections of incremental operating costs summarized in Tables 6, 9, and 12.

3.2 Bus Maintenance

The bus maintenance program will need to evolve over the next ten years, to accommodate the introduction of electric buses. Ultimately it may require re-training of existing employees to develop new skills and recruitment of new employees with different skill sets than those of traditional automotive mechanics.

Most systems on electric buses will be the same or similar as systems on current internal combustion engine buses; only 25 – 40 percent of current maintenance activities will change. In addition, CMBC already maintains hybrid-electric buses which incorporate very similar drive train components as battery electric buses, including electric drive motors, inverters/power electronics, and battery packs. Drive train diagnostics and maintenance activities for battery buses will be similar to those for CMBC's current hybrid buses. Nonetheless, the following maintenance issues will require attention:

- All maintenance employees will require high voltage training, and a greater percentage of maintenance activities will require high voltage awareness and safety procedures (for example lock-out/tag-out).
- Current preventive maintenance (PM) cycles are often aligned to engine oil change intervals. Since electric buses will not require frequent oil changes there may be opportunities to re-think current maintenance intervals and packaging of PM activities.
- Drive train diagnostic procedures will change, with an even greater reliance on electronic diagnostics tools.
- Mid-life overhaul programs will need to migrate from engine and transmission overhaul/rebuild to rebuilding and/or replacement of electric drive motors, inverters, and battery packs. These new activities could be performed in-house at the transit centres or at the Central Maintenance Facility, or CMBC could contract with a third party for this work. If performed in-house it will require investments in equipment and tooling, as well as employee training.
- Lithium-ion batteries lose capacity (kWh) as they are charged and discharged, but the exact deterioration rate in transit service is unknown. This analysis assumes up to 2.4 percent capacity loss per year, which will require 100 percent battery replacement at bus mid-life (year 8). This will be a major expense which must be budgeted for annually, beginning in 2030. Expenses will include material purchases and mechanic labor.

- Electric drive components are expected to have a lower in-service failure rate than diesel engines and transmissions, but individual failures are likely to be more consequential, requiring replacement of entire components or major sub-systems at a cost of \$5,000 or more per unit. These units may also have a long lead time, particularly in the short and medium term when annual production of electric buses is low. CMBC must set up appropriate procurement or service contracts to ensure that buses can be repaired expeditiously. This may include holding drive system component replacement inventory locally and/or requiring suppliers to maintain certain inventory levels dedicated to CMBC. It will also be advisable to develop a core/exchange program in which failed parts are removed and replaced with factory rebuilt components, with the failed part returned to the factory for rebuild and financial credit.

3.3 Cold Weather Operations

While battery chemistries vary, in general the chemical batteries used in battery-electric buses work best when the internal temperature in the battery pack is between approximately 0 °C and 20 °C. Both higher and lower battery temperatures will reduce the allowable charge and/or discharge rate without compromising battery life. In practical terms, failure to maintain appropriate pack temperatures in extreme ambient conditions (hot or cold) can reduce bus power, regen capability, or both.

While the Vancouver climate is generally temperate year-round, there are a few days a year when overnight temperature can fall below 0 °C. Since all CMBC buses are stored outdoors in unheated space, equipment and procedures will need to be put in place to ensure successful electric bus operations on cold days.

For electric buses at MTC and BTC that use overnight depot charging, on cold nights every bus parked at the depot must have a charging pantograph lowered to connect the bus to a charger, even if the battery is fully charged. The depot chargers and buses should be set up to allow the chargers to power the battery heaters on-board the bus – even after battery charging is complete - to maintain a target internal battery pack temperature.

For in-route charged buses at the other transit centres, the buses should include the capability of the on-board battery pack to power the battery heater to maintain appropriate pack temperature on cold nights. This capability may be able to be fully automated based on ambient and battery pack temperature monitoring or may require maintenance personnel to leave the bus in “run” mode, and/or toggle a switch to enable this functionality.

Maintenance procedures must be put in place to:

- Monitor projected overnight temperature during winter months and implement cold weather procedures if the temperature will fall below 3 °C
- When cold weather procedures are in effect, ensure that all buses are connected to a charger (depot charging) or that all buses have battery heating mode enabled (in-route charging) when parked at the depot for the night.
- When cold weather procedures are in effect, monitor all buses periodically through the night to ensure that battery heaters are active and maintaining proper battery temperature.

3.4 Charge Monitoring

Given the range limitations of battery buses, the negative consequences of mis-fueling (i.e. not charging when scheduled) are more severe for battery buses than they are for current internal combustion engine buses, which typically have 600 kilometers or greater range from a full tank of fuel. As such, CMBC will need to develop specific tools and procedures to minimize the potential for electric buses to miss scheduled charging events due to miscommunications, operator error, or equipment failures. Necessary activities will include fostering awareness of the need to maintain proper charging among bus operators, mechanics, and supervisors; regularly monitoring all charging to ensure that it is proceeding properly; and reacting quickly to malfunctions to re-start charging when it is interrupted.

At a minimum, CMBC should:

- Equip MTC and BTC with a centralized monitoring station that displays charge status for every depot charger at the location. Assign a maintenance supervisor to periodically check charging status throughout the night and/or provide the maintenance supervisor with automated real-time alerts if charging is interrupted for any bus.
- Develop the maintenance capability to respond to MTC and BTC charger failures within 30 minutes of detection and maintain a supply of repair parts – readily accessible – to repair common failures within an hour. This maintenance capability should be available 24 hours per day but will be in highest demand between 10 PM and 6 AM.
- Create a charging network control center with the capability to monitor the status of every in-route charger in real time, and to dispatch maintenance personnel to diagnose and repair identified failures.
- Develop the maintenance capability to respond to in-route charger failures within 60 minutes of detection and maintain a supply of repair parts – readily accessible – to repair

common failures within two hours. This maintenance capability should be available 24 hours per day but will be in highest demand between 6 AM and 8 PM.

- Develop procedures and systems to monitor charging status (in-route charging) and state of charge (in-route and depot charging) for buses in service throughout the day, with that information relayed to the bus command center on an exception basis for buses missing scheduled charges or with low state of charge. Set specific standards and thresholds for when the command center should intervene to either hold a bus for a longer charge session or take a bus out of service (and return it to the transit centre) due to low charge state.

3.5 Charging Infrastructure Maintenance

CMBC will need to develop an entirely new maintenance capability, which does not exist today, involving servicing, diagnostics, and repair/replacement of charging infrastructure, for both depot chargers and in-route chargers.

Annual scheduled charger maintenance will include visual inspection, tightening and retorquing of connectors, cleaning or replacement of filters, and cleaning inside and out, including cleaning of pantograph charge blades; a software diagnostic may also be recommended by some manufacturers. Software and/or hardware updates may also be scheduled during some maintenance visits. For high-use chargers, semi-annual maintenance may be recommended or required.

In terms of failures, connectors and cords may require replacement due to wear and abuse from users. Ventilation filters can also become clogged and fans can overheat and/or fail over time. Software can also crash and require rebooting.

In British Columbia, anyone working on electrical components when there is a potential to contact live conductors must be licensed as an electrical contractor by the province. Employees conducting some routine maintenance tasks may not require licensing, but those performing failure maintenance likely will.

CMBC could recruit and train licensed employees to perform charger maintenance or could contract for maintenance services from the charger manufacturer(s) or from third-party electrical contractors.

3.6 Contingency for Loss of Grid Power

For a full fleet roll-out of electric buses, TransLink should make contingency plans for maintaining some level of bus charging even if grid power is disrupted to one or more charging locations.

Information provided by BC Hydro indicates that their system has historically been very reliable. Between 2015 and 2018, 70 percent of all circuits had annual outage time of less than 5 hours, and 90 percent had annual outage time of less than 10 hours. In addition, for 86 percent of circuits average outage time per incident was less than an hour. Most outages were caused by either weather or vehicle damage.

Given the high reliability of the system, the recommended alternative is to use mobile diesel generator(s) that can be moved between locations as needed, rather than providing fixed back-up generation at every charging location.

For depot charging one or more 750 kW mobile generators would be required, with each providing the ability to supply power to up to 15 buses charging concurrently overnight at a depot. For in-route charging one or more 450 kW mobile generators would be required³⁶, with each providing the ability to supply power to one in-route charger.

The number of mobile generators required would depend on the number of electric buses deployed, and the likelihood of losing power at each charging location separately, and at multiple locations simultaneously. TransLink should work with BC Hydro to further evaluate historical trends and to project future needs.

It is possible that TransLink can contract for rental/lease of emergency power generation as required, rather than having to purchase and own mobile generating capacity.

3.7 Axle Weight Exemption

As discussed in Appendix A, current electric buses are heavier than diesel and hybrid-electric buses, primarily due to the weight of their battery packs. The rear axle weight of a 40-ft depot-charged electric bus (with a large battery) will be 1,200 – 1,800 kg more than the rear axle weight of a 40-ft diesel bus with the same number of passengers. In-route charged electric buses, with a smaller battery, will typically have 300-750 kg higher rear axle weight.

The additional weight of electric buses could cause them to exceed Provincial axle weight limits when heavily loaded during peak periods, though such conditions will be infrequent. TransLink

³⁶ It may also be possible to develop a mobile battery pack system that could power an in-route charger for 12-hours or more.

will need to coordinate with Provincial road authorities to determine whether electric buses will require an axle weight limit exemption to be deployed in CMBC service.

Ultimately, the available axle weight exemption(s) may limit the maximum battery capacity that can be installed on CMBC buses, and their effective daily range when depot charging is used.

3.8 Management of Bus Charging Load

As discussed in Appendix C (section C-2.2), BC Hydro's proposed EV rates have no demand charges assessed for demand that occurs between 6 AM and 10 PM. For in-route charging, peak demand will occur during day-time peak service hours, and CMBC will have little or no opportunity to manage this demand for either individual chargers, or the network as a whole, without affecting service. However, CMBC does have the ability to manage depot charging demand, to minimize or eliminate demand between 6 AM and 10 PM, to minimize demand charges and reduce total electricity costs.

When implementing depot charging at MTC and BTC, CMBC should install a demand management system, to control the timing and charge rate of individual buses, to manage total depot charging demand. The system should be able to:

- Delay the start of any charging until after 10 PM, regardless of when buses are parked at the depot when returning from evening service
- Increase the charge rate of late-returning buses, to complete a full charge before 6 AM.

3.8 Management of Service Disruptions and Service Expansion

The limited range of battery buses will introduce limitations on how CMBC will be able to deal with service disruptions and will complicate planning for some kinds of service expansion.

BUS BRIDGES: For some special events, and when SkyTrain service is disrupted, CMBC is required to temporarily, but significantly increase service on some routes – referred to as operating a “bus bridge”. Routes that use in-route charging will have limited capacity to absorb such a temporary increase in service (especially during peak hours) due to limits on installed charger capacity. Depot charged buses have longer independent range but will still be limited to only 10 – 12 hours per day in service.

In the short and medium-term (through at least 2035) there will be enough diesel and hybrid-electric buses remaining in the fleet to cover this need. However, in the long-term TransLink and CMBC will need to develop contingency plans to effectively operate bus bridges with battery buses (with a focus on how the bridge buses will be charged) or retain a small diesel/hybrid fleet for this purpose.

BUS BUNCHING: As in most large cities, CMBC bus service experiences “bus bunching” when certain routes are congested, or if there is some kind of disruption on the route. Bus bunching refers to the tendency of buses to run close together, arriving at bus stops at the same time or less than a minute apart, rather than maintaining scheduled headways along the route. For routes that use in-route charging bus-bunching at in-route charging locations will reduce the ability of buses to maintain sufficient charge throughout the day. When planning the in-route charge network, CMBC should evaluate historical data to identify specific routes/locations/times when bus bunching is an issue and develop plans to ensure that all buses can get sufficient charge across the day. There may be opportunities to implement active headway management on some routes. In the extreme it might be necessary to install additional chargers at some locations, and/or insert additional recovery time into some schedules if bus bunching is determined to be a chronic issue that cannot be addressed any other way.

SERVICE EXPANSION: For any given route the number of buses required each day is primarily determined by peak hour headways, but the average daily mileage accumulation per bus is more a function of headways during off-peak hours; i.e. for a given number of peak buses average daily mileage will be higher if off-peak headway is shorter (more trips per hour) and will be lower if off-peak headway is longer (fewer trips per hour). Based on current service levels, and daily mileage accumulation, the electric bus implementation plan assumes that 15 percent more buses will be required to implement depot charging at MTC and BTC, due to electric bus range limitations. However, if additional mid-day service is added to the routes operating from these depots this will increase daily average bus mileage, resulting in the need to adjust daily bus blocks and potentially increasing peak bus requirements further.

For routes that use in-route charging increasing average daily mileage accumulation per bus will not create a problem as long as the route has sufficient charging capacity. For the conceptual in-route charge network developed under this project, the required number of chargers on each route is based on peak hour headways. As such, adding mid-day service will not increase the number of required chargers if mid-day headway is equivalent to or longer than peak headway.

APPENDIXES

Status of North American Electric Bus Industry

This section summarizes the status of the electric bus industry in North America, including the number of battery electric buses currently in service and on order, the manufacturers that produce electric buses, and the capabilities of commercially available battery bus models.

A-1 Electric Buses In-service and on Order

Full-sized³⁷ battery electric transit buses have been in limited operation in the North America for a decade, but their use has increased dramatically in the last three years. According to the American Public Transportation Association, there are currently at least 49 U.S. agencies operating a total of more than 550 battery electric buses, with 70 percent of them entering service since 2016³⁸. A number of Canadian agencies also have electric buses in service or on order, including Toronto, Ontario; Edmonton, Alberta; St. Albert, Alberta; Brampton, Ontario; Winnipeg, Manitoba; Windsor, Ontario; and Montreal/Laval, Quebec³⁹. There are also at least 1,200 battery buses on order for delivery to more than 100 different North American transit agencies over the next three years⁴⁰. When these buses have been delivered, approximately 6 percent of North American transit agencies will be operating electric buses, and they will comprise about 2 percent of the transit bus fleet. One leading North American transit bus manufacturer estimates that 27 percent of their sales over the next 5 years could be battery-electric buses.⁴¹

Most agencies are still operating less than ten battery buses each, but some agencies have already placed orders for 100 or more electric buses. Some notable recent battery bus orders include Los Angeles Department of Transportation (118); Los Angeles Metro (210); Edmonton Transit, Canada (100); Antelope Valley, California (89); King County Metro, Seattle (73); Foothill Transit, California (50); Toronto Transit Commission, Canada (60); Minneapolis Metro (27); SEPTA in Philadelphia (25); Chicago Transit Authority (30), and Montreal/Laval, Canada (40).

³⁷ Full-sized buses are those that are greater than 30-ft long; a limited number of 22-foot battery electric buses have been operating at a handful of U.S. agencies since the early 2000s.

³⁸ American Public Transportation Association, *Public Transportation Vehicle Database*, <https://www.apta.com/research-technical-resources/transit-statistics/vehicle-database/>, accessed June 26, 2019. The first battery-electric bus listed in the database was manufactured in 2009

³⁹ Clean Energy Canada, *Will Canada miss the bus?*, March 2019

⁴⁰ Based on news articles and press releases from various sources, and bus manufacturer websites

⁴¹ Personal communication with J. Gibson, New Flyer of America

An important driver of U.S. electric bus adoption is the *Innovative Clean Transit Regulation*, which was adopted by the California Air Resources Board (ARB) in December 2018⁴². This regulation requires all transit agencies in California to phase in purchasing of “zero-emission” buses⁴³ between 2020 and 2029, after which 100 percent of all new bus purchases must be zero emission. ARB estimates that this will result in a 100 percent zero emission fleet in the state by 2040. Approximately 20 percent of all U.S. transit buses are in California.

A-2 Electric Bus Manufacturers

See Table A-1 for a summary of the manufacturers that currently offer battery electric transit buses in the North American Market. Virtually every full-line bus manufacturer that produces diesel, CNG, and hybrid-electric buses for the North American market also offers at least one battery-electric option, including New Flyer, Gillig, Nova, and Alexander Dennis. Battery buses from these manufacturers use the same bus platform as the other bus types, with only minor modifications to accommodate the electric propulsion system. Proterra, BYD, and Green Power Motor Company manufacture only battery buses, and do not offer buses with conventional propulsion systems. Complete coach works remanufactures old diesel buses with a new electric propulsion system.

To-date, BYD, Green Power, Alexander Dennis, and Complete Coach Works have focused on buses that use plug-in charging, typically overnight at the depot. Nova Bus offers only overhead conductive charging, which is typically used for in-route charging, but could also be used in a depot setting. Proterra, New Flyer, and Gillig offer both plug-in and overhead conductive charging on their buses. See Section 3 for a discussion of the different charging options.

The data in Table 2 is current as of July 2019. There have been significant changes in the electric bus market over the past three years and it is likely to remain a fluid market; in the future additional new entrants are possible, along with additional charging options from existing manufacturers.

⁴² <https://ww2.arb.ca.gov/news/california-transitioning-all-electric-public-bus-fleet-2040>

⁴³ Zero emission buses include battery-electric buses and hydrogen fuel cell buses

Table A-1 North American Electric Bus Manufacturers

Manufacturer	Location	Vehicle Types / Sizes	Charging Infrastructure
Alexander Dennis	UK	45-ft double decker	Depot
BYD	Lancaster, CA	30-ft, 35-ft, 40-ft, 60-ft	Depot
Complete Coach Works	Riverside, CA	40-ft remanufactured	Depot
Gillig	Livermore, CA	40-ft	Depot, In-route
Green Power Motor Company	Porterville, CA	30-ft, 35-ft, 40-ft, 45-ft, 45-ft double decker	Depot
Nova Bus	Saint-Eustache, QC, Canada; Plattsburg, NY	40-ft	In-route
New Flyer	St. Cloud & Crookston, MN; Anniston, AL; Winnipeg, MB, Canada	35-ft, 40-ft, 60-ft	Depot, In-route
Proterra	Los Angeles, CA; Greenville, SC	35-ft, 40-ft	Depot, In-route

Note that transit bus manufacturers typically do not produce buses shorter than 30-ft. The smaller shuttle buses used by CMBC for neighborhood service are produced by different manufacturers. While there are several small, specialty manufacturers that currently produce small electric “cut-away” buses⁴⁴, none of the major shuttle bus manufacturers currently produce electric buses. While many North American transit agencies operate small shuttle buses, none of the battery electric buses listed in the American Public Transportation Association *Public Transportation Vehicle Database* are shorter than 30-ft.

A-3 Available Electric Bus Models

Table A-2 compares relevant characteristics of the 40-ft electric bus models offered by the different manufacturers. The major differences between various models, and their relevance to bus operations, are discussed below.

⁴⁴ A cut-away is a bus built by installing a passenger body on a standard cab/chassis. These specialty manufacturers purchase a cab/chassis without an engine from a major manufacture and install an electric drive system. Production volumes are very low.

STRUCTURAL DESIGN

All manufacturers except Proterra manufacture electric buses using a welded tubular steel frame, with steel, aluminum, or composite body panels riveted, bolted or bonded to the frame – the same construction used for traditional transit buses with internal combustion engines. The load bearing structure, walls, roof, and floor of Proterra electric buses are all constructed or fiberglass composite, with a design and construction method like that used for many small and medium-sized marine vessels. The composite structure is lighter than a steel structure, and is not subject to corrosion, but may experience other deterioration over time due to structural stress– for example cracking or delamination. The composite structure also behaves differently than steel structures in a crash and will require different repair methods.

Since the Proterra composite structure is lighter than a steel structure, the Proterra bus has 900 – 1,360 kg lower curb weight than other electric buses with the same sized batteries.

Table A-2 Commercially Available 40-ft Battery Buses

Parameter	BYD	Gillig	New Flyer	Nova	Proterra
Length (m)	12.2	12.7	12.5	12.4	13.0
Wheelbase (m)	6.1	7.1	7.2	6.2	7.5
Height (m)	3.4	3.4	3.3	3.3	3.4
Front Overhang (m) ¹	2.6	2.6	2.2	3.0	2.6
GVWR (kg)	19,741	20,455	20,140	19,545	19,841
Curb Weight (kg) ²	14,963	13,477/15,341	13,697/14,964	14,545	12,113/15,067
Passenger Capacity ³	77	75	75	71	70
Battery Type	Iron-phosphate	Lithium-ion	Lithium-ion	Lithium-ion	Lithium-ion
Battery Size Options	324 kWh	148 kWh 296 kWh 444 kWh	160 kWh 267 kWh 388 kWh 466 kWh	150 kWh	220 kWh 440 kWh 660 kWh
Battery Locations ⁴	A	A, B, C	A, B	A, B	D
Plug-in Charging	SAE J1772 CCS-Type 1	SAE J1772 CCS-Type 1	SAE J1772 CCS-Type 1	Not available	SAE J1772 CCS-Type 1
Conductive Charging	Not available	SAE J3105-1	SAE J3105-1	SAE J3105-1	SAE J3105-1

APPENDIX A – Status of North American Bus Industry

Structure	Tubular steel	Tubular steel	Tubular steel	Tubular steel	Composite
Drive Motor	Dual 150 kW AC synchronous	No Data	200 kW Permanent magnet	230 kW Permanent magnet	Dual 190 kW or single 250 kW Perm magnet
Gear Box	None- direct drive	No Data	None – direct drive	None – direct drive	2-speed auto shift
Top Speed	100 KPH	No Data	No Data	No Data	105 KPH
Energy Use ⁵	1.23 kWh/km (2014 - CBD)	No Data	1.09 kWh/km (2014 - CDB)	1.20 kWh/km (2018 – OCC)	1.25 kWh/km (2017 – OCC)
¹ Center of front axle to front bumper ² With smallest/largest available battery ³ Maximum, with largest battery. Based on GVWR and 68 kg/passenger ⁴ A = on roof; B = in rear compartment behind passenger cabin; C = under floor, just ahead of rear axle; D= under floor between front and rear axles ⁵ From Altoona testing. For testing prior to 2017 listed results are from track testing on Central Business District (CBD) cycle. For testing in 2017 and 2018 listed results are from dynamometer testing on Orange County (OCC) cycle. Stated values do not include energy for air conditioning or cabin heating.					

PHYSICAL DIMENSIONS

All electric buses have similar dimensions (height, length, wheelbase) as CNG and hybrid-electric buses on the market⁴⁵. For buses that will use overhead high-power conductive charging, all electric bus manufacturers install the on-bus charge port on the roof, essentially centered over the front axle. Therefore, the front overhang length (center of front axle to front bumper) may be important when siting in-route chargers. As shown, the front overhang of 40-ft electric buses ranges from 2.2 meters to 3.0 meters.

BATTERIES

All manufacturers except BYD use lithium-ion batteries, while BYD uses iron-phosphate batteries. Individual battery modules are packaged into two – six separate battery packs which are then wired in parallel. Different manufacturers install the battery packs in different locations. Proterra installs all battery packs under the bus floor, between the front and rear axles, while BYD installs all battery packs on the roof. Depending on total battery capacity the other manufacturers may install battery packs on the roof, in a compartment behind the

⁴⁵ CNG, hybrid-electric, and battery buses are all slightly taller than many diesel buses due to roof-mounted equipment.

passenger cabin (where the engine and transmission would be on a diesel bus) and/or under the floor just in front of the rear axle.

One key parameter is the installed battery energy capacity (kilowatt hours of energy, kWh), which – together with vehicle energy efficiency - determines how far the bus can go on a single charge (range). Most manufacturers offer a range of battery sizes, from approximately 150 kWh to approximately 450 kWh. BYD currently only offers one battery size (324 kWh), but is reportedly working to offer a larger, extended range battery. Proterra offers the largest battery currently available in the market, at 660 kWh. The larger the battery the longer the range (miles) per charge. Also, the larger the battery the heavier the bus, and the practical limitation on maximum battery size is primarily weight, not volume. Proterra can offer a larger battery than other manufacturers due to the lower weight of their composite structure.

The smaller battery offerings (<250 kWh) are primarily intended for buses that will use in-route opportunity charging. The larger battery offerings are primarily intended for buses that will charge overnight at the depot (see section 3 for a discussion of charging options).

Since batteries are the single largest cost element for electric buses, larger batteries also typically increase the purchase cost of the bus.

The data in table 3 represents commercial offerings for the 2019 model year. In the future battery energy density (watt-hours per kilogram, wh/kg) is projected to continue to increase, allowing for installation of battery packs with greater energy capacity. It is likely that battery offerings will continue to evolve for all manufacturers.

WEIGHT & PASSENGER CAPACITY

All electric buses have similar interior lay-out and capacity as diesel buses from the same manufacturer, with a maximum of 36 – 40 seats in a 40-ft bus, depending on seating configuration.

Electric buses have a gross vehicle weight rating (GVWR) of 19,550 – 20,450 kilograms (kg), and curb weight of 12,100 – 15,350 kg, depending on manufacturer and installed battery capacity. The curb weight of 40-ft diesel buses is typically in the range of 11,800 – 12,700 kg, so electric buses with the largest available battery, appropriate for overnight depot charging, will typically weigh 1,800 – 2,700 kg more than a similar diesel bus, with 1,200 – 1,800 kg more on the rear axle. In-route charged electric buses, with a smaller battery, will typically weigh 450 – 1,150 kg more than a diesel bus, with 300-750 kg more on the rear axle. The only electric bus on the

market with a similar curb weight to a diesel bus is the Proterra bus with the smallest available battery; Proterra buses with larger batteries, and all battery buses from the other manufacturers will be heavier than current diesel buses.

The maximum passenger capacity of 40-ft electric buses with the largest available batteries range from 70 – 77 passengers, based on GVWR and assuming 68 kg per passenger.

DRIVE SYSTEM

The electric propulsion system on battery buses includes an energy storage system (battery packs), an alternating current (AC) electric drive motor, an inverter/power electronics to convert direct current (DC) from the battery to AC to power the motor, and a control system. Nominal propulsion system voltage is typically 500 – 650 volts. Electric buses typically also include a DC-DC converter to power 12- and 24-volt auxiliary systems (lights, fare box, etc.) and may include a second inverter to power HVAC systems at a higher voltage.

Some manufacturers use a single large drive motor and others use two smaller motors. Peak motor power on 40-ft battery buses ranges from 200 to 380 kW. All manufacturers except Proterra utilize a direct drive system with no transmission or gear box between the drive motor and rear axle. Proterra uses a 2-speed auto-shifting gear box between the drive motor(s) and rear axle.

CHARGING

All manufacturers except Nova offer plug-in direct current (DC) charging, using a charge port compatible with an SAE J1772 CCS-Type 1 connector⁴⁶. As such, a single DC charger equipped with this type of connector can be used to charge buses from all manufacturers. All manufacturers provide a charge port on the curb-side rear of the bus and all manufacturers offer the option of a second charge port, on the street-side rear or street-side front of the bus.

BYD also offers AC charging using a connector that is not offered by any other North American manufacturer⁴⁷. With AC charging the inverters installed on the bus convert incoming 480-volt AC current to DC to charge the batteries, and a separate DC charger is not required. However, the connectors used by BYD on the cord and bus cannot be used to charge buses from other manufacturers.

⁴⁶ CCS stands for Combined Charging System. These connectors are often referred to as just “CCS connectors”

⁴⁷ BYD uses a GB/T 20234 connector, constructed to a standard adopted in China.

Nova, and all other manufacturers except BYD also offer over-head conductive charging, at charge rates up to 450 kW. For overhead conductive charging all manufacturers intend to comply with the SAE J3105 -1 charging standard, which has been in progress for the last few years, and was published on January 20, 2020⁴⁸. All manufacturers install the J3105-1 vehicle connection interface on the roof of the bus, centered over the front axle.

While there are several manufacturers that offer wireless inductive charging systems for transit buses (see section 3), none of the bus models listed in Table 3 currently offer wireless charging as a standard option. There are only a handful of wireless bus charging systems currently installed in either North America or Europe.

CABIN HEATING

A bus with an internal combustion (IC) engine uses waste heat captured via the engine cooling system to heat the passenger cabin in cold weather. Electric buses also have waste heat produced by the inverters and drive motor, which are typically cooled with a water-ethylene glycol (WEG) system. However, electric buses produce significantly less waste heat than IC engine buses, and the WEG loop operates at lower temperature. No electric bus manufacturer currently harvests this waste heat for cabin heating.

Instead, electric buses are equipped with electric resistance heating coils fed by energy from the propulsion battery. Details of how the heat is distributed from the coils to the passenger compartment vary by manufacturer, to include heating WEG to feed floor-mounted heat exchangers, distributing heated air from the rear through a ceiling level plenum, and directly recirculating cabin air over the coil mounted on the roof in the middle of the bus.

As discussed in section 4, the amount of battery energy used for cabin heating can be significant during cold weather and will affect bus range. All manufacturers offer the option of a diesel-fired heater to supplement the electric heating system. Some manufacturers integrate the electric and diesel systems while others keep them separate.

While the use of fuel heat will increase GHG emissions relative to the use of electric heat, the increase will be small. In CMBC service, total annual GHG emissions from an electric bus with a supplemental diesel-fired heater are estimated to be 90 percent lower than annual GHG

⁴⁸ SAE is also developing J3105-2 and J3105-3 standards for a blade-type connector and a vehicle-mounted pantograph (pantograph-up) connector, respectively. Many European bus manufacturers are adopting the J3105-3 standard for bus charging.

emissions from a hybrid bus and 92 percent lower than emissions from a diesel bus. Even with supplemental diesel heating, electric buses will easily meet targets for 2050 GHG reduction.

EXTREME WEATHER OPERATION

While battery chemistries vary, in general the chemical batteries used in battery-electric buses work best when the internal temperature in the battery pack is between approximately 0 °C and 20 °C. Both higher and lower battery temperatures will reduce the allowable charge and/or discharge rate without compromising battery life. In practical terms this means that operation of electric buses in extreme temperatures (hot or cold) can reduce bus power, regen capability, or both.

Bus manufacturers provide active cooling and heating to battery packs to maintain appropriate battery pack temperature and allow for continued operation in extreme weather. Given the temperate summer environment in Vancouver hot weather operation is not expected to be problematic for CMBC battery electric buses. Winter temperatures are also mild in Vancouver, but there are a handful of days per year when over-night temperatures fall below freezing, which could negatively affect electric buses – particularly those stored outdoors in unheated space, as all CMBC buses are currently⁴⁹. To be used successfully in Vancouver, electric buses will likely require active battery-pack heating when stored outside at the transit centres overnight on cold nights (5 – 15 nights per year); without active heating pack temperatures may fall below the allowable minimum, thus limiting available bus power when buses enter service.

For buses that use overnight depot charging, every bus parked at the depot will likely be plugged into a charger (see section 3); these chargers can be set up to power on-board battery heaters during cold weather – even after battery charging is complete - to maintain a target internal battery pack temperature. For depot-charged buses not connected to a charger all night, or for in-route charged buses, the on-board battery pack can be used to power the battery heater, to maintain appropriate pack temperature on cold nights. Projected power required for battery pack heating is on the order of 2 – 5 kW when ambient temperature is 0 °C to -10 °C; for a 200-kWh battery pack this would use up 10 – 25 percent of battery power for 10-hours overnight storage (typical), if power is drawn from the on-board battery pack.

⁴⁹ Battery packs have high thermal mass (they cool off slowly) and also generate heat as they are dis-charged over the day. As such, daily operation on cold days is not expected to be a significant problem, as long as the battery packs are sufficiently warm to start the day.

BUS PURCHASE PRICE

Definitive data on current pricing for electric buses is difficult to develop due to significant differences in purchase specifications and contract details for different transit agencies, and the fact that the technology, and bus manufacturer offerings, are still evolving. Review of public bid documents indicates that between 2017 and 2019 different U.S. agencies have paid between \$650,000 and \$1.2 million (U.S. \$) per bus for 40-ft battery-electric buses; the weighted average price of 40-ft electric buses listed in the APTA transit vehicle database is \$889,000 per bus and the weighted average price of 60-ft electric buses is \$1.3 million per bus⁵⁰. However, on the high end some contracts have included charging infrastructure in the per-bus price and may also have included significant spare parts. On the low end the purchase price was reduced by the agency’s decision to lease the bus batteries rather than buying them outright. In 2018 TransLink paid approximately \$1.0 million each (CDN\$) for the fleet of four 40-ft electric buses in their pilot program.

Bus manufacturers are also tight-lipped about current battery costs, which are a significant contributor to over-all electric bus purchase costs. In 2017 published reports put the cost of batteries for electric buses as high as \$750/kWh (U.S. \$). Current public pricing data from Proterra’s battery leasing program implies that costs have fallen into the range of \$445/kWh (U.S. \$), at least for Proterra.

In recent years the price of buses to TransLink, in Canadian dollars, has been approximately 25 percent higher than the U.S. average price in U.S. dollars, based on currency exchange rates. Based on the totality of available information, MJB&A estimates that 40-ft electric buses purchased in volume (30+ buses) over the next few years by TransLink will cost approximately \$1.1 million per bus for depot-charged buses with a large battery (450 kWh) and \$950,000 - \$970,000 per bus for in-route charged buses with a smaller battery (150-200 kWh). Estimated prices for 60-ft electric buses are \$1.6 million per bus for a bus with the largest available battery, and \$1.4 million per bus for buses with smaller batteries, for use with in-route charging. These prices are in Canadian dollars.

⁵⁰ American Public Transportation Association, *2019 Public Transportation Vehicle Database*, <https://www.apta.com/research-technical-resources/transit-statistics/vehicle-database/>, downloaded on 9/26/19. There are 191 electric transit buses listed with length between 37 and 43-ft, and 26 articulated buses (length >55 ft) listed, with “year built” between 2017 and 2021 (some are on order but not yet delivered). These buses were manufactured by Proterra, BYD, and New Flyer.



This compares to the approximately \$630,000 (CDN \$) estimated purchase price for TransLink 40-ft diesel buses, and approximately \$890,000 purchase price for TransLink 40-ft diesel hybrid-electric buses. Estimated prices for 60-ft diesel and hybrid electric buses are approximately \$1.0 million, and \$1.3 million per bus, respectively.

Electric Bus Charging Options

This section discusses and compares the two major options for charging battery buses: 1) depot charging, and 2) in-route charging.

B-1 Depot Charging

Depot charging is generally analogous to home charging for personal electric vehicles; usually a charger is provided at every bus parking spot in the depot, and buses are plugged in and charged during the time that they are parked, which is typically between about 9 PM and 5 AM. Minimum charging rates of 50 – 75 kW are required, to complete the necessary charging in the available 6- to 8-hour overnight window. Higher charge rates could also be used, to finish necessary daily charging faster. Some agencies are experimenting with higher depot charge rates to reduce the required number of depot chargers, but these charging scenarios typically also entail additional bus shifting costs, since buses must be moved away from the charging position when done, to allow the next bus to be charged.

Figure B-1 Commercially Available CCS Connector Compatible Chargers



The most common way to implement depot charging is to use direct current chargers equipped with an SAE J1772 CCS-Type 1 connector. Incoming alternating current from the grid is converted to direct current by inverters in the charger, to directly charge the bus batteries. In North America input power for these direct current chargers is 480 volt, 3-phase. To charge, the

standard connector is plugged into a compatible port on the bus, and direct current power is transferred from the charger to the bus via an electrical cord.

There are a number of appropriately sized chargers on the market (50 kW – 62 kW), which are also used for “fast-charging” electric cars. These chargers combine required inverters, control equipment, and switches into one “box” equipped with one or two charge cords. See figure B-1 for several examples of commercially available chargers. See Figure B-2 for the configuration of the CCS connector and on-bus charge port.

Several companies also sell charging systems which separate the power inverters and controller/cord connections into separate units. Under this scenario a 100 – 150 kW power module will feed up to three charging heads, and the power module/power cabinet (inverter) can be physically separated from the charge heads. Larger capacity charging cabinets with capability to supply a larger number of charge heads (often referred to as charging posts) are under development, most notably by ChargePoint; which plans to release a 500kW charging cabinet with ability to supply 8 charge posts, in 2020. Tesla currently has a 1 MW charging system (V3 Supercharger) with ability to supply up to 8 charge posts, but the connectors are proprietary Tesla type.

Figure B-2 CCS Connector



The charge heads for systems that separate the charger cabinet are typically smaller and lighter than all-in-one units and require less space between bus lanes if the charge heads are ground-mounted, or less structure to support the charge heads if mounted overhead. In addition, these systems are able to be configured to allow any individual bus to charge at the maximum rating of the charge cabinet if only one of every three charge heads are actively charging. See Figure B-3.

Figure B-3 Corded Charger with Separate Power Module and Charging Heads



Source: ABB

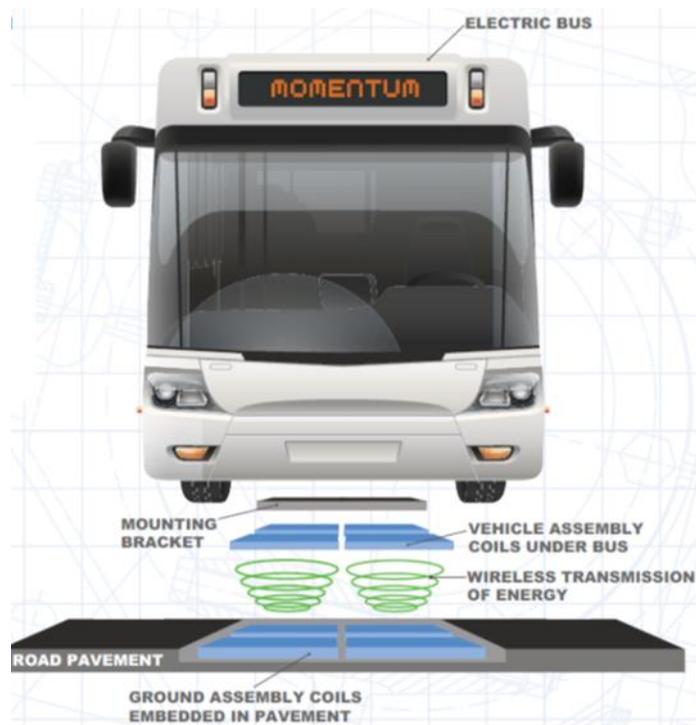
When implementing depot charging with CCS chargers, each bus will need to be plugged in to start the charge and unplugged before the bus leaves the depot. In addition, the space required to install the chargers will reduce depot parking capacity by 5 to 25 percent, depending on whether they are mounted on the ground or overhead. While overhead mounting will reduce the space requirements it will add cost, due to the need to add overhead structure to carry the weight of the chargers.

To reduce operational requirements of plugging and unplugging buses, and to minimize charger space claim, some transit agencies are experimenting with using SAE J3105-1 overhead conductive chargers for depot charging; these are the same chargers used for in-route charging, as described in Section B-2 below. There are various ways to implement depot-based overhead conductive charging; for example a pantograph could be installed at each bus parking space to implement “slow” charging (50 – 75 kW; 6 – 8 hour charge time per bus), or a smaller number of higher-power overhead chargers could be installed – for example 450 KW overhead chargers could charge each bus in less than an hour.

While operationally simpler, overhead depot charging is typically more expensive than using corded chargers, due to the cost of the overhead pantographs used to connect the charger to the bus (slow charging), or operational costs for shifting buses through the chargers (fast charging). In North America overhead charging is usually implemented “pantograph- down” – i.e. the movable pantograph that makes the electrical connection between the charger and bus

is installed on the charger and it moves down to connect to charge rails on the bus. A number of European transit agencies are using “pantograph – up” systems for depot charging. In this scenario a movable pantograph is installed on every bus; to charge, the pantograph moves up to contact a fixed charging rail at the overhead charging point.

Figure B-4 Wireless Inductive Charging



Source: Momentum Dynamics

Several companies also sell wireless inductive chargers that could be used for depot charging. With a wireless charger a power pad is embedded in or on the floor of the depot and a power receiver is mounted on the bus. With the receiver positioned over the ground-mounted pad, power is transferred across the air gap via magnetic fields generated by magnetic coils in the source and receiver. See Figure B-4.

Similar to other chargers, wireless systems require power modules (inverters, switches, controls) to feed direct current power to the ground-mounted power pads. These power modules are of similar size as for other direct current chargers and can be located up to 100 feet away from the ground-mounted pads.

The on-bus charge receiver is only a few inches thick but requires approximately four-square feet of surface area for every 75 kW of power transferred and weighs 100 – 200 pounds. The on-bus

power receiver must be actively cooled during charging, which requires a higher level of integration to bus systems than the other charging methods; none of the bus models listed in Table 3 offer wireless charging as a standard option.

Wireless charging is reported by one manufacturer to be as efficient as wired and conductive charging, with a similar cost for purchase and installation of the necessary equipment. However, this is an infant technology with only a handful of installations in North America or Europe, less than 3 years of in-use experience, and a small and potentially fragile manufacturing base.

The biggest issue associated with depot charging is a limitation on daily bus operating range (miles, hours), due to limitations on the size of batteries that can be installed on the bus. As discussed in Section 4.2, depot-charged buses would have shorter daily range than required on many CMBC routes. This would require existing long daily bus assignments to be shortened, which would increase the number of peak buses required to provide current service levels.

Another potential disadvantage of depot charging is that total peak charging load could be 8 - 10 MW for a 200-bus depot. Depending on the capacity of the existing distribution infrastructure, interconnection costs for such a large load could be very high. For example, estimated interconnection costs to handle the projected depot charging load at TransLink transit centres ranges from a low of \$350,000 to a high of \$11 million (see Section C-2.2)

B-2 In-route Charging

With in-route charging energy is added periodically while the buses are in service each day, rather than buses being charged at the depot overnight. In-route charging requires much higher charge rates than depot charging— typically 300 to 450 kW – but fewer chargers; as discussed in Appendix C, in-route charging would require one charger for approximately every seven peak buses on CMBC routes.

In-route chargers are typically installed at one or both termini on a route, and buses are charged for 5 -15 minutes each time they come to the end of the route where the charger(s) is located.

Depending on route length, and whether charging is done at one or both termini, buses may charge once every 1 – 2 hours in service. With 450 kW in-route chargers total in-route charge time will typically be 45 – 90 minutes per day per bus.

In-route charging is typically done using overhead conductive chargers. See Figure B-5 for an example of a typical in-route charger installation. A movable pantograph, powered by electricity or compressed air, is installed on a pole which extends over the roadway. When a bus pulls under the charger the pantograph moves down, and contacts power rails installed on top of the bus; power is then transferred between the rails on the pantograph and the rails on the bus.

Figure B-5 Typical In-route Charger Installation



There are two main companies that sell overhead conductive chargers in the North American market, ABB and Siemens. Both companies offer chargers with nominal charge rate of 150 kW, 300 kW, 450 kW, or 600 kW. The power modules used by these companies are very similar to the power modules used to provide power to corded or wireless chargers (see figure 5); their main purpose is to convert supply power (alternating current at a range of potential voltages) to 600 – 1,000 volt direct current to charge the bus batteries. For in-route charging these power modules are typically located in an enclosure in the vicinity of the charging location (less than 100 feet) and power is transferred between the power module and the charging pole/pantograph via under-ground conduit. See Figure B-6 for two typical in-route charging power module installations; both examples are for 450 kW in-route chargers.

Figure B-6 450 kW In-route Charger Power Modules



There are several transit agencies that are experimenting with inductive wireless in-route charging. The same type of equipment as is used for inductive wireless depot charging is used for inductive wireless in-route charging, but the charging pad is installed in the roadway at the in-route charge point. Manufacturers indicate that wireless power transfer is unaffected by rain or snow on the charge pad. The largest system currently in-use has a maximum charge rate of 300 kW, which requires an on-bus power receiver with 1.5 square meter of surface area. Given current systems it may be impractical to use inductive charging at higher charge rates, due to practical limitations on the size of the on-bus receiver without affecting bus break-over angle or placement of other bus equipment⁵¹.

⁵¹ At least one research & development team is working on 500 kW wireless units in which the on-vehicle receiver has a surface area smaller than current 300 kW units

One of the most significant advantages of in-route charging compared to depot charging is that with a properly designed charging network there is virtually no limitation on daily bus range; buses would leave the depot in the morning with a near full battery and return with a near full battery after periodic charge events throughout the day which replenished all of the energy used on route. In addition, the battery on the bus can be smaller than the battery on a depot-charged bus, which reduces bus weight and cost.

A potential dis-advantage of in-route charging is that, depending on the battery chemistry used, some bus manufacturers may require periodic “slow” charging over a period of several hours or more to “balance” the charge in the on-board batteries. This requires some number of lower power chargers at the bus depot, increasing total infrastructure costs and complicating over-all charging operations. The four pilot buses currently being operated by CMBC using in-route charging were produced by two different manufacturers; one manufacturer requires a battery balancing charge at the depot and the other does not.

While in-route charging eliminates the range restrictions of depot-charged buses, time may need to be added to bus schedules to accommodate the periodic charging. In addition, to ensure that every bus receives a proper charge without affecting on-time performance proper spacing between buses on the route must be maintained. Many transit agencies experience “bus bunching” when routes are congested, or if there is some kind of disruption on the route. If this is a significant problem, additional time may need to be added to schedules on some routes, and additional lay-over spaces may be required at charging locations, to ensure that every bus has time to charge even when service is disrupted.

In addition, an optimized in-route charge network will have limited ability to absorb short-term but significant increases in service on a given route – for example to operate a “bus bridge” if the Sky Train is out of service - because there will be insufficient charger capacity to charge the additional buses on the route. Planned permanent increases in service can be accommodated by adding additional chargers at existing charging locations, or by adding new charging locations to the network.

In addition, TransLink will need to procure easements or other agreements to install the necessary chargers on public or private land across the service area. Prior experience of other transit agencies has shown that the process of siting and permitting in-route chargers can be time-consuming and the time from site acquisition to commissioning may take two years or more for some sites.

B-3 Comparison of Charging Methods

This section compares and contrasts the advantages and disadvantages of depot charging and in-route charging, and also compares the different ways to implement depot charging.

See Table B-1 for a comparison of the advantages and dis-advantages of depot charging versus in-route charging. In general depot charging will have lower costs for charging infrastructure but higher costs for bus purchase than in-route charging. Depot charging will require additional space at bus depots, but in-route charging will require the agency to purchase or lease space at in-route lay-over locations.

Table B-1 Comparison of Depot and In-route Charging

	Depot Charging	In-Route Charging
PROS (+)	<ul style="list-style-type: none"> • Direct control of infrastructure (on transit-owned property) • Lower infrastructure costs • Potentially lower electricity cost due to reduced demand charges (load in non-peak hours) 	<ul style="list-style-type: none"> • No limitation on daily bus range; can keep existing daily bus schedules with no increase in peak buses • No loss of depot parking capacity • Lower bus purchase cost due to smaller battery • Potentially greater resiliency/reliability - loss of power at a single charging location will have limited effect on bus operations
CONS (-)	<ul style="list-style-type: none"> • Limited bus range – will need to shorten long assignments, resulting in increased peak buses • Higher bus purchase cost due to larger battery • Charger space claim reduces bus parking • Loss of power at depot will significantly effect bus operations 	<ul style="list-style-type: none"> • Less control over infrastructure (may need to locate chargers on land not owned/controlled by transit agency) • Time and effort for site acquisition and permitting of charger sites • Higher infrastructure costs • Potentially higher electricity cost due to higher demand charges (load during peak hours) • Potentially higher cost/difficulty of charger maintenance • Must add time to existing schedules to accommodate charging • Bus bunching will reduce charging effectiveness • Limited ability to absorb temporary increases in service for special events due to limited charging capacity

Both options will require changes to existing bus schedules. With depot charging long daily bus assignments will need to be shortened due to range limitations, which will increase peak bus requirements. With in-route charging there will be no limitation on the length of daily bus assignments, but time will likely need to be added to all schedules to accommodate in-route charging time; this may also increase peak bus requirements, but not as much as depot charging.

Development of an in-route charging network will likely take longer than installation of chargers at a depot due to time for planning, site acquisition, permitting, and obtaining electrical service at multiple sites. However, because it is more distributed, an in-route charge network is inherently more resilient than depot charging; the loss of grid power at the depot would affect bus service over a large area if buses could not be charged, but the loss of grid power at one in-route charging location would affect a much more limited service area.

It is also possible to employ a hybrid charging strategy which uses over-night depot charging to replenish the bulk of the energy used by buses for daily service, with limited in-route charging to extend daily range to cover long daily assignments. This type of hybrid strategy could potentially minimize required changes to existing bus schedules but would likely be more expensive than either a pure depot- or pure in-route charging strategy due to the need for both expensive buses with large batteries, and a greater amount of charging infrastructure.

See tables B-2 and B-3 for a comparison of the different depot-charging options: corded charging, inductive wireless charging, and overhead conductive charging. Table B-2 addresses the differences between charging technology for “slow” overnight depot charging and Table B-3 addresses requirements for fast depot charging and the pros and cons of this approach compared to slow charging.

Compared to other charging options corded chargers have the lowest capital cost and the largest number of commercially available options. The main draw-back of these devices is the need to plug in the charge cords to initiate charging, and to unplug the cords when charging is complete. It is reasonable to expect that some connectors and cords will be damaged and require replacement. These chargers also have higher space claim than the other options when implementing slow charging (one charger per peak bus), especially if the charging heads are ground mounted.

Both inductive wireless chargers and overhead conductive chargers can eliminate the operational issues and costs associated with charge cord handling and can reduce charger

space claim for slow charging, but each introduces trade-offs for these benefits. Wireless chargers require active cooling of the on-bus charge receiver during charging and therefore require a greater level of integration with other bus systems. At this point in time this technology is also likely riskier than the others due the fact that it is still an infant technology with few North American installations, a limited amount of in-use experience and a limited manufacturing base. For slow depot charging the capital cost of overhead inductive chargers is significantly more than the cost of corded chargers, due to the need for a pantograph at virtually every bus parking space (or on every bus under the European pantograph-up charging scenario).

Table B-2 Comparison of Options for Slow Depot Charging

Charge Rate	Minimum 50 – 75 kW		
Charge Time	6 – 8 hours per bus		
Chargers required	One per peak bus		
	SAE J1772 CCS Type 1 Corded Chargers	SAE J3105-1 Overhead Conductive Chargers	Inductive Wireless Chargers
PROS (+)	<ul style="list-style-type: none"> • Lowest capital cost • Largest number of commercial options 	<ul style="list-style-type: none"> • Do not need to plug and unplug buses • No cords to damage • Lower space claim – less loss of parking space 	<ul style="list-style-type: none"> • Do not need to plug and unplug buses • No cords to damage • Lower space claim – less loss of parking space • Potentially similar capital cost to corded chargers
CONS (-)	<ul style="list-style-type: none"> • Requires plugging and unplugging buses • Charger space claim reduces bus parking space • Potential to damage cords and connectors 	<ul style="list-style-type: none"> • Higher capital cost than corded chargers due to cost of pantograph at each charging location 	<ul style="list-style-type: none"> • Charge receiver on bus requires active cooling during charging • Not a standard option on commercially available buses • Infant technology; small and potentially fragile commercial base

The concept of “fast” depot charging (at charge rates up to 450 kW) is primarily intended to reduce the number and cost of depot chargers compared to slow charging; to that end it is most effective in reducing costs for overhead conductive chargers because significantly fewer expensive pantographs are required. However, even at 450 kW charge rate most buses will

APPENDIX B – Electric Bus Charging Options

require 30 – 60 minutes to receive a full charge, and one charger will be required for every 6 – 8 peak buses to be able to charge all buses in the available 6 – 8 hour over-night window when buses are parked at the depot. Given this charge time, the use of fast depot charging will require buses to be shifted through the chargers, which adds operating costs compared to slow charging. Also, the required space claim for the chargers will increase to either allow for uncharged buses to stack up behind the chargers as they come off the road, or to allow drive through access to each charger to allow buses to be moved from the parking area to the charger and back to parking.

Table B-3 Comparison of Options for Fast Depot Charging

Charge Rate	150 kW	300 kW	450 kW
Charge Time	Up to 140 min/bus	Up to 72 min/bus	Up to 60 min/bus
Chargers required	One for every 3 – 4 peak buses	One for every 5 – 7 peak buses	One for every 6 – 8 peak buses
Charger Options	CCS corded SAE 3105-1 Overhead conductive Inductive Wireless	SAE 3105-1 Overhead conductive Inductive Wireless	SAE 3105-1 Overhead conductive
<i>Compared to slow depot charging</i>			
PROS (+)	<ul style="list-style-type: none"> Fewer chargers required, and likely lower capital costs, especially for SAE 3105 Overhead conductive charging, due to the need for fewer pantographs 		
CONS (-)	<ul style="list-style-type: none"> Corded chargers likely limited to ~ 150 kW charge rate without cooled cords Inductive wireless chargers likely limited to ~300 kW due to required space claim on bus for charge receiver Will add operating costs for shifting buses through the chargers when charging is complete Charger space claim likely higher than for slow charging, to allow for drive-through access to chargers 		

CMBC Operational Analysis

This section summarizes the analysis of CMBC bus operations, and implications for transition to electric buses. The subjects covered include projected energy use on CMBC routes, range per charge and required bus replacement ratio if using depot charging, the required charging network if using in-route charging, projected electricity cost, and capital costs for charging infrastructure, for both depot charging and in-route charging. Estimated capital costs for charging infrastructure are based on conceptual charging designs developed by AES Engineering, and are specific to CMBC facilities.

C-1 Projected Electric Bus Energy Use

The energy required to operate an electric bus includes propulsion energy (i.e. driving) and energy to cool or heat the passenger cabin. Propulsion energy varies with average in-service speed on the route – the lower the average speed the more energy required (kilowatt-hours per kilometer, kWh/km), primarily because lower speed correlates to more stops per kilometer, which requires more energy to repeatedly accelerate from a stop.

The energy required for heating and cooling varies with temperature – the lower or higher the ambient temperature the more energy is required. In the case of an electric bus, the energy required for heating during cold weather is significantly greater than the energy required for cooling during hot weather. Available in-use data indicates that the average daily cooling load (air conditioning) is approximately 2.5 kilowatts (kW) when ambient temperature is 27 °C, while the average daily heating load could be as high as 14 kW (electric resistance heating) when the ambient temperature is -18 °C.

See figure C-1 for the historical average monthly high and low temperature in Vancouver. Historically the annual average high temperature is 17 °C (in July and August), but could reach 22 °C or higher. The annual average low temperature is 3 °C (in January), but could fall below 0 °C.

See Figure C-2 for a summary of the estimated energy use by 40-ft electric buses in service on CMBC routes. The average in-service speed of the different CMBC routes ranges from 13 kph to 36 kph⁵². As such, the estimated energy required for propulsion will range from 1.26 – 1.70 kWh/km, depending on the route. On the coldest winter day (0 °C), the additional energy required for cabin heating will add 0.22 – 0.62 kWh/km, for a total load of 1.48 – 2.31 kWh/km.

⁵² This range does not include highway routes, which have higher average speed

Across the entire year, average 40-ft bus energy use is projected to total 1.37 – 2.00 kWh/km for the different routes, including both propulsion and heating/cooling. Average energy use for all 40-ft buses in the fleet is projected to be 1.60 kWh/km across the year, and 1.79 kWh/km on the coldest winter days. 60-ft electric buses are projected to use proportionally more energy, based on their greater weight; a fleet average of 2.15 kWh/km across the year, and a fleet average of 2.42 kWh/km on the coldest winter days.

Figure C-1 Average High and Low Temperature, Vancouver, BC

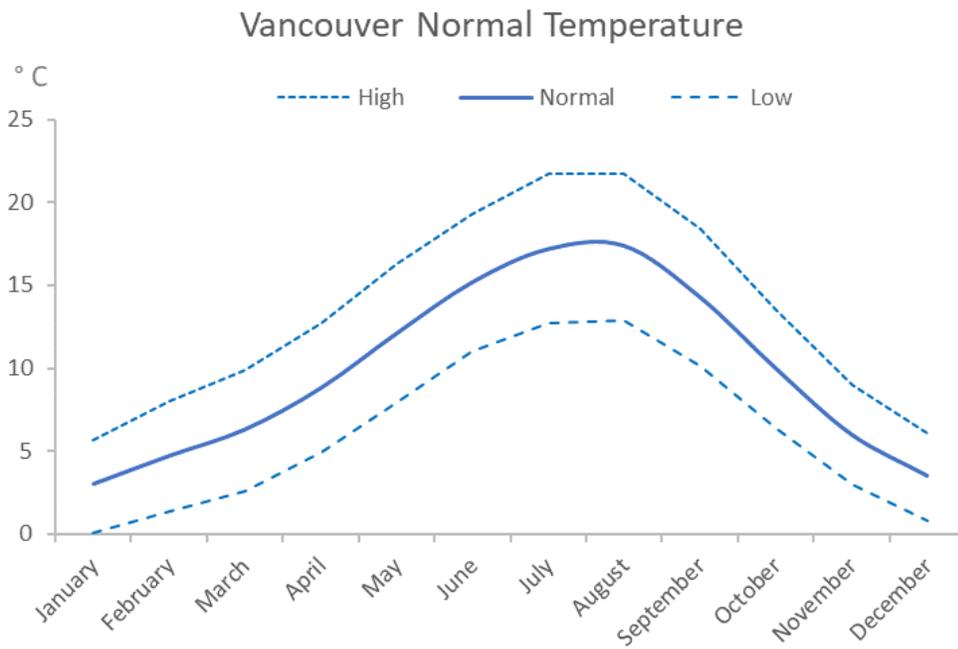
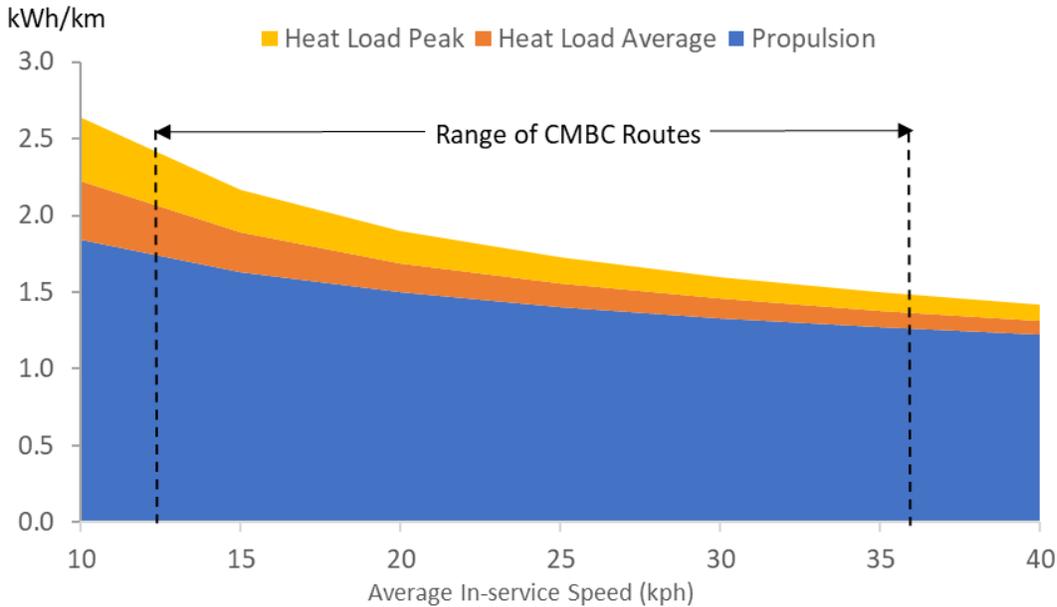


Figure C-2 Projected 40-ft Electric Bus Energy Use in CMBC Service



C-2 Depot Charging Analysis

This section summarizes the analysis of cost and operational considerations for CMBC fleet electrification using over-night depot charging of electric buses. The analysis encompasses estimated range per charge on different CMBC routes and the resulting number of electric buses that would be required to replace existing diesel buses (replacement ratio); estimated daily depot charging load and electricity cost; and infrastructure costs for installing the necessary chargers at CMBC depots.

C-2.1 Range per Charge & Replacement Ratio

As discussed in section Appendix A, for most manufacturers the nameplate energy capacity of the largest battery currently available on 40-ft buses is 450 kWh; the exception is Proterra which offers battery packs as large as 660 kWh. This is the theoretical capacity when the battery pack is new⁵³, but not all that energy is available for use. Batteries degrade (i.e. lose capacity) as they are charged and dis-charged over time, and this degradation typically accelerates if the battery is regularly fully discharged. Most battery manufacturers recommend that batteries not be discharged below 15-20 percent of capacity on a regular basis when new – as batteries age this

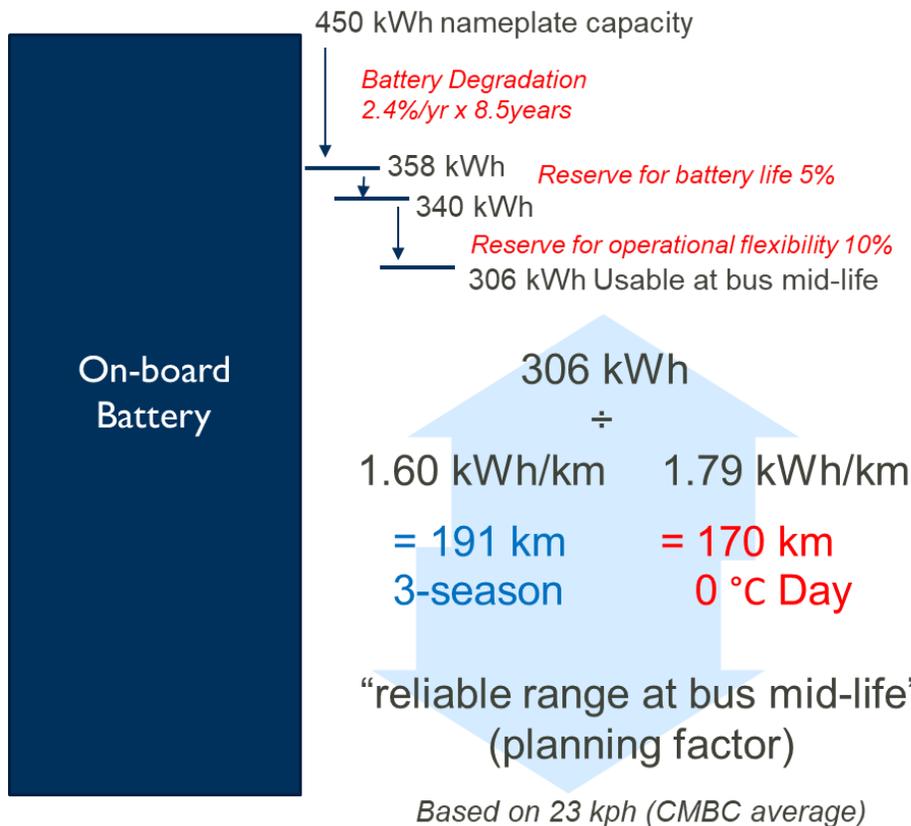
⁵³ The actual maximum capacity may be slightly higher than stated; some manufacturers publish figures that include a small safety margin.

discharge window can be opened, to allow discharge down to 5% of capacity near battery end-of life.

Even when not fully discharged batteries will lose capacity. Based on manufacturer warranties, MJB&A estimates that capacity loss could be as high as 2.4 percent per year – so that by the time a battery has been in service for 8.5 years (bus mid-life) it will only retain about 80 percent of its original capacity, and by bus end-of life at 17 years it will retain only 59 percent of its original capacity.

When planning for fleet electrification using depot charging, MJB&A recommends that transit agencies plan to replace electric bus batteries at bus mid-life, and that peak bus requirements be based on the “reliable” range (kilometers) that can be achieved just before the battery is replaced.

Figure C-3 Calculation of 40-ft Bus Reliable Range at Bus Mid-life



The calculation of reliable range should be based on projected average energy use (kWh/km) but should account for the fact that on any given day a given bus could use more than the average,

based on factors such as traffic, passenger loading, and driver behavior; we recommend using 110% of the projected average to account for these factors. If the passenger cabin will be heated electrically, using energy from the battery, the calculation of reliable range should include energy used for cabin heating, and be based on the expected coldest day, not the annual average heat load. For buses that will use supplemental fuel heaters reliable range can be based on projected annual average energy use.

See Figure C-3 for an example of reliable range calculation, which accounts for both projected battery degradation and variability in daily energy use, using projected average energy use in CMBC service. As shown, with a 450-kWh battery, at bus mid-life only 306 kWh (68%) will be reliably available. Assuming average annual energy use of 1.6 kWh/km, from a planning perspective buses in average CMBC service can be assumed to have a reliable range of 191 kilometers per charge most of the year. However, unless supplemental fuel heating is used, range per charge in average CMBC service will fall to only 170 kilometers on the coldest winter days in Vancouver.

See Table C-1 for a summary of the projected reliable range per charge, at bus mid-life, of 40-ft depot-charged electric buses operating on routes assigned to the different CMBC transit centres⁵⁴.

With only electric heat, electric buses at the different transit centres will have a reliable range per charge at bus mid-life of 149 - 184 kilometers if equipped with a 450-kWh battery (industry norm), or 170 – 203 kilometers if equipped with a 660-kWh battery (industry best). If buses are equipped with supplemental fuel heat projected range per charge will increase by approximately 20 kilometers with a 450-kWh battery or 30 kilometers with a 660-kWh battery.

Currently, the maximum battery size available on 60-ft electric buses is 600 kWh. With this sized battery, 60-ft electric buses are projected to have similar range per charge in CMBC service as 40-ft buses with a 450-kWh battery: 150 – 185 km if equipped with only electric heat, and 173 – 205 km if equipped with supplemental diesel heat.

⁵⁴ In Table 8, data for transit centres other than VTC, BTC, and MTC are based on current operations. When MTC opens some routes will be moved between depots; the most affected depots will be BTC and VTC. The data in table 8 for VTC, BTC, and MTC is based on anticipated route assignments as of 2025.

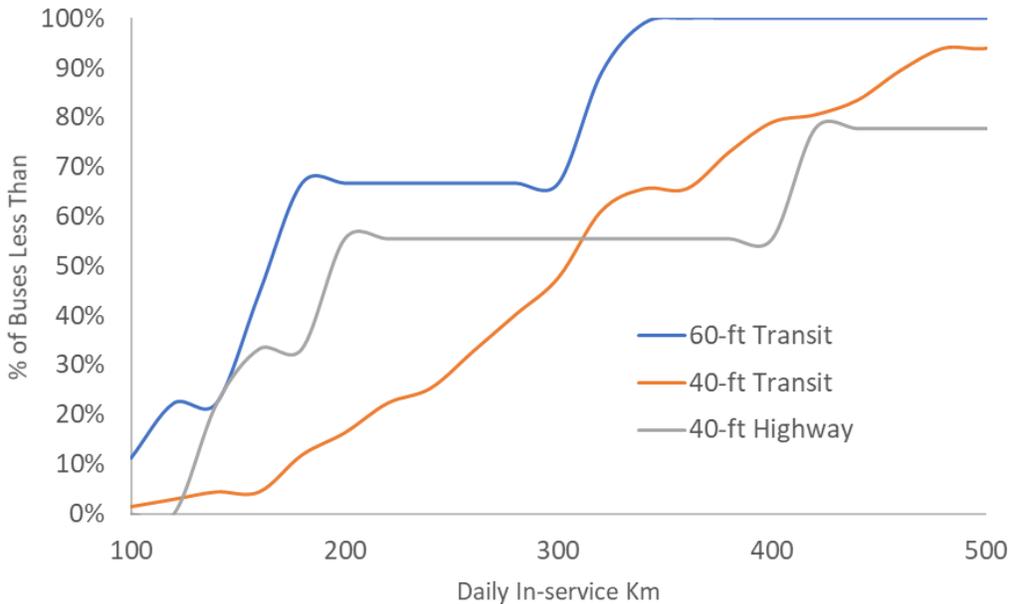
Table C-1 Projected Range per Charge of 40-ft Buses on CMBC Routes, at Bus Mid-life

Depot	AVG SPEED KPH	AVG Energy Use (kWh/km)		Range Per Charge (km)			
		Annual AVG	Peak Day	450 kWh Battery		660 kWh Battery	
				Elec Heat	Fuel Heat	Elec Heat	Fuel Heat
HTC	22.7	1.61	1.80	170	190	250	278
PTC	27.1	1.51	1.67	184	203	269	297
RTC	24.2	1.57	1.75	175	194	257	285
STC	26.7	1.52	1.68	183	201	268	295
VTC	17.2	1.79	2.03	150	171	221	251
BTC	17.1	1.79	2.04	150	171	220	250
MTC	16.9	1.80	2.05	149	170	219	249

The average daily driving distance for 40-ft and 60-ft transit buses operated by CMBC ranges from 202 – 303 kilometers per day at the different transit centres. Highway buses average over 330 kilometers per day at all three locations from which they operate. While this is the average daily driving distance, a significant number of buses regularly exceed this value, due to the way CMBC schedules service. Typically, about 30 percent of buses leave the depot early in the morning and do not return until late afternoon or evening. Other buses leave the depot in the morning to cover the AM peak commuting period, then return to the depot at about 10 AM, since fewer buses operate mid-day. These same buses will likely then leave the depot again in mid-afternoon to provide additional service for the afternoon peak commuting period and return in the early evening.

See Figure C-4, which shows the distribution of mileage accumulated on a typical weekday by buses operating from the Port Coquitlam Transit Centre (PTC); other transit centres have similar distributions. Forty-foot transit buses at PTC average 314 kilometers per day, and about 50 percent of buses accumulate less mileage than this, but about 50 percent accumulate more mileage – with some buses driving more than 500 kilometers per day. Highway coaches at PTC have a similar distribution, but 60-ft buses do fewer miles. On average 60-ft buses at PTC only drive 200 kilometers per day, but still 30 percent of buses drive more than 300 kilometers per day.

Figure C-4 Distribution of Daily Bus Mileage at Port Coquitlam Transit Centre

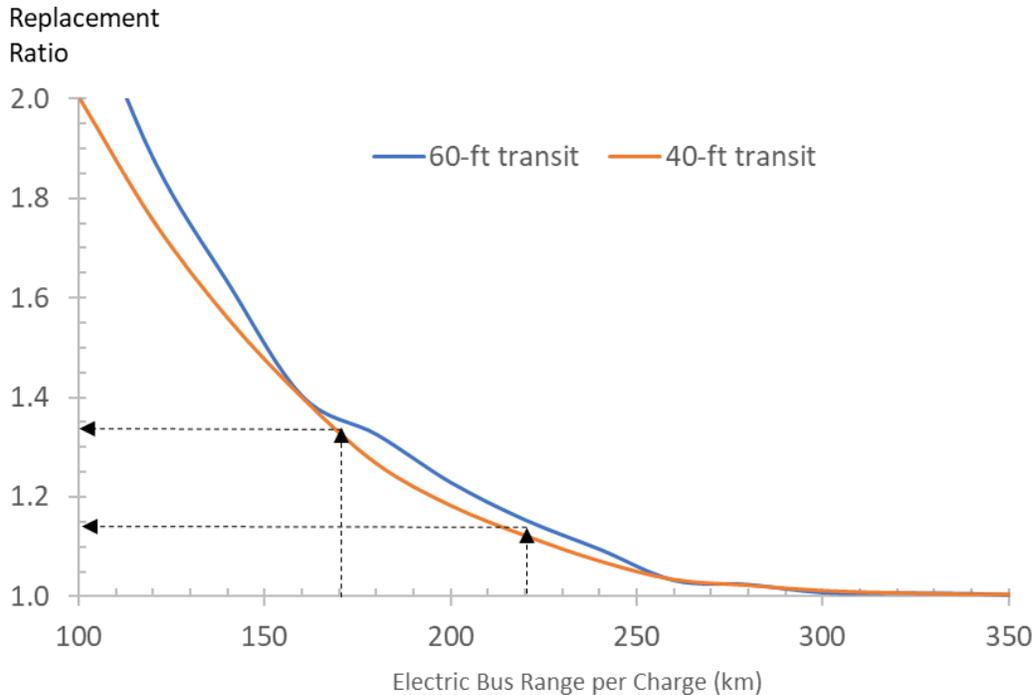


Given the projected range per charge values shown in Table C-1, to implement depot charging CMBC would need to change the way they schedule buses, to “break up” long daily bus assignments into shorter assignments that could be handled by an electric bus before needing to be re-charged. Doing this would increase the number of peak buses required, as discussed below.

To determine the number of depot-charged electric buses that would be required to maintain current service levels, MJB&A used the distribution of daily mileage at each transit centre and estimated electric bus range per charge at mid-life to calculate a “replacement ratio” for depot-charged electric buses in CMBC service⁵⁵. The replacement ratio is the proportional number of electric buses that would be required to replace one diesel bus, due to limits on range per charge. A replacement ratio of 1.0 means that one electric bus can take the place of one diesel, hybrid-electric, or CNG bus. A replacement ratio of 1.2 indicates that 20 percent more electric buses would be required – i.e. every 100 diesel buses would need to be replaced with 120 electric buses due to the range restrictions of electric buses.

⁵⁵ For this calculation, all daily bus assignments less than estimated range per charge are assumed to have a replacement ratio of 1, and all daily bus assignments greater than estimated range per charge are assumed to have a replacement ratio calculated as daily miles divided by range per charge. A weighted average replacement ratio is then calculated for all daily bus assignments.

Figure C-5 Electric Bus Replacement Ratio versus Range per Charge at Marpole Transit Centre



See Figure C-5 for a plot of replacement ratio versus electric bus range per charge for 40-ft and 60-ft transit buses operating from Marpole Transit Centre (MTC)⁵⁶. At MTC, if either a 40-ft or 60-ft electric bus had only 170 kilometers range per charge the replacement ratio would be about 1.35 – i.e. 35 percent more electric buses would be needed than diesel buses. If the electric buses had 220 kilometers range per charge only about 15 percent more buses would be required (1.15 replacement ratio). To be able to replace diesel, hybrid, or CNG buses one-for-one with electric buses at MTC, the electric bus range per charge would need to be greater than 300 kilometers.

See Table C-2 for a summary of projected replacement ratios for the different bus types operating from each CMBC transit centre. The replacement ratios in Table C-2 assume a 500-kWh battery pack for 40-ft buses and a 660-kWh battery pack for 60-ft buses; these are projected “industry norm” battery pack sizes for electric buses purchased in 2023 – 2026, accounting for projected further improvements in battery energy density. The values in Table C-2 also assume that buses will be equipped with supplemental fuel heaters, which will reduce battery energy demands on cold winter days, resulting in longer range.

⁵⁶ This is based on the routes projected to be assigned to MTC when it opens.

Table C-2 Projected Replacement Ratio for CMBC Depot Charging

Transit Centre	Bus Type		
	40-ft Transit	40-ft Highway	60-ft Transit
HTC	1.17	NA	1.21
PTC	1.43	1.36	1.15
RTC	1.33	1.37	1.22
STC	1.35	1.66	1.55
VTC	1.15	NA	1.13
BTC	1.15	NA	1.21
MTC	1.18	NA	1.13

As shown, the projected replacement ratio for depot-charged electric buses ranges from a low of 1.15 (40-ft transit buses at BTC and VTC) to a high of 1.66 (highway buses at STC). Projected depot charging replacement ratios for all bus types are significantly higher at PTC, RTC, and STC than at the other transit centres, due to higher average daily mileage accumulation at these depots. At all depots from which they operate highway buses have very high daily mileage and very high depot charge replacement ratios.

For buses not equipped with supplemental fuel heaters, projected range on cold winter days would be lower, and replacement ratios would be higher than that shown in Table 9 for all bus types at all transit centres; compared to electric buses with supplemental fuel heaters, about 10 percent more buses would be required if they were equipped with only electric heat.

The required increase in the bus fleet to implement depot charging has multiple effects:

- Capital costs will increase to purchase additional buses
- Capital costs will increase to purchase additional depot chargers
- Additional parking space will be required at CMBC depots
- Long daily bus assignments will need to be shortened, to turn buses back to the depot sooner than current practice. This will increase dead-head mileage.

C-2.2 Depot Charging Load & Electricity Cost

Currently, CMBC would be subject to local utility BC Hydro’s Large General Service (LGS) rate for all electricity used to charge electric buses. This rate includes energy charges (dollars per kilowatt-hour, \$/kWh) for all energy used, as well as demand charges (dollars per kilowatt, \$/kW) based on monthly peak demand. BC Hydro has recently proposed to the British Columbia

Utilities Commission (BCUC) several options for special electric vehicle rates designed to incentivize electric vehicle adoption by lowering net electricity costs, especially for charging during “off-peak” periods.

See Table C-3 for a summary of the rate components of BC Hydro’s LGS rate and the three proposed EV rates.

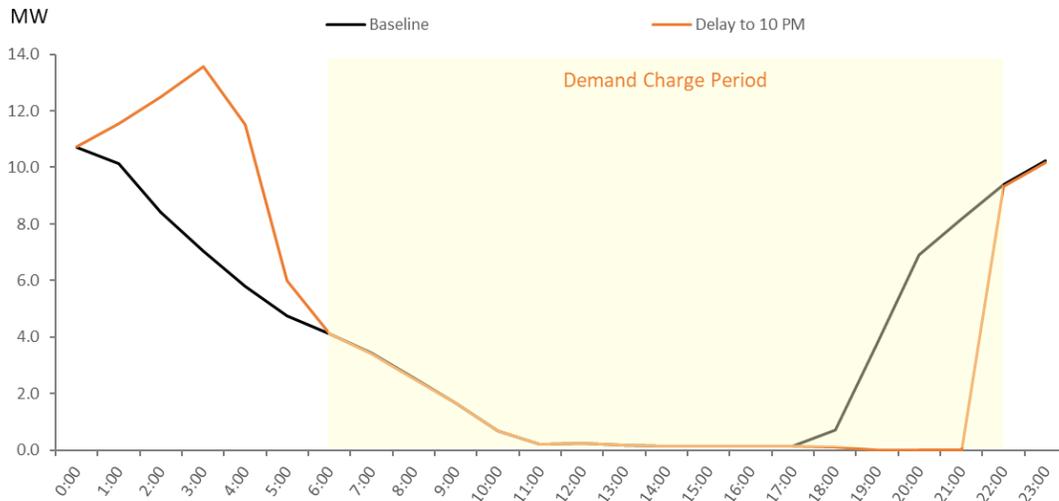
Table C-3 BC Hydro Electricity Rates

RATE	Demand Charge		Energy Charge (\$/kWh)			
	\$/KW	Period	11 PM – 7AM	7 AM – 4 PM	4 PM – 9 PM	9 PM -11 PM
LGS	\$12.34	All-day	\$0.061			
EV1	\$12.34	6AM – 10 PM	\$0.072			
EV2	\$12.34	7AM – 10 PM	\$0.060	\$0.115	\$0.147	\$0.115
EV3 ¹	\$0	NA	\$0.090			
¹ Applies only for the first five years, then will revert to LGS <i>EV rates have been proposed but not yet approved</i>						

BC Hydro’s LGS rate applies the demand charge to the highest demand over any 15-minute period throughout the month, regardless of what time of day this peak happens, and energy charges are also the same regardless of when the energy is used. EV rates 1 and 2 keep the magnitude of demand charges the same as LGS (\$12.34/kW), but they apply only to monthly peak demand during the time period 6 AM to 10 PM, or 7 AM – 10 PM. EV rate 2 additionally charges different energy rates by time of day, with the lowest rate between 11 PM and 7 AM, and the highest rate between 4 PM and 9 PM, which is typically the time of day when over-all regional electricity demand is highest. EV rate 3 has no demand charge, but the energy charge (\$/kWh) is 50 percent higher than under the LGS rate.

See Figure C-7 for the projected weekday charging load at Marpole Transit Centre, assuming an average charge rate of 50 kW per bus. If charging at 50 kW, the average charge time will be between 5 and 7 hours per bus per day; there is enough time over-night to complete charging before buses need to pull out for morning peak service, and mid-day charging will not generally be required.

Figure C-7 Projected Weekday Charging Load for Depot Charging at MTC



The shape of the load curve will be similar for other transit centres, but the magnitude of the load (kW) will vary by location, in proportion to the number of daily peak buses. In Figure C-7 the baseline (black) load curve assumes that each bus will plug in and start to charge about one hour after returning to the transit centre in the afternoon or evening. The orange load curve shows the effect of delaying charge start for all buses to after 10 PM, to coincide with the time period of zero demand charges under BC Hydro’s proposed EV rates. Baseline charging load peaks at about 10.5 megawatts (MW) at about midnight. If charge start is delayed to 10 PM peak charging load is shifted to about 3 AM, and also increases to 13.5 MW.

See Table C-4 for a summary of the projected average electricity cost for depot charging at CMBC transit centres under the different BC Hydro rates, based on the load profiles in Figure C-7. Under the baseline charging scenario electricity is projected to cost an average of approximately \$0.12/kWh under all rates except EV3, where it would be \$0.09/kWh for the first five years and \$0.12/kWh in subsequent years.

If CMBC were to delay the start of depot charging until 10 PM, the average cost of electricity would go up to \$0.13/kWh under the current Large General Services rate but would fall to approximately \$0.09/kWh under all of the proposed EV rates. Note that average electricity costs could be as low as \$0.07/kWh (under rate EV1) if there was no depot charging demand between 6 AM and 10 PM. However, this may not be feasible for CMBC bus operations; charging for a small number of late-returning night buses may need to take place either between 6 AM and 10 AM, or mid-day after morning peak service. The ability to finish charging these late returning buses before 6 AM would be enhanced if TransLink employed charging systems that provide

three charge heads supplied by a single 150 kW inverter, such that in the early morning after most buses had finished charging these late-returning buses could charge at rates up to 150 kW each (see Section B-1).

Table C-4 Projected Depot Charging Electricity Cost

Charging Scenario	Rate			
	LSG	EV1	EV2	EV3
Baseline	\$0.117	\$0.115	\$0.128	\$0.090
Delay to 10 PM	\$0.132	\$0.094	\$0.089	\$0.090

Based on 1.6 kWh/km projected energy use, and an average electricity cost of \$0.09/kWh (EV rates), energy costs for 40-ft depot-charged electric buses operated by CMBC are projected to average \$0.144/km; this compares to average fuel costs of \$0.623/km for CMBC diesel buses and \$0.493/km for CMBC hybrid buses⁵⁷.

C-2.3 Depot Charging Infrastructure Design and Cost

As part of the Low Carbon Fleet Strategy development process AES Engineering developed conceptual designs for implementation of depot charging at two CMBC transit centres, the Burnaby Transit Centre (BTC) and the new Marpole Transit Centre (MTC). These locations were chosen because they were identified as the easiest locations to implement depot charging, due to lower daily mileage accumulation and lower electric bus replacement ratios on the routes which operate from these locations. BTC would represent a retrofit of an existing location, while MTC would represent a new depot designed for electric buses.

For each location AES evaluated four options for charging buses while parked overnight at the transit centre: 1) use of ground-mounted CCS corded chargers, 2) use of overhead-mounted CCS corded chargers, 3) use of overhead-mounted SAE J3105-1 conductive - pantograph chargers, and 4) use of wireless chargers.

For each option the following major assumptions were used:

- Nominal peak charging load of 50 kW or 75 kW per bus
- One charger provided at each bus parking space

⁵⁷ CMBC 40-ft diesel buses average 0.599 l/km and 40-ft hybrid buses average 0.474 l/km. CMBC currently pays a net cost of \$1.04/l for diesel fuel.

-
- At BTC all bus parking is outdoors, uncovered; at MTC bus parking areas would be covered by an employee parking deck, due to site space constraints

The issues explored by AES in their conceptual designs included the lay-out and space claim of charging heads and power modules, required upgrades/expansion of building electrical systems to accommodate the new load, and distribution of power from the utility meter to the charging locations.

See Figures C-8 to C-10 for conceptual views of how each option would look at BTC. For ground-mounted corded chargers (Figure C-8), a new raised curb would need to be installed between every two bus parking lanes to hold the chargers, which would be in the middle of this lane toward the rear of each designated bus parking space.

Buses would need to be equipped with two charge ports - on the rear curb-side and rear street-side of the bus – so that buses on each side of the charge lane could access a charger. Power would be distributed to each charger in underground conduit beneath each charger curb lane.

The new curbs required to hold chargers would reduce existing parking capacity by 20 - 25 percent, depending on charger manufacturer. BTC would be reduced from 129 40-ft parking spaces and 97 60-ft parking spaces to 102 – 111 and 81 – 85 parking spaces, respectively.⁵⁸ At MTC only 280 40-ft equivalent bus parking spaces could be provided at ground level, compared to the planned 300 spaces.

The main advantage of mounting chargers overhead, instead of on the ground, is that they would take up less space, since you would not need a new raised curb between every two parking lanes. However, because bus parking is outdoors, uncovered at BTC (and all of CMBC's current transit centres), over-head mounting of corded chargers would require a gantry structure to be installed across all parking lanes at each parking location (see Figure C-9). At BTC 25 gantries of varying lengths would be required; the chargers would be installed on the gantries. Power would be distributed to each charger in conduits running along each gantry. Under this scenario only one charging port would be required on each bus, but each charger would need to have an appropriate cable management system to ensure cords do not interfere with bus movements after disconnection.

⁵⁸ BTC includes two locations across the street from each other. BTC North has parking for 60-ft buses and BTC South has parking for 40-ft buses.

Figure C-8 Depot Charging with ground-mounted CCS corded chargers



Source: AES Engineering

Figure C-9 Depot Charging with overhead-mounted corded chargers



Source: AES Engineering

The new MTC has not yet been designed, but given the size of the available site, and planned capacity of 300 forty-foot equivalent buses, it has already been determined that employee

parking will need to be located on a parking deck above the bus parking area. Under this scenario, overhead-mounted chargers could be hung from this parking structure, and a separate gantry structure would not be required.

If chargers were mounted overhead at BTC no current bus parking spaces would be lost⁵⁹. At MTC, overhead mounting of chargers would also result in no loss of bus parking space compared to current plans, but the clearance below the employee parking deck would likely need to increase by two meters.

To use SAE J3105-1 conductive chargers for depot charging, instead of corded chargers, a pantograph must be installed overhead at each bus parking space. Under this scenario buses would not need to be plugged in and unplugged to charge - to initiate a charge the pantograph would move down to connect with charge rails installed on the roof or the bus, and then would move up when charging was complete. This is the same method used for in-route charging - see Appendix B.

See Figure C-10 for how this might look at BTC; the pantographs would be installed on overhead gantries, like overhead-mounted corded chargers. The power modules required to convert alternating current grid power to direct current for charging could also be installed on the gantries, or in a lane parallel to the bus parking lanes. At MTC the pantographs would be mounted to the underside of the overhead employee parking structure, and the power modules could either be located on the employee parking level, or on the bus parking level.

Each bus will need to be able to charge at an average rate of 50 kW. However, the system can be set up to have one 150 kW power module feeding three pantograph chargers. Under this scenario a given bus could charge at up to 150 kW, as long as the other two pantographs on the same module were not actively charging.

Overhead pantograph charging may reduce parking capacity at either BTC or MTC by up to 5 percent - to accommodate the space claim of required power modules. The main advantage of SAE J3105-1 pantograph chargers over corded chargers for depot charging is significantly reduced operational complexity, since buses will not need to be plugged in and unplugged each day. In addition, corded chargers are likely to suffer cord damage from bus movements, which will not be an issue with pantograph charging.

⁵⁹ The conceptual design of the gantry structure was optimized to reduce its impact on parking spaces.

Figure C-10 Depot Charging with SAE J3105-1 conductive pantograph chargers



Source: AES Engineering

Table C-5 Projected Cost of Depot Chargers at BTC and MTC

Transit Center	Metric	Corded Ground-mounted	Corded Overhead-mounted	SAE J3105 Overhead Pantograph
BTC	Bus Parking Spaces ¹	197	226	220
	Total Cost (\$)	\$18,124,000	\$38,646,000	\$66,660,000
	\$/charger	\$92,000	\$171,000	\$303,000
MTC	Bus Parking Spaces ¹	280	350 ²	340
	Total Cost (\$)	\$25,760,000	\$36,400,000	\$80,240,000
	\$/charger	\$92,000	\$104,000	\$236,000

¹ Maximum possible at ground level on existing (BTC) or planned (MTC) site

² Clearance below planned employee parking deck will need to be greater if overhead chargers installed

See Table C-5 for a summary of the estimated cost of installing depot charging infrastructure at BTC and MTC⁶⁰. This includes all costs on the customer side of the meter to distribute the necessary power and install a charger at each bus parking space. This estimate includes 10 percent construction contingency but does not include the cost of design, permitting, project management, or financing costs.

As shown in Table C-5, ground-mounted corded chargers are projected to be the least expensive option at both depots, costing just over \$90,000 per charger. Overhead mounting of corded chargers is estimated to add an additional \$79,000 per charger at BTC, but only \$12,000 at MTC; this is because a gantry structure would be required at BTC, but at MTC chargers could be hung from the already planned employee parking deck to be installed over the bus parking area.

Compared to overhead-mounted corded chargers, cordless conductive charging using pantographs is estimated to add \$132,000 per charger at either depot, due to the additional purchase and installation costs of the pantographs⁶¹.

For the other CMBC transit centres the cost of depot chargers is projected to be similar to costs at BTC, because these sites would require a similar design and have similar constraints.

Table C-6 BC Hydro Depot Charging Upgrade Costs

Transit Centre	BC Hydro Upgrade Cost	
	Total	Approx \$/charger
BTC	\$650,000	\$2,600
HTC	\$11,000,000	\$55,000
PTC	\$350,000	\$1,500
RTC	\$4,500,000	\$20,000
STC	\$1,000,000	\$4,500
VTC	\$3,900,000	\$8,700
MTC	\$2,400,000	\$6,900

In addition to the costs shown in Table C-5, installation of depot chargers would require BC Hydro to provide additional electrical services. See Table C-6 for BC Hydro’s estimate of the primary service upgrade cost at each CMBC transit centre. BC Hydro upgrade costs would add less than \$10,000/charger at all transit centres except RTC and HTC. The very high costs at HTC result from insufficient capacity at the closest substation, which would require installation of a new 12-kilometer feeder cable to serve the load from the next closest substation with available capacity.

⁶⁰ These cost estimates were developed by AES Engineering, based on their conceptual charging designs for each site.

⁶¹ Estimated costs for overhead pantograph connectors are based on current commercial offerings. There are reportedly efforts underway to reduce the cost of overhead pantograph connectors for depot-based charging, but there is insufficient information at this time to accurately project how pantograph costs may change in the future.

In addition to the cost of installing the chargers themselves, and upgrading the primary BC Hydro service, implementation of depot charging for a significant number of buses will require CMBC to acquire or build additional depot space, to accommodate both the space claim of the chargers and the need to purchase additional buses to maintain current service levels. As noted above, even overhead-mounted chargers (corded or pantograph) may result in up to 5 percent loss of bus parking spaces at both BTC and MTC. As discussed above, implementation of depot charging at BTC and MTC will also require approximately 15 percent more buses to maintain current service levels due to range restrictions of electric buses; at other depots even more buses would be needed - at least 30 percent more at PTC, RTC, and STC.

Implementation of depot charging with overhead chargers at BTC and MTC would require an additional 100 - 110 40-ft equivalent bus spaces somewhere in the system. Some options for accommodating this need include:

- Demolish an existing maintenance building at BTC North and expand bus parking into this space. This building houses fleet-wide support activities (office, shop, and warehouse space) that could be moved to another site without compromising functionality or increasing operating costs.
- Build a ninth transit center on a new site.

TransLink estimates that the cost of expanding bus parking at BTC North, including relocating existing functions, is in the range of \$50 million. The cost of adding a ninth depot is unknown at this time.

C-3 In-route Charging Analysis

This section summarizes the analysis of cost and operational considerations for CMBC fleet electrification using in-route charging of electric buses. The analysis encompasses the estimated number and location of required in-route chargers (charging network); estimated charging time and effect on daily bus schedules; estimated daily charging load and electricity cost; and infrastructure costs for installing the necessary chargers along CMBC bus routes.

C-3.1 Required Charging Network

MJB&A analyzed the existing CMBC route network and service levels to develop a high-level conceptual design for the in-route charging network required to support fleet electrification using in-route charging. For each route, MJB&A analyzed one-way trip time (minutes), projected one-way trip energy use (kWh), and estimated charging time (minutes) to replenish the energy used, assuming 450 kW in-route chargers. This charging time was then compared to bus headway (minutes between buses) to determine whether charging would be required on only one end

of the route (one charge per round-trip), or on both ends of the route (one charge per one-way trip), and how many chargers would be required on the route in order to keep charging time less than bus headway and make sure that all buses could charge on every trip.

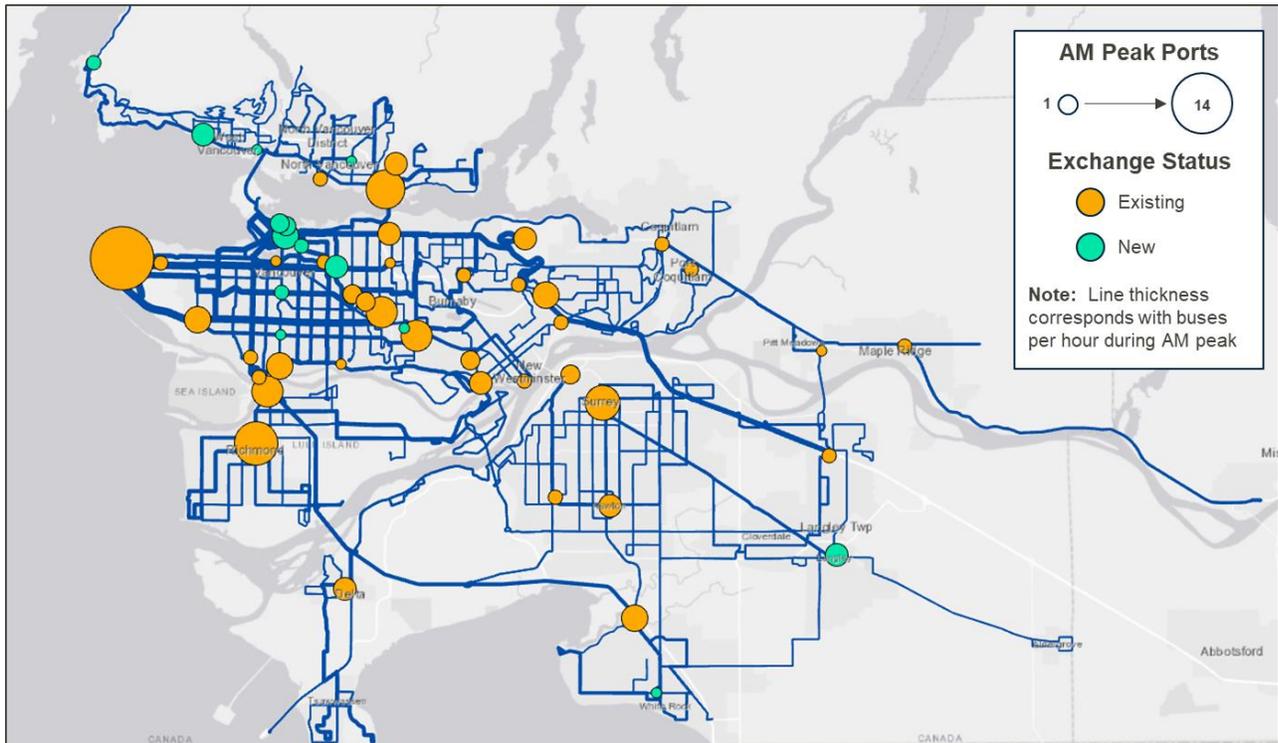
Next, MJB&A identified potential locations to locate in-route chargers. Considerations when identifying potential charging locations included:

- Minimize the total number of charging locations while also attempting to keep the number of chargers at any one location less than five
- Prioritize charging locations at route termini; only allow mid-route charging when no reasonable alternative exists
- Try to keep charging time at any charger less than six minutes; only allow longer charging time if it allows only one charge location on the route or allows travel all the way to the route terminus, and charge time is still less than route headway
- If possible, locate chargers at existing off-street bus exchanges. For necessary charging locations not at existing bus exchanges, locate at TransLink owned/controlled property if possible (i.e. SkyTrain Stations)

The existing off-street bus exchanges are generally located at route termini where several routes come together so that passengers can easily change between routes. The exchanges include marked bus bays where passengers load/unload and other bus parking spots for buses to lay-over between runs. Not every CMBC route has an off-street exchange. On some CMBC routes buses lay-over at designated locations on the street at the curb. Because the exchanges are already bus lay-over locations, and are located at route termini, they are ideal locations for in-route chargers.

See Figure C-10 for the resulting conceptual in-route charging network which would be required to serve all CMBC routes if every 40-ft and 60-ft bus (including current trolleys) was battery electric and all used in-route charging. This network is based on projected service levels in 2025, after the opening of the new Marpole Transit Center. This full network would require a total of 178 chargers at 53 different locations; this equates to one charger for approximately every seven peak buses (or one for every 8 total buses). Of the 53 locations identified as requiring chargers, 39 are existing off-street bus exchanges, and 14 are new locations. These new locations where chargers would be required are generally located at route termini.

Figure C-10 Conceptual In-route Charging Network for CMBC Service Area – Full System



Of the potential charging locations shown in Figure C-10, twenty-six (49 percent) will require either one or two chargers, 20 locations (38 percent) will require 3 – 5 chargers each, and seven locations will require more than five chargers. The largest potential charging location is UBC Loop (the largest circle in Figure C-10, on the extreme left of the figure), which will require as many as 14 chargers. UBC Loop is a very large existing off-street bus exchange which serves ten different bus routes. Most of the routes served by UBC Loop also require charging at both route termini which means that the only way to reduce the required number of chargers there is to either use depot charging for some of these routes, or to do mid-route charging on these routes.

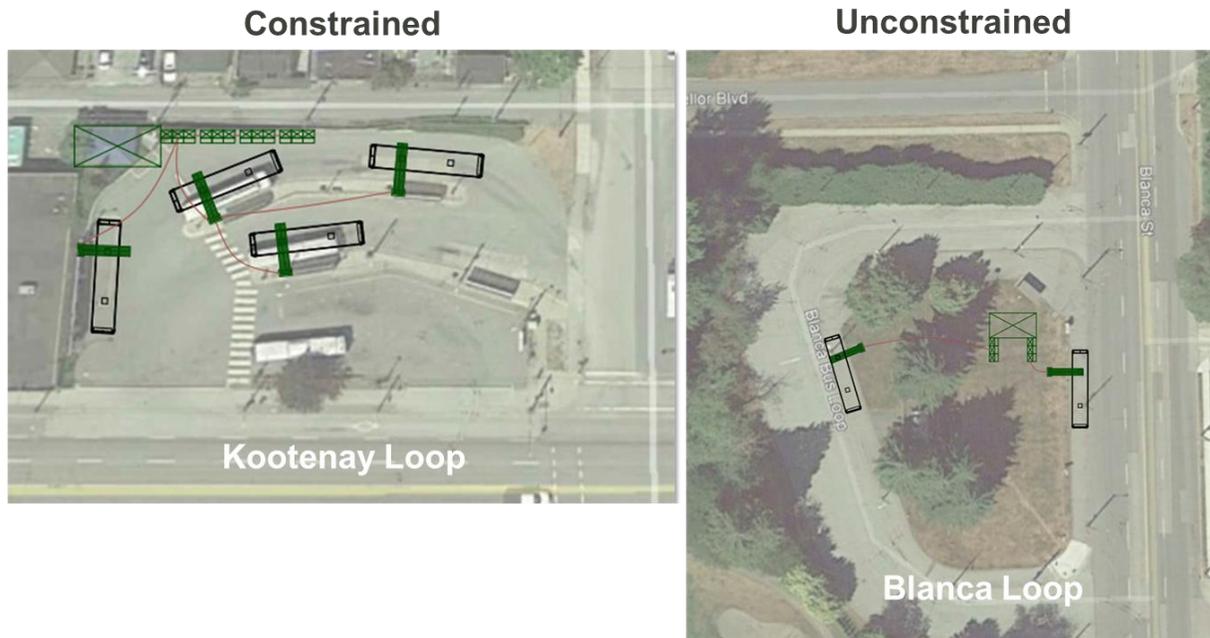
Note that the network designs shown in Figures C-10 is conceptual only and is intended to evaluate high-level feasibility and cost. Some of the specific charging locations identified may need to change due to site constraints. The local utility, BC Hydro, reviewed their power distribution system in the vicinity of all the potential charging sites shown in Figure C-10, to identify any power constraints; their review identified only three locations at which there was insufficient capacity to supply the estimated number of chargers required, at reasonable cost.

AES Engineering also did a high-level review of all these locations to evaluate available space for charging infrastructure and bus queuing, and ease of power access. Their review indicates that

at about 35 percent of the sites installation of chargers would be relatively easy— there is enough space to install the necessary equipment and doing so will require no changes to existing pavements, curbs, or structures on the site. The remaining sites have some constraints that would make installation of the necessary chargers more difficult and costly. See Figure C-11 for an example of a constrained and unconstrained site.

Kootenay Loop is shown on the left in Figure C-11; this site could require up to four chargers, but there is insufficient space to do so. Installing four chargers at this location would require major changes to the existing site layout and/or acquisition of additional land. Blanca Loop is shown in the right of Figure C-11; this site would require up to two chargers and has enough space to do so without any changes to the existing site layout. See below for a discussion of how site constraints affect the cost of in-route charger installation.

Figure C-11 Examples of Constrained and Unconstrained In-route Charging Locations

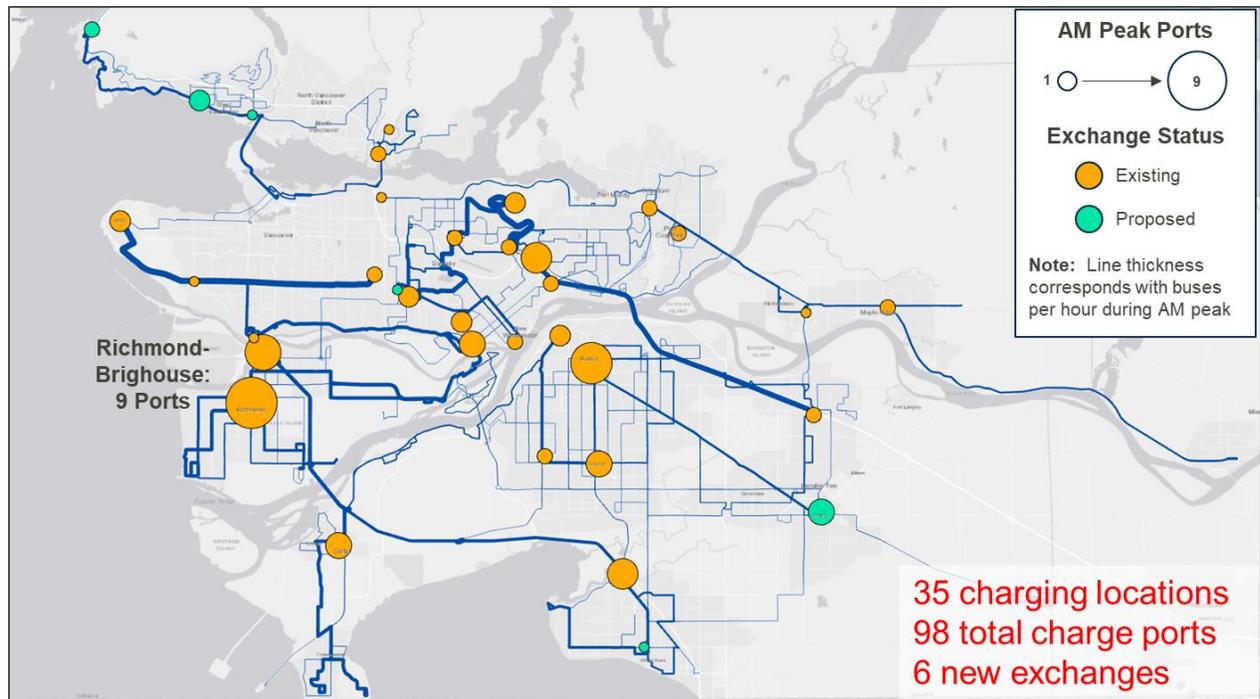


Also note that the conceptual charging network shown in Figure C-10 is for a full roll-out of in-route charging for all 40-ft and 60-ft buses operated by CMBC, including on routes that are currently trolley routes. If trolley routes continue as they are (no in-route charging required) the remaining 40-ft and 60-ft bus routes would require only 47 in-route charging locations with a total of 155 chargers. As discussed above the CMBC transit centres at which it would be easiest to implement depot charging are VTC (which is mostly trolleys), MTC, and BTC. If all three of these transit centres implemented depot charging, the in-route charge network required for the

routes which operate from the remaining CMBC transit centres would include 98 chargers at 35 different locations, only six of which are new exchanges; see figure C-12.

Of these 35 potential charging locations only nine (26 percent) have space or power constraints that would make it more difficult and costly to install chargers. In addition, this network would require no chargers in downtown Vancouver, where space for bus lay-overs and charging is difficult and costly to develop. This reduced network also has fewer locations that would require a large number of chargers. In particular, the number of chargers at UBC Loop is reduced from 14 to three, the number at Phibbs Exchange is reduced from eight to two, the number at Joyce Station is reduced from six to two, and the number at Dunbar Loop is reduced from five to one. In this reduced network the location with potentially the largest number of required in-route chargers is Richmond-Brighouse station with nine in-route chargers.

Figure C-12 Conceptual In-route Charging Network for PTC, HTC, RTC and STC Service Areas



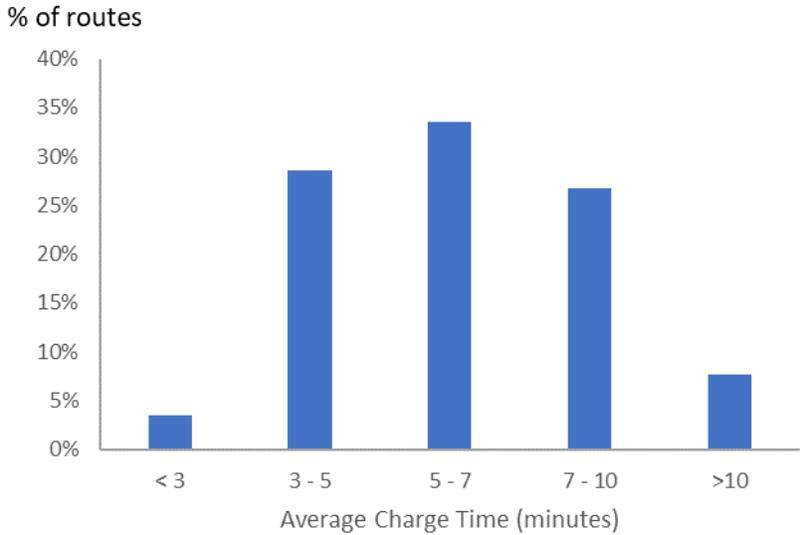
C-3.2 In-route Charging Time

See Figure C-13 for the distribution of in-route charge times that results from the conceptual in-route charge network shown in Figure C-10. This is the average charge time per charge event, to

replenish the energy used since the last charge event, including one minute per event for bus movement in and out of charging position.

As shown, two thirds of routes will have charge times of less than 10 minutes per event; the weighted average charge time is 6 minutes per event across all routes. The routes with longer charge times are routes that have long headways; on all routes projected charge time is less than headway. The weighted average charge time across all routes is also 6 minutes per in-service hour; on average every bus will charge once per hour in service. CMBC buses average 11.4 to 17.3 hours per day in service, depending on bus type and transit centre; the weighted average in-service time for all 40-ft and 60-ft buses is 12.6 hours per day⁶². Total charge time for in-route charging will therefore average 1.26 hours per day per bus.

Figure C-13 Distribution of In-route Charge Times on CMBC Routes



Current CMBC bus schedules include lay-over time that averages approximately 9 minutes per hour. On average this is enough to cover the time required for in-route charging. However, in addition to providing a break for bus operators this lay-over time also serves as “recovery time” to keep buses on schedule throughout the day – i.e. if a bus is running late the normally scheduled lay-over time will be cut short, and the bus will leave on-time for the next run after dwelling at the exchange for a shorter period.

⁶² This does not include highway coaches, which are in-service for a shorter time per day. Individual buses can be in service for a shorter or longer time on any given day.

As discussed above, in-route charging will happen during bus lay-overs – at bus exchanges or other lay-over locations. However, bus charging is a scheduled activity that must happen, even if a bus is running late on the route. As such, if existing lay-over time in bus schedules is used for charging it will not be able to function as recovery time.

An analysis of actual versus scheduled lay-over time over the last year shows that actual lay-over time was greater than 6 minutes per hour on 71 percent of all blocks operated⁶³, varying from 65 percent to 86 percent at different transit centres. Based on this data, existing lay-over time in current schedules should be able to cover at least 50 percent of required in-route charging time, without affecting on-time performance. A conservative estimate of the additional lay-over time that must be added to CMBC schedules to accommodate in-route charging is therefore 3 minutes per in-service hour. This additional time could be added during non-peak periods, so that the effect on the required number of peak buses would be minimal.

This analysis assumes that 450 kW in-route chargers will be used. MJB&A also evaluated the effect of using lower power chargers (300 kW). Lower power chargers will cost less to install, but daily charge time per bus will increase, and the amount of additional lay-over time required will also increase. Given that bus operators must be paid during lay-over time, the incremental cost of increased charging time would outweigh any savings on charger installation. Our analysis indicates that higher-power in-route charging is therefore less costly than charging at a lower rate.

C-3.3 In-route Charging Electricity Cost

MJB&A evaluated the average monthly demand (peak kW) and throughput (kWh) at CMBC in-route chargers and calculated projected monthly energy costs for in-route charging using the current BC Hydro Large General Service rate and the three EV rates recently proposed by BC Hydro (see section C-2.2 for a description of these rates).

For full implementation of in-route charging on a given route, average electricity costs under the current LGS rate are projected to be \$0.116/kWh. This is slightly lower than projected average costs for depot charging under the LGS rate (\$0.117/kWh) due to lower peak demand per bus⁶⁴. For small pilot programs and during the transition to electric buses on a given route, the average electricity cost of in-route charging will be higher because monthly demand at each charger will be the same, but monthly through-put at each charger will be lower. If only one of every three

⁶³ A block is an assigned piece of work for a specific bus, from the time it leaves the transit center until it returns.

⁶⁴ Peak demand per bus is lower for in-route charging than for depot charging because it is spread out over a longer period of time - the 12+ hours that a bus is in service, rather than the 6 – 8 hours that the bus is parked at the depot at night.

buses on a route was electric, the average cost of electricity for in-route charging could as high as \$0.22/kWh.

Under two of the proposed EV rates, average electricity cost for in-route charging will be higher than under the current LGS rate; \$0.127/kWh under proposed EV rate 1 and \$0.176/kWh under proposed EV rate 2. These proposed rates are designed to provide discounts for charging during off-peak periods (10 PM – 7AM), but most in-route charging is during the peak period (7AM – 10 PM) when buses are in service, so these rates are not advantageous for in-route charging. Only proposed EV rate 3 – which charges a flat rate of \$0.09/kWh and no demand charge – will be advantageous for in-route charging, particularly during the early years of transition when installed in-route chargers may not be fully utilized.

C-3.4 In-route Charging Infrastructure Cost

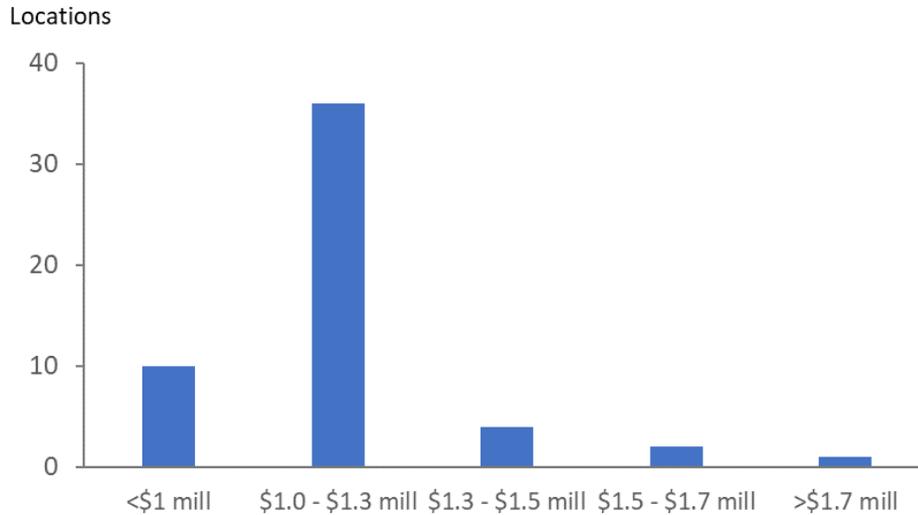
As part of the Low Carbon Fleet Strategy development process AES Engineering developed conceptual designs for implementation of in-route charging within the CMBC service area. This included a high-level review of all the potential in-route charging locations shown in Figure 18 to evaluate available space for charging infrastructure and bus queuing, and ease of power access (see Figure 19). The AES review indicates that only 27 percent of sites have significant challenges that would make charger installation difficult and costly. At most other sites there is enough space to install the necessary equipment and doing so will require few or no changes to existing pavements, curbs, or structures on the site.

AES estimates that the cost of in-route charger installation will range from \$900,000 to \$1.2 million per charger, depending on the extent of site modifications required. Approximately 40 percent of potential charger sites are judged to be at the low end of this cost range, 40 percent are judged to be in the middle of the range, and 20 percent are at the high end of the range. The weighted average cost for all sites is estimated to be \$1.0 million per charger. This estimated cost includes purchase and installation of the power module and the pole-mounted pantograph, and all work on the customer side of the utility meter to distribute alternating current grid power to the power module and to distribute direct current from the power module to the pantograph charger. It also includes changes to roadway pavements, curbs, etc. to accommodate the installation, and 10 percent construction contingency. It does not include the cost of design, permitting, project management, or financing costs.

As with depot charging, installation of in-route chargers will require BC Hydro to upgrade the local power distribution system to provide the necessary power at each site. BC Hydro reviewed all of the potential charger sites in Figure C-10 to determine the cost of necessary upgrades. BC Hydro estimates that necessary upgrades to primary distribution will cost less than \$50,000/charger at 25 percent of the sites, and less than \$150,000/charger at 75 percent of the

sites. A handful of locations will cost more – up to \$800,000/charger at one location⁶⁵. The weighted average upgrade cost for all potential charging sites is estimated to be \$125,000/charger.

Figure C-14 Distribution of Projected Total In-route Charger Costs



See Figure C-14 for the distribution of projected total costs for in-route chargers in the CMBC service area, including both TransLink and BC Hydro costs. The cost at 85 percent of sites is projected to be less than \$1.3 million/charger, and the weighted average for all sites is projected to be \$1.1 million/charger⁶⁶.

⁶⁵ It is likely that this charging location could be moved to a location with lower upgrade costs.

⁶⁶ Not including the cost of design, permitting, project management, or financing costs.

Life-Cycle Cost Analysis

This section summarizes a life cycle cost analysis, which compares the cost of operating battery electric buses to the cost of operating current diesel, CNG, and hybrid-electric buses. Diesel, CNG, and hybrid bus costs are based on analysis of actual CMBC operating costs for the current fleet. Electric bus costs are based on the analysis described in section 4 and are specific to CMBC service. For all buses the life-cycle costs included in the analysis are:

- Bus purchase cost, including additional buses required due to range restrictions (depot charging) and in-route charge time (in-route charging)
- Purchase and installation cost of charging infrastructure (electric buses)
- Cost of depot expansion to accommodate depot-charged electric buses (additional buses, and additional space for chargers)
- 17 years of maintenance costs, including battery replacement at mid-life (for electric buses)
- 17 years of fuel costs
- 17 years of bus operator labor costs, including additional labor costs for electric buses due to increased lay-over time (in-route charging) or increased dead-head time (depot charging)
- 17 years of maintenance costs for bus chargers (electric buses)

The analysis uses estimates of general and fuel inflation over the 17-year life of buses consistent with assumptions used in TransLink financial plans.

Values are presented in both constant 2019 dollars and nominal dollars.

The major assumptions used in the cost analysis are shown in Table D-1.

Table D-1 Major 40-ft Bus Life-Cycle Cost Assumptions (2019\$)

METRIC	DIESEL	HYBRID	Electric – Depot Charge	Electric - In Route Charge
Bus Cost	MY2020 \$630,000 MY2040 \$630,000	MY2020 \$890,000 MY2040 \$890,000	MY2020 \$1,110,000 MY2040 \$960,000	MY2020 \$945,000 MY2040 \$840,000
Battery Size	NA	MY2020 30 kWh MY2040 30 kWh	MY2020 450 kWh MY2040 550 kWh	MY2020 150 kWh MY2040 150 kWh
Replacement Ratio	1.00	1.00	MY2020 1.15 MY2040 1.05	1.00
Charger Cost ⁶⁷	NA	NA	\$298,000/charger (50 kW panto)	\$2.0 mill/charger (450 kW panto)
Chargers Required	NA	NA	1 per bus	1 per 8 buses
Fuel Cost	\$1.04/liter	\$1.04/liter	\$0.09/kWh	\$0.10/kWh
Fuel Use	0.60 l/km	0.47 l/km	1.4 kWh/km 0.02 l/km (fuel heat)	1.6 kWh/km
Maintenance Cost	\$0.80/km	\$0.80/km	MY2020 \$0.80/km MY2040 \$0.70/km	MY2020 \$0.80/km MY2040 \$0.70/km
Annual Mileage	68,000 km	68,000 km	68,000 km	68,000 km

D-1 Current Generation Buses (MY2020)

See Figure D-1 for a comparison of projected life-cycle costs (average \$/mile) of model year 2019 40-ft diesel, hybrid, CNG and battery electric buses, operated in CMBC service.

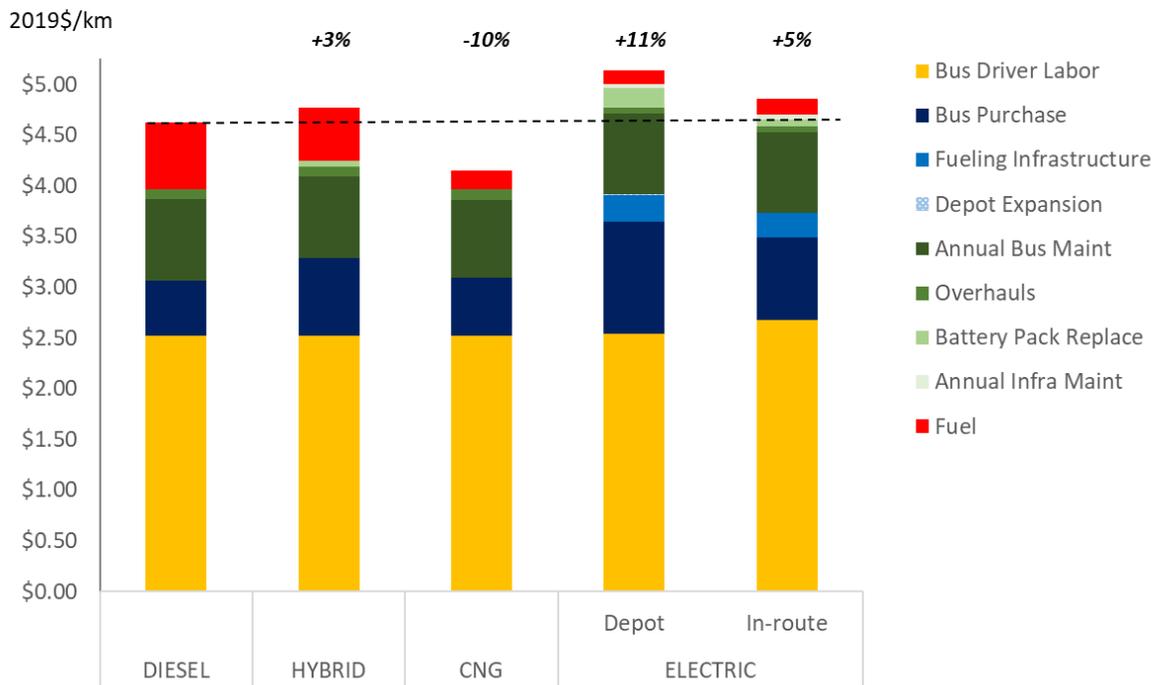
CMBC 40-ft diesel buses are projected to cost \$4.62/km to operate over their life-time, hybrid buses are projected to cost \$4.77/km, CNG buses are projected to cost \$4.15/km, and battery buses are projected to cost between \$4.86/km (in-route charging) and \$5.14/km (depot charging). Over their life-time current battery buses are projected to cost 5 – 11 percent more to operate than diesel buses.

For all bus types the largest expense is bus operator labor. For diesel buses the second largest expense is maintenance, followed by fuel, then bus purchase cost. Hybrid buses are similar,

⁶⁷ These charger costs are fully burdened, including 10 percent construction contingency and costs for design, permitting, project management, and financing costs. In-route charger costs also include the cost of installing a small number of maintenance chargers at the depot.

except that bus purchase is a bigger expense than fuel. For electric buses the second largest expense is bus purchase cost, which is significantly higher than for diesel buses, especially if the electric buses are depot charged. Electric buses also have increased costs relative to diesel for purchase and maintenance of the charging infrastructure and for mid-life battery replacement. However, electric buses have significantly lower fuel costs than diesel or hybrid buses.

Figure D-1 Projected Life Cycle Costs of 40-ft MY2019 Buses in CMBC Service



These cost relationships are shown more clearly in Figure D-2, which plots the difference in cost between diesel buses and electric buses. As shown in Figure 24, compared to diesel buses the purchase cost of current electric buses will add \$0.27 - \$0.56/km over their life, the cost of installing charging infrastructure will add \$0.24 - \$0.27/km, battery pack replacement will add \$0.07 - \$0.20/km, charger maintenance will add \$0.03 - \$0.05/km and bus operator labor costs will be \$0.02 - \$0.16/km higher. This will be balanced by a fuel cost savings of \$0.49 - \$0.51/km. Net costs will be \$0.43 - \$0.52/km higher for electric buses.

Figure D-2 Incremental Cost of MY2019 Electric Buses versus Diesel Buses (2019 \$/km)



It is clear from Figures D-1 and D-2 that with current buses and charging infrastructure in-route charging is projected to be less expensive than depot charging for CMBC. Higher bus operator labor, charger maintenance, and fuel costs are more than offset by a significant savings in bus purchase, battery replacement, and charging infrastructure costs. This is primarily because depot charging requires significantly more buses (due to range restrictions) but also because the larger battery required for depot charging increases bus purchase and battery replacement costs per bus. Charging infrastructure costs are higher for depot charging than for in-route charging because the above analysis assumes SAE J3105 overhead pantograph charging at the depot, to eliminate the complications and cost of plugging and unplugging buses every day. If the analysis assumed the use of SAE J1772 corded chargers for depot charging, infrastructure costs would be significantly lower, but there would be additional operating costs for plugging and unplugging buses and for replacement of damaged charge cords.

D-2 Future Buses

The most significant reason why electric buses are projected to be more expensive to operate than diesel buses are the high cost of bus purchase and, for depot charging, the required increase in fleet size due to limits on battery size and resulting range limitations. Battery buses are more expensive to purchase than diesel buses due to high costs for both batteries and electric drive trains.

In the past 5 years the cost of bus batteries (\$/kWh) has fallen by more than 40%, and most analysts predict that they will continue to fall – by 50 percent or more by 2035. Industry participants also project that the costs of electric drive trains will fall by as much as 50 percent over time as the technology matures and production volumes increase.

Analysts also predict that battery energy density will continue to increase, allowing for larger batteries and increased range, which will reduce the number of buses required for depot charging.

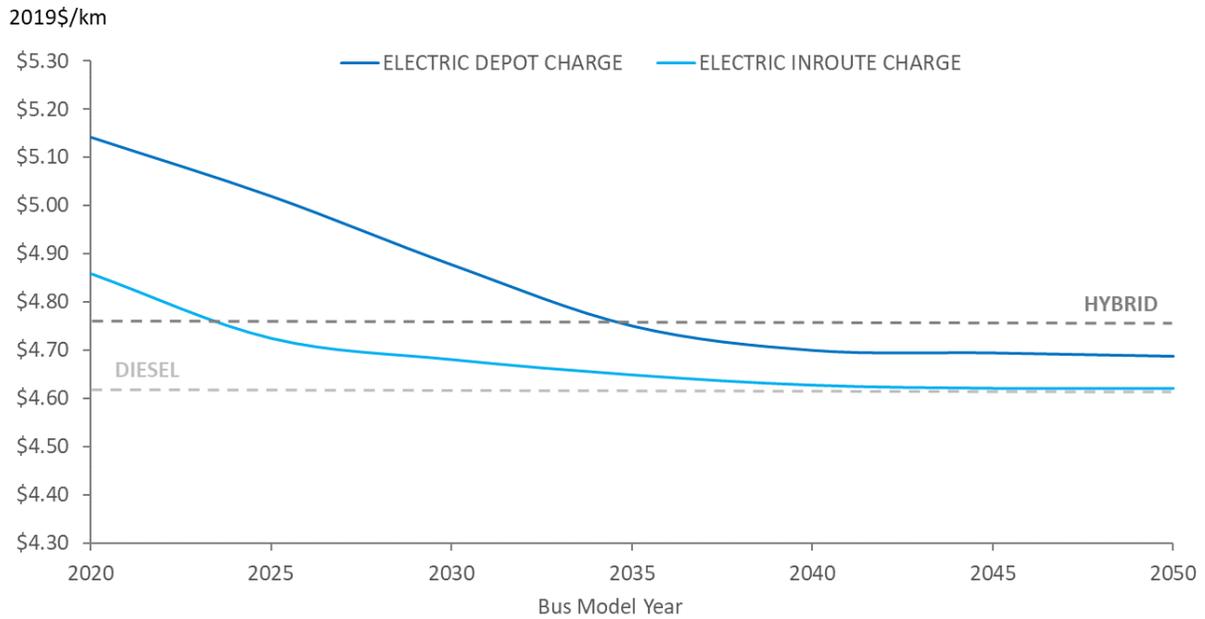
There are also opportunities for improved drive train and heating system efficiency, which will reduce energy use and fuel costs. Most analysts also project that over the next 20 years the price of diesel fuel will increase faster than the price of electricity, which will improve electric bus economics relative to diesel and hybrid buses.

Finally, there is reason to believe that electric bus maintenance cost will fall over time as the technology matures – this has been the experience with previous new technology introductions into transit (CNG, hybrid-electric).

See Figure D-3 for MJB&A’s projection of CMBC bus life-cycle costs (2109 \$/mi) for electric buses purchased between model years 2020 and 2050, compared to the current cost of diesel and hybrid buses. Life-cycle costs for electric buses that use in-route charging are projected to fall below the cost of hybrid buses after model year 2025, and to reach cost parity with diesel buses after about 2045.

Life-cycle costs of depot-charged electric buses are projected to fall below the cost of hybrid buses after model year 2035 but are still projected to be slightly higher than diesel bus costs through model year 2050.

Figure D-3 Projected Life Cycle Cost for Model Year 2020 – 2050 Buses



TO: Mayors' Council on Regional Transportation

FROM: Kevin Desmond, CEO
Sarah Buckle, TransLink Director Enterprise Risk and Sustainability

DATE: February 20, 2020

SUBJECT: **ITEM 4.1 – Update on Low Carbon Fleet Strategy**

RECOMMENDATION:

Management recommends that the Mayors' Council on Regional Transportation:

1. Re-commit to its earlier direction to pursue the "Aggressive" approach in order to meet TransLink's greenhouse gas emissions targets and support Metro Vancouver's 2030 climate goals; and,
 2. Continue to advocate for \$447 million in Federal and Provincial funding over the first ten years of the LCFS to support the "Aggressive" approach;
 3. Receive this report.
-

PURPOSE:

The purpose of this report outlines key findings from Phase 2 of the Low Carbon Fleet Strategy. This information was presented to the Joint New Mobility Committee on November 15, 2019 and February 19, 2020. In addition, a deep dive into the Phase 2 LCFS report¹ and findings was held with TransLink's Board of Directors on January 22, 2020. The Board has endorsed the work completed by TransLink staff.

The LCFS analysis to date supports a move to electrification of the bus fleet in coming years. There are upfront capital cost investments that will be required to facilitate this move, currently estimated at about \$450 million over the next 10 years. This is an unfunded initiative. We are seeking direction from the Mayors' Council in January to inform the development of the Phase Two Update Plan scheduled for approval in Spring 2020 and the Phase Three Plan scheduled for Spring, 2021.

BACKGROUND:

Transportation accounts for over 35 per cent of all greenhouse gas (GHG) emissions in Metro Vancouver. TransLink plays a particularly important role in reducing emissions in the region by expanding and improving products and services to grow transit ridership, ease traffic congestion, and reduce single-occupancy vehicle kilometers traveled (VKT); by promoting compact, active, pedestrian- and transit-oriented communities; and by supporting non-motorized travel.

As one of the region's largest consumers of diesel fuel and operator of a fleet of heavy-duty vehicles, TransLink also plays an important role in reducing emissions in our own operations.

¹ Low Carbon Fleet Transition Plan, dated February 24, 2020. The final LCFS Report was peer reviewed by industry experts coordinated by C40 Cities.

Policy Commitments

Phase One of the 10-Year Vision of the 2017-2026 Investment Plan committed TransLink to manage the system to be more efficient and customer-focused. Within this commitment, TransLink committed to developing a Low Carbon Fleet Strategy with the goal of reducing fleet emissions across the region of Metro Vancouver.

Through their Climate 2050 Plan, Metro Vancouver has made the commitment to be carbon neutral by 2050 and reduce GHG emissions by 45% by 2030 from 2010 levels.

The Province of BC has committed to an 80% reduction for all provincial GHG emissions and the federal government has committed to reducing their corporate GHG emissions by 80%. The CleanBC strategy outlines specific actions to meet BC's 2030 GHG reduction goals by shifting away from fossil fuels and towards clean and renewable energy. The current plan outlines action that will achieve 75 per cent of its GHG reduction goals, and the remaining 25 per cent is to be determined. One of the sectors identified as a strong potential in making up the 25 per cent is cleaner public transportation. TransLink can help the Province meet its goals.

DISCUSSION:

The Phase One Investment Plan, which started implementation of the Mayors' 10-Year Vision, was approved in 2017. The Plan contained a commitment to develop a Low Carbon Fleet Strategy (LCFS) to reduce carbon fleet emissions.

In October of 2018, the Mayors' Council and TransLink Board of Directors approved environmental sustainability targets to reduce greenhouse gas emission by 80% by 2050 and to utilize 100% renewable energy in all operations by 2050. Meeting TransLink's GHG reduction goals requires the implementation of cleaner, low carbon technologies, progressive policies and clean energy investments.

The Phase 2 LCFS report provided in Attachment B provides a strategy for the transition to an electric bus fleet aligning with our internal GHG targets and the provincial/regional climate goals. The report outlines a high-level transition plan for our bus fleet² including financial analysis and GHG reductions over the 30-year period. The report details three approaches for electrification over the next decade: Cautious, Progressive and Aggressive. Each approach varies in short-term and total GHG reductions, technology and cost risks, and required capital investments. Note that these approaches fall on a continuum and are not mutually exclusive.

The LCFS has been in development over the past two years and the scope of work included identifying low carbon fleet technologies that are currently available to meet our GHG reductions. The primary recommendation was that TransLink pursue a long-term strategy to electrify the 40-ft and 60-ft transit bus fleet using battery-electric buses. As part of the work, electric bus charging strategies were developed and assessed, and associated fleet and infrastructure costs were analyzed.

The Phase 2 LCFS analysis included a review of each depot to determine suitability for depot charging and/or on-route charging. Each depot was assessed using a variety of factors, including:

² The LCFS analyzed only replacement buses and does not include expansion buses to be included in the Phase 3 Investment Plan.

- Bus route energy demand (a lower energy demand is better suited to depot charged buses)
- Siting of on-route chargers (areas such as downtown Vancouver are not well suited to on-route charging, and therefore it is recommended that these routes be serviced by depot charged buses)
- Cost of BC Hydro upgrades to depots for depot charging (the costs varied from depot to depot, for example the cost to upgrade power for Port Coquitlam Transit Centre was estimated to be \$350,000 and the upgrade for Hamilton Transit Centre was estimated to be \$11M).

It was determined that some of the depots were better suited to depot charging, such as Marpole Transit Centre and Burnaby Transit Centre. The two depots better suited to on-route charging were Port Coquitlam Transit Centre and Surrey Transit Centre. The cost to upgrade power to Hamilton Transit Centre prohibits depot charging; however, it could be considered if these costs were reduced or subsidized. The energy demand from Richmond Transit Centre³ and the relatively high cost to upgrade the power (\$4.5M) doesn't clearly point to on-route charging or depot charging. The LCFS recommended that Richmond Transit Centre be re-evaluated as technology advances.

A subsequent recommendation from the LCFS analysis is that TransLink continue to monitor the use of renewable fuels for market readiness as a step to decarbonize TransLink's compressed natural gas and diesel-hybrid fleet (primarily highway coaches). Currently renewable natural gas is available locally but in limited quantities. TransLink has a five-year contract with FortisBC to procure renewable natural gas up to 500,000 gigajoules which would come close to TransLink's full demand in year five. Renewable diesel is available to fuel suppliers in B.C. for blending with petroleum diesel; however, the 10-year outlook on supply of 100 per cent renewable diesel is unknown.

LCFS Funding Opportunities and Challenges

Transitioning to a low carbon fleet will require support from our municipal partners, the province and the federal government. Some of the key federal and provincial actions include policies that increase the supply of zero emissions vehicles and that increase the availability of renewable fuels.

There is currently no authorized funding for this program, other than the Pilot project and 15 additional buses. Potential funding sources include the Green Infrastructure Fund, Clean BC funding, Carbon credits, Canada Infrastructure Bank, the new Federal program (mandate to electrify 5,000 buses) and other finance and leasing mechanisms.

SUMMARY:

Over the next decade, TransLink can transition over 50 per cent of our conventional bus fleet (this figure does not include our trolley fleet which is already zero emission) to clean, zero-emission electric buses. We believe this is an approach that best begins to move us fast, takes full advantage of MTC even as technology is expected to advance in the next several years. If this opportunity is missed and internal combustion engines are procured, realizing any meaningful GHG reductions over the next two decades will be a challenge.

³ The current fleet size at RTC is 197 buses. These buses have the highest average kilometers per bus per day in the system which make them better suited to on-route charging (>35 charges would be required). These buses also have lower service hours per day (~11 hrs) and return to the depot mid-day which make them better suited to depot charging.

Currently, the main opportunities are:

- To replace up to 635 diesel/diesel-hybrid buses with battery-electric buses in next decade;
- With Marpole Transit Centre opening at the end of 2023, there is an opportunity to build BC's first, and Canada's second fully electric capable depot; and
- Meet TransLink's internal GHG reduction target and supporting provincial/Metro Vancouver 2030 climate goals.

NEXT STEPS:

TransLink will continue to explore and obtain funding commitments from the province and federal government to inform the next Investment Plan and the path for fleet electrification.

In addition, TransLink will finalize the scope of work and begin work on Phase 3 of the LCFS, which will be the last phase of work. The intent of this phase will be to detail the operational impacts and changes needed to make the transition to electrification successful. Throughout the process, benchmarking the battery-bus/charging industry will continue to ensure the costs and benefits assumptions used in Phase 2 remain relevant.

ATTACHMENTS:

- **Attachment A:** TransLink's Low Carbon Fleet Strategy - PowerPoint Presentation
- **Attachment B:** Low Carbon Fleet Transition Final Report (dated February 24, 2020)

TO: TransLink Board of Directors

FROM: Gigi Chen-Kuo, General Counsel and Executive Vice President, Corporate Services
Derek Stewart, Director, Safety, Environment & Emergency Management

DATE: March 19, 2020

SUBJECT: TransLink Enterprise Safety Commitment

PROPOSED RESOLUTION

That the TransLink Board of Directors approves the TransLink Enterprise Safety Commitment, attached to this report as Attachment 1.

Background

Over the past year, TransLink and its Operating Companies have jointly developed a safety framework that takes into consideration our unique and varied work environments and developed guiding principles and key actions to improve safety performance and culture within the organization and with our stakeholders. In previous Safety Updates, the Board was provided the Safety Framework (Mar 2019) and the draft Safety Commitment (Nov 2019).

Safety Commitment Verification and Adoption

Since the last Safety Update, we compiled and reviewed feedback from our exempt Managers and Supervisors and verified that the drafted Safety Commitment guiding principles and actions are representative of the direction and aspirations of our employees. The commitment language was refined in collaboration with safety subject matter experts, senior leaders, and communications professionals. The Safety Commitment was approved by Senior Executive on January 13, 2020 and is provided below.

Next Steps

To deliver on the Safety Commitment, there are several actions planned or in progress including, and further detailed in Attachment 2:

- Establishing the tools and mechanisms to enable us to meet our commitments including developing a formal safety review process for major capital projects.
- Implementing Health & Safety software in 2020-2021.
- Developing a new Safety Policy for TransLink Corporate and aligning existing subsidiary policies, based on the Safety Commitment.
- With respect to contractors:
 - ensuring TransLink Corporate and subsidiary policies specifically address contractor safety
 - Using contractual provisions to influence the safety of contractors and worksites
- Embedding the Safety Commitment into business plans for 2021 and beyond.
- Communicating the Safety Commitment to Employees and stakeholders.
- Tracking projects enabled by the adoption of the Safety Commitment

ATTACHMENTS

Attachment 1: TransLink Enterprise Safety Commitment

Attachment 2: Preliminary Safety Commitment Action Plan

TransLink Safety Commitment

TransLink operates on a foundation that includes *Safety, Sustainability and Resiliency*. These pillars are fundamental to everything we do.

To demonstrate our dedication to safety, we have developed the TransLink Safety Commitment.

Our Safety Commitment applies to all employees of TransLink, its subsidiaries, and service contractors. It includes safety-related policies and practices for our customers, employees, vehicles and infrastructure.

SETTING GOALS

Our Safety Commitment includes three guiding principles:

- **Eliminate injuries** to both our customers and employees
- **Empower employees** and hold them accountable to work safely
- **Influence others** to improve safety for people across Metro Vancouver

THE PATH FORWARD

Establishing our Safety Commitment is the first step in a journey.

As we embark on this journey, we will take the following steps to achieve our safety goals.

To **eliminate injuries**, we will:

- Set ambitious safety objectives and annual targets that are industry-leading
- Use data and identify root causes of injuries to proactively reduce safety risks
- Prioritize safety, security and resiliency when building infrastructure or expanding our fleet

To **empower employees**, we will:

- Increase training opportunities for staff across the enterprise
- Introduce accountability measures to ensure safe transit operations
- Cultivate strong partnerships with our employees and unions in the pursuit of safety

To **influence others**, we will:

- Work with the communities we serve to improve safety
- Conduct customer safety campaigns to promote hazard awareness
- Establish industry-leading benchmarks and influence new safety technology

Read our full Safety Commitment and learn more at translink.ca/safety.

PRELIMINARY SAFETY COMMITMENT ACTION PLAN

The following is a list of initiatives drafted to implement the Safety Commitment.

Eliminate injuries

Level of Completion
0% 100%

Short Term Initiatives

- Continue with employee safety campaigns and focussed prevention efforts, establish a process for reviewing safety features of new fleet, and improve safety reporting to employees.



Medium Term Initiatives

- Implement Health and Safety Software to improve essential safety processes such as investigations, root cause analysis, corrective actions and KPIs. Determine areas for improved and expanded training.



Long Term Initiatives

- Establish and implement capital review processes and safety and resiliency standards for new infrastructure, develop and implement new safety training, establish and maintain SMS in all business divisions.



Empower employees

Short Term Initiatives

- Establish new ways to better involve employees in safety including establishing safe work procedures, reviewing safety of fleet and identifying training needs.



Medium Term Initiatives

- Conduct safety culture surveys regularly, improve accountability to established policies and safe work procedures through audits and coaching, and better inform employees on risks by sharing data.



Long Term Initiatives

- Explore new ways to involve employees in identifying risk and establishing safer ways to work, utilize apps or health and safety software to allow real-time reporting of safety hazards.



Influence others

Short Term Initiatives

- Establish a Safety Policy for TransLink Corporate, improve Prime Contractor language in TransLink contracts and trial collision avoidance technologies, and continue with public safety campaigns focussed on high risk topics.



Medium Term Initiatives

- Work with CUTA, APTA and other transit associations to establish and evolve safety benchmarking and best practices, and work with fleet vendors to improve safety of buses and trains.



Long Term Initiatives

- Maintain, expand and improve relationships with municipalities across our service area to jointly improve safety for employees, customers and public, using data to drive our areas of focus.



TO: Board of Directors

FROM: Geoff Cross, Vice President, Transportation Planning & Policy
Steve Vanagas, Vice President, Customer Communications & Public Affairs

DATE: March 19, 2020

SUBJECT: Phase Two Update Investment Plan Engagement Strategy

PROPOSED RESOLUTION:

That the TransLink Board of Directors approve the *Phase Two Update Plan Engagement Strategy*, as adapted by Management in order to respond to timing requirements relating to the COVID-19 pandemic.

PURPOSE

The Phase Two Update Investment Plan Engagement Strategy Report attached to this report as Attachment 1 was presented to the Planning and Stakeholder Relations Committee at its March 16, 2020 meeting. After discussion, the Committee approved the resolution for recommendation to the Board as set out above.

ATTACHMENTS

APPENDIX 1 - Phase Two Update Investment Plan Engagement Strategy

TO: Board of Directors

FROM: Geoff Cross, Vice President, Transportation Planning & Policy
Steve Vanagas, Vice President, Customer Communications & Public Affairs

DATE: February 21, 2020

SUBJECT: Phase Two Update Investment Plan Engagement Strategy

PROPOSED RESOLUTION:

That the TransLink Board of Directors approve the *Phase Two Update Plan Engagement Strategy*.

EXECUTIVE SUMMARY

Translink is in the process of developing the next Investment Plan, the Phase Two Update Plan. The *South Coast British Columbia Transportation Authority Act* (SCBCTA Act) requires Translink to consult with the public, the Mayors' Council, Metro Vancouver, municipalities, and other organizations that will be affected on the contents of an investment plan. The Phase Two Update Plan makes minor changes to the 2018 – 2027 Investment Plan: Phase Two of the 10-Year Vision (Phase Two Plan): advancing the Surrey Langley SkyTrain project. Given the extensive consultation on Surrey Langley SkyTrain, Management recommends an online approach to inform the public of these changes.

PURPOSE

To describe the proposed *Phase Two Update Plan Engagement Strategy* for review and endorsement by the Board.

BACKGROUND

Under the *South Coast British Columbia Transportation Authority Act* (SCBCTA Act), TransLink must prepare a 10-Year Investment Plan. The Plan serves as TransLink's strategic and financial plan, and must be approved by the Board and the Mayors' Council. Management is currently developing the Phase Two Update Plan, guided by the Board and Mayors' Council Joint Finance and Governance Committee.

When TransLink plans to engage, the SCBCTA Act says it must adopt a consultation plan that will provide opportunities for consultation and consider any comments provided during the consultation process before taking the action. Additionally, and specific to Investment Plans, Section 15 (3.1) of the SCBCTA Act states:

Before an investment plan is provided to the Mayors' Council on Regional Transportation under section 202.1, the authority must consult, on matters that the authority proposes to include in that plan, with

- (a) the public in the transportation service region,*
- (b) the Mayors' Council on Regional Transportation,*
- (c) the Greater Vancouver Regional District, and*
- (d) any municipality and other organization that the authority considers will be affected.*

DISCUSSION

TransLink is currently developing the Phase Two Update Plan. The scope of the Phase Two Update will focus on re-allocating Surrey-Newton Guildford funding to the Surrey-Langley SkyTrain to 166 Street with no additional regional funds or senior government funding beyond what has already been secured.

The *Phase Two Update Plan Engagement Strategy* is attached for Board consideration.

TransLink proposes to engage the groups identified above in the following manner:

(a) the public in the transportation service region:

The public engagement component is an online approach with a goal to raise awareness and provide information about the minor updates in the Phase Two Update Plan. Information will be posted to the *tenyearvision.translink.ca* site, and an email address will be provided for the public to submit questions. Online consultation would begin on Friday, April 24th.

Management may include additional means to increase ease of access to the information and inform the public of the proposed changes. This could include advertisements in local newspapers or a telephone town hall-type activity.

(b) the Mayors' Council on Regional Transportation:

The development of the Phase Two Update Plan is guided by the monthly meetings of the Board and Mayors' Council Joint Finance and Governance Committee, which consists of the following members: Mayor Malcolm Brodie, Mayor Bill Dingwall, Mayor Ron McLaughlin, Mayor Mike Little, Mayor Kennedy Stewart, Chief Ken Baird, Mayor Darryl Walker, Mayor Jonathan Coté, Board Chair Tony Gugliotta, Board member Sarah Clark, Board member Harj Dhaliwal, Board member Murray Dinwoodie, Board member Karen Horcher, and Board member Andy Ross.

A report from the Joint Finance and Governance Committee is included in the public and in-camera portions of every meeting of the Mayors' Council.

Feedback from these two monthly meetings is used to direct the activities of the investment planning process, as well as to provide final say on investments included in the plan.

(c) the Greater Vancouver Regional District:

TransLink will formally consult with Metro Vancouver through their committee and board process. The information is expected to go to Metro Vancouver staff for feedback at the May 1 meeting of the Regional Planning Committee.

(d) any municipality and other organization that the authority considers will be affected:

Management has consulted with municipal stakeholders through the development of the Phase Two Update Plan. In addition to regular updates to the Regional Transportation Advisory Committee (RTAC), a dedicated workshop was completed with local government

staff and Metro Vancouver staff in October 2019. All members of the RTAC were invited to attend. This session was held at TransLink's Sapperton head office on Tuesday, October 22, and included 12 participants from local government.

Similar workshops to develop the investment plan scope were also completed with regional mayors, municipal CAO's, and TransLink Board members. These workshops were held at TransLink's Sapperton head office on Wednesday, November 20 and two workshops on Friday, November 22. These workshops included 18, 22, and 9 participants, respectively.

This approach aligns with the municipal engagement approach used for previous investment plans.

Customer Impact

The engagement strategy meets the requirements of the SCBCTA Act. As designed, Management recommends adopting this engagement strategy to provide an avenue for public awareness, and to educate about the investment planning process.

Analysis of Alternatives

Management considered an alternative engagement that included public open houses. This alternative was ultimately not selected because it is out-of-step with the scale of updates being made. This Investment Plan has been designed as a minor update to the Phase Two Plan – it does not propose any new regional revenue sources, nor does it propose any new or expanded services. A larger scale engagement would require more time, putting timelines for the Surrey Langley SkyTrain project at risk. A larger engagement effort may also detract from other, parallel, TransLink projects that will be engaging with the public over a similar time period.

Financial Impact

Expenditures related to the engagement process will be accommodated within TransLink's 2020 operational budget.

Communications

The engagement will be based on a communications strategy to inform the public that TransLink is updating the Phase Two Investment Plan. The communications strategy is primarily focused on informing the public of changes after the Phase Two Update Plan is approved.

Timing and design of the engagement process has been informed by the level of feedback required and the investment plan approval deadlines. Other significant TransLink projects will also be engaging near this effort, including:

- Surrey Langley SkyTrain Phase 3 Engagement (tentatively April 20 – May 1 2020, to be confirmed)
- T2050 Phase 2 Engagement (May 2020)

Key messages about the Phase Two Update Plan may be incorporated into the parallel engagement processes, as appropriate.

ATTACHMENTS

Attachment 1 – *Phase Two Update Plan Engagement Strategy*

Engagement Strategy

Phase Two Investment Plan

1. BACKGROUND

1.1 PHASE TWO UPDATE PLAN BACKGROUND

TransLink is in the process of developing the next investment plan – referred to in this document as the “Phase Two Update Plan.”

The scope of the Phase Two Update Plan will focus on re-allocating Surrey-Newton Guildford funding to the Surrey-Langley SkyTrain to 166 Street with no additional regional funds or senior government funding beyond what has already been secured. This update will allow TransLink to stay on schedule to deliver the Surrey-Langley SkyTrain project.

If approved by the TransLink Board and the Mayors’ Council, the Phase Two Update Plan would serve as TransLink’s strategic and financial plan from 2020 to 2029.

Given that the changes between the Phase Two Plan and the Phase Two Update Plan are minor, TransLink will inform the public about the updated projects funded through the Phase Two Update Plan in late April. It is anticipated that a more robust Phase Three Investment Plan, focused on completing the Mayors’ Council 10-Year Vision, would be prepared for consideration in 2021.

2. RESPONSIBILITIES

2.1 PUBLIC AFFAIRS WORKING GROUP

Engagement and communication will be coordinated by a cross-departmental project Public Affairs Working Group (PAWG), comprised of individuals from TransLink’s Strategy and Plan Development, Government and Community Relations, Digital Marketing, and Communications departments.

The PAWG will support the development of engagement material and ensure that the engagement framework is implemented and managed according to schedule.

The following representatives within TransLink will work together to ensure the stakeholder and public engagement process is delivered in an efficient and professional manner.

Name	Title
Briana Ingram (Project Manager)	Investment Plan Project Manager, Strategy and Plan Development
Sabrina Lau Texier	Manager, Strategy & Plan Development, Strategic Planning & Policy
Vincent Gonsalves	Manager, Community Engagement
Drew Ferrari	Senior Advisor, Public Affairs
Terence Chu	Senior Communications Advisor, Corporate Communications
Kari-Lynne Soucie	Senior Digital Marketing Advisor

3. ENGAGEMENT OVERVIEW

The engagement strategy for the Phase Two Update Plan will focus on informing the public of minor updates to the Phase Two Plan solely through a digital approach.

Goal: Inform the public about the re-allocation of Surrey-Newton Guildford funding to the Surrey-Langley SkyTrain to 166 Street.

Proposed Engagement Period: April 24 – May 5, 2020

4. ENGAGEMENT TECHNIQUES

4.1 WEBPAGE

The webpage for the 10-Year Vision (<https://tenyearvision.translink.ca>) will serve as the primary means to inform the public about details of the Phase Two Update Plan. Users will be directed to a PDF housed on the 10-Year Vision website. This PDF would:

- Inform the public about the re-allocation of Surrey-Newton Guildford funding to the Surrey-Langley SkyTrain to 166 Street; and
- Deliver the message that funding will come from existing sources.

A project email address will be provided for the public to submit comments.

4.2 ELECTED OFFICIAL OUTREACH

TransLink staff will share information about the Phase Two Update Plan with elected officials through the Mayors' Council, in advance of the public. In addition, the Government Relations team will inform local members of Council and MLAs in advance of the public.

4.2.1 METRO VANCOUVER ENGAGEMENT

TransLink will work with Metro Vancouver staff to share information about the Phase Two Update Plan with the Metro Vancouver Regional Planning Committee (comprised of Metro Vancouver Board members) on May 1, 2020.

4.2.2 PREVIOUS MUNICIPAL ENGAGEMENT

With a goal of building confidence and consensus around the Phase Two Update Plan and the Phase Three Investment Plan, a series of workshops were conducted in fall 2019. The purpose of these workshops was to get input from Mayors, CAOs and municipal staff on potential investments and funding sources for the Phase Two Update Plan and Phase Three Investment Plans. TransLink staff hosted the following workshops in October and November:

Audience	Workshop dates	Number of participants
Local government staff	October 22, 2019	12
Mayors' Council, CAOs, TransLink Board	November 20, 2019	18
	November 22, 2019 (AM)	22
	November 22, 2019 (PM)	9

5. COMMUNICATIONS OVERVIEW

Key messages about the Phase Two Update Plan will be incorporated into the parallel Surrey-Langley SkyTrain Phase Three engagement, as appropriate.

Information about the Phase Two Update Plan will be primarily shared after the Phase Two Update Plan has been finalized. This information will be shared on a variety of media, such as social media, Buzzer blog, etc.

5.1 COMMUNICATIONS OBJECTIVES

- Inform transit users, government and the public that TransLink is moving ahead with the Surrey-Langley SkyTrain to 166 Street.
- Build trust and confidence in TransLink and demonstrate that we are transparent and accountable with decision-making.
- Monitor public feedback and media coverage in order to manage issues early and effectively.

TO: Board of Directors

FROM: Steve Vanagas, Vice-President, Customer Communications & Public Affairs

DATE: March 6, 2020

SUBJECT: Fleet and Facilities Naming Policy

PROPOSED RESOLUTION:

That the Board of Directors authorize Management to select fleet and facilities names consistent with the core naming principles set out in this report.

BACKGROUND

In 2009, TransLink established its TransLink Wayfinding Standards Manual which details standards and guidelines for naming Transit Passenger Facilities. These standards have been used for the Canada Line, Millennium Line-Evergreen Extension and the Broadway Subway Project (BSP).

SkyTrain Station and fleet names are based on four core principles. Names should be:

- Simple (short, easy to remember and easy to use when giving directions; eg., “Burrard” or “Surrey Central”);
- Logical (clearly fit in with the rest of the system and provide a mental link when trip planning);
- Durable (tied to permanent features of the region so they are less likely to become dated); and
- Self-Locating (allow users to place themselves geographically in the region; eg., “Commercial-Broadway” or “YVR-Airport”).

These principles also meet the needs of emergency responders, regulatory requirements, help TransLink achieve its brand objectives, and uphold TransLink’s values and reputation.

DISCUSSION

Facilities Naming process

TransLink has established project-specific Station Naming Working Groups for previous station naming including most recently, naming of the stations on Millennium Line Broadway Extension (MLBE), also known as the Broadway Subway Project.

Working Groups generate potential station names based on current, historical, and planned local features such as the names of local neighborhoods, streets and landmarks. Stakeholders – including relevant local municipalities – are engaged to provide feedback. TransLink Management makes the final determination on the suitability of the proposed names.

In the case of the MLBE, a working group comprised of staff from TransLink and the City of Vancouver started to meet beginning in 2017. The Working Group evaluated station name options against the TransLink Wayfinding Standards Manual to assess the extent to which the various options were simple, logical, durable and self-locating.

A shortlist of name options for each station was identified and agreed upon by the Working Group. The recommended names were then approved by senior leaders at the City of Vancouver and TransLink. These recommendations were presented to the Broadway Subway Project and adopted. In Fall 2019, the

Provincial Government announced the interim names. Final names must be presented to the Broadway Subway Project within 20 days of the effective date of the Design-Build-Finance contract, scheduled for August 15, 2020.

Fleet Naming process

TransLink has relied upon the same Wayfinding principles for the naming of the new SeaBus: the *Burrard Chinook*. An internal Working Group was established to identify a shortlist of proposed names and the final name was determined by TransLink Management. Marine vessel regulations required an additional step of Transport Canada approval of the name – which was received.

The Fleet and Facilities Naming principles apply to all stations on the Expo, Millennium and Canada Lines and any future extensions. It also applies to marine vessels, bus loops, transit hubs and exchanges, major operations and maintenance facilities, and any names to individual fleet in revenue service or for pilot projects.

CONCLUSION

Management intends to develop an internal Fleet and Facilities Naming Policy incorporating the four core principles set out in this report, together with the internal and external processes followed as part of Fleet and Facility name selection. Management recommends that the Board authorize Management to name Fleet and Facilities consistent with the four core principles set out in this report.

TO: Board of Directors

FROM: Geoff Cross, Vice President, Transportation Planning and Policy

DATE: February 28, 2020

SUBJECT: Background to the 2019 Access Transit Users' Advisory Committee Annual Report

The Access Transit Users' Advisory Committee (UAC) continues to provide critical input into TransLink plans, policies and initiatives. The terms of reference for the Committee calls for an annual report to the TransLink Board of Directors. The annual report to the Board is attached to this report as Attachment 1.

This advisory committee was established from TransLink's 2007 Access Transit Strategy, holding its first meeting in 2008. The UAC's terms of reference identify the following activities that guide its work:

- a. Advise TransLink on matters which will enhance accessibility
- b. Assist TransLink in determining whether its measures are inclusive or exclusive of persons with disabilities and/or seniors
- c. Assist TransLink in setting priorities on accessibility issues
- d. Provide comment on TransLink policies and strategies

The Access Transit Planning group in the Transportation Planning and Policy division provides administrative support to the UAC. The Manager of Access Transit Planning is a non-voting ex-officio member of the UAC and sits as second Vice Chair.

Through 2019, the UAC's work included input into the major projects being undertaken including enhanced accessibility features at RapidBus stops, improvements to the BC Parkway, and providing feedback on planned station and exchange upgrades. An area of significant discussion and concern for the UAC continued from previous years on the provision of accessible information at bus stops to assist customers with sight loss. The UAC was very pleased with the Board's approval of a three-pronged approach involving braille and tactile signage, tactile walking surface indicators and a wayfinding technology pilot.

TransLink staff look forward to a productive year in 2020 working with this important advisory resource of transit customers across Metro Vancouver.

ATTACHMENT

Attachment 1: *2019 Access Transit Users' Advisory Committee Annual Report*

TO: Board of Directors

FROM: The TransLink Access Transit Users' Advisory Committee

DATE: February 28, 2020

SUBJECT: 2019 Access Transit Users' Advisory Committee Annual Report

PURPOSE

To inform the TransLink Board of Directors of the Access Transit Users' Advisory Committee activities throughout 2019.

BACKGROUND

The purpose of the Access Transit Users' Advisory Committee (UAC) is to establish an ongoing, independent customer voice to provide accessibility-related advice on TransLink plans, programs and other initiatives.

The UAC was established in 2008 and continues to meet at minimum of six times each year. In 2019 the Committee was composed of 17 members representing a wide range of demographics, including seniors and people with various physical, cognitive and sensory disabilities, and their representatives. The UAC Terms of Reference call for an Annual Report to the TransLink Board. The report was drafted by the Manager, Access Transit Planning, and approved by the Committee Chair and Vice-Chair.

DISCUSSION

The Access Transit Users' Advisory Committee's activities for the past year are detailed below.

Emergency Preparedness

At the May 2019 UAC meeting, the UAC members participated in a building evacuation drill. Committee members want to ensure that staff are aware of the importance of additional training/education for floor wardens and other staff who may be present during an emergency at the Sapperton TransLink building. Several members of the UAC require additional assistance when safely evacuating, and some may need to shelter in place until emergency services arrive. TransLink volunteer Floor Wardens now have the complete list of upcoming UAC meeting dates. This allows them to be aware of the need for additional support if an evacuation should happen on any of those days. This was an arrangement suggested by the UAC and will be kept up to date as subsequent meetings are scheduled. Work will continue to assist TransLink staff to better understand the needs of people with disabilities while in the building.

RapidBus Bus Stop Accessibility Features

In June, the UAC received a presentation and demonstration of the bus passenger information displays (B-PIDs) which are located along the new RapidBus routes. The B-PIDs include accessibility features such as automatically adjustable screen contrast and an audio information button that can be pushed to announce what is on the screen.

Committee members emphasized the importance of the audio information having adjustable volume in order to maintain accessibility, regardless of the surrounding noise level. These features could include ambient noise detection for the audio or the ability to hold the button for a longer period of time to

increase the volume for that particular button push. These additional features could be implemented as part of future upgrades to the B-PIDs. Additionally, positive feedback was given on the visibility and legibility of the LCD screen for all passengers, especially those with low vision.

Broader discussions about RapidBus stops included concerns regarding the inconsistency of tactile walking surface indicators (TWSI), which are used to indicate the location of the bus stop and aid in safe boarding for passengers with vision loss. The inclusion of this feature depends on agreement from the municipality in which the stop is located, and acceptance of this feature has not been consistent across the region. The UAC recommended that the committee and staff look for further opportunities to explain and clarify the accessibility benefits of TWSI to municipal partners. To facilitate this, TransLink staff are initiating a TWSI Working Group with the Regional Transportation Advisory Committee, which is comprised of municipal staff from across Metro Vancouver; members of the UAC will be invited to present to this committee.

Lonsdale Exchange Renovations and Updates

The UAC worked closely with the Project Manager of the Lonsdale Exchange Update to ensure accessibility was maintained during complex, phased construction that involved ongoing changes to how customers accessed bus services, and that accessibility features were improved as a result of the project. UAC Chair, Pam Horton assisted with an on-site review in order to provide first-hand customer feedback and accessibility advice. As a result, the project team worked closely with the City to modify the parking and drop-off arrangements, increase the assistance available to customers from traffic control staff, and create more defined passenger loading zones within the construction site.

SeaBus North and South Terminal Interior Refurbishment Project Update

The UAC was first consulted on the SeaBus north and south terminal refurbishment project in 2018, and a follow-up presentation was given at the September 2019 meeting. Feedback provided by the committee included a request for accessibility decals on all boarding doors rather than the current centre door placement, advice on the correct use of tactile walking surface indicators to indicate the top and bottom of stairs, and a recommendation to use high colour contrast to differentiate seating from floors. Work will continue with the project team to implement these recommendations into the overall project plan.

Canada Line Capstan Way Station Design

A presentation on the design of the Canada Line Capstan Way Station was given at the September 2019 UAC meeting. Major elements of the proposed design were presented and explained, and feedback from UAC members included a desire for the provision of washrooms at the station, as well as a strong preference for two, dual-direction escalators. The comments were taken into consideration by the project manager and Access Transit planning staff will continue to work with the project team.

Provincial Government Disability Legislation Framework

Guillaume Dufresne, the Director of the Provincial Accessibility Secretariat presented at the October UAC meeting on the in-depth public consultation being conducted to help inform the development of BC's Provincial Accessibility Legislation. Pam Horton, UAC Chair, communicated that many members would be submitting comments on the legislation during consultation with other organizations they represent. It was also expressed that it will be important to engage not just people with disabilities, but also family members and caregivers. These comments were received by the Accessibility Secretariat as part of their formal engagement process.

Maintaining Accessibility During TransLink Construction

Due to accessibility challenges that occurred during some recent station or bus exchange upgrades, a presentation was given at the November 2019 UAC meeting outlining a new TransLink policy to mitigate such issues in the future. The new Public Protection Standard will outline criteria that will help to better maintain accessibility for people with disabilities during major construction at TransLink facilities. The committee felt that when accessible bus stops are moved due to construction, the newly located stops need to maintain accessible status. Additionally, flaggers need to be educated on providing proper communication and assistance for people with disabilities.

Customer Washroom Implementation Strategy

The subject of public washrooms has been brought up by UAC members frequently over the past several years, as locating and accessing washroom facilities near transit routes is particularly challenging for customers with disabilities. In December 2018, the Board approved a staff recommendation to create an implementation strategy for providing washroom facilities on the system over the longer term. At the December 2019 UAC meeting, a presentation was given, outlining the project history, current work, and next steps to develop a customer washrooms implementation strategy.

Concerns raised by committee members during this presentation focussed on washroom location, access, and maintenance. It was suggested that washrooms should be located at sites other than rapid transit stations such as bus exchanges and park and rides. Both options of washrooms being located either inside or outside of fare paid zones caused concerns from the UAC. Cleanliness and safety were brought up, and specialized keyed access was mentioned as a possible solution, though it presents accessibility challenges for customers.

2020 BC Parkway Bike Infrastructure Improvements

At the December meeting, a presentation was given outlining the history of the BC Parkway and the improvements that might be needed to improve this important piece of infrastructure. Concerns were raised about trees dropping leaves along the Parkway reducing cane detectability, as well as the importance of providing sufficient path width for people in the deaf community to use sign language while walking side by side, while allowing for cycle traffic as well. Suggested accessibility features for people who are blind or partially sighted included the use of tactile pavers to mark the edge of the walking path, cane detectable street furniture and the need for pathways to be obstacle free. It was also mentioned that benches should have multi-height seating in order to be universally accessible.

Bus Stop Accessibility for Customers with Sight Loss

At its November 2019 meeting, the UAC received a presentation and update on the bus stop accessibility project, to provide information at bus stops to allow customers with sight loss to independently locate a bus stop and verify that it is the correct stop. The committee received details of the recommendation that would be presented to the Board at its December 2019 meeting.

The committee unanimously endorsed the proposed path forward which includes a three-pronged approach, where:

- A. tactile walking surface indicators (TWSI) be implemented at all in-service bus stops, bays and unloading stations on properties TransLink owns, leases or licenses, as permitted;
- B. braille and tactile signage be implemented at all in-service bus stops in TransLink's service region, and
- C. a pilot to test wayfinding technology be developed.

The accessibility of information at bus stops for customers who are blind or partially sighted has been a longstanding concern for stakeholders in the vision loss community. The committee would like to thank the Board for approving the proposal. This will establish TransLink as an industry leader in increasing accessibility of bus stop information for people with sight loss.

Conclusion

Throughout 2019, UAC members shared their accessibility knowledge and perspectives, gathered from their lived experiences as well as vast involvement with community networks. In 2020, the UAC will continue to provide valuable insight, advice and recommendations to TransLink and its' subsidiaries including key projects such as the implementation of the bus stop accessibility project, Transport 2050, and ongoing facilities expansion and upgrades.

The UAC looks forward to receiving information and continuing to provide advice on programs and initiatives in order to advance the accessibility of TransLink's services.

TO: Board of Directors

FROM: Geoff Cross, Vice President, Transportation Planning and Policy

DATE: February 28, 2020

SUBJECT: Background to the 2019 HandyDART Users' Advisory Committee Annual Report

The HandyDART Users' Advisory Committee was established in March 2019 and the inaugural 13-member committee was appointed by the Board in June 2019. Two meetings were held during the second half of the year. The terms of reference for the Committee calls for an annual report to the TransLink Board of Directors. The annual report is attached to this report as Attachment 1.

As noted in the 2019 annual report, the committee provides advice and guidance on HandyDART plans, programs and other initiatives and advises TransLink, CMBC and service contractors on matters to improve HandyDART service for customers. The committee's terms of reference identify the following activities that guide its work:

- The committee will discuss and provide input to TransLink, CMBC and service contractor staff on HandyDART plans, programs and other initiatives.
- The committee will provide a forum for the exchange of ideas, the provision of input and advice, and allow TransLink, CMBC and service contractors to hear directly from HandyDART stakeholders and customers regarding systemic issues and not individual customer complaints.

The Access Transit Planning group in the Transportation Policy and Planning division provides administrative support to the committee. The Manager of Access Transit Planning, the Director of Access Transit Service Delivery, and Managing Director of the Service Contractor are all non-voting ex-officio members of the Committee.

Through 2019, the Committee's work included building a foundational understanding of the HandyDART service and providing input into projects including Compass for HandyDART, HandyDART Registration Update, and the development of the HandyDART Performance Report.

TransLink staff look forward to working closely with this valuable advisory resource of HandyDART customers and stakeholders in 2020.

ATTACHMENT

Attachment 1: *2019 HandyDART Users' Advisory Committee Annual Report*

TO: Board of Directors

FROM: HandyDART Users' Advisory Committee

DATE: February 28, 2020

SUBJECT: 2019 HandyDART Users' Advisory Committee Annual Report

PURPOSE

To inform the TransLink Board of Directors of the HandyDART Users' Advisory Committee's activities throughout 2019.

BACKGROUND

In March 2019, The TransLink Board provided direction to form the HandyDART Users' Advisory Committee. After an open call for applications, 13 individuals were appointed by the Board in June 2019. Two meetings were held in the second half of last year; commencing in 2020, the committee will meet at least four times per year.

The purpose of the HandyDART Users' Advisory Committee is to provide advice and guidance on HandyDART plans, programs and other initiatives and advise TransLink on matters to improve HandyDART service for customers. This also offers a forum for the exchange of ideas that allows TransLink, CMBC and service contractors to hear directly from HandyDART stakeholders and customers regarding systemic concerns about the service.

The committee includes 11 HandyDART customers and those representing organizations that work with customers, the Chair of the Access Transit Users' Advisory Committee, and a representative from the HandyDART Riders' Alliance. The HandyDART Users' Advisory Committee terms of reference calls for an annual report to the TransLink Board of Directors. The report was drafted by the Manager, Access Transit Planning, and approved by the Committee Chair.

DISCUSSION

The HandyDART Users' Advisory Committee's activities for the past year are listed below.

2019 COMMITTEE ACTIVITIES

Inaugural Meeting & Orientation

In September 2019, the Committee had its inaugural meeting which focussed on building a foundational understanding of the HandyDART service. Topics covered during this meeting included:

- History of HandyDART
- Current projects and initiatives
- Organizational structure of TransLink
- Challenges and opportunities

Committee members spent time outlining their expectations, areas of interest, and topics they hoped to better understand to maximize their contribution. This led to the creation of an initial list of topics to be explored in future meetings.

Compass for HandyDART and HandyDART Registration Update

The Committee has been closely engaged on the Compass for HandyDART and HandyDART Registration Update projects. Committee members participated in stakeholder engagement activities throughout the fall and have received regular presentations at meetings allowing them to provide important feedback on this work.

HandyDART Performance Report

At its December meeting, the committee received an update on the development of the HandyDART Performance Report. This report is intended to be a standalone customer facing HandyDART document reporting on the metrics that measure HandyDART performance and identify enhanced data collection and reporting in the future. An overview of the stakeholder engagement process, key findings and recommendations were presented. This report is intended to be updated annually and provide a greater understanding of the HandyDART service to all stakeholders. The HDUAC emphasized that the report should consolidate information in a manner that is accessible, transparent and accountable.

Health-Related Trips

At its December meeting, the committee received a presentation on health-related HandyDART trips. This provided a detailed review of the categories of health-related trips, including that approximately two thirds of HandyDART trips are provided to access Provincially funded medical services. The presentation also outlined ongoing challenges with these types of trips and responded to questions the committee had about day programs schedules and their impacts on HandyDART peak period demand.

Trip Cancellations

At its December meeting, the committee received a report providing information on trip cancellations and the overall impact on HandyDART services. The committee was interested in better understanding of the different categories of cancellations such as canceling trips at the door and no shows. These types of late cancellations have the greatest impact on service as the space cannot be reallocated to accommodate other trips. Committee members commented that the process of communicating cancellations could be improved to make it easier for customers to cancel trips earlier, improving the chances of that trip being reallocated to another customer.

Conclusion

In 2020, the HandyDART Users' Advisory Committee looks forward to continuing their work to provide valuable insights and advice to TransLink, CMBC, and the HandyDART contractor.

Membership as of December 31, 2019

- Martin Aquino
- Brian Gibney
- Wayne Leslie
- Justina Loh
- Tim Louis
- Laura Mackenrot
- Marjorie (Marjie) Ross
- Roseanne Shannon
- Linda Tang
- Avery Timm

- Bet Tuason
- Brian Tucker
- Access Transit Users' Advisory Committee Chair

TO: Board of Directors

FROM: Geoff Cross, Vice President, Transportation Planning and Policy

DATE: February 28, 2020

SUBJECT: Update on the Implementation of the Custom Transit Service Delivery Review

EXECUTIVE SUMMARY

TransLink and CMBC continue to advance recommendations from the 2017 Board-endorsed Custom Transit Service Delivery Review (CTSDR). Since the last update to the Board in March 2019, a number of initiatives have progressed, including the establishment of a HandyDART Users' Advisory Committee, progress towards online trip booking, and the growth of the travel training program. TransLink, CMBC and the HandyDART service provider First Transit are actively implementing CTSDR recommendations to improve the service and will continue to work closely with stakeholders to advance remaining initiatives.

PURPOSE

This report provides an update on the implementation status of the CTSDR recommendations.

BACKGROUND

In June 2016, the TransLink Board committed to undertake a review of the policies and delivery model for HandyDART, TransLink's custom transit service. On March 30, 2017, the Board endorsed recommendations on both HandyDART policies and the service delivery model, with a focus on improving customer experience and increasing the availability of service. In December 2017, the Board directed Management to execute a contract with First Canada for delivery of HandyDART services beginning July 1, 2018. Progress reports on the implementation of the CTSDR recommendations are provided to the Board periodically and have been provided to the Board in December 2017, June 2018 and March 2019.

DISCUSSION

Consistent with the format of the recommendations approved by the Board in March 2017, the following tables provide updates on the implementation status of the policy recommendations to improve the HandyDART customer experience.

Ten of the nineteen recommendations are fully complete and a further three are expected to be completed by the end of 2020. The remaining six are initiatives where significant work has been undertaken and will remain a focus for the organization in the years to come. Ensuring HandyDART trips are available when customers need the service is a significant challenge, particularly given the increase and forecast in demand for the service. We continue to expand HandyDART trips through the Phase One and Two Investment Plans, advocate for additional funding, and we have established a travel training program and make improvements to the accessibility of the conventional system as part of TransLink's ongoing work. A foundational component to ensure that HandyDART trips are available is establishing a

registration process that supports a family of services approach. Work is underway on potential changes to registration and it is anticipated a report will be brought to the Board in June.

OBJECTIVE: Improve Customer Experience by Improving Reservation Convenience

Action	Progress
Extend the HandyDART booking reservation window to 4 p.m. by mid 2017.	<i>Completed</i>
Continue to pursue online booking options and determine the financial implications.	Online booking options expected by the end of 2020 as part of software upgrades to existing Trapeze systems.

OBJECTIVE: Improve Customer Experience by Reducing Wait Times

Action	Progress
Develop strategies to improve the performance of the 10-minute advance warning of vehicle arrival, for completion by the end of 2017.	<i>Completed</i>
Add wait times to the TransLink Accountability Dashboard by end of 2017.	<i>Completed</i>
Complete a feasibility assessment to reduce wait times by end of 2017.	<p><i>Completed</i></p> <p>A feasibility assessment was completed which determined that both reducing the 30-minute window and having more trips arrive in the first 15 minutes would reduce the number of available trips.</p> <p>Customer engagement indicated that customers do not necessarily want to be picked up in the first 15 minutes of the pickup window.</p> <p>When HandyDART’s reservation software is updated in 2020, new software functionality will be tested to determine if there are any other options that would reduce wait times.</p> <p>Two prior recommendations have been implemented:</p> <ul style="list-style-type: none"> • Train operators to evaluate their schedule to determine what part of the pickup window best suited the drop off. • Review dispatch workload and train for proactive dispatch

OBJECTIVE: Improve Customer Experience by Reducing Travel Times

Action	Progress
<p>Complete a feasibility assessment by end of 2017 for the implementation of a policy where trips take no longer than 1.5x the duration of the same trip on the conventional system.</p>	<p><i>Completed</i></p> <p>The outcome of the feasibility assessment was that the current software cannot not handle this issue. As an interim step, until software upgrades occur, a daily review of trips over 90 minutes has been implemented and compared against the 1.5x standard; when appropriate, schedule changes are made to the trip in order to bring it into alignment with the standard for a future occurrence.</p> <p>In November 2019, the Capital Management Committee approved the funds to acquire new Trapeze scheduling software that can identify trips that exceed 1.5 times the duration of the same trip on the conventional bus system. This software is expected to be functional by the end of 2020.</p>
<p>Continuing improvements to dispatching.</p>	<p><i>Completed</i></p> <p>A full review of all service areas was completed by First Transit resulting in reallocation of resources to improve dispatch, i.e. identifying bottle necks and service delays, shifting current resources and hiring more staff.</p> <p>A new radio channel was implemented along with an increase in dispatchers resulting in a better ratio of drivers to dispatchers and an improved efficiency of dispatch communications.</p>
<p>Engage a specialist to review all parameter settings in the scheduling software by the end of 2017.</p>	<p><i>Completed</i></p> <p>Trapeze professionals reviewed all parameters in scheduling software and made recommendations to improve scheduling and readjust parameters. In 2019 a designated staff person at First Transit was tasked to implement these changes, including ongoing operational reviews.</p> <p>A Trapeze software upgrade from version 14 to version 18 is anticipated for Q3 2020, which will improve software functionality. New software modules (Itinerary Planner and Viewpoint) will also improve scheduling.</p>

OBJECTIVE: Improve Customer Experience by continuing to use and enhancing HandyDART taxi service

Action	Progress
Develop an implementation plan by the end of 2017 for a taxi driver training program.	A training program has been developed and made available to all taxi companies. Taxi driver training is included in the renegotiation of the service contracts with both the VTA and the BCTA. A final contract is expected by the end of Q2 2020.
At the conclusion of the current contract cycle, taxi service agreements be transferred to TransLink (from MVT) to improve oversight and build in performance levers. Other mechanisms to achieve customer service standards from taxis and new opportunities for customer feedback on taxis will also be investigated.	<i>Completed</i> After a review was completed, the decision was made that the Taxi contracts would be managed by First Transit with TransLink oversight; contract negotiations are currently underway.
Exploration of technical solutions to integrate HandyDART and taxi scheduling software for tracking customer pick-up/drop-off information be completed by early 2018.	First Transit provided training to taxi company dispatch staff to more effectively use existing technology and is committed to train all new taxi dispatch staff, as required. Technical solutions to integrate HandyDART and taxi scheduling software will be examined and recommended as part of a study to be completed in 2021. One of the key barriers to any immediate solution is the different scheduling software used among the 21 taxi companies that operate in the Lower Mainland, including differences among software versions and functionality.
Implement policy by end of 2017 making high-visibility signage mandatory for all taxis performing HandyDART trips.	High visibility signage continues to be a priority and we are in the final stages of finalizing a new protocol that will include their use. Vests continue to be available for those companies that choose to wear them.

OBJECTIVE: Ensure HandyDART trips are Available for Customers When They Need to use the HandyDART System

Action	Progress
Deliver sufficient HandyDART trips to meet customer demand.	The Phase 2 Investment Plan was approved and includes an additional 7% increase in service hours for 2020 and 2021. This represents a total funded increase in HandyDART service of 22% over 2016 budgeted levels. We are seeing increasing demand on the system, but we are committed to keeping the trip denial rate low for our customers.

<p>Develop an implementation strategy for the Family of Services approach and include a phased, multi-year rollout.</p>	<p>Family of services is delivered through: 1) Maximizing the accessibility of the conventional system 2) Implementing an eligibility process that provides substantive information about registrant’s abilities 3) Establishing protocols for intermodal service; and 4) Creating a travel training program. Work on these individual initiatives is underway; a comprehensive implementation plan for family of services is a longer-term initiative.</p>
<p>Develop an implementation plan for a Travel Training program in 2017 and implement the program in 2018.</p>	<p><i>Completed</i></p> <p>A travel training program has been established and currently travel training information sessions, workshops and partnerships are currently provided. To date, 79 sessions with various stakeholder groups have been completed, reaching approximately 3,500 participants. In addition, travel training videos will be released by April 2020. It is anticipated that one-on-one travel training implementation will be completed in conjunction with changes to the registration process.</p>
<p>Continue to make improvements to the accessibility of the conventional system through established guidelines and policies, and with the support of the Access Transit Users’ Advisory Committee.</p>	<p>TransLink is making improvements to our conventional services on an ongoing basis. Recent initiatives include:</p> <ul style="list-style-type: none"> • Receiving ongoing advice from the Access Transit Users’ Advisory Committee on TransLink’s plans and policies. • Introduction of directional announcements onboard SkyTrain indicating which side the doors will open. • A December 2019 Board endorsement of a path forward to provide accessible information at bus stops for customers with vision-loss, which includes tactile and braille signage at all bus stops. • Improved training material for Skytrain Attendants assisting customers with sight- loss.
<p>Immediately establish a working group with customers, stakeholders and staff to develop an implementation strategy for an eligibility process that provides substantive information on registrants’ abilities by end of 2017 that includes a phased, multi-year rollout.</p>	<p>In 2019, the HandyDART Users’ Advisory Committee (H DUAC) was established to provide advice and guidance on HandyDART plans and programs, including changes to the registration process. In fall 2019 we undertook service design work to understand customer and stakeholder perspectives on HandyDART registration to inform a review. The H DUAC will continue to be engaged on this work as it progresses.</p>

OBJECTIVE: Ensure that HandyDART is appropriately funded.

Action	Progress
Continue to advance analysis on how best to forecast demand for HandyDART service.	<i>Complete</i> A demand forecasting model has been developed and has provided us with projections to inform HandyDART policy.
Work with senior government and agencies and develop opportunities for funding solutions for HandyDART and other accessibility improvements.	A Custom Transit Working Group was established in 2018 with representation from the Ministry of Transportation and Infrastructure, BC Transit, and TransLink; goals include 1) establishing a sustainable funding framework and 2) examining ways to provide universal access to HandyDART service across the province. The work is ongoing.

Stakeholder and Customer Engagement

We have initiated several outreach activities to hear directly from customers regarding HandyDART service. Examples include:

- The HandyDART Users' Advisory Committee was created to provide advice and guidance on HandyDART plans, programs and other initiatives.
- Regional open houses which provide information about our service, as well as opportunities to provide feedback and share ideas.
- Travel training workshops, training and information sessions were held with stakeholders and business partners and partnerships developed with agencies including Canucks Autism Network, Community Living Services, and various school boards.
- Phone surveys have been implemented to hear from customers about their experience on HandyDART trips delivered by taxi; we will move to a similar survey directed at customers travelling on HandyDART vehicles.
- Outreach calls were initiated to better understand the impacts of excessively late trips on our customers; this information was used to inform training and process design.
- An engagement process was undertaken for Compass for HandyDART and HandyDART Registration Update Project, which included direct engagement with customers and stakeholders through a series of interview and workshops.
- Regular meetings are being held with organizations that represent HandyDART customers and a number of municipal accessibility advisory groups.
- The HandyDART newsletter is distributed quarterly and is made available digitally and onboard HandyDART vehicles to provide updates and information to customers

TO: Board of Directors

FROM: Geoff Cross, Vice President, Transportation Planning & Policy

DATE: February 27, 2020

SUBJECT: Transit Service Partnership Agreement and Independent Transit Services Application – Fraser Mills

PROPOSED RESOLUTIONS:

That the TransLink Board of Directors:

1. Determine that the proposed *Fraser Mills Shuttle* would be an Independent Transit Service under Section 5 of the *South Coast British Columbia Transportation Authority Act* and has approval to operate, subject to the conditions outlined in this report and attachment; and
2. Authorize staff to continue negotiations with Beedie Development Group regarding an agreement for TransLink to provide increased service to the proposed Fraser Mills development at no increase in net cost to TransLink.

EXECUTIVE SUMMARY

As part of the development approval process the City of Coquitlam has required that Beedie Development Group (Beedie) ensure a higher level of transit service to the proposed Fraser Mills site than what is currently provided by TransLink. TransLink staff have identified two alternatives that would satisfy Coquitlam's requirement: an agreement in which Beedie would pay TransLink directly for additional transit service, or an Independent Transit Service (ITS), approved by TransLink but operated independently by Beedie. While the first option is preferred by all parties there is no existing mechanism for this type of investment; as such, the proposed ITS is considered a fall-back option in the event that Beedie and TransLink are unable to come to an agreement. With regards to the proposed Fraser Mills ITS, Management's analysis indicates the service would have negligible impact on the financial viability or effectiveness of the regional transportation system. Management recommends the approval of the *Fraser Mills Shuttle* to operate as an Independent Transit Service.

PURPOSE

The purpose of this report is two-fold, the first is to outline a potential agreement between TransLink and Beedie that would see TransLink provide increased transit service to the proposed Fraser Mills development in southeast Coquitlam. The second objective is to seek Board approval for Beedie to operate the *Fraser Mills Shuttle* as an ITS on the basis that the proposed service is consistent with the existing ITS policy and is not expected to negatively impact the financial viability or effectiveness of the regional transportation system.

BACKGROUND

Content within this report follows on a number of separate reports presented to the TransLink Board, Planning & Stakeholder Relations Committee, Mayors' Council and the Joint Finance and Governance Committee.

Transit Service Partnerships

The Board was initially briefed on Transit Service Partnerships in April 2019, and at that time requested that staff begin work on the proposed policy. In June 2019, staff presented an initial list and evaluation of policy options to the Planning & Stakeholder Committee. The following September staff presented the Board with an updated policy framework with more detail on mitigation approaches to previously identified risks. The Board endorsed the recommended policy framework and required staff to seek Mayors' Council input.

As per the Board's request, on February 13, 2020 staff presented the recommended policy framework to the Joint Finance & Governance Committee for feedback. The committee endorsed the framework and advanced it for consideration by the Mayors' Council. At their February 27 meeting, the Mayors' Council endorsed the recommended TSP policy framework and asked staff to continue development of the policy with the Board.

Independent Transit Services Application

With regards specifically to the proposed Fraser Mills ITS, in November 2019 staff provided the Planning & Stakeholder Relations Committee with a summary of the proposed *Fraser Mills Shuttle* and Beedie Development Group's application to operate as an Independent Transit Service. The report was presented as information only in advance of future formal consideration by the Board.

South Coast British Columbia Transportation Authority Act

Under Section 5 of the *Act*, TransLink's Board of Directors is authorized to determine whether or not this service should be considered an Independent Transit Service. TransLink's [Independent Transit Service Policy](#) – approved by the Board in December 2012 – provides direction on the process, a definition of ITS, evaluation criteria, and standard terms & conditions required for approval. As outlined in the Act and the Policy, TransLink may grant approval for an ITS to operate, provided it does not negatively impact the effectiveness or financial viability of the regional transportation system. The ITS policy includes definitional criteria used to determine whether a service should be considered an ITS. The *Fraser Mills Shuttle* is considered an Independent Transit Service per the criteria outlined in Section 2 of the ITS policy. TransLink Board approval would not impact the operator's need to meet all other safety and operating regulatory approvals.

DISCUSSION

Fraser Mills Development Context

The proposed development site is 94 acres of industrial land located in southeast Coquitlam south of Highway #1 between United Boulevard and the Fraser River. In terms of adjacent land uses, the surrounding area is characterized by a broad mix of highway retail, light and heavy industrial, service commercial, and entertainment (e.g. Hard Rock Casino).



Figure 1: Fraser Mills Site and Current TransLink Routing (Beedie Development Group)

The development would be mixed-use, comprised of approximately 5,000 residential units and a range of commercial, light industrial, and civic uses. If approved complete build-out is anticipated to take approximately 25 years. With regards to the Regional Growth Strategy, the Fraser Mills site is located within the City of Coquitlam's Urban Containment Boundary but not within or near a designated Town Centre.

In advance of an OCP amendment related to the proposed Fraser Mills development, Coquitlam has identified various preconditions that Beedie must resolve in order to move the project forward. Among these the development of a comprehensive traffic demand management plan and the provision of transit service to the Fraser Mills site beyond what TransLink currently provides along the corridor. For more detail on the proposed development, the development approval process, and the City of Coquitlam's initial OCP amendment, including TransLink's response, please refer to Attachments 1 and 2.

OPTION 1 – Transit Service Partnership Agreement

Ongoing Policy Development

As mentioned, two alternatives have been identified that would satisfy Coquitlam's requirement for additional transit service to the proposed Fraser Mills development:

- an agreement in which Beedie would pay TransLink directly for additional transit service to be provided by TransLink, or
- an Independent Transit Service, approved by TransLink but operated independently by Beedie.

Option 1 relates to the currently under development Transit Service Partnership (TSP) policy, in which new or augmented TransLink service is funded wholly or in part by third parties. With no existing mechanism to allow for this type of investment, the Board approved the scope and consultation plan for developing a policy framework that would enable TransLink to increase the delivery of transit service across the region by leveraging funding from third-parties, while ensuring other regional interests and desired outcomes can be met.

In June 2019, the Planning and Stakeholder Committee considered and endorsed draft goals and objectives, policy framework options and risk mitigation measures. The following September, staff presented the Board with an updated policy framework with more detail on mitigation approaches to previously identified risks. The Board endorsed the recommended policy framework for Transit Service Partnerships and requested that staff to seek Mayors' Council input.

As per the Board's request, on February 27 staff presented the recommended policy framework to the Mayors' Council for feedback. The Council endorsed the framework and directed staff to continue development of the policy with the Board.

Potential Next Steps

While the TSP policy has yet to be adopted by the Mayors' Council and Board, the proposed Fraser Mills agreement is a unique opportunity to increase the delivery of transit service in southeast Coquitlam by leveraging funding from a third party (Beedie), while also advancing the development of the TSP policy through practice.

If the Board is supportive of the proposed resolution, staff would work with Coquitlam and Beedie to confirm the desired level of service along United Boulevard in the Fraser Mills area and then agreement on the number of additional annual service hours required to implement that increase. Route 159, which currently provides service between Coquitlam Central and Braid Station, is the preferred candidate for increased service.

With regards to existing 159 service and how it compares to Coquitlam's desired service levels, additional service hours would be required primarily for off-peak periods (peak service levels are already at or close to Coquitlam's desired frequency). While the specific terms of any potential agreement have not yet been determined, it is understood that Beedie's contribution would reflect all incremental costs above existing base service currently provided by TransLink.

Given that the agreement would not involve any previously committed TransLink funding, is not projected to require any additional fleet (i.e. no bus procurement required) and would have no impact on existing

depot constraints, Management considers it to be relatively low risk and likely to provide valuable insight on the development and implementation of potential future TSP agreements.

Business Terms to be Negotiated

In order to implement an agreement with Beedie a number of business terms need to be resolved as the basis for negotiation, these include:

- the specific level of service to be provided;
- the starting conditions for increased service (e.g. specific year, or occupancy at development);
- length of the agreement; and
- in collaboration with Coquitlam, determining what happens at the conclusion of the agreement.

While staff consider the proposed Transit Service Partnership to be low risk, there is some risk associated with the conclusion of the agreement when there is no longer partnership funding. If there isn't expansion funding available to maintain more frequent service, TransLink may be required to return to pre-agreement service levels. Alternatively, in order to maintain the higher level of service, TransLink may reallocate service hours from elsewhere within the City of Coquitlam. TransLink would seek agreement with the City of Coquitlam in advance on potential outcomes at the end of the Transit Service Partnership.

If Beedie, Coquitlam and TransLink are able to come to an agreement it's expected that Beedie would forgo the proposed ITS. Conversely, it is TransLink's understanding that from the City of Coquitlam's perspective the ITS is a suitable alternative if Beedie, Coquitlam and TransLink are unable to come to terms on a TSP agreement. From TransLink's perspective, Option 1 is preferred in that it would improve 159 service along the corridor as a whole, maintain existing TransLink service standards and would continue to provide customers access to an integrated transit network.

OPTION 2 – Fraser Mills Independent Transit Service

Service Characteristics

The *Fraser Mills Shuttle* would provide year-round service seven days a week between the development site in southeast Coquitlam and Braid SkyTrain Station in New Westminster. Per the City of Coquitlam's requirements, the *Shuttle* would have a 15-20 min frequency at peak times and 20-30 min off-peak.

Approximately 6.5 km in length, the fixed-route loop would provide a direct connection to Braid, where users could access both the Expo and Millennium SkyTrain lines, as well as a range of bus routes serving various local and sub-regional destinations. There are no stops proposed between Fraser Mills and Braid Station.

Impact on the Effectiveness of the Regional Transportation System

TransLink currently provides bus service in the area via the 159 (Coquitlam Central Station/Braid Station) and 791 (Haney Place/Braid Station), both travel along United Boulevard adjacent to Fraser Mills.

The 159 provides service between Coquitlam Central Station and Braid Station, travelling primarily along Lougheed Highway, Mary Hill Bypass, and United Boulevard. The route is considered Standard service as per TransLink's Transit Service Guidelines. The 791 provides sub-regional service between Maple Ridge and Braid Station, travelling primarily along Dewdney Trunk Road and Lougheed Highway. Defined as Basic service, the 791 does not operate on weekends and has limited evening service.

In terms of goods movement, United Boulevard and Lougheed Highway both serve industrial areas in southeast Coquitlam and are important goods movement corridors within the region. With as many as 10,000 new residents, as well as those travelling to the area for employment, it's likely both corridors will experience additional congestion as development occurs.

In general, staff do not expect the service to reduce the safety, reliability or effectiveness of the regional transportation system, but rather provide a complementary service that will mitigate to some degree the impacts of increased vehicle traffic within the local area. With no immediate plans for TransLink service expansion along the United Boulevard corridor, the proposed ITS would in the near-term expand the range of sustainable transportation options available to future residents, visitors and employees.

Impact on the Financial Viability of the Regional Transportation System

With service along United Boulevard the proposed ITS route would overlap current 159 and 791 routing and could affect future TransLink ridership growth; in particular, peak-period commuters travelling between Braid Station and employment destinations along United Boulevard.

However, while both the 159 and 791 serve bus stops along United Boulevard adjacent to Fraser Mills, TransLink ridership data indicates that the majority of current customers are travelling through the area and alighting either at Braid station or city centres in Port Coquitlam, Coquitlam and Maple Ridge.

Given that fares for non-Fraser Mills residents would be comparable to TransLink's, as well as the *Shuttle* having no proposed stops along on United Boulevard other than Fraser Mills, it's likely that the proposed ITS would have only a minor impact on existing 159 or 791 ridership.

In general, we anticipate that any negative impacts on revenue would be minor and that the impact on the financial viability of the regional transportation system would continue to be negligible throughout the currently proposed 3-year approval period. During that time, the *Shuttle's* direct connection to Braid Station would be an attractive option for future residents that would positively impact Expo Line ridership and most likely outweigh the anticipated negative minor negative impact on TransLink bus service.

RECOMMENDATION

Management recommends that the Board endorse Management efforts to negotiate with the City of Coquitlam and Beedie Development for an agreement for TransLink to provide increased service to the proposed Fraser Mills development as a Transit Service Partnership; and as a fall-back option to that preferred outcome, that the Board also approve the proposed *Fraser Mills Shuttle* to operate as an ITS, subject to the terms and conditions outlined in this report.

ATTACHMENTS

Attachment 1: *Fraser Mills Development Approval Process*

Attachment 2: *TransLink Correspondence (2018) – Amendment to the Citywide Official Community Plan*

TERMS AND CONDITIONS – Fraser Mills Shuttle ITS

The following standard conditions apply to all approved ITS:

1. TransLink reserves the right to review and/or re-evaluate approved services at any point in the future, and revoke approval if deemed appropriate.
2. No financial support will be provided by TransLink or any of its subsidiaries.
3. Approval to operate as an Independent Transit Service does not constitute approval with respect to any other federal, provincial and local transportation regulations, including safety.
4. TransLink may request changes in service provision (including, but not limited to, changes in route, frequency, stops, operating times, passenger access and/or revenue structure). Approval will only be granted if TransLink and the ITS provider agree to service terms.
5. Approved ITS must notify TransLink of any substantive, planned changes in service provision (including, but not limited to, changes in route, frequency, stops, operating times, passenger access and/or revenue structure) at least 60 days in advance of a planned change.
6. Each approved ITS must report annually to TransLink to confirm its service plan and report changes.
7. Use of TransLink-owned or operated infrastructure, including transit exchanges or TransLink bus stops, must be negotiated and approved in advance of use by ITS.
8. Use of TransLink or subsidiaries branding, language, or symbols, must be negotiated and approved in advance of use by ITS.
9. Approved ITS may be recognized or communicated by TransLink to improve the effectiveness of the regional transportation system as appropriate, and at TransLink's discretion.

Should the Board approve the *Fraser Mills Shuttle* to operate as an Independent Transit Service, Management recommends the following additional conditions be applied:

- That Beedie Development Group confirm with TransLink at least 60 days in advance of the first day of operation: stop locations, schedule and fare structure.
- That approval to operate is given for a period of 3 years from start of service, with option to extend pending compliance with terms and conditions and re-evaluation against ITS policy.
- That the service provider report ridership figures to TransLink annually.
- That the service operator will not make stops at and/or restrict access to any TransLink bus stops in the service area.
- That any violation to the terms and conditions could result in the suspension or termination of the ITS.

Fraser Mills Development Approval Process

The current development process began in December 2016, when Beedie Development (Beedie) submitted a formal development application for the Fraser Mills site. Given the site's existing industrial designation, this would require rezoning and a significant amendment to Coquitlam's Citywide Official Community Plan (CWOCP). Since then the City of Coquitlam has been working with Beedie to identify and resolve various preconditions necessary to advance the project, including the development and implementation of a comprehensive traffic demand management plan.

TransLink Perspective on Fraser Mills OCP Amendment

In January 2018, TransLink responded to the proposed amendment of Coquitlam's Citywide Plan relating to the Fraser Mills development site (2, 10, 12, and 14 King Edward Street, 1200 and 1316 United Boulevard). TransLink's feedback was provided based on a legislative requirement to comment on OCP amendments having implications for the region's transportation network, as well as our policy mandate to work with local governments towards more aligned local and regional planning.

Per our response (attached as Appendix B), the proposed development site and transit corridor lack many of the land-use elements necessary to support an effective and efficient transportation network, criteria which are used to identify and prioritize enhanced service. The site is not located within an Urban Centre or Frequent Transit Development Area as identified in the Regional Growth Strategy, or along TransLink's Frequent Transit Network (FTN). As such, the development site and corridor are not currently identified as an area for expansion in any of TransLink's current plans. This previous correspondence had noted a number of key issues which remain relevant today:

- The site is not located near rapid transit nor the FTN and is roughly a 2 km walk distance to Braid Station. TransLink's *Transit-Orientated Communities Design Guidelines* identify an 800 metre walk catchment for rapid transit. A walking distance in excess of 800 metres is unlikely to support transit as an everyday transportation option.
- The location is not well connected with other residential neighbourhoods and is challenging to access by sustainable modes of transportation (walking, cycling and transit).
- Additional traffic generation from the Fraser Mills development is likely to impact capacity on the Major Road Network (MRN) and the efficiency of regional goods movement. As resources to invest in the MRN are scarce, it's important that demand management measures such as the proposed ITS are utilized as a first step.

TransLink Correspondence (2018) – Amendment to the Citywide Official Community Plan



TransLink
400 - 287 Nelson's Court
New Westminster, BC V3L 0E7
Canada
Tel 778.375.7500
translink.ca

South Coast British Columbia
Transportation Authority

January 26th, 2018

Sean O'Melinn
Legislative Services Manager
City of Coquitlam
3000 Guildford Way
Coquitlam, BC V3B 7N2

Dear Mr. O'Melinn,

Re: Application for Amendment to the Citywide Official Community Plan (CWOCP) – 2, 10, 12 and 14 King Edward Street, 1200 and 1316 United Boulevard

Thank you for your letter dated January 2, 2018, providing TransLink with the opportunity for comment on the proposed amendment to the CWOCP relating to the properties collectively known as Fraser Mills. Our feedback is provided based on our legal requirement to comment on OCP amendments having implications for the region's transportation system, as well as our policy mandate to work with our partner agencies toward aligned local and regional planning.

The feedback provided in this letter follows TransLink's previous correspondence regarding the Fraser Mills site, dated September 16, 2005 and September 8, 2008 (attached). This previous correspondence had noted a number of key issues which remain relevant today:

- The site is not located near rapid transit nor the Frequent Transit Network (FTN). It is a minimum 1.75 km walk distance to Braid Station, whereas our [Transit-Oriented Communities Design Guidelines](#) identify 800 m as the walk catchment for rapid transit. TransLink supports the intensification of growth in the region's Urban Centres, Frequent Transit Development Areas, and along the FTN, in order to advance our [Regional Transportation Strategy](#) targets to have half of all trips made by walking, cycling and transit, and to reduce the distances driven by one-third.

- The location is not well connected with other residential neighbourhoods and is challenging to access by sustainable modes of transportation (walking, cycling and transit).
- Additional traffic generation from the development is likely to impact capacity on the Major Road Network (MRN) and regional goods movement.

Transit

Since our previous correspondence in 2008, the King Edward Street overpass has been constructed, improving road connectivity in this area. This investment has helped to better connect the site to surrounding areas via all transportation modes, including bus service. The overpass is currently being used by route 159, which is the only bus route serving the Fraser Mills site directly. The 159 generally operates on a 30-minute frequency, with frequency as high as 15 minutes during peak periods in the eastbound direction only. Since this service does not provide 15 minutes or better frequency throughout the day and evening, neither King Edward Street nor United Boulevard are considered part of the Frequent Transit Network (FTN). The nearest FTN connection is the Expo Line, accessed from Braid Station.

As part of the Phase 2 Investment Plan consultation, TransLink has engaged with the region's municipalities around potential improvements to various routes, including the 159 (please reference the attached report). The proposed improvements to the 159 are within the "minimum" scope of bus investments, but are still tentative and subject to confirmation via an approved Investment Plan. Even if this potential service improvement were implemented, the resulting 159 service would likely not be adequate to meet the demand created by the addition of as many as 10,000 new residents to the area (a 27 percent increase over the planned CWOC population of 8,800).

Walking and Cycling

The King Edward Street overpass features a multi-use path and bike lanes providing new north-south connections for pedestrians and cyclists. As a result, our prior comments around site access via active transportation have been addressed in part through infrastructure investment. However, despite this new north-south link, an east-west connection is still needed to provide improved walking and cycling connectivity to SkyTrain. We reiterate our support for the [planned Fraser River Greenway](#)—a segment of which will be constructed within the proposed development—and encourage the advancement of greenway design and implementation to coincide with site development. Even with an established network of safe pedestrian and bicycle routes in place, the connectivity challenges of the Fraser Mills site may continue to limit the potential for active transportation mode share over time.

Major Road Network and Goods Movement

The proposed development is adjacent to two segments of the Major Road Network (MRN): United Boulevard (east of King Edward Street) and King Edward Street (north of United Boulevard). These roads are also part of the designated truck route network, as is the segment of United Boulevard west of King Edward Street. The expected net traffic impact from the proposed development is an issue of significant concern for MRN capacity and regional goods movement in the Fraser Mills area. Given that the current proposal would add even more new residents to the site than was proposed in 2008, we anticipate even further increases to traffic generation than originally expected, on an order of magnitude consistent with a 27 percent increase in residential units (plus added recreational and waterfront destinations and new office space).

Capacity constraints for the MRN and regional goods movement are major challenges in the broader area surrounding Fraser Mills, particularly around the intersection of Brunette Avenue and Braid Street. Along with other proposed major new developments in this broader area, the cumulative impacts on the MRN and regional goods movement is of significant concern. Also of relevance is the future proposed redesign of the Highway 1 interchange at Brunette, and how that future potential change to the area's road network might impact (and be impacted by) the Fraser Mills development.

In accordance with the [South Coast British Columbia Transportation Authority Act](#), TransLink is required to approve any actions that would:

- Reduce the people moving capacity of the MRN; and/or
- Prohibit the movement of trucks on any road (except for provincial highways), regardless of whether or not that road is part of the MRN.

If it is determined that the proposed development includes any changes requiring TransLink approval per the above, please contact me to initiate the process to seek such approvals.

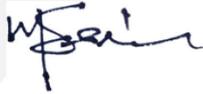
In our previous comments TransLink had encouraged the City and developer to harness additional lands (the "Westech" site) for essential "complete community" functions in order to reduce motor vehicle trips. Given that the current amendment includes a second additional parcel (1316 United Boulevard), we reiterate our support for a land use mix that reduces the need for external trips by providing essential destinations within the community.

The proposed development is located within the region's General Urban designated area and will provide a diversity of land uses in a compact new community. However, it also poses challenges for the regional transportation system, particularly in terms of goods movement and capacity on the Major Road Network.

Sean O'Melinn
January 26, 2018
Page 4 of 4

Thank you again for the opportunity to comment, and we look forward to continued coordination on this development with the City of Coquitlam. Please do not hesitate to reach out with questions or clarifications regarding this response.

Sincerely,

A handwritten signature in black ink, appearing to read 'M Seinen', written over a small white rectangular background.

Mark Seinen
Senior Planner, Partner Planning

cc: Heather McNell, Director of Regional Planning and Electoral Area Services,
Parks, Planning and Environment, Metro Vancouver

TO: Board of Directors

FROM: Geoff Cross, Vice President, Transportation Planning and Policy

DATE: March 2, 2020

SUBJECT: Interim Intermunicipal Business License for Ride-hailing Update

PURPOSE

This item is to provide an update to the progress to adopt an intermunicipal business license for ride-hailing within Region 1, which encompasses Metro Vancouver, Fraser Valley and Squamish-Lillooet regions.

The report is attached as Attachment 1 and was originally delivered to the Mayors' Council on February 27, 2020. Due to the rapidly evolving nature of this issue, Management will provide a verbal status update to complement this report.

ATTACHMENTS

Attachment 1: Report to Mayors' Council, February 27, 2020, "ITEM 3.1 – Interim Intermunicipal Business License for Ride-hailing Update"

TO: Mayors' Council on Regional Transportation – February 27, 2020
FROM: Geoff Cross, Vice President, Transportation Planning and Policy
DATE: February 19, 2020
SUBJECT: **ITEM 3.1 – Interim Intermunicipal Business License for Ride-hailing Update**

RECOMMENDATIONS:

That the Mayors' Council on Regional Transportation receive this report for information.

PURPOSE

To provide an update on the status of development of an intermunicipal business licence (IMBL) for ride-hailing in Region 1.

BACKGROUND

At the January 30, 2020, Mayors' Council meeting, staff provided an update on the status of the interim intermunicipal business license (IMBL) for ride-hailing in Region 1. At that time, the municipal staff IMBL working group were near-finalization of a draft proposed bylaw.

DISCUSSION

Several developments have occurred since the January 30 Mayors' Council meeting.

IMBL draft interim bylaw completed and under legal review

On January 31, 2020, the IMBL working group completed a draft interim IMBL bylaw and issued a memo to the Mayors' Council informing that the work has been complete.

Since January 31, the working group has been finalizing the bylaw language through legal review by the various participating municipalities.

Provincial Data Sharing

Shortly after the working group met on January 31, the City of Vancouver learned that the Province received approval from the BC Privacy Commissioner to provide ride-hailing and taxi data to public sector bodies, including municipalities and TransLink directly, at a granularity equivalent to what was being required by the IMBL (6 decimal place trip data).

This data sharing would be enabled through an information sharing agreement, which allows any municipality to sign on to access the raw data for their municipality (no individual data sharing agreement required).

The Province also confirmed that it will be able to also provide some simple reports for municipalities in the interim period, while it investigates the possibility of providing more detailed analyses in the future.

The working group convened on February 4 to discuss the implications of this development. The key implication is that **the data requirement may be removed from the proposed interim IMBL bylaw** and municipalities can instead request data from the Province directly. This reduces the level of effort on the part of both industry and the City of Vancouver, who was previously responsible for collecting and re-distributing the data to each municipality. The decision was made by the working group to make this change and not adjust the fees, which were felt to be modest. As a result, a slightly higher level of revenue sharing may be expected due to cost savings by streamlining data collection.

PTB approves two more operators for Region 1

On February 2, 2020, the Passenger Transportation Board (PTB) approved two more ride-hailing operators for Region 1 (Kabu and Apt Rides) and denied three applications (InOrbis, Transroad and TappCar). In total to date, five ride-hailing operators are now approved by the Province to operate in Region 1.

Municipal Participation and Council Schedules

The working group Secretariat have reached out to all the municipalities in Region 1 to inquire about whether or not there are plans to bring to council, and if so, when.

See Appendix A for a list of municipalities seeking to bring the proposed IMBL bylaw to council, and Appendix B for the council schedule, if known.

Key items to note are:

- 1) The City of Surrey is the first municipality to present the proposed bylaw to council, on February 24, 2020, followed by the City of Vancouver on Tuesday, February 25, 2020;
- 2) Staff from 25 municipalities in Region 1 intend to bring the bylaw to council for consideration.

APPENDIX A – REGION 1 PARTICIPATION

Municipal plans for taking proposed draft bylaw forward for Council consideration:

Municipality	Confirmed will take for council consideration	Date (if known)
Abbotsford	Yes	Monday, March 9, 2020
Anmore	Yes	Tuesday, March 3, 2020
Belcarra	No	N/A
Bowen Island	Yes	Monday, March 9, 2020
Burnaby	Yes	?
Chilliwack	Yes	?
Coquitlam	Yes	Monday, March 2, 2020
Delta	Yes	Monday, March 9, 2020
District of Lillooet	No	N/A
Harrison Hot Springs	Yes	Monday, March 16, 2020
Hope	No	N/A
Kent	No	N/A
Langley (City)	Yes	Monday, March 9, 2020
Langley (Township)	Yes	Monday, March 9, 2020
Lions Bay	Yes	March 3 or 17
Maple Ridge	Yes	Tuesday, March 10, 2020
Mission	?	?
New Westminster	Yes	Monday, March 9, 2020
North Vancouver (City)	Yes	Monday, March 9, 2020
North Vancouver (District)	Yes	Monday, March 2, 2020
Pemberton	No	N/A
Pitt Meadows	Yes	Tuesday, March 3, 2020
Port Coquitlam	Yes	Tuesday, March 10, 2020
Port Moody	Yes	Tuesday, March 10, 2020
Richmond	Yes	Monday, March 9, 2020
Squamish	Yes	Tuesday, March 3, 2020
Surrey	Yes	Monday, February 24, 2020
Tsawwassen First Nation	No	N/A
Vancouver	Yes	Tuesday, February 25, 2020
West Vancouver District	Yes	Monday, March 9, 2020
Whistler	Yes	Tuesday, March 3, 2020
White Rock	Yes	Monday, March 9, 2020

To: Board of Directors

From: Jennifer Breeze, Associate General Counsel & Corporate Secretary
Jennifer Johnston, Privacy Officer

Date: February 14, 2020

Subject: Update of Freedom of Information and Protection of Privacy Bylaw

PROPOSED RESOLUTION:

That the TransLink Board of Directors:

- A. Introduces and reads a first, second and third time the *South Coast British Columbia Transportation Authority Freedom of Information and Protection of Privacy Bylaw Number 133-2020*, attached in this report as Attachment 1; and
 - B. Reconsiders and finally adopts the *South Coast British Columbia Transportation Authority Freedom of Information and Protection of Privacy Bylaw Number 133-2020*, attached in this report as Attachment 1.
-

EXECUTIVE SUMMARY

This report presents the updated Freedom of Information and Protection of Privacy Bylaw Number 133-2020 (the “Bylaw”) for TransLink Board’s approval. The new Bylaw Number 133-2020 is largely a housekeeping update to the existing Bylaw Number 20-2001 to remove delegations of duties and powers no longer required to be made by bylaw under the *Freedom of Information and Protection of Privacy Act* (FOIPPA). There is no change to the designated head of TransLink for purposes of FOIPPA, it remains the CEO of TransLink. There is no change to the fee schedule for applicants requesting access to records.

PURPOSE

The purpose of this report is to detail the revisions required to update the Freedom of Information and Protection of Privacy Bylaw to meet the current requirements of FOIPPA and to enact the Bylaw.

BACKGROUND

In British Columbia, provincial public bodies are subject to FOIPPA. FOIPPA confers a number of duties, powers, and functions on the “head” of a public body. For many public bodies, the head is designated in Schedule 2 of FOIPPA. TransLink, however, is considered a “local government body” (a subset of public body) under FOIPPA and, therefore, must by bylaw designate a person as the head pursuant to s. 77 of FOIPPA. Section 77 also provides that a local government body may set fees to be paid by applicants for access to records.

Power to make bylaws

- 77** A local public body, by bylaw or other legal instrument by which the local public body acts,
- (a) must designate a person or group of persons as the head of the local public body for the purposes of this Act...
 - (c) may set any fees the local public body requires to be paid under section 75.

Pursuant to s. 66 of FOIPPA, the head of a public body may then delegate their FOIPPA duties, powers and functions to any person. Typically, such delegation is to the Privacy Officer and Manager, Information Access for day-to-day operations.

Delegation by the head of a public body

- 66** (1) The head of a public body may delegate to any person any duty, power or function of the head of the public body under this Act, except the power to delegate under this section.
- (2) A delegation under subsection (1) must be in writing and may contain any conditions or restrictions the head of the public body considers appropriate.

Previously under FOIPPA, s. 66 did not apply to a local government body, so any delegation by the head of TransLink had to be authorized by bylaw.

DISCUSSION

The requirements of s. 77 are currently fulfilled by TransLink's existing Freedom of Information and Protection of Privacy Bylaw Number 20-2001 which designates TransLink's CEO as the head and sets out a fee schedule. However, there have been a number of FOIPPA changes since the adoption of existing Bylaw 20-2001 that are addressed in the new Bylaw 133-2020:

- Updating Greater Vancouver Transportation Authority to South Coast British Columbia Transportation Authority; and
- The s. 66 delegation restriction for local government bodies was repealed and today the head of a local government body does have the authority under s. 66 to delegate any of the head's powers or functions. Delegations need only be in writing and do not have to be authorized by bylaw. Bylaw 133-2020 reflects this change and removes the existing delegations from the bylaw.

A blacklined version of the proposed Bylaw 133-2020, compared to Bylaw 20-2001, is attached as Attachment 2 for reference.

RECOMMENDATION

It is recommended that the Board approve and adopt the attached Bylaw Number 133-2020.

ATTACHMENTS

Attachment 1: Bylaw Number 133-2020

Attachment 2: Blackline of Bylaw Number 133-2020, compared to Bylaw 20-2001.

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

BYLAW NUMBER 133-2020

***A Bylaw related to the Freedom of Information and Protection of
Privacy Act (British Columbia)***

SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY

BYLAW NUMBER 133-2020

A Bylaw related to the *Freedom of Information and Protection of Privacy Act* (British Columbia).

WHEREAS the *Freedom of Information and Protection of Privacy Act (British Columbia)* (the “Act”) applies to local public bodies;

AND WHEREAS the South Coast British Columbia Transportation Authority is a local public body for the purposes of the Act;

AND WHEREAS the Act requires a local public body to designate a person or group of persons as the head of the local public body for the purposes of the Act (the “Head”);

AND WHEREAS the Act enables a local public body to set any fees the local public body requires to be paid under section 75 of the Act;

NOW THEREFORE the Board of Directors of the South Coast British Columbia Transportation Authority enacts as follows:

1. South Coast British Columbia Transportation Authority Bylaw Number 20, 2001 is hereby replaced by this Bylaw.
2. This Bylaw shall be cited as “South Coast British Columbia Transportation Authority Freedom of Information and Protection of Privacy Bylaw Number 133-2020.”
3. The Chief Executive Officer of the South Coast British Columbia Transportation Authority is designated as the Head for the purposes of the Act.
4. Fees for services rendered in providing information to an applicant making a request for the purposes of the Act shall be in accordance with Schedule 1 attached hereto.
5. This Bylaw comes into force and takes effect on March 26, 2020.

READ A FIRST, SECOND, AND THIRD TIME this 26th day of March, 2020.

RECONSIDERED, PASSED AND FINALLY ADOPTED this 26th day of March, 2020.

Tony Gugliotta, Chair

Jennifer Breeze, Associate General Counsel and Secretary

**SCHEDULE 1 attached to and forming part of
SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY
BYLAW NUMBER 133-2020**

SCHEDULE OF MAXIMUM FEES

- | | | |
|----|--|--|
| 1. | For applicants other than commercial applicants: | |
| | (a) for locating and retrieving a record..... | \$7.50 per ¼ hour after the first 3 hours, |
| | (b) for producing a record manually..... | \$7.50 per ¼ hour, |
| | (c) for producing a record from a machine readable record..... | \$16.50 per minute for cost of use of central mainframe processor and all locally attached devices plus \$7.50 per ¼ hour for developing a computer program to produce the record, |
| | (d) for preparing a record for disclosure and handling a record.... | \$7.50 per ¼ hour, |
| | (e) for shipping copies..... | actual costs of shipping method chosen by applicant, |
| | (f) for copying records | |
| | (i) photocopies of computer printouts..... | \$0.25 per page (8.5" x 11" - 8.5" x 14")
\$0.30 per page (11" x 17"), |
| | (ii) floppy disks..... | \$10.00 per disk, |
| | (iii) Computer tapes..... | \$40.00 per tape, up to 2400 feet,
\$10.00 per fiche, |
| | (iv) microfiche..... | \$25.00 per roll, |
| | (v) 16 mm microfilm duplication..... | \$40.00 per roll, |
| | (vi) 35 mm microfilm duplication..... | \$0.50 per page, |
| | (vii) microfilm to paper duplication..... | \$5.00 to produce negative |
| | (viii) photographs - (colour or black and white)..... | \$12.00 each for 16" x 20"
\$9.00 each for 11" x 14"
\$4.00 each for 8" x 10"
\$3.00 each for 5" x 7", |
| | (ix) photographic print of textual, graphic or cartographic record (8" x 10" black and white)..... | \$12.50 each, |
| | (x) hard copy laser print, B/W, 300 dots per inch..... | \$0.25 each, |
| | (xi) hard copy laser print, B/W, 1200 dots per inch..... | \$0.40 each, |
| | (xii) hard copy laser print, colour..... | \$1.65 each, |
| | (xiii) Photomechanical reproduction of 105 mm cartographic record/plan..... | \$3.00 each, |
| | (xiv) slide duplication..... | \$0.95 each, |
| | (xv) plans..... | \$1.00 per square metre, |
| | (xvi) audio cassette duplication..... | \$10.00 plus \$7.00 per ¼ hour of recording |
| | (xvii) video cassette (1/4" or 8mm) duplication..... | \$11.00 per 60 minute cassette plus \$7.00 per ¼ hour of recording; \$20.00 per 120 minute cassette plus \$7.00 per ¼ hour of recording, |
| | (xviii) video cassette (1/2") duplication..... | \$15.00 per cassette plus \$11.00 per ¼ hour of recording, and |
| | (xix) video cassette (3/4") duplication..... | \$40.00 per cassette plus \$11.00 per ¼ hour of recording. |
| 2. | For commercial applicants | |
| | for each service listed in item 1..... | actual cost of providing that service. |

~~GREATER VANCOUVER~~

~~**SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY.**~~

BYLAW NUMBER ~~20, 2001~~133-2020

~~**A** (Consolidated for convenience only, amended to include Greater Vancouver Transportation Authority **Bylaw** No. 31-2003 effective September 14, 2001) **related**~~

~~**A** Greater Vancouver Transportation Authority Bylaw to revise and consolidate bylaws relating **to the**~~

~~**Freedom of Information and Protection of Privacy Act (British Columbia)**~~

~~**SOUTH COAST BRITISH COLUMBIA TRANSPORTATION AUTHORITY**~~

~~**BYLAW NUMBER 133-2020**~~

~~**A Bylaw related to the Freedom of Information and Protection of Privacy Act (British Columbia).**~~

WHEREAS the *Freedom of Information and Protection of Privacy Act (British Columbia)* (the “Act”) applies to local public bodies;

AND WHEREAS the ~~Greater Vancouver~~South Coast British Columbia Transportation Authority is a local public body for the purposes of the Act;

AND WHEREAS the Act requires a local public body to designate a person or group of persons as the head of the local public body for the purposes of the Act (the “Head”);

~~AND WHEREAS the Act enables a local public body to authorize any person to perform any duty or exercise any function under the Act of the person or group of persons designated as the Head of the local public body;~~

AND WHEREAS the Act enables a local public body to set any fees the local public body requires to be paid under section 75 of the Act;

NOW THEREFORE the Board of Directors of the ~~Greater Vancouver~~South Coast British Columbia Transportation Authority ~~in open meeting assembled~~ enacts as follows:

1. South Coast British Columbia Transportation Authority Bylaw Number 20, 2001 is hereby replaced by this Bylaw.
2. This Bylaw shall be cited as “~~Greater Vancouver~~South Coast British Columbia Transportation Authority Freedom of Information and Protection of Privacy Bylaw Number ~~20, 2001~~”.133-2020.”
3. The Chief Executive Officer of the ~~Greater Vancouver~~South Coast British Columbia Transportation Authority is designated as the Head for the purposes of the Act.
- ~~3. The General Counsel of the Greater Vancouver Transportation Authority is authorized to perform all the duties and exercise all of the functions of the Head for the purposes of the Act.~~
- ~~4. The President of Coast Mountain Bus Company Ltd. is authorized to perform all the duties and exercise all of the functions of the Head for the purposes of the Act in relation to Coast Mountain Bus Company Ltd. records in the custody of Coast Mountain Bus Company Ltd.~~
- ~~5. The Manager, Information and Privacy of the Greater Vancouver Transportation Authority is authorized to perform the duties and functions of the Head in accordance with Schedule 1 attached hereto.~~

4. Fees for services rendered in providing information to an applicant making a request for the purposes of the Act shall be in accordance with Schedule ~~21~~ attached hereto.

~~Greater Vancouver Transportation Authority Bylaws Number 6, 1999 and Number 11, 1999 are repealed.~~

5. This Bylaw comes into force and takes effect on ~~September 14, 2001~~ March 26, 2020.

READ A FIRST, SECOND, AND THIRD TIME this ~~14th~~ 26th day of ~~September 2001~~ March, 2020.

RECONSIDERED, PASSED AND FINALLY ADOPTED this ~~14th~~ 26th day of ~~September, 2001~~ March, 2020.

Original Signed

~~George Puil, Chair~~

~~Gigi Chen Kuo,~~

~~Tony Gugliotta, Chair~~

~~Jennifer Breeze, Associate General Counsel and Secretary~~

SCHEDULE 1

~~attached to Greater Vancouver Transportation Authority
Freedom of Information and Protection of Privacy Bylaw
Number 20, 2001 forming part of~~

~~Delegation of Authority to Manager, Information and Privacy~~

~~Freedom of Information and Protection of Privacy Act~~

<u>Description</u>	<u>Sections</u>
Information rights and how to exercise them....	4, 6, 7, 8, 9, 10, 11
Exceptions.....	12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22
Notice to third parties.....	23, 24
Collection, protection and retention of personal information by public bodies.....	26, 27, 28, 29, 30, 31
Use and disclosure of personal information by public bodies.....	32, 33, 34, 35
Reviews and complaints.....	56, 57, 59
Freedom of Information directory.....	69
Policy manuals and records.....	70, 71
Public record index.....	72
Fees.....	75

SCHEDULE 2
~~to Greater Vancouver~~ **SOUTH COAST BRITISH COLUMBIA TRANSPORTATION**
AUTHORITY ~~Freedom of Information and Protection of~~
~~Privacy~~
BYLAW 20, 2001 **NUMBER 133-2020**

SCHEDULE OF MAXIMUM FEES

1. For applicants other than commercial applicants:
 - (a) for locating and retrieving a record..... \$7.50 per ¼ hour after the first 3 hours,
 - (b) for producing a record manually..... \$7.50 per ¼ hour,
 - (c) for producing a record from a machine readable record..... \$16.50 per minute for cost of use of central mainframe processor and all locally attached devices plus \$7.50 per ¼ hour for developing a computer program to produce the record,
 - (d) for preparing a record for disclosure and handling a record.... \$7.50 per ¼ hour,
 - (e) for shipping copies..... actual costs of shipping method chosen by applicant,
 - (f) for copying records
 - (i) photocopies of computer printouts..... \$0.25 per page (8.5" x 11" - 8.5" x 14")
\$0.30 per page (11" x 17"),
 - (ii) floppy disks..... \$10.00 per disk,
 - (iii) Computer tapes..... \$40.00 per tape, up to 2400 feet,
\$10.00 per fiche,
 - (iv) microfiche..... \$25.00 per roll,
 - (v) 16 mm microfilm duplication..... \$40.00 per roll,
 - (vi) 35 mm microfilm duplication..... \$0.50 per page,
 - (vii) microfilm to paper duplication..... \$5.00 to produce negative
 - (viii) photographs - (colour or black and white)..... \$12.00 each for 16" x 20"
\$9.00 each for 11" x 14"
\$4.00 each for 8" x 10"
\$3.00 each for 5" x 7",
 - (ix) photographic print of textual, graphic or cartographic record (8" x 10" black and white)..... \$12.50 each,
 - (x) hard copy laser print, B/W, 300 dots per inch..... \$0.25 each,
 - (xi) hard copy laser print, B/W, 1200 dots per inch..... \$0.40 each,
 - (xii) hard copy laser print, colour..... \$1.65 each,
 - (xiii) Photomechanical reproduction of 105 mm cartographic record/plan..... \$3.00 each,
 - (xiv) slide duplication..... \$0.95 each,
 - (xv) plans..... \$1.00 per square metre,
 - (xvi) audio cassette duplication..... \$10.00 plus \$7.00 per ¼ hour of recording
 - (xvii) video cassette (1/4" or 8mm) duplication..... \$11.00 per 60 minute cassette plus \$7.00 per ¼ hour of recording; \$20.00 per 120 minute cassette plus \$7.00 per ¼ hour of recording,
 - (xviii) video cassette (1/2") duplication..... \$15.00 per cassette plus \$11.00 per ¼ hour of recording, and
 - (xix) video cassette (3/4") duplication..... \$40.00 per cassette plus \$11.00 per ¼ hour of recording.
2. For commercial applicants
 - for each service listed in item 1..... actual cost of providing that service.