#SMARTER TOGETHER

SCC Finalist Application

Submitted to Infrastructure Canada
by the City of Vancouver and City of Surrey
March 5, 2019

SMART
IDEAS
START
HERE

smart
cities
challenge

Dear Minister Champagne:

Re: The City of Vancouver and City of Surrey Smart Cities Challenge Final Submission

On behalf of the City of Vancouver and the City of Surrey, we are excited to submit this final application for the Smart Cities Challenge for your consideration.

This proposal is the culmination of more than 20 months of hard work by engaged City teams and residents to identify and develop innovative new solutions that will tackle pressing challenges in two important focus areas in our respective communities: mobility and safety.
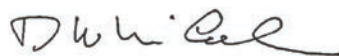
In response to our Call for Innovation, many private sector companies — including Fortune 500 firms, small and medium businesses, and local startups — submitted proposals that seamlessly integrate smart city technologies to increase mobility and improve the safety of our existing transportation systems.

To inspire and engage our communities about the future of autonomous vehicle shuttles, we brought the first Electric Autonomous (ELA) Shuttle Experience to the public in British Columbia.

Our Cities are excited to see the transformation that is underway. With a $50 million investment through the Smart Cities Challenge, we are confident that we will not only move people more efficiently and enhance travel experiences, but also reduce the number of transportation-related collisions to zero.

We look forward to your review of our submission and to taking the next step with Infrastructure Canada to create a safer and more mobile future for our citizens.

Sincerely,

Doug McCallum
Mayor, City of Surrey

Kennedy Stewart
Mayor, City of Vancouver

CITY OF
VANCOUVER

CITY OF
SURREY

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GLOSSARY

ADR	Architecture Development and Review
API	Application Programming Interface
AURORA	Automotive Testbed for Reconfigurable and Optimized Radio Access
AV	Autonomous Vehicle
BC	British Columbia
CaaP	City as a Platform
CCTV	Closed Circuit Television
CEB	Community Employment Benefit
CFI	Call for Innovation
CHATR	Access to Health & Active Transportation Research Lab
CMVSS	Canadian Motor Vehicle Safety Standards
CSA	Cloud Security Alliance
CUTRIC	Canadian Urban Transit Research & Innovation Consortium
ELA	Electric Autonomous Shuttle
FOIPPA	Freedom of Information and Protection of Privacy Act
GDDP	Green & Digital Demonstration Program
GHG	Greenhouse Gas
GPS	Global Positioning System
IAP2	International Association for Public Participation
ICBC	Insurance Corporation of British Columbia
INFC	Infrastructure Canada
ISO	International Organization for Standardization
ITS	Intelligent Transportation System
IoT	Internet of Things
JPIT	Joint Project Implementation Team
LGBTQ+	Lesbian, Gay, Bisexual, Trans, Gender Diverse, and Queer
LiDAR	Light Detection and Ranging
LTE	Long-Term Evolution
LPWAN	Low-Power Wide-Area Network
MaaS	Mobility as a Service
MOTI	Province of British Columbia Ministry of Transportation Infrastructure
MoU	Memorandum of Understanding
MVSA	Motor Vehicle Safety Act
NACTO	National Association of City Transportation Officials
NIST	National Institute of Standards and Technology
NTCIP	National Transportation Communications for ITS Protocol
NYC	New York City
OE	Owner's Engineer
OIPC	Office of the Information and Privacy Commissioner of BC
PCI DSS	Payment Card Industry Data Security Standard
PET	Post Encroachment Time
PMO	Program Management Office
PMP	Project Management Professional
PPIA	Preliminary Privacy Impact Assessment
PIPEDA	Personal Information Protection and Electronic Documents Act
RCMP	Royal Canadian Mounted Police
SFU	Simon Fraser University
START	Sustainable Transportation Action Research Team
STRA	Security Threat and Risk Assessments
TCO	Total Cost of Ownership
TTC	Time to Collision
UBC	University of British Columbia
VEC	Vancouver Economic Commission
YVR	Vancouver International Airport (International Air Transport Association code)

EXECUTIVE SUMMARY

Vancouver and Surrey's #SmarterTogether program is a bold vision to create Canada's first two collision free multi-modal corridors. Our Cities will introduce a suite of smart city technologies in two different urban contexts that will transform city infrastructure and establish new, connected ways for residents to travel safely, connect socially, and enjoy an increased quality of life.

The two collision-free corridors — **Vancouver's South False Creek Innovation Corridor and the Surrey Innovation Corridor** — will achieve a number of outcomes for our residents. The corridors will result in improved safety, reduced emissions, healthier communities, increased availability of mobility options, more socially connected communities, increased accessibility to the community, higher people-moving capacity, and an enhanced travel experience.

These ambitious aims will be achieved through the implementation of a portfolio of advanced smart city technologies that will work in concert in real time. A collection of **81 project proposals from 55 vendors** – including those from four top telecommunications firms, two global software leaders, one major global automaker, and three autonomous vehicle shuttle suppliers — will be further refined to create the optimal mix of technologies that will bring our corridors to fruition.

Among these integrated technologies will be:

- **The Smart City Integration Hub**, a software platform that represents the cornerstone of corridor security, privacy, and interoperability.

- **Autonomous vehicle shuttles and last mile mobility vehicles** that ensure safe travel and provide abundant and accessible mode shift opportunities for all residents.

- **Intelligent traffic system devices**, including sensors and controls embedded in traffic infrastructure, that collect data and enable real-time responses to specific traffic situations.

The combined operation of these technologies will improve our residents' lives in a multitude of ways. The availability of new mobility options will provide accessibility to community amenities and will reduce social isolation and feelings of loneliness in our communities. Conflict and collision-reducing technologies like dynamic

crosswalks and adaptive traffic signals will make travel safer, especially for those people in groups disproportionately involved in accidents. Wayfinding applications for smartphones will enable residents to plan the safest multi-modal routes through the corridors. Intuitively-designed digital kiosks placed at popular spots will ensure everyone has access to corridor services and information, even if they do not have a smartphone.

To help us deliver these benefits, vendors have offered nearly **$36.5 million in private sector contributions** that our Cities can use to leverage Smart Cities Challenge funding. Our Cities will contribute **an additional $15 million at least** to support corridor development.

The #SmarterTogether program is the result of unprecedented joint engagement. Our Challenge Statement was crafted from insights distilled from over 149,000 interactions with our residents. We spoke with residents, experts, and leaders of communities to explore how the corridors could be designed to be appealing and accessible to all. We arranged corridor technology demonstrations, including **autonomous vehicle shuttle ride demos in Vancouver and Surrey** that provided **over 4000 passenger rides to residents** who are enthusiastic about the technology's promise.

We will continue to focus on **accessibility and inclusivity,** and will take an intersectional gender lens approach to designing our corridors, aligning our efforts with other federal investments, and further cementing Canada's commitment towards **achieving greater gender equality.**

Our progress toward realizing the promise of the corridors **will be measurable.** Our Cities consulted renowned academics at the **University of British Columbia and Simon Fraser University** to develop a robust model

that links our implementations and activities to #SmarterTogether outcomes. This model employs multiple clear performance indicators that will track the trajectory toward safer, greener, healthier, and more socially connected communities.

The privacy and security of our residents' data is a top priority for the #SmarterTogether program. All technology projects will be compliant with *BC's Freedom of Information and Protection of Privacy Act.* Collected data will be anonymized at the earliest opportunity and will remain under City control, to be used only for #SmarterTogether program projects. Our open-by-default approach will make non-personal and anonymized datasets available to all. Robust information security risk management processes and a *secure by design* approach to project development will ensure that our residents' data remains safe.

With our two Cities creating smart mobility corridors in two distinct contexts — one urban and one suburban — **our proposal is replicable by design.** We intend the #SmarterTogether program to be **a replicability resource for other Canadian cities** seeking to duplicate our success. Our shared knowledge, technology roadmaps, and novel procurement and project evaluation tools are valuable resources that will be made available through our Learning Library. Key lessons learned about our successful long-term collaboration will save other cities valuable time and resources in their pursuits to create smart mobility corridors, and ultimately, may save lives.

The #SmarterTogether program is **ambitious and achievable.** It is not a call for incremental progress. It is an opportunity to fundamentally transform our Cities' infrastructure in a way that will save lives, improve quality of life, and provide a replicable model for Canadian cities that wish to bring the same outcomes to their communities.

VISION 1

1.1 Challenge Statement

Surrey and Vancouver will implement Canada's first two collision-free multi-modal transportation corridors, leveraging autonomous vehicles and smart technologies to demonstrate the path to safer, healthier and more socially connected communities while reducing emissions, improving transportation efficiency and enhancing livability in the face of rapid growth and traffic congestion. #SmarterTogether

1.2 An ambitious vision with meaningful, attainable outcomes

Vancouver and Surrey are poised to implement Canada's first two collision-free multi-modal corridors. By leveraging smart city technology, our Cities will create safer, healthier, and more socially connected communities for our residents. At the same time, we will create a catalogue of replicable projects and processes that provide a roadmap for cities across Canada to follow.

The two corridors will be the result of a portfolio of distinct technology projects that constitute the #SmarterTogether program. These technologies will work individually and in concert to achieve each of the following outcomes for our residents over five years:

- improved safety, including zero collisions;
- reduced emissions;
- healthier communities;
- increased availability of mobility options;
- more socially connected communities;
- increased accessibility to the community;
- higher people-moving capacity; and
- enhanced travel experience.

> **"** This is the type of initiative that could be replicated to other municipalities. In our small town, we only have two main throughways, so the ability to make them safer, smarter, accessible and more efficient would make a tremendous difference in the lives our residents and everyone else who travels through."
>
> **- Raman Braich, Manager of Information Services, City of Port Moody**

1.3 A program driven by real need uncovered through authentic conversations

Our focus on these outcomes came after an unprecedented joint engagement effort by our Cities during the Spring 2018 Application Phase of the Smart Cities Challenge. Through more than 149,000 interactions, our residents revealed that mobility and safety were the two main focus areas primed for smart city innovation.

Their insight is supported by our Cities' road safety data. **Each year, 77,000 collisions occur in Vancouver and Surrey,** resulting in 35 fatalities, 450 serious injuries, and 22,800 minor injuries on average.

It is a problem that changes lives, impacts every demographic, and is shared almost universally by cities across Canada.

1.4 Two corridors in different urban contexts powered by the same smart mobility technology

Our two Cities' joint vision is to use one collection of technology projects to achieve similar outcomes in two different city contexts: a busy urban area in Vancouver and a densifying suburban area in Surrey. Each corridor has its own specific features, traffic flows, and opportunities for enhanced safety and mobility.
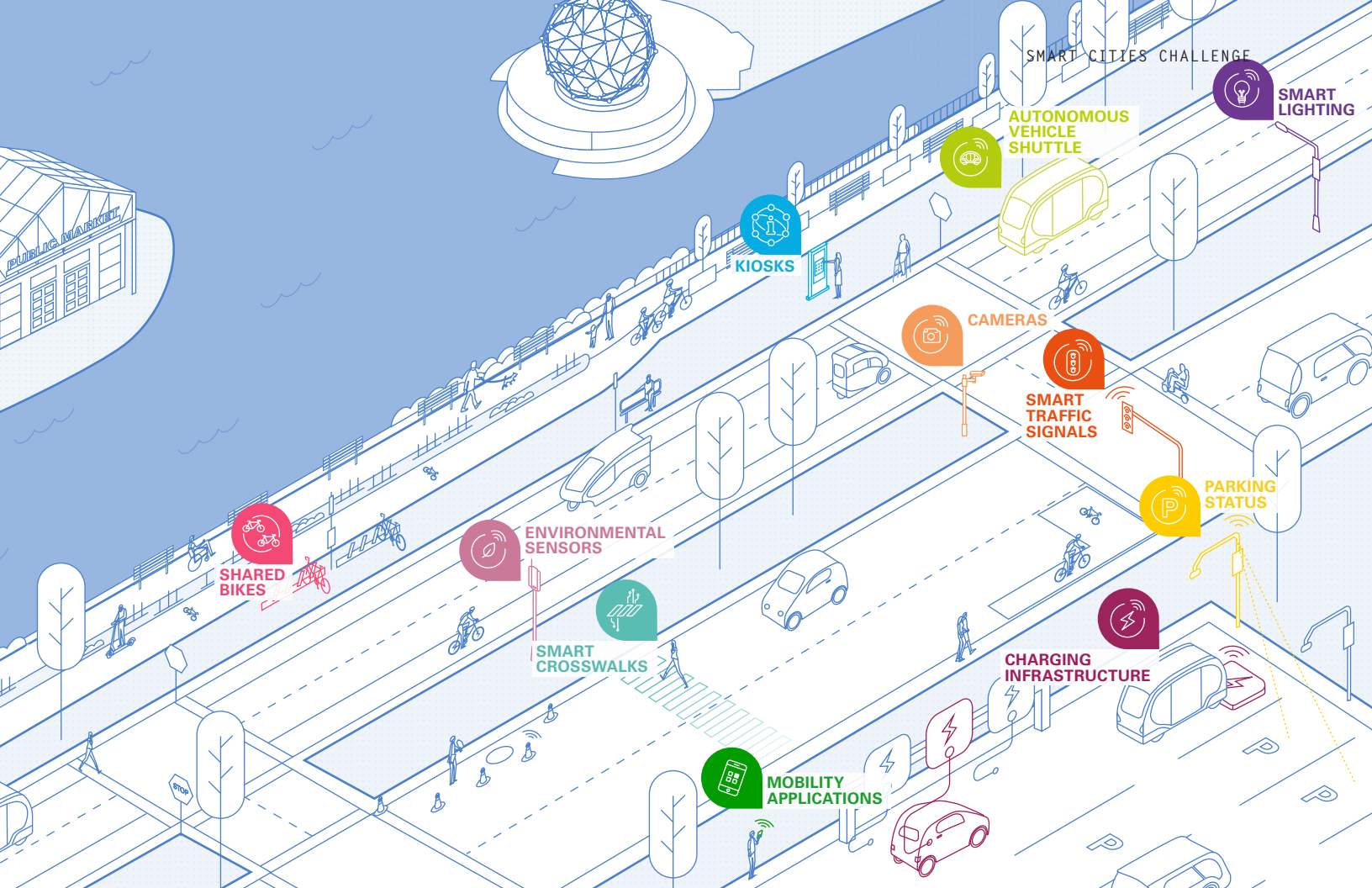
SMART
LIGHTING

AUTONOMOUS
VEHICLE
SHUTTLE

KIOSKS

CAMERAS

SMART
TRAFFIC
SIGNALS

PARKING
STATUS

SHARED
BIKES

ENVIRONMENTAL
SENSORS

SMART
CROSSWALKS

CHARGING
INFRASTRUCTURE

MOBILITY
APPLICATIONS

STOP

Figure 1.A The South False Creek Innovation Corridor

VANCOUVER'S SOUTH FALSE CREEK INNOVATION CORRIDOR

Vancouver's three-kilometer South False Creek Innovation Corridor comprises three parallel routes that link popular tourist destinations Granville Island and Science World, and connect with the False Creek South and Olympic Village communities. The location is a center of Vancouver activity, tourism, and traffic. It includes three major commercial districts, many popular tourist destinations, an emerging technology innovation hub, and a major health precinct and hospital site.

Three routes will comprise the corridor, each with a mix of connected technologies that suit its distinct features, road conflict zones, and traffic volumes. The three routes are:

1 The Complete Streets route

A multi-lane vehicle and transit arterial including West 4th, West 6th, and West 2nd Avenues

2 The Sustainable Modes AV route

A local street — with transit and varying walking and cycling infrastructure — that includes the Seaside Bypass route along Lamey's Mill Road, Charleson Park, Moberly Road, Commodore Road, and West 1st Avenue. **The AV shuttle will be deployed along this route in years 2-4** of the #SmarterTogether program.

3 The Active Transportation route

A waterfront walking and cycling path along the Seaside Greenway/Seawall between Granville Island and Science World
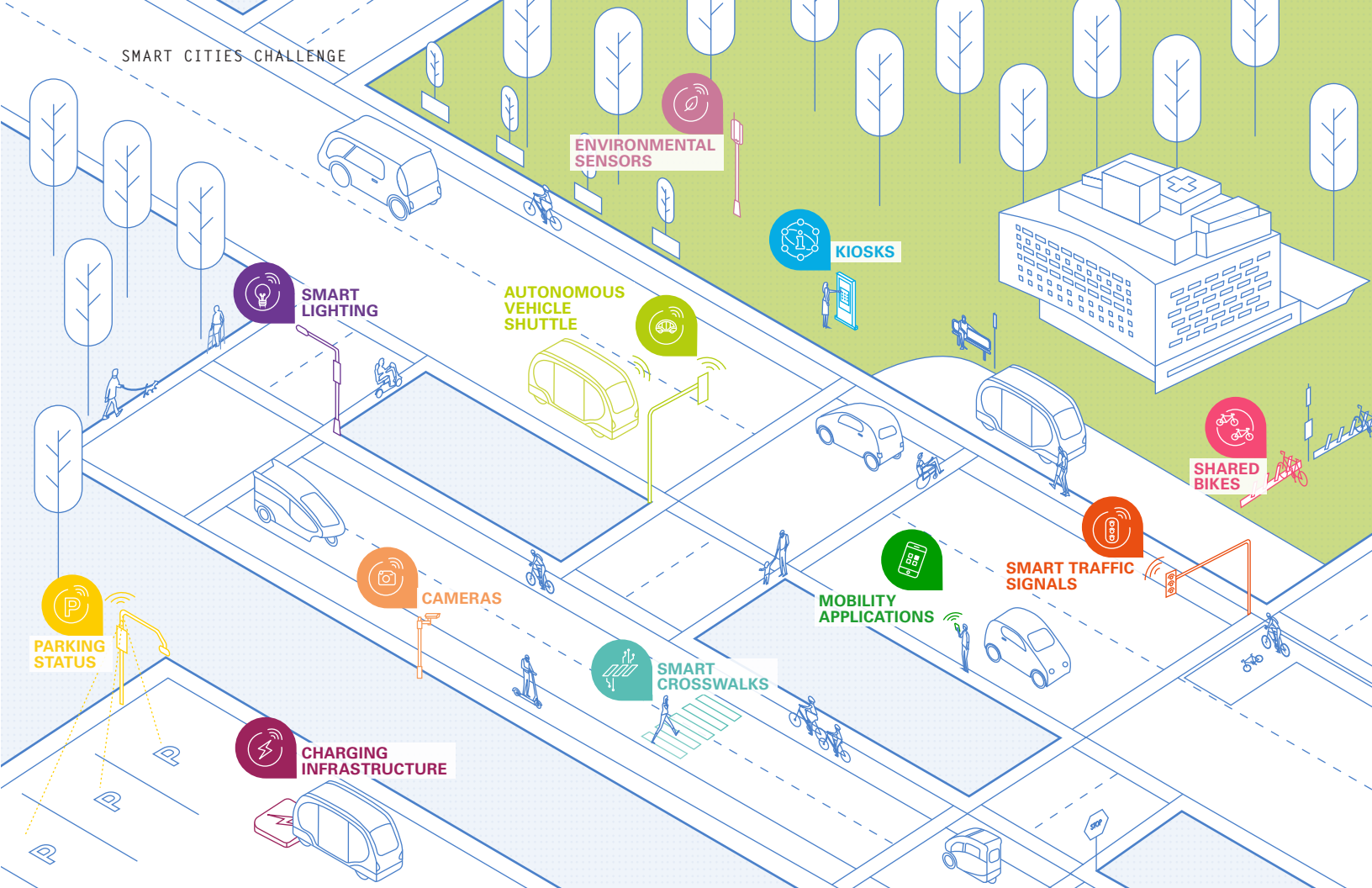
ENVIRONMENTAL SENSORS

KIOSKS

SMART LIGHTING

AUTONOMOUS VEHICLE SHUTTLE

SHARED BIKES

CAMERAS

SMART TRAFFIC SIGNALS

MOBILITY APPLICATIONS

PARKING STATUS

SMART CROSSWALKS

CHARGING INFRASTRUCTURE

Figure 1.B Surrey Innovation Corridor

SURREY'S INNOVATION CORRIDOR

Surrey's Innovation Corridor comprises two routes in areas that are rapidly growing. The two routes are:

1 The University Drive route

This 1.2-kilometer route connects Surrey Central SkyTrain Station with Gateway SkyTrain Station. **The route will provide an opportunity to pilot AV shuttles and connected mobility technologies**, with AV shuttles transporting passengers **within the first two years** of the #SmarterTogether program.

The route links many high-traffic nodes, including Simon Fraser University's Surrey campus, City Hall, City Centre Library, Civic Plaza, Kwantlen Polytechnic University's Civic Plaza campus, Central City Mall, the Fraser Health Authority headquarters, a new sustainable energy environmental engineering centre, a 560,000 square foot commercial office complex, and a

regional multi-modal transportation hub that includes Surrey Central SkyTrain Station, car-share sites, a dedicated Fraser Health employee shuttle, and the region's second busiest bus exchange.

2 The Innovation Boulevard route

This 4.5-kilometer route comprises a mix of local streets, collector streets, and high volume arterials in a residential area that is transforming into a high density health innovation precinct.

Important features along the Innovation Boulevard route include Surrey Memorial Hospital (the second largest in B.C. and site of the province's busiest emergency room), the Jim Pattison Outpatient Surgery Centre (a $237 million facility that includes over 50 clinics and services), 10 additional Fraser Health Authority facilities, low income and social housing buildings, and RCMP E-Division Headquarters.

1.5 Procuring the corridor technologies through an innovative call

Through our innovative Call for Innovation (CFI) procurement instrument, we called for technologies that could bring the corridors to fruition.[1] Our approach was unconventional; we did not prescribe which technologies were required. Instead, we wanted to source the best ideas from around the world, and provide all innovative smart city vendors – those with ongoing public partnerships and validated technologies as well as those developing experimental technologies – with the chance to present their technologies for evaluation and be included in the portfolio of projects that will achieve the #SmarterTogether outcomes.

1.6 Premier auto makers, global tech companies, and innovative SMEs answered our call

The CFI generated a massive response from the vendor community: we received 172 vendor submissions. After two stages of a rigorous three-stage evaluation process that our teams designed — and that we will share with other cities in our Library of Learning — we narrowed the field to a shortlist of 81 project proposals from 55 vendors. This shortlist includes vendors with impressive track records of implementing large and small scale communications, mobility, and smart city technology. It includes a major global automaker, three AV shuttle suppliers

with implementation experience, four top telecommunications firms, and two global software leaders. The shortlist of vendors can be found in the Confidential Annex.[2]

After consultation with two premier engineering consulting firms and a cross-section of internal departments in both Cities, we have determined that the implementation of a mix of these project proposals will enable the achievement of our outcomes in both corridors, and will provide a replicable methodology for other Canadian cities to use.

We will select the final vendors to carry out each corridor project once we complete a final evaluation stage, thorough technical due diligence, and public consultation. This will be undertaken immediately upon announcement of the Smart Cities Challenge award.

1.7 Leveraging the Smart City Challenge award: $36.5 million in vendor contribution offers

Along with the vendor proposals came offers amounting to nearly $36.5 million in private sector contributions, including:

- over $13 million for intelligent traffic system technologies;[3]
- over $7.5 million for autonomous vehicle (AV) shuttle technology;
- over $7 million for communication infrastructure;
- over $4 million for last mile mobility solutions; and

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[1] The Call for Innovation (CFI): To streamline the procurement process and build flexibility into proposal development, we introduced the CFI in the Application Stage of the Smart Cities Challenge. This instrument enabled our team to quickly source the best technology and ideas from top vendors around the world. The result of employing the CFI is a portfolio of projects that not only provide the technological elements necessary to build the corridors, but that enable services that go even beyond the aspirations informing our initial vision, boosting the ambition of the program in the process.

[2] We received 13 proposals related to technical, communications, and transportation consulting services. We did not include these in our shortlist of project proposals. Since the content of these consulting proposals may enhance project implementations once we complete final evaluation of corridor proposals and select vendors, we have filed them for future review and potential use.

[3] Described in section 2.2.1.1 *Smart City Integration Hub* in Chapter 2: Technology.

- over $1 million for interactive technology projects for residents.[4]

These contributions will enable our Cities to leverage Infrastructure Canada's $50 million award, providing the potential for a greater number of project implementations, more comprehensive engagement and onboarding efforts, and ultimately, cities that are all the more safe and livable for their residents.

1.8 Our Cities will contribute at least $15 million to support the #SmarterTogether program

Our Cities have earmarked a minimum of $15 million in capital in our budgets for foundational infrastructure that will support the #SmarterTogether program. This includes capital for roadways to be rebuilt and reconfigured to Complete Streets, All Ages & Abilities Access, and Vision Zero design standards, for fibre optic and communications infrastructure, and for cybersecurity and privacy protection systems.

1.9 Sharing our learnings will enable cities across Canada to achieve the same outcomes

Replicability and scalability are inherent in our plan. Our two Cities have come together to implement technologies that will achieve the same outcomes in different city contexts. This alone demonstrates that cities across Canada can implement all or part of our corridors by following the same blueprint. All of our validated tools and processes — including the Call for Innovation, our three-gate project evaluation process, survey questions and related engagement material, governance structure, inter-city collaboration tools, and

the results of our ongoing evaluation of products — are valuable and applicable to other municipalities, and will be made available in the #SmarterTogether Library of Learning.

1.10 #SmarterTogether is ambitious and achievable for Vancouver, Surrey, and other Canadian cities

The Smart City Challenge galvanized our two Cities, our residents, a large collection of technology vendors, and academia to embrace a bold vision in which a mix of smart mobility technologies can be combined to improve and save lives.

The pathway from implementation to outcomes is well-known, the technologies are exciting, and the Cities are ready. Two leading universities advised us as we modeled how the technology projects could combine to attain our Challenge Statement outcomes. The suite of technologies our vendors offer are validated and operating around the world today. Our Cities have extensive experience building large-scale infrastructure projects, and creating leading digital and technology strategies.

The corridors are ambitious and achievable. **The #SmarterTogether program is not a call for incremental progress. It is an opportunity to build a large piece of the smart, safer city of tomorrow, and to provide our residents with the benefit of that city today.**

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[4] Described in section 2.2.2.3 *Citizen experience* in Chapter 2: Technology.

TECHNOLOGY²

2.1 Introduction & approach

For people moving through the corridors, interaction with the technology will be seamless. As a person rides an AV shuttle, she may note that the safe navigation to her destination is done autonomously, but may not perceive the shuttle's constant communication with traffic signals and other infrastructure. When a senior crosses the street, he may notice the crosswalk that adjusts the timer to his pace, but may not see the sensors that inform it.

These seamless experiences result from the elegant management of a number of technologies, many of which remain "under the hood" and invisible to the user. However, to understand how the corridors can create these experiences and achieve our program outcomes, it is important to understand each discrete technology involved.

The technologies that comprise the corridors are organized into four categories:

- **Foundational technologies:** The communication infrastructure, computing hardware, and software that underpin all connected corridor technologies and enable interoperability among them. Foundational technologies are separated into two sub-categories: the Smart City Integration Hub and communication infrastructure.
- **Connected technologies:** Validated devices and software systems with which people in the corridors interact, which monitor corridor status and activity, and which convert copious corridor data into intuitive insight. Connected technologies include five sub-categories: ITS infrastructure, AV shuttles, citizen experience, last mile mobility, and data & analytics.
- **City as a Platform technologies:** Early stage and experimental technologies that leverage existing city infrastructure.
- **Supporting technologies:** Projects with a technology aspect that bolster implementation efforts through support related to regulation, resilience, and engagement.

In general, our approach involves the sequential implementation of technologies over five years. We will implement foundational technology projects during the first two years of the #SmarterTogether program. These projects will provide the infrastructure that enables the communication and interoperability of connected technology projects, which together constitute the engine of our outcomes. The exception to this implementation sequence is the University Drive Pilot route, where all connected technologies — including AV shuttles — will begin implementation immediately and will operate within the first two years of the program.

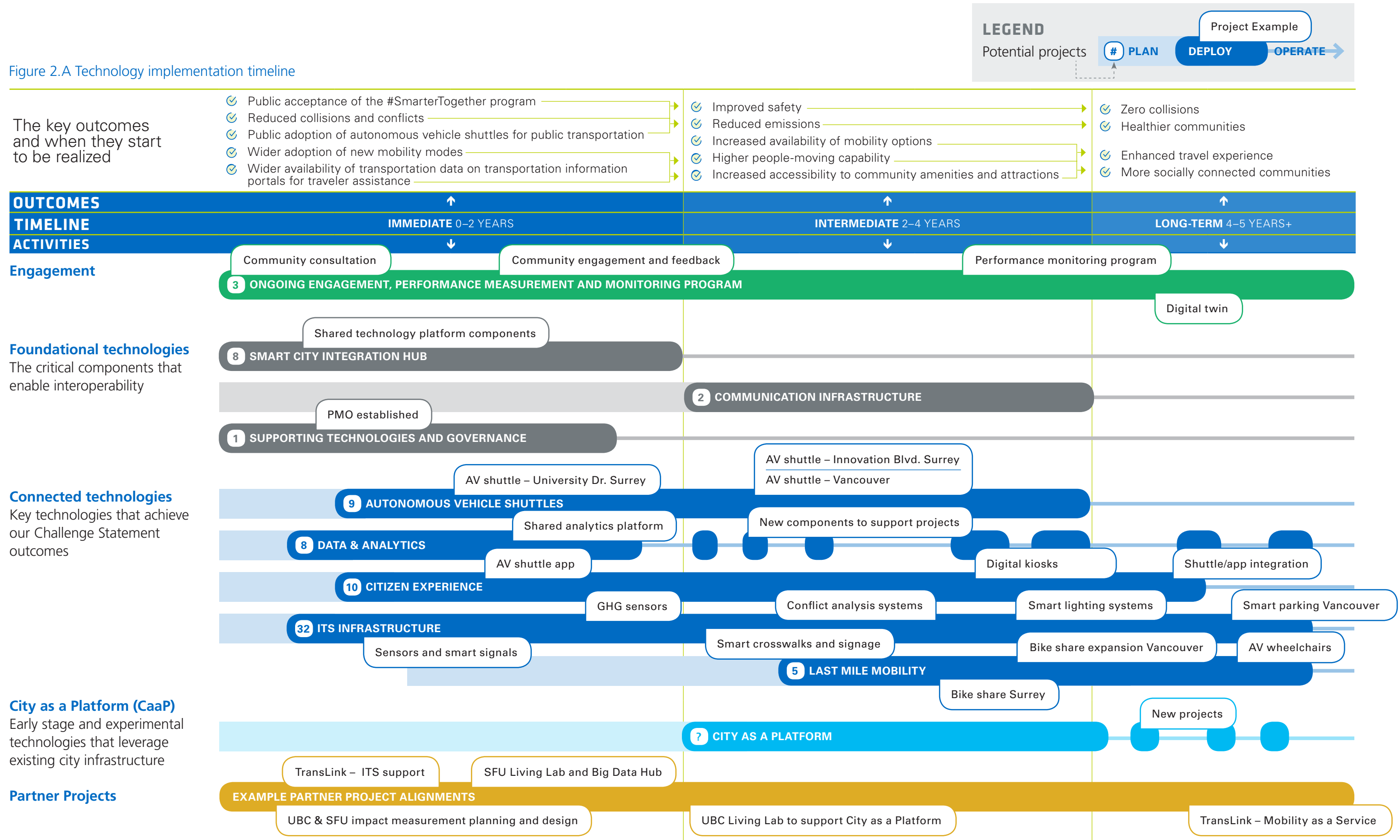Figure 2.A displays the implementation timelines for each of the technology categories.

> **❝** I live here with my wife and baby daughter and we have watched your little shuttle go back and forth and it makes us smile!
>
> You have my support for anything that moves people quietly, without pollution, slowly, safely, through our neighbourhood!"
>
> **- Darren S., a Vancouver resident commenting on our ELA demonstration**

Figure 2.A Technology implementation timeline

The key outcomes and when they start to be realized

- ☑ Public acceptance of the #SmarterTogether program
- ☑ Reduced collisions and conflicts
- ☑ Public adoption of autonomous vehicle shuttles for public transportation
- ☑ Wider adoption of new mobility modes
- ☑ Wider availability of transportation data on transportation information portals for traveler assistance

- ☑ Improved safety
- ☑ Reduced emissions
- ☑ Increased availability of mobility options
- ☑ Higher people-moving capability
- ☑ Increased accessibility to community amenities and attractions

- ☑ Zero collisions
- ☑ Healthier communities
- ☑ Enhanced travel experience
- ☑ More socially connected communities

OUTCOMES	↑	↑	↑
TIMELINE	**IMMEDIATE** 0–2 YEARS	**INTERMEDIATE** 2–4 YEARS	**LONG-TERM** 4–5 YEARS+
ACTIVITIES	↓	↓	↓

Engagement

Community consultation

Community engagement and feedback

Performance monitoring program

3 ONGOING ENGAGEMENT, PERFORMANCE MEASUREMENT AND MONITORING PROGRAM

Digital twin

Foundational technologies
The critical components that enable interoperability

Shared technology platform components

8 SMART CITY INTEGRATION HUB

2 COMMUNICATION INFRASTRUCTURE

PMO established

1 SUPPORTING TECHNOLOGIES AND GOVERNANCE

Connected technologies
Key technologies that achieve our Challenge Statement outcomes

AV shuttle – University Dr. Surrey

AV shuttle – Innovation Blvd. Surrey

AV shuttle – Vancouver

9 AUTONOMOUS VEHICLE SHUTTLES

Shared analytics platform

New components to support projects

8 DATA & ANALYTICS

AV shuttle app

Digital kiosks

Shuttle/app integration

10 CITIZEN EXPERIENCE

GHG sensors

Conflict analysis systems

Smart lighting systems

Smart parking Vancouver

32 ITS INFRASTRUCTURE

Sensors and smart signals

Smart crosswalks and signage

Bike share expansion Vancouver

AV wheelchairs

5 LAST MILE MOBILITY

Bike share Surrey

City as a Platform (CaaP)
Early stage and experimental technologies that leverage existing city infrastructure

New projects

? CITY AS A PLATFORM

Partner Projects

TransLink – ITS support

SFU Living Lab and Big Data Hub

EXAMPLE PARTNER PROJECT ALIGNMENTS

UBC & SFU impact measurement planning and design

UBC Living Lab to support City as a Platform

TransLink – Mobility as a Service

2.2 The Corridor Technologies

2.2.1 FOUNDATIONAL TECHNOLOGIES

Foundational technologies include two categories of projects:

1 **The Smart City Integration Hub**

2 **Communication infrastructure**

1 **2.2.1.1 Smart City Integration Hub**

The Smart City Integration Hub consists of the computing hardware and software that integrates and operates the corridor systems and devices by ensuring data moves seamlessly between smart city components. The Hub and its services represent the cornerstone of corridor security, privacy, and interoperability.

The Hub will be designed with a service-oriented architecture approach. This involves loose coupling of applications, enabling simple and effective application integration and straightforward changes when required. It also removes the risk of potentially expensive code modifications. This architecture will provide high-level resilience, and will allow systems, devices, and applications to connect directly with one another. The architecture will allow data to be shared among all corridor components without one needing to intimately understand all the others. This facilitates the further scaling of connected solutions across the Cities.

The Smart City Integration Hub will be used by both Vancouver and Surrey. It will include a mix of on-premise and cloud-hosted applications and services. During the planning and design process, we will identify and prioritize open source enterprise software options where possible.

The evaluation of the 172 vendor submissions we received and discussions with other Cities revealed that no integration standard for mobility-related connected technologies has yet emerged. It has become evident that Cities have a major role to play as integrators and facilitators of these technologies. The #SmarterTogether Smart City Integration Hub will enable this, and will provide a tool that all Canadian cities can duplicate as they introduce connected mobility technologies to make their communities safer, greener, healthier, and more connected as well.

The Hub will perform and combine **eight key services** to achieve interoperability, privacy, security, and seamless integration. These services are listed in Table 2.A.

Table 2.A Smart City Integration Hub services

SERVICE	DESCRIPTION
Transformation services	**Ensures interoperability of data** that is exchanged among various components.
API services	**Makes corridor data available** to City departments, third party developers, and the community.
Aggregation services	**Aggregates and normalizes corridor data** for use by downstream applications and services (e.g. analytics and consumer applications).
Policy services	**Examines data sets** against predefined policies, and **prohibits downstream misuse of data** through aggregation and anonymization services.
Anonymization services	**Anonymizes data** prior to delivery to downstream applications and services.
Security services	**Ensures authentication, authorization, data authenticity, data integrity and data confidentiality.**
Edge ITS services	**Enables data collection by sensors and data processing** within devices (i.e., edge computing).
Protocol services	**Ensures communication interoperability** and independence among various components through real-time conversion of distinct and/or proprietary protocols to common protocols.

The Smart City Integration Hub architecture layers are displayed in Figure 2.B, and a visual representation of the Hub is displayed in Figure 2.C.

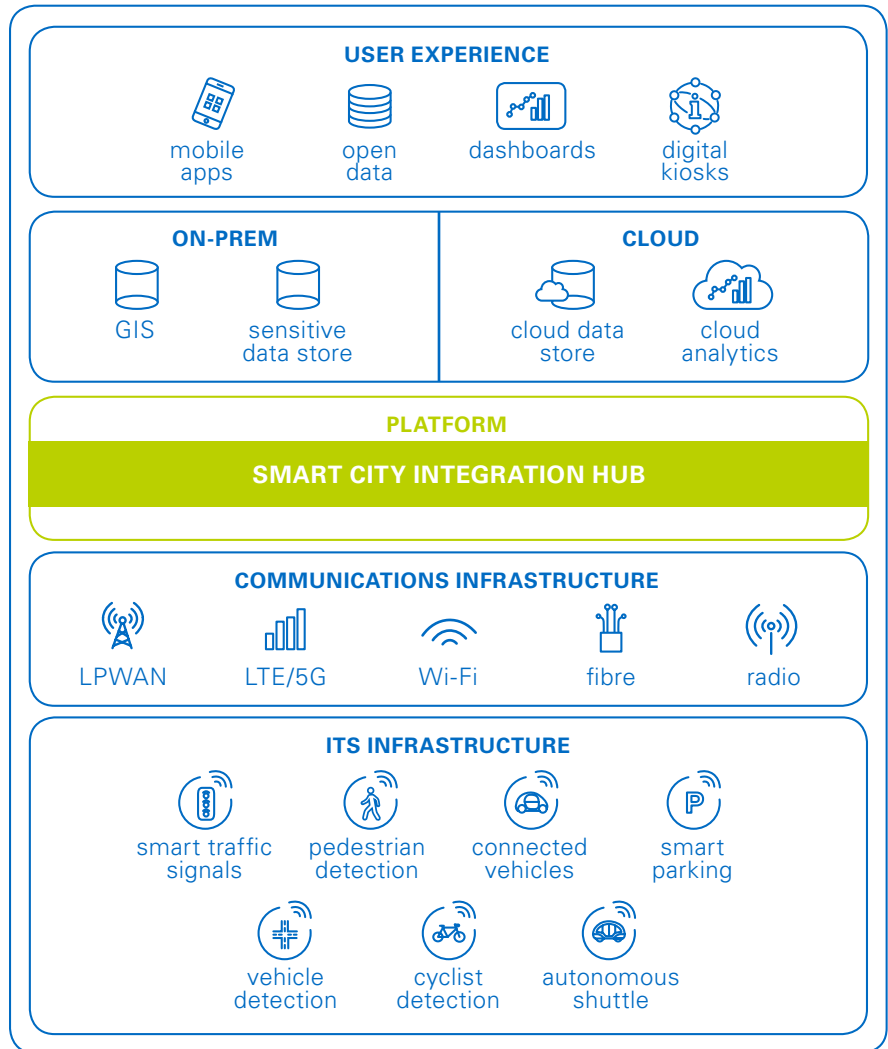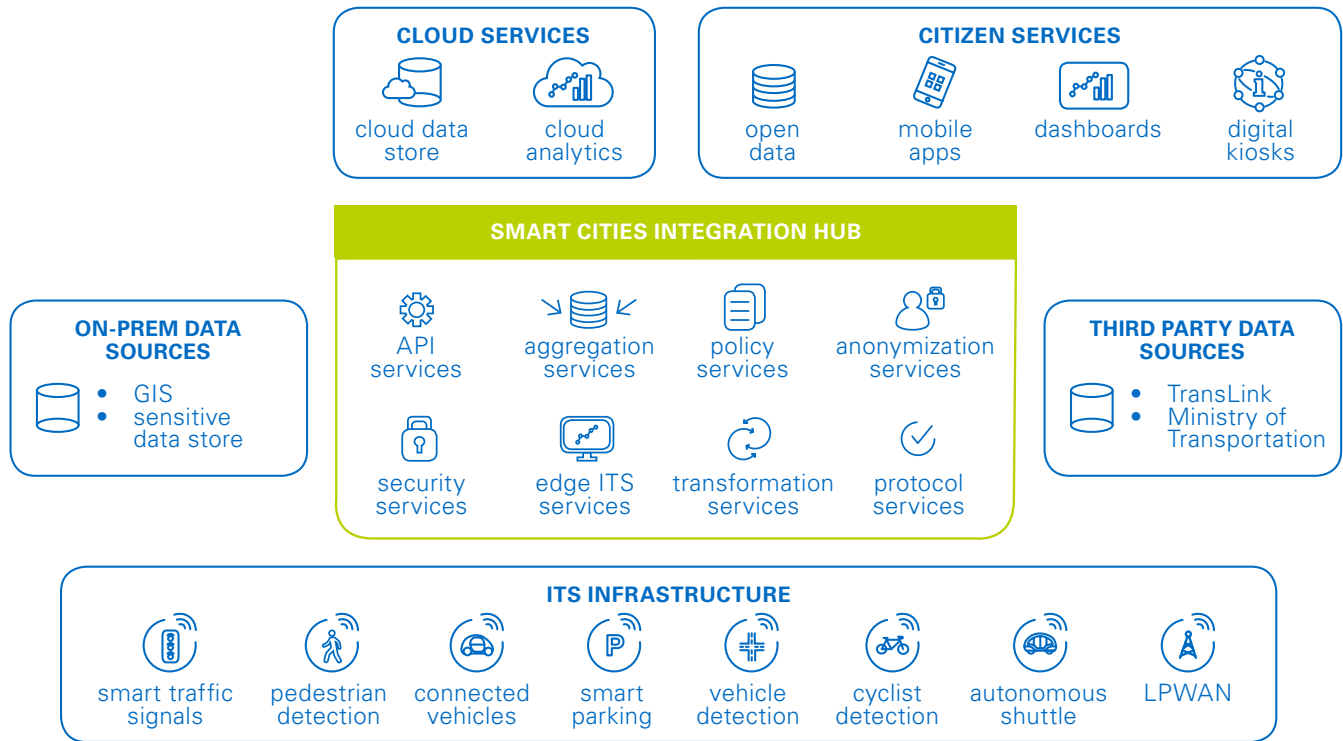Figure 2.B. Smart City Integration Hub architecture layers

USER EXPERIENCE

mobile apps | open data | dashboards | digital kiosks

ON-PREM

GIS | sensitive data store

CLOUD

cloud data store | cloud analytics

PLATFORM

SMART CITY INTEGRATION HUB

COMMUNICATIONS INFRASTRUCTURE

LPWAN | LTE/5G | Wi-Fi | fibre | radio

ITS INFRASTRUCTURE

smart traffic signals | pedestrian detection | connected vehicles | smart parking

vehicle detection | cyclist detection | autonomous shuttle

Figure 2.C. Smart City Integration Hub

CLOUD SERVICES

cloud data store

cloud analytics

CITIZEN SERVICES

open data

mobile apps

dashboards

digital kiosks

SMART CITIES INTEGRATION HUB

API services

aggregation services

policy services

anonymization services

ON-PREM DATA SOURCES

- GIS
- sensitive data store

security services

edge ITS services

transformation services

protocol services

THIRD PARTY DATA SOURCES

- TransLink
- Ministry of Transportation

ITS INFRASTRUCTURE

smart traffic signals

pedestrian detection

connected vehicles

smart parking

vehicle detection

cyclist detection

autonomous shuttle

LPWAN

2 2.2.1.2 Communication infrastructure

Communication infrastructure ensures seamless and secure communication between corridor devices and the Smart City Integration Hub, and among the devices themselves.

The communication infrastructure in each of the corridors is well-positioned to be leveraged for smart city projects. Each corridor has a high degree of connectivity provided by high speed fibre and radio networks that are owned by the Cities. The corridors also currently have cellular (LTE) and Wi-Fi connectivity, and there is potential within the corridors to test and deploy 5G cellular and low-power wide-area network (LPWAN) technologies. These will be supplemented by communication infrastructure from telecommunications vendors.

2.2.2 CONNECTED TECHNOLOGIES

Connected technologies include the software and devices that people in the corridors use and that monitor, interpret, and display corridor activity. This technology category is separated into five sub-categories:

Intelligent transportation system (ITS) infrastructure

Autonomous vehicle shuttles

Citizen experience

Last mile mobility

Data & analytics

2.2.2.1 ITS infrastructure

ITS infrastructure in the corridors will include sensors and controls embedded in traffic infrastructure that collect data and enable adaptive real-time responses to specific traffic situations. Devices will monitor and manage traffic, distinguish among mobility types, detect pedestrian movement, enable traffic signal phasing and digital signage, adjust street lighting, and transmit corridor information to wayfinding applications and kiosks.

Implementing advanced data analytics and a comprehensive array of ITS infrastructure in our corridors will result in vehicle collision reduction, improved traffic efficiency, effective monitoring of traffic mode demand, and real-time adjustments that accommodate various vehicle types, pedestrian behaviours, and traffic situations.

Types of ITS infrastructure, their functions, and the corridors in which they will be implemented are listed in Table 2.B.

> **Vehicle-to-everything technology: the sensors behind the scenes**
>
> A foundational element of safer vehicle movement is rapidly emerging "V2X" [vehicle-to-everything] technology. V2X technology allows vehicles to send information to infrastructure and other vehicles. Data from movement sensors can inform traffic and crosswalk signals when to change to best protect vulnerable road users such as cyclists and pedestrians. Analytics software can discover conflicts in traffic signal timing and vehicle movement, provide expedited movement for emergency and transit vehicles, and send alerts to drivers about hazards on the roadway ahead. V2X technology has a major role to play in the creation of collision-free corridors.

Table 2.B ITS infrastructure across the two corridors

INFRASTRUCTURE & DESCRIPTION	CORRIDORS				
	CITY OF VANCOUVER			CITY OF SURREY	
	South False Creek Innovation Corridor			Surrey Innovation Corridor	
	Active Transportation route	Sustainable Modes AV route	Complete Streets route	Innovation Boulevard route	University Drive route
Traffic signal controls with timing adjustment, related sensors, and software control Enables emergency vehicle, transit, bicycle, and pedestrian priority at traffic signals.		✓	✓	✓	✓
Cameras, related sensors, and software for analysis and control Collects traffic data. Distinguishes among powered vehicles, non-powered vehicles, and pedestrians.	✓	✓	✓	✓	✓
Signals with communication capability Enables AV shuttle and other connected vehicle broadcasts from traffic signals.		✓ [5]	✓	✓	✓
Kiosks, applications, variable message signs, software for control and interaction, and user interfaces Provides and displays wayfinding information.	✓	✓	✓	✓	✓
Smart lighting systems, software for control, and user interfaces Enables real-time lighting adjustment according to vehicular, cyclist, and pedestrian activity.	✓	✓	✓	✓	✓

[5] Depends on feasibility.

Table 2.B continued

INFRASTRUCTURE & DESCRIPTION	CORRIDORS				
	CITY OF VANCOUVER			CITY OF SURREY	
	South False Creek Innovation Corridor			Surrey Innovation Corridor	
	Active Transportation route	Sustainable Modes AV route	Complete Streets route	Innovation Boulevard route	University Drive route
Equipment on vehicles or infrastructure to aid parking status and enforcement, and related sensors Enables parking systems that monitor parking spaces, provide parking information to corridor users, and automate enforcement. Alternatively, expansion of automated enforcement.		✓	✓	✓	
Smart traffic signals Enables phasing specifically for AV shuttles.		✓		✓	✓
Traffic signals and infrastructure with communication capability, software for control, and user interfaces Enables designated vehicle priority at traffic signals (transit, AV shuttles, and emergency vehicles).		✓	✓	✓	✓
Sensors embedded in traffic signals and infrastructure, with communication capability, software for control, and user interfaces Controls traffic signals and warning devices.		✓	✓	✓	✓

Table 2.B continued

INFRASTRUCTURE & DESCRIPTION	CORRIDORS				
	CITY OF VANCOUVER			CITY OF SURREY	
	South False Creek Innovation Corridor			Surrey Innovation Corridor	
	Active Transportation route	Sustainable Modes AV route	Complete Streets route	Innovation Boulevard route	University Drive route
Environmental sensors Monitors greenhouse gas emissions in specific locations.	✓	✓	✓	✓	✓
Smart crosswalk detectors, lighting, active signs, and radio Enables dynamic crosswalks that detect and adapt to various pedestrian situations.	✓	✓	✓	✓	✓
Last mile vehicles, sensors, charging infrastructure, docks, software for control, and user interfaces Enables implementation of shared bikes, scooters, and other last mile solutions.	✓	✓		✓	

2.2.2.2 Autonomous vehicles shuttles

Autonomous vehicle shuttles (AVs) interpret and navigate their surroundings with limited or no human intervention. The sensors required for this navigation are embedded in the vehicles. Data is processed for navigation by hardware within the vehicle and transmitted to relevant traffic infrastructure controls and the Smart City Integration Hub. Each AV shuttle will be fully accessible and able to accommodate numerous passengers.

The first AV shuttles will be implemented on the University Drive route during the first two years of the #SmarterTogether program. These AVs will run on a dedicated roadway, interacting with traffic at four signalized intersections. Between years two and four of the program, AV shuttles will be implemented on the Sustainable Modes AV route and Innovation Boulevard route. AV shuttles on these routes will interact with mixed traffic and pedestrians and will interface with corridor traffic signals.

The AV shuttles will communicate with a central scheduling and management system using cellular technology, and will offer scheduled or on-demand transportation, picking up and dropping off riders at pre-determined locations. Although they do not require drivers, each #SmarterTogether AV shuttle deployment will typically have an onboard host or operator during its first years of operation. The decision to include a host was inspired by a suggestion made during a Finalist Phase engagement activity. This host will provide a critical human element as new riders get used to the new technology, and will provide wayfinding, security, and assistance for those with limited mobility.

Automated vehicles have turned the corner

In recent years, electrified autonomous vehicle shuttles have evolved from conceptual test vehicles to proven technology, successfully operating in over 20 countries and 80 cities around the world. The EasyMile "ELA" vehicle used for Vancouver and Surrey's highly popular demo rides has safely carried over 300,000 passengers thousands of kilometres without incident..

2.2.2.3 Citizen experience

Citizen experience technologies will provide information and features to residents through mobile applications, websites, dynamic message signs, and digital kiosks located strategically throughout the corridors. The information and features — available in multiple languages — will relate to travel options, corridor conditions, AV shuttle and last mile vehicle reservations, and travel-related payment options. Accessibility to all will be a core principle of our user experience designs. To support travellers without smartphones, digital kiosks located in high traffic areas will provide the same information and capabilities as websites and mobile applications.

Smartphone apps, websites, and digital kiosks will:

provide information on:

- current AV shuttle schedules and arrival times at designated stops;
- availability of last mile solutions, such as bike share;
- incentives for mode change;
- SkyTrain and bus schedules, fares, and general information;
- wayfinding; and
- multi-modal route optimization through the corridor

and allow travellers to:

- book on-demand requests for AV shuttles;
- reserve last mile services, such as bike share; and
- provide online payment for transit, AV shuttle, and last mile vehicle fares.

2.2.2.4 Last mile mobility

Last mile mobility technologies will enable residents to travel between main transit hubs in the corridors (e.g., SkyTrain stations and multi-modal transfer points) and their final destinations. These solutions will include a mix of shareable bicycles, e-bikes, small electric vehicles, car share and ride hailing services, and autonomous short-distance wheelchair navigation systems.[6]

2.2.2.5 Data & analytics

Advanced analytics software will be used to derive useful insights from the continuous flow of data that will be generated by ITS infrastructure and connected technologies in the corridors. Custom dashboards and visualizations will present data, insights, and performance against key objectives. All data — with the exception of those required by privacy laws and guidelines to remain private[7] — will be available through the City of Vancouver's Open Data Portal and the City of Surrey's Open Data Catalogue.

> **Compass Card integration can make mode shift frictionless**
>
> Our TransLink partnership provides an opportunity to leverage their highly successful Compass Card access/payment system as we expand mobility options to include vehicles such as e-bikes, car-share, and AV shuttles. There are over one million Compass Card users in the region. These users made 407 million transit boardings with Compass Cards in 2017.

2.2.3 CITY AS A PLATFORM TECHNOLOGIES

City as a Platform refers to the concept of turning traditional city infrastructure into an open ecosystem in which academic and private sector technology projects can be deployed and tested to validate technologies, provide services, or gather environmental data. The City as a Platform concept is rising in prominence among urban planners, and is forming the basis for a novel type of public-private partnership that delivers new revenue streams to municipalities. In the #SmarterTogether program, the City as a Platform technology category will focus on the implementation of early-stage and experimental technologies that leverage our Cities' infrastructure.

A major source of City as a Platform projects will be the Green & Digital Demonstration Program (GDDP), which has been operated by the Vancouver Economic Commission

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[6] It should be noted that AV shuttles can also be considered last-mile vehicles. For the purposes of our program, we have determined that AV shuttles will comprise a technology category of its own. However, we recognize the AV shuttle's utility at providing a 'last mile solution'.
[7] Described further in Chapter 7: Data & Privacy.
[8] www.vancouvereconomic.com/gddp/

(VEC) since 2014.[8] GDDP provides a way for promising early-stage technology companies to implement their products on City of Vancouver infrastructure. Applications to GDDP are evaluated by VEC according to these criteria: scalability, environmental impact, implementability, risk, and cost. If applications pass this evaluation, the applicants receive the opportunity to pitch to senior City staff. No direct or incremental costs are incurred by the City for GDDP project implementations.[9] For the #SmarterTogether program, we will build on the successful foundation of GDDP, and **scale the City as a Platform concept across both Cities.**

We will also further refine the evaluation criteria to fully align with #SmarterTogether requirements. All City as a Platform projects in the #SmarterTogether program will have to meet ethical standards and privacy, security, safety, and regulatory compliance requirements that will be codified in project evaluation templates. This category of projects will provide our Cities with the opportunity to introduce promising, cutting edge technologies that may emerge over the next five years. It will also provide the opportunity to potentially create long-term partnerships that provide revenue that can then be reinvested into the #SmarterTogether program.

For the Cities, City as a Platform technologies represent a method of continuously testing innovative new solutions, future-proofing mobility infrastructure, and achieving additional beneficial outcomes for our residents.

2.2.4 SUPPORTING TECHNOLOGIES

Our Cities received proposals offering services and technologies that do not directly drive or facilitate outcomes in a technical manner but nonetheless support the corridor program in meaningful ways. These are categorized as regulatory, resilience, and community engagement projects.

Regulatory One proposal offered services related to AV shuttle technical scope development, predictive feasibility modeling, research, and assistance in conversations between original equipment manufacturers and the Cities. This organization is deeply involved in projects that are leading to new standardizations related to AV cybersecurity, communication systems, and charging infrastructure. The support offered in this proposal can provide tremendous value to our implementation while potentially helping regulators expedite the development and approval of regulatory frameworks for AV operation.

Resilience 100 Resilient Cities is an organization that leads a network of cities dedicated to developing resilience against physical, social, and economic challenges. The organization has offered to assist the #SmarterTogether program as a partner and a source of subject matter expertise. Vancouver is a member of the 100 Resilient Cities network.

Community engagement Proposals offering tools that enhance community engagement and citizen understanding of the corridors were also submitted. These proposals include an innovative engagement platform and a service that will provide digital twins of the corridors for our residents, with features and visualizations that enable education, research, and experimentation using traffic and crowd simulations.

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[9] The GDDP is a replicable program. Ottawa's Innovation Pilot Program and Toronto's Green Market Acceleration Program pilot are similar. The success of Vancouver's GDDP program was referenced in an April 2018 report to the City of Toronto's Economic Development Committee *"seeking authority to renew the program for an additional four years."*

2.3 Our Cities are ready for the future

Our Cities follow processes that include safeguards against technology obsolescence and vendor lock-in.

Architecture development and review (ADR) processes ensure all solutions are built with a focus on the longer term and relate to the long-term #SmarterTogether program vision.

Furthermore, the inclusion of the City as a Platform program is due, in part, to a continuous need to future proof city infrastructure. The regular introduction of innovative products into our transportation departments, engineering offices, and project management offices brings new and evolving technologies to our staff's attention and inspires them to consider how today's infrastructure can be bridged with tomorrow's capabilities.

The typical risks associated with introducing emerging technologies are offset by the fact that the City as a Platform program is a scaled-up version of the existing and highly successful GDDP program which has robust processes for evaluating project risk.

2.4 Compliance with legislative and regulatory requirements

While the Cities comply with established engineering and safety standards, the regulation, licensing, and insurance of connected automated vehicles remains an evolving field across Canada, and particularly in British Columbia. No standards or policies for AV operation on public roadways are currently in place. However, the Cities' highly popular deployment of AV shuttles on two

demonstration routes during the Finalist Phase was a catalyst for the regulating agencies (the Ministry of Transportation & Infrastructure and the Insurance Corporation of British Columbia) to begin conceptualizing policies. Each agency assigned subject matter experts and policy development resources to the consideration of a regulatory framework along with insurance and permitting details that will apply to AVs. Both agencies have indicated their enthusiastic support for the Cities' objectives of using AVs to reduce roadway injuries and fatalities.

The Ontario Ministry of Transportation's recent decision to allow driverless automated vehicles to drive on public roads in pilot programs provides us with confidence that BC regulating agencies will soon move in a similar direction and that the necessary regulations will be in place prior to an expanded deployment of AVs during our program's intermediate and long-term time frames.[10]

From a legislative perspective, there are requirements to comply with the BC Motor Vehicle Act, which includes standards on traffic control devices (e.g., signs, signals, and pavement markings) and local bylaws. There are also Federal (e.g., Motor Vehicle Safety Act (MVSA)) and Provincial (e.g., Transportation Act) regulations that govern the types of vehicles that can be used on public roadways and their associated safety features. A relevant example that is currently under development is the Federal Quiet Vehicles safety standard (CMVSS 141). These are proposed regulations that require electric and electric hybrid vehicles to have a system that creates a noise so that people with visual impairments are aware that these vehicles are operating nearby. With respect to technologies deployed as part of the

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[10] *Ontario Government Supports Innovation and Growth in Automated Vehicle Industry.* Ontario Ministry of Transportation news release. Jan. 22, 2019.

#SmarterTogether program, we will ensure that they comply with the applicable legislation or we will request exemptions for pilot applications.

2.5 Adoption & development of standards, architectures, certifications, guidelines

The fundamentals of many corridor projects lend themselves to the use of proprietary technologies, protocols, and data formats. To alleviate these potential proprietary limitations, our Cities will develop the Smart City Integration Hub, which will serve as the mechanism by which we will maintain the interoperability and interconnectivity of all the smart city components.

The Smart City Integration Hub design architecture will ensure that data moves seamlessly among the various corridor components such as sensors, local and third party data stores, downstream analytics, and applications. For additional information on how the Smart City Integration Hub architecture will facilitate interoperability and resilience, please see section 2.2.1.1: Smart City Integration Hub.

A number of standards exist in the intelligent transportation systems industry that will be applied to appropriate project technologies. These standards are designed to facilitate interconnectivity between various technologies and prevent vendor lock-in to promote future proofing. The key standard is the National Transportation Communications for ITS Protocol (NTCIP). This standard identifies communication protocols between ITS equipment including traffic signal controllers, vehicle detectors, variable message signs, road weather information systems, CCTV cameras, among other devices. The Traffic Management Data Dictionary provides standards for communication between various traffic management centres and systems so they can effectively exchange information. In addition, we will apply communication industry standards for communications protocols such as Ethernet, dedicated short-range communications, and wireless.

2.6 Roles and responsibilities of technology partners

Our technology partners will be the vendors chosen to implement technologies. Their roles and responsibilities will include:

- participation in a detailed project evaluation as part of our complete procurement process;
- delivery of accurate scope, costs, and timelines for projects;
- planning, definition, and implementation of technology according to the agreed scope, costs, and timelines;
- working with relevant City resources as required for the selected implementation; and
- supporting, operating, and maintaining the selected technology (as applicable).

2.7 Technologies will be accessible to diverse users, residents, and other stakeholders

Accessibility and usability were important considerations during vendor proposal evaluation sessions, and will remain a major consideration in the final proposal evaluation stage. In designing our portfolio of projects, we have endeavoured to ensure that the needs of our diverse residents are accounted for. For example, all AV shuttles will be fully-accessible, and will accommodate wheelchairs, scooters, and strollers.

Engagement has played a central role in informing how corridor devices and vehicles can be made more accessible. Engagement with residents, community leaders, and subject matter experts provided insight into the needs and perceptions of specific population groups, and how issues that disproportionately affect certain groups can be alleviated through thoughtful design.

2.8 Identification of key risks and development of appropriate mitigation strategies

Key risks and mitigation strategies related to technology are listed in Table 2.C.

Table 2.C Key technology risks and mitigation strategies

RISK	MITIGATION
Smart City Integration Hub becomes unavailable, impacting all technologies.	Create architecture that will support a highly available, highly resilient system.
Cybersecurity breach	Apply robust cybersecurity risk management practices, implement strong cybersecurity controls, and develop rigorous cybersecurity incident response processes.
Unanticipated operational issues result in delays and unexpected costs.	Include experienced experts with demonstrated understanding of architecture in implementation processes and operation.
Communication protocol standards are not consistent across vendors.	Select vendors with track records of adjustment to new standards and roadmaps for future evolution.
Bandwidth issues and network congestion impact real-time operations.	Leverage bandwidth optimization, data compression, and edge computing technologies to minimize congestion caused by high volumes of data.
Communications network becomes unavailable, impacting all technologies.	Implement a robust fault tolerant and resilient communications network supplemented by cellular, wireless, and radio technologies.
Reliance on partner integration and resources	Ensure ongoing collaboration with asset owners and stakeholders such as the Ministry of Transportation Infrastructure (MOTI), TransLink, other transit operators, multi-city engineering departments, utility companies, and a range of strategic partners including academia.

Table 2.C continued

RISK	MITIGATION
Incompatibilities between various systems or components lead to the inability to collect data or control various components.	Ensure thorough system architecture planning and selection of compatible partner solutions.
Physical security of deployed sensors and devices could be compromised through physical theft, vandalism, etc.	Select technologies that include proven protection from theft and vandalism.
A changing regulatory landscape impacts project scope.	Maintain robust Program Management Office oversight over scope, and encourage participation in national, provincial, and local discussions on regulatory development, including some with stakeholders from industry and academia.
Sustainment, operations, and/or data storage costs exceed expectations.	Engage in proactive analysis to determine the total cost of ownership over a ten-year period to understand budget implications and create fixed costs vendor agreements to mitigate against rising variable costs.
Current lack of clarity in direction of AV industry and rate of improvement.	Establish a steering committee to leverage ongoing research and industry expertise.
Dependence on the introduction of AV-related legislation.	Engage in early action with the Insurance Corporation of British Columbia and MOTI to expedite legislation in place or appropriate waivers.
Requirement for comprehensive AV testing causes schedule delays.	Leverage testing facilities at UBC to do initial off-road testing without waiting for legislative changes.
Public apprehension related to new technologies inhibits adoption.	Maintain a regular communication schedule, and a clear and transparent engagement program.
Risk of AV collisions and other incidents.	Use a vendor with a proven safety track record in other implementations and test extensively pre-deployment before gradual deployment from the dedicated environment to a shared environment.
Reliance on third parties amplifies the exposure to operational and regulatory risk.	Maintain full control of key components and solutions when feasible, ensure visibility into vendors' operations, and establish an evaluation criterium (prior to selection) and audit process of their operation and controls.

3
PERFORMANCE MEASUREMENT

3.1 A rigorous approach to linking projects, activities, and outcomes

The path from implementation to outcome is complex in a program that includes a mix of technology projects, outcomes, and implementation timelines for different corridors. Our Cities consulted two premier universities with extensive experience in innovation project planning and performance management to help us develop a robust model that could guide our activities and implementations so that the #SmarterTogether program will achieve its objectives.

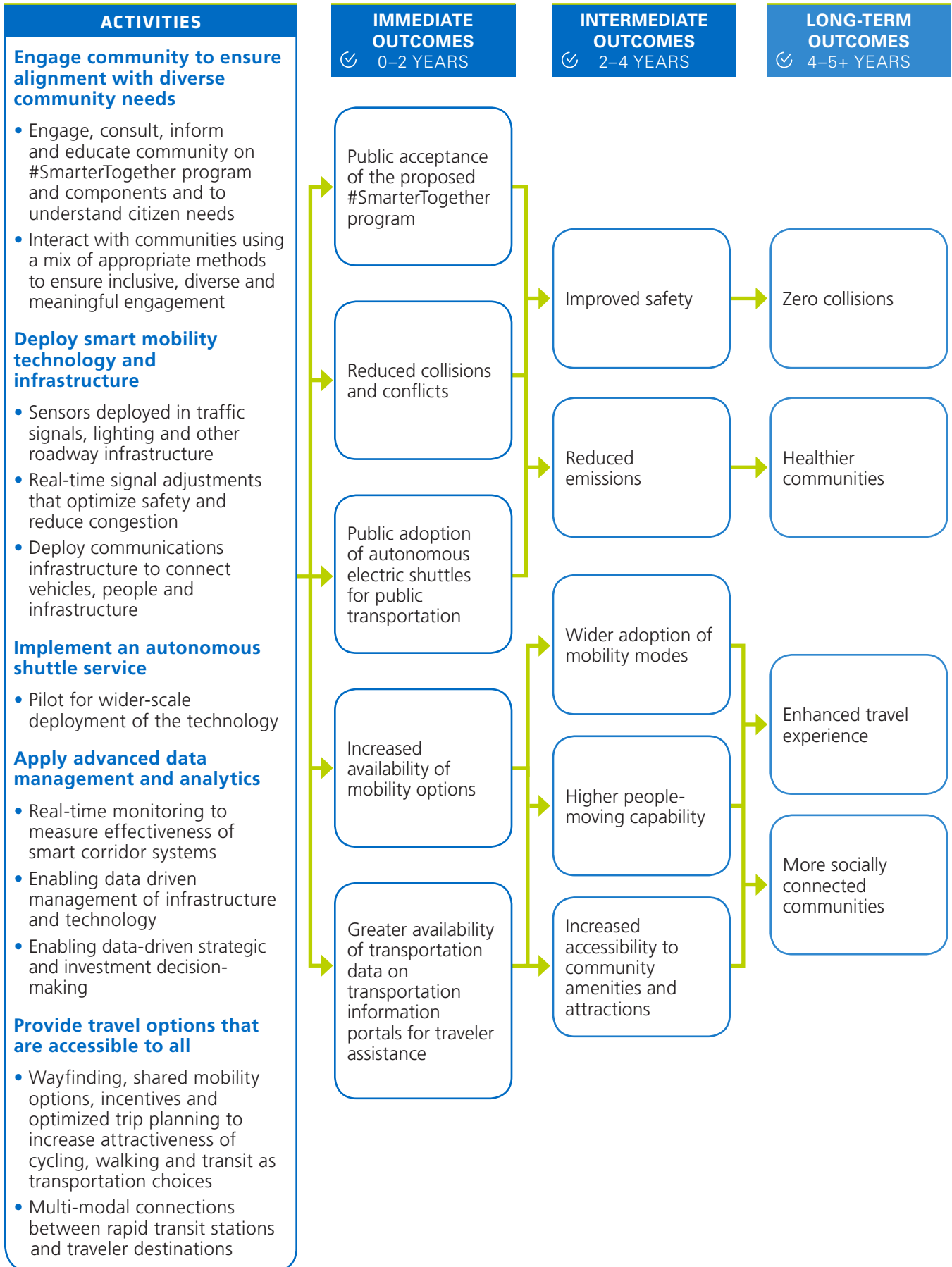The universities we consulted are:

- **The University of British Columbia (UBC):** We engaged Professor Martino Tran, who leads UBC's Urban Predictive Analytics Lab. With expertise in data science and access to high-performance computing, the Lab specializes in measuring, modeling, and predicting the impact of smart technologies on society and the environment. The Lab has experience informing policy and analyzing mobility projects.

- **Simon Fraser University (SFU):** We consulted Associate Professor Meghan Winters from the SFU Faculty of Health Sciences. Dr. Winters has expertise in the impact of community design on social connectedness and mobility.

The result of this collaboration was the #SmarterTogether Logic Model (Figure 3.A). The Model clearly links our activities to each of the proposed outcomes over time. This Model informed the project implementation schedule for the corridors and helped to determine the sequence of activities in our engagement strategy.

Figure 3.A: #SmarterTogether Logic Model

ACTIVITIES	IMMEDIATE OUTCOMES ☑ 0–2 YEARS	INTERMEDIATE OUTCOMES ☑ 2–4 YEARS	LONG-TERM OUTCOMES ☑ 4–5+ YEARS

Engage community to ensure alignment with diverse community needs

- Engage, consult, inform and educate community on #SmarterTogether program and components and to understand citizen needs
- Interact with communities using a mix of appropriate methods to ensure inclusive, diverse and meaningful engagement

Deploy smart mobility technology and infrastructure

- Sensors deployed in traffic signals, lighting and other roadway infrastructure
- Real-time signal adjustments that optimize safety and reduce congestion
- Deploy communications infrastructure to connect vehicles, people and infrastructure

Implement an autonomous shuttle service

- Pilot for wider-scale deployment of the technology

Apply advanced data management and analytics

- Real-time monitoring to measure effectiveness of smart corridor systems
- Enabling data driven management of infrastructure and technology
- Enabling data-driven strategic and investment decision-making

Provide travel options that are accessible to all

- Wayfinding, shared mobility options, incentives and optimized trip planning to increase attractiveness of cycling, walking and transit as transportation choices
- Multi-modal connections between rapid transit stations and traveler destinations

Immediate Outcomes (0–2 years):
- Public acceptance of the proposed #SmarterTogether program
- Reduced collisions and conflicts
- Public adoption of autonomous electric shuttles for public transportation
- Increased availability of mobility options
- Greater availability of transportation data on transportation information portals for traveler assistance

Intermediate Outcomes (2–4 years):
- Improved safety
- Reduced emissions
- Wider adoption of mobility modes
- Higher people-moving capability
- Increased accessibility to community amenities and attractions

Long-term Outcomes (4–5+ years):
- Zero collisions
- Healthier communities
- Enhanced travel experience
- More socially connected communities

3.2 Relationships between activities and outcomes in different timeframes

3.2.1. YEARS 0-2: ENGAGEMENT ACTIVITIES AND UNIVERSITY DRIVE PROJECTS DRIVE IMMEDIATE OUTCOMES

Communications and engagement activities combined with the implementation of connected technologies on the University Drive Pilot route will lead to the achievement of outcomes within the first two years of the #SmarterTogether program.[11] Engagement efforts will drive awareness, enthusiasm, and onboarding of AV shuttles and interactive digital kiosks on the route. Intersection conflict detection technology, advanced video analytics, dynamic crosswalks, and traffic signals that adjust to traffic demand will also be in operation on the route.

The result of these activities will be a measurable increase in public acceptance of projects and use of digital kiosks and AV shuttles. Adaptive traffic signals, AV shuttles, and wayfinding information that provides safe, multi-modal route suggestions to travellers will result in fewer collisions and conflicts.[12] Outcomes related to collisions and conflicts, adoption of mobility modes, availability of transportation data, and AV shuttle use will result exclusively from projects on the University Drive Pilot route in the immediate timeframe.

Performance indicators for the immediate timeframe are listed in Table 3.A.

Table 3.A: Performance indicators for immediate outcomes

IMMEDIATE OUTCOMES	PERFORMANCE INDICATORS
Public acceptance of #SmarterTogether program	• Public opinion surveys showing trends of acceptance and over timeframe of program • Ongoing survey of the public acceptance of program components • Public acceptance of program and components reported by the media • Usage trends of new mobility modes
Reduced collisions and conflicts	• Rate and trend of conflicts (near misses) between road users within corridor area broken down by involved user
Public adoption of autonomous electric shuttles for public transportation	• Number of people moved on AV shuttles by trip or time of day • % of available space on AV shuttles used by trip or time of day • Trend in calls for AV shuttle on-demand service
Increased availability of mobility options	• AV shuttle ride counts and trends within study area
Greater availability of transportation data on transportation information portals for traveller assistance	• Number of intersections outfitted to collect pedestrian and bicycle data • Number of additional websites or apps providing travel data • Number of kiosks deployed to provide traveller information • Number of additional traveller information web visits, app uses or kiosk visits

[11] Engagement activities are described in Chapter 6: Engagement

3.2.2. YEARS 2-4: HIGH PUBLIC ADOPTION OF TECHNOLOGY CREATES SAFER, GREENER, AND MORE ACCESSIBLE CORRIDORS

The Innovation Boulevard route and all three South False Creek Innovation Corridor routes will have connected technologies coming online in the intermediate timeframe. As a result, the #SmarterTogether program will achieve a mix of the Logic Model's immediate and intermediate outcomes in this timeframe.

Public awareness and adoption of smart mobility solutions will be high due to familiarity with the University Drive Pilot route implementations over the previous two years. Since all or almost all connected technology projects will be operating in both corridors, there will be a significant increase in mobility options, much higher people-moving capacity through the corridors, reduced emissions, improved safety, and increased accessibility to community amenities for residents.

A measurable shift will be made to sustainable travel modes. This will be catalyzed by an array of sustainable last-mile vehicles and convenient trip-planning applications that will be accessible through smartphones and digital kiosks. Parking management projects that monitor and relay available parking information in real time will reduce searching time spent by drivers operating auto vehicles, contributing to reduced greenhouse gas emissions. These emissions will be monitored by dedicated sensors in the corridors.

Kiosks, applications, and digital signage will relay information about community events, online services, and transit information. When this is combined with safe and convenient on-demand transportation modes, residents will have greater access to community amenities.

Performance indicators for the intermediate timeframe are listed in Table 3.B. Note that public acceptance and adoption will continue to be measured according to the performance indicators listed in Table 3.A.

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[12] Conflicts are interactions between road users that would have resulted in a collision if neither road user had taken evasive action. In other words, a 'near miss'. There are two main definitions for conflicts:
i. Time to Collision (TTC): The time until two road users collide if they don't change their speed or travel path. Lower TTCs indicate more serious conflicts.
ii. Post Encroachment Time (PET): The time between one road user exiting a point in space and another one entering it. Lower PETs indicate more serious conflicts.
We will work with industry experts to identify the most suitable definition and time duration for the various locations or road users in each corridor.

Table 3.B: Performance indicators for intermediate outcomes

INTERMEDIATE OUTCOMES	PERFORMANCE INDICATORS
Improved safety	• Rate and trend of conflicts (near misses) between road users within corridor area broken down by involved user • Rate and trend of killed and seriously injured within corridor area • Rate and trend of pedestrian collisions within corridor area • Rate and trend of cyclist collisions within corridor area • Rate and trend of motorcycle collisions within corridor area[13] • Rate and trend of auto collisions within corridor area • Overall "perceived safety" trends measured through public surveys • Trend in speeding in corridor • Trend in red light running
Reduced emissions	• GHG emissions trends within corridor area • Roadside GHG emissions along corridor
Wider adoption of mobility modes	• Number and trends in availability of last mile shared mobility (bike share, etc.) • Number and trends of people using last mile shared mobility (bike share, etc.) • Number and trends of people moved on AV shuttles by time of day • Pedestrian counts and trends within study area • Cycling counts and trends within study area • Trend in digital kiosks use • Trend in travel planning app use • Trend in use of traveller apps and websites specifically for end-to-end trip planning
Higher people-moving capability	• Trend in % of available space on AV shuttles used by trip or time of day • Total auto trips as a % of total people moved showing trends before and over time frame of program • Number and trends of people using last mile shared mobility (bike share, etc.) • Transit ridership counts and trends within study area
Increased accessibility to community amenities and attractions	• Trend in number of AV shuttles, transit and paratransit vehicle trips to destinations such as hospitals, medical buildings, senior centres, transitional housing and transit stations • Trend in number of available last mile vehicles (bike share bicycles, etc.) at transit stations and other key community amenities • Trends of people using last mile shared mobility (bike share, etc.)

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[13] There are very low volumes for this metric, and it may not be statistically relevant in the Surrey Innovation Corridor.

3.2.3. YEARS 4-5: ACHIEVEMENT OF THE COMPLETE SERIES OF OUTCOMES

In the long-term timeframe, residents will be very familiar with corridor technologies. Frequent, innovative engagement activities and continuous design adjustments informed by traffic data insights and resident feedback will lead to high adoption and acceptance among all residents, including those from vulnerable populations.

The availability and adoption of more mobility options, combined with increased accessibility, will translate into better travel experiences. It will also mean that residents will have a greater ability to get to social and community events. Lower greenhouse gas emissions and the increased availability and use of sustainable last-mile vehicles will positively impact residents' health.

Working interoperably, AV shuttles, digital signage indicating potential upcoming crossing zones, dynamic crosswalks that adapt to pedestrian and context requirements, and data-driven intersection adjustments will contribute to increased safety. Through smartphone applications and digital kiosks, pedestrians and multi-modal travellers will plan safe routes and see exactly where high-traffic and potential conflict zones are in the corridor in real-time. Advanced data analytics will reveal what the most common patterns preceding conflicts are, and technology projects will be designed and adjusted to mitigate them. Collisions in the corridors will drop to zero.

By this time, we will be able to reliably link residents' well-being with their travel experiences. Among the performance indicators in this timeframe will be the new Canadian Mobility Index, a person-centric measure that reflects the connection between the movement of people and the quality of their experiences.

The Index will be the result of a collaboration with the University of British Columbia in which we will explore and develop innovative transportation metrics that enable us to evaluate the **equity, fairness, inclusivity, and accessibility** of our transportation system. The Canadian Mobility Index will allow us to better monitor and respond to the expectations, perceptions, and actual experiences of people traveling throughout our Cities and corridors.

Table 3.C: Performance indicators for long-term outcomes

LONG TERM OUTCOMES	PERFORMANCE INDICATORS
Zero collisions	• Rate and trend of collisions within corridor area • Rate and trend of collisions for metropolitan Vancouver area to compare to corridors • Rate and trend of pedestrian collisions within corridor area • Rate and trend of cyclist collisions within corridor area • Rate and trend of motorcycle collisions within corridor area • Rate and trend of auto collisions within corridor area
Healthier communities	• Trend of killed and seriously injured within corridor area • Pedestrian trends within study area • Cycling trends within study area • Overall "Perceived Safety" trends measured through public surveys • Trend in Canadian Mobility Index
Enhanced travel experience	• Trend in additional websites or apps providing travel data • Trend in number of kiosks deployed to provide traveller information • Trend in number of traveller information web visits, app uses or kiosk visits • Trend in availability of last mile shared mobility (bike share, etc.)
More socially connected communities	• Trend in number of AV shuttles, transit and paratransit vehicle trips to destinations such as hospitals, medical buildings, senior centres, RCMP Headquarters, transitional housing and transit stations • Trend in use of traveller apps, websites and kiosks for travel planning to social destinations (restaurants, community centres, etc.) • Trends of people using last mile shared mobility (bike share, etc.)

3.3 Project timelines, deliverables, and milestones

The following tables detail the timelines and deliverables of project categories in all corridors over immediate, intermediate, and long-term timeframes. Table 3.D breaks down the budgets allocated by project category in each timeframe. For the associated payment schedule, please refer to Tables 8.B and 8.C in Chapter 8: Financial.

Table 3.D Budget schedule breakdown

TECHNOLOGY CATEGORY	PROJECT CATEGORY	IMMEDIATE $M 0–2 YEARS	INTERMEDIATE $M 2-4 YEARS	LONG-TERM $M 4-5+ YEARS	TOTAL $M
Foundational technologies		$9.00	$0.00	$0.00	$9.00
	Smart City Integration Hub	$7.00	$0.00	$0.00	$7.00
	Communication infrastructure	$2.00	$0.00	$0.00	$2.00
Connected technologies		$20.65	$15.75	$3.60	$40.00
	AV shuttles - University Drive	$3.00	$0.00	$0.00	$3.00
	Autonomous shuttles - Full deployment	$3.40	$8.00	$1.60	$13.00
	Citizen experience	$0.55	$0.45	$0.00	$1.00
	Data & analytics	$5.00	$0.00	$0.00	$5.00
	ITS infrastructure	$8.00	$6.00	$2.00	$16.00
	Last mile mobility	$0.70	$1.30	$0.00	$2.00
City as a Platform technologies[14]		$0.00	$0.00	$0.00	$0.00
Supporting technologies		$0.60	$0.20	$0.20	$1.00
	Community engagement tools	$0.30	$0.10	$0.10	$0.50
	Regulatory	$0.30	$0.10	$0.10	$0.50
Total		**$30.25**	**$15.95**	**$3.80**	**$50.00**
					INFC Total

[14] No direct or incremental costs are incurred by the City for City as a Platform project implementations sourced through GDDP.

Table 3.E breaks down the budgets for each technology category in each timeframe. It also lists the outcomes associated with each timeframe, the measurements of which will demonstrate progress.

Table 3.E Budget schedule: Outcomes

CATEGORY	IMMEDIATE $M 0–2 YEARS	INTERMEDIATE $M 2-4 YEARS	LONG-TERM $M 4-5+ YEARS	TOTAL $M
Foundational technologies	$9.00	$0.00	$0.00	$9.00
Connected technologies	$20.65	$15.75	$3.60	$40.00
City as a Platform technologies	$0.00	$0.00	$0.00	$0.00
Supporting technologies	$0.60	$0.20	$0.20	$1.00
Total	**$30.25**	**$15.95**	**$3.80**	**$50.00**
Outcomes	☑ Public acceptance of the #SmarterTogether program ☑ Reduced collisions and conflicts ☑ Public adoption of autonomous electric shuttles for public transportation ☑ Increased availability of mobility options ☑ Greater availability of transportation data on transportation information portals for traveller assistance	☑ Improved safety ☑ Reduced emissions ☑ Wider adoption of mobility modes ☑ Higher people-moving capability ☑ Increased accessibility to community amenities and attractions	☑ Zero collisions ☑ Healthier communities ☑ Enhanced travel experience ☑ More socially connected communities	

3.4 Monitoring, reporting and evaluation strategies

Monitoring and evaluation strategies are highly project-dependent. After vendors are selected, the Program Management Office will produce a program plan that includes milestones and deliverables that are relevant to the defined projects. Reporting will follow the strategy set out in section 5.8 Monitoring, controlling, and reporting strategies and checkpoints in Chapter 5: Project Management.

3.5 Identification of key risks and development of appropriate mitigation strategies

Key risks and mitigation strategies related to performance measurement are listed in Table 3.F.

Table 3.F Key performance measurement risks and mitigation strategies

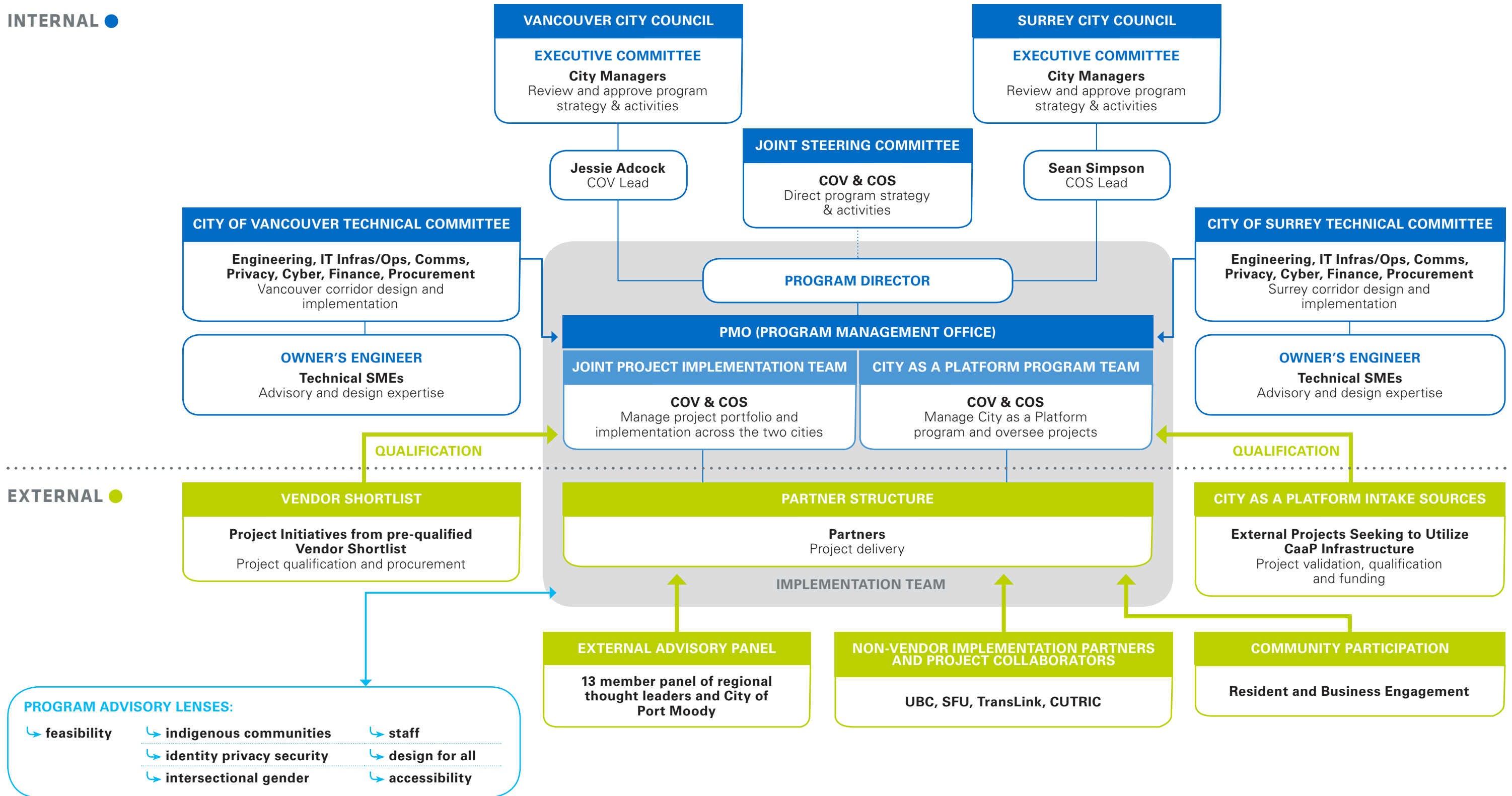| RISK	RISK MITIGATION
Lack of citizen participation or awareness leads to inaccurate baseline measurements. Lack of citizen awareness or negative perceptions leads to inaccurate baseline data.	Carry out a comprehensive engagement strategy, including the development of a stakeholder registry, use of City citizen feedback platforms, etc.
Negative perceptions of projects result in lack of citizen engagement.	Carry out a comprehensive engagement strategy with a sustained focus on education and engage in continuous conversation to understand misgivings.
Difficulty sourcing information for services that are operated by third parties (e.g., bike share)	Establish access-to-data agreements with equipment suppliers at the program outset.
Program outcomes cannot be achieved without all projects and supporting technologies delivered.	Establish a robust end-to-end architecture that allows for the combined corridor technologies to deliver outcomes in the absence of single technologies. (i.e., Outcomes cannot rely solely on AVs)

4 GOVERNANCE

4.1 Overview

During the Application Phase, Vancouver and Surrey signed a memorandum of understanding (MoU) to collaborate and submit a joint application for the Smart Cities Challenge. Guided by principles of transparency, experimentation, diversity & inclusiveness, empowerment, and knowledge-sharing, we developed joint governance, communication, and decision-making models that have enabled us to combine our expertise, test technology in multiple urban contexts, and share each others' lessons and successes.

This model guided governance during the Finalist Phase, and will continue to do so through the Implementation Phase.

The governance framework (Figure 4.A) comprises various internal working groups and committees, along with external partners, advisors, and project sources.

Figure 4.A Governance framework & reporting structure

INTERNAL ●

VANCOUVER CITY COUNCIL

EXECUTIVE COMMITTEE
City Managers
Review and approve program strategy & activities

SURREY CITY COUNCIL

EXECUTIVE COMMITTEE
City Managers
Review and approve program strategy & activities

Jessie Adcock
COV Lead

JOINT STEERING COMMITTEE
COV & COS
Direct program strategy & activities

Sean Simpson
COS Lead

CITY OF VANCOUVER TECHNICAL COMMITTEE
Engineering, IT Infras/Ops, Comms, Privacy, Cyber, Finance, Procurement
Vancouver corridor design and implementation

PROGRAM DIRECTOR

CITY OF SURREY TECHNICAL COMMITTEE
Engineering, IT Infras/Ops, Comms, Privacy, Cyber, Finance, Procurement
Surrey corridor design and implementation

OWNER'S ENGINEER
Technical SMEs
Advisory and design expertise

PMO (PROGRAM MANAGEMENT OFFICE)

JOINT PROJECT IMPLEMENTATION TEAM	**CITY AS A PLATFORM PROGRAM TEAM**
COV & COS Manage project portfolio and implementation across the two cities	**COV & COS** Manage City as a Platform program and oversee projects

OWNER'S ENGINEER
Technical SMEs
Advisory and design expertise

QUALIFICATION

QUALIFICATION

EXTERNAL ●

VENDOR SHORTLIST
Project Initiatives from pre-qualified Vendor Shortlist
Project qualification and procurement

PARTNER STRUCTURE
Partners
Project delivery

IMPLEMENTATION TEAM

CITY AS A PLATFORM INTAKE SOURCES
External Projects Seeking to Utilize CaaP Infrastructure
Project validation, qualification and funding

PROGRAM ADVISORY LENSES:
↳ **feasibility**   ↳ **staff**
↳ **indigenous communities**
↳ **identity privacy security**   ↳ **design for all**
↳ **intersectional gender**   ↳ **accessibility**

EXTERNAL ADVISORY PANEL
13 member panel of regional thought leaders and City of Port Moody

NON-VENDOR IMPLEMENTATION PARTNERS AND PROJECT COLLABORATORS
UBC, SFU, TransLink, CUTRIC

COMMUNITY PARTICIPATION
Resident and Business Engagement

4.2 Framework breakdown

4.2.1 EXECUTIVE OVERSIGHT, APPROVAL, AND STRATEGIC DECISION-MAKING

The executive level is comprised of Executive Committees and the Joint Steering Committee.

- **Executive Committees:** These committees are responsible for review and approval of strategy and activities. They are made up of City Managers from each City, and report to their respective Mayors and Council.
- **Joint Steering Committee:** The Joint Steering Committee oversees the development of strategy, the determination of project activities, procurement, monitoring, and the management of funds. Each City has a lead that reports to its respective Executive Committee.

4.2.2 PROJECT IMPLEMENTATION:

- **Implementation Team:** The Implementation Team is comprised of a Program Director, a Program Management Office (PMO), internal teams, and external partners. The PMO receives input from various internal and external groups, including Technical Committees from each City, an External Advisory Panel, and Non-Vendor Implementation Partners.

Internal teams

- **Program Director:** The Program Director is a role dedicated to the corridor project. This role oversees the PMO and is responsible for the implementation of the entire program of projects and for ensuring projects are implemented consistently across the two Cities. The Program Director drafts implementation budgets, which are approved by the Joint

Steering Committee. The Program Director then oversees the distribution of funds to the partners and internal teams conducting implementation. This single position is the result of the development and harmonization of processes across the Cities during the Application Phase, when the project was co-led by senior managers from each City. The Program Director reports to the Joint Steering Committee.

- **Program Management Office:** The PMO consists of dedicated project management and administrative staff.
- **Joint Project Implementation Team (JPIT):** The JPIT works with internal and external partners to implement projects and manage risks. The team meets weekly to discuss all topics pertinent to the implementation. As needed, the Technical Committees are supported by external engineering consultants and technical small and medium enterprises, whose services are procured through the Call for Innovation procurement instrument.
- **City as a Platform Program Team:** This team manages the final evaluation and implementation of City as a Platform projects.[15]
- **Technical Committees:** The Technical Committees for each City provide regular design and implementation guidance and oversee technical design, compliance, and project risks. Technical Committees are made up of City staff who are domain experts in transportation, engineering, data & analytics, enterprise architecture, cybersecurity, privacy, human resources, finance, procurement, networks, and communication infrastructure. They are supported by Owner's Engineers (OEs), which are external private engineering consultants with domain expertise in transportation infrastructure, information technology, and connected technologies.

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[15] Described in section 2.2.3 *City as a Platform technologies* in Chapter 2: Technology.

The Joint Project Implementation Team, City as a Platform Program Team, and Technical Committees all report to the Program Director.

External

- **Implementation Partners:** These are the vendors [to be selected from among the 55 that have passed #SmarterTogether evaluations to date] and non-OE consulting firms whose products and services are procured for project implementation.

4.2.3 ADVISORY:

- **Non-Vendor Partners:** These include partner universities, TransLink, and Canadian Urban Transit Research & Innovation Consortium (CUTRIC). Non-Vendor Partners advise and support on issues including project operation, performance measurement, regulation, testing & validation, and city resilience, among others. Longstanding MoUs with some of our partners supersede this program. In those cases, we operate within the terms of the MoUs.
- **Community Stakeholder Group:** This group provides expert input regarding projects and the impacts they will have on various communities and population groups. Members include representatives from City departments, non-profit organizations, and other organizations that advocate for and support vulnerable population groups.
- **External Advisory Panel:** This group consists of thirteen influential regional thought leaders that provide expertise and diverse perspectives through lenses of public health, innovation, education, and commerce. Also included as part of the Panel are City representatives for Port Moody, who serve as community advisors and provide guidance on replicability opportunities and

the suitability of #SmarterTogether program projects for small and medium cities. The Panel is typically interviewed by a contracted professional services provider who reports to the Program Director.

4.3 Note on governance approach and teams

Inherent in our approach is the assessment of projects and decisions through lenses of feasibility, Indigenous communities, identity/privacy/security, staffing, design-for-all, accessibility, and intersectional gender considerations. This assessment is done by all teams, and is occasionally facilitated by external partners and subject matter experts.

4.4 Approach to managing funds

The two Cities have predetermined and approved budgets for each project category listed in Chapter 2: Technology. When funds are required for a specific project in any given category, the Program Director will oversee the development of a project budget and seek approval from the Joint Steering Committee. This budget approval process was formalized in the Application Phase MoU between the two Cities. The multiple experiences smoothly and successfully executing the process has engendered strong trust that will continue through the Implementation Phase.

4.5 Approach to partnerships that retains community control over sensitive & personal data

In short, our approach is open by default. Our guiding principles, which extend to our partners, include:

- All data will be made available according to an open data standard.
- All data that is collected will be used to improve quality of life, and not for commercial purposes.
- All data that is collected will reside in Canada.
- All data will be encrypted in transit and at rest.
- We will inform and engage citizens regarding projects as they relate to data collection.
- Data privacy protections will be designed into all projects.
- The process used to develop data policies will be open and collaborative.

Additionally, the City of Vancouver has demonstrated its commitment to these principles through its membership in the NYC Guidelines for the Internet of Things network which includes 35 prominent cities that have agreed to abide by a defined framework of five guidelines for the Internet of Things (IoT). A key guideline relates to Privacy & Transparency, and emphasizes the public availability of IoT-related processes, policies, and data. The City of Surrey, while not a member of the network, supports these guidelines.[16]

4.6 Details about partners

Each of our non-vendor partners has an incredible depth of experience in mobility, innovation, or both. The partners, along with their roles, include:

- **University of British Columbia (UBC):** UBC will provide project support related to AV shuttles, citizen experience, advanced data & analytics, and ITS infrastructure projects. The University will also provide performance measurement advisory and support through its existing Campus as a Living Lab.
- **Simon Fraser University (SFU):** SFU will provide project support related to AV shuttles and performance measurement advisory support.
- **TransLink:** TransLink will provide project implementation support and advisory support.
- **Vancouver Economic Commission (VEC):** VEC will provide potential projects to our City as a Platform program through an expansion of the existing Green & Digital Demonstration Program (GDDP). VEC is responsible for the initial evaluation of potential projects before introduction to the City. VEC has operated a version of this program with the City of Vancouver since 2014.

4.7 Identification of key risks and development of appropriate mitigation strategies

Key risks and mitigation strategies related to governance are listed in Table 4.A.

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[16] Found at iot.cityofnewyork.us. Among the cities in the NYC Guidelines for the Internet of Things are Austin, Boston, Tel Aviv, Seattle, Los Angeles, Stockholm, Washington D.C., and San Francisco.

Table 4.A Key governance risks & mitigation strategies

RISK	RISK MITIGATION
Mistaken attribution of results to strategy, plan, or execution during exercise of implementation oversight.	Establish strong logical links between strategy and outcomes. Expand metrics and prepare a standard root cause analysis procedure for any result.
Conflict between Committee members leads to ineffective oversight.	Employ a process to resolve conflicting agendas, informed by professional consultation and/or best practices. Ensure the Chair has adequate related training. Create and maintain a culture in which respectful challenge of decisions is acceptable.
Information gets concentrated with key individuals creating single points of failure.	Create robust, thorough, organized, and accessible documentation of all meetings, implementations, major decisions, and lessons learned.
Any number of project accountabilities remain unassigned.	Make project accountabilities the responsibility of the Program Director. Make all documentation accessible to the Steering Committee. Prepare and attach the latest project assignment lists as a report appendix for Steering Committee meetings.

5 PROJECT MANAGEMENT

5.1 Project management approaches

We will apply two distinct project management approaches during the Implementation Phase:

- **a defined delivery approach; and**
- **an exploratory development approach**

The **defined delivery approach** follows industry standard project management best practices and is appropriate for delivering projects with well-known implementation roadmaps, namely those in our foundational, connected, and supporting technologies categories. Project implementation under this approach will follow these phases:

1. planning & design;[17]
2. procurement, construction, & deployment;[18] and
3. operations & monitoring

[17] including public engagement and consultation
[18] including public engagement and consultation

The **exploratory development approach** is appropriate for delivering projects in our City as a Platform technologies category. Projects in this program may involve emergent or immature technologies for which there are no best-practice implementation roadmaps to follow. These projects require exploration, development, nurturing, and support if they are to be implemented successfully.

In this approach, we will enable project innovation through rapid and agile ideation and prototyping and piloting in controlled environments using internal resources and key partners such as SFU and UBC in the development process.

5.2 Our Cities have the capacity and capability to deliver

Surrey and Vancouver both have offices with track records of successfully designing and completing complex transportation and infrastructure projects that require the cooperation of multiple departments and stakeholders. These offices include:

- **Surrey's Design & Construction division:** This division designs and delivers all major infrastructure engineering projects ($100-150 million per year), and regularly partners with Corporate Service's Project Management Office to deliver technology projects, such as the City of Surrey's Traffic Management Centre.

- **Vancouver's Engineering Project Management Office:** This office works with over 30 engineering branches — comprising nearly 2,000 staff supported by external partners and contractors — to plan and deliver complex infrastructure projects (approximately $220 million per year). The Engineering Project Management Office liaises closely with the City's Technology Services Project Management Office on projects relating to operating technology, cybersecurity, data, connectivity, or citizen services.

5.3 The #SmarterTogether Program Management Office

The #SmarterTogether Program Management Office (PMO), led by the Program Director, will be responsible for project definition and delivery, risk management, and reporting. Major elements of the PMO have already been established, including its mandate, governance structure, communication and reporting protocols, processes and tools for monitoring program progress (such as a collaborative SharePoint site shared by both Cities), and

a two-City approach to project control that includes management of shared budgets, costs, benefits, risks & issues, quality, scope, and timelines.

5.4 The #SmarterTogether project portfolio overview and implementation sequence

5.4.1 #SMARTERTOGETHER PROGRAM SCOPE

The #SmarterTogether program will achieve outcomes through the implementation of the mix of technology projects (described in Chapter 2: Technology) and engagement activities (described in Chapter 6: Engagement), delivered and conducted over five years.

5.4.2 #SMARTERTOGETHER PROGRAM DEPENDENCIES

Common dependencies across foundational and connected technology projects include:

1. the final evaluation and selection of vendors;
2. compliance with relevant standards, guidelines, regulations, and legislative requirements; and
3. completion of appropriate privacy impact assessments, data sharing agreements, and similar compliance standards.

For some projects requiring the use of existing transportation infrastructure, dependencies include:

1. connection to power sources;
2. space for technology to be housed, stored and/or maintained; and
3. potential modification of existing City infrastructure.

Further project-specific project dependencies are outlined in Table 5.A.

Table 5.A Project category-specific dependencies

PROJECT	DEPENDENCY
Autonomous vehicle shuttles	• AV shuttle management and scheduling software • potential payment integration
ITS infrastructure	• integration with MOTI and TransLink infrastructure • potential modifications to traffic signal infrastructure

5.5 PMO resourcing plan

The PMO will have the resources required to carry out projects that contribute to outcomes. PMO processes will be an expansion of the highly successful joint processes that were created, strengthened, and refined by our Cities during the Application and Finalist phases. The Cities will continue to contribute staff effort and expertise from various departments including cybersecurity, engineering, transportation, information technology, etc. to support the PMO.

Additionally, staff and expertise from the City of Surrey's Design & Construction division and City of Vancouver's Engineering Project Management Office (described in section 5.2 Our Cities have the capacity and capability to deliver) will be available to the PMO as needed.

Financial resourcing for the PMO is accounted for in the estimation methodology for project categories, described in section 8.3 Estimation methodology in Chapter 8: Financial. The methodology allocates funds for PMO overhead.

5.6 Infrastructure readiness

The corridor locations are primed for smart mobility technology implementations. Each corridor has a high degree of connectivity provided by high speed fibre that is owned by the Cities. The corridors also currently have cellular (LTE) and Wi-Fi connectivity, and there is potential within the corridors to test and deploy 5G cellular and low-power wide-area network (LPWAN) technologies. Roadway and traffic

signal infrastructure exists and is prepared for project implementations.

5.7 Key #SmarterTogether program management strategies

5.7.1 STRATEGIES FOR RISK IDENTIFICATION AND MITIGATION

The PMO will be responsible for applying best practices and appropriate methods to identify, track, and manage common and special risks on all projects. A risk register will be the primary tool employed to manage program risks. A common register will be used across both Cities. For each project, the risk register requires:

Risk identification, analysis, and evaluation:

- Risk identification, analysis, and evaluation will be conducted through subject-matter expert interviews and qualitative and quantitative information research. Each risk will be gauged according to probability of occurrence and severity of consequence.

Risk mitigation plan and implications:

- The risk mitigation plan will include actions for avoidance, mitigation, transfer, and acceptance of risks.

Risk management communication and engagement:

- Risks will be mapped with relevant stakeholders and appropriate communication processes and documentation will be listed for each.

Risk monitoring, review, and anticipation over time

- Updates, including newly identified risks and changes in existing risk profiles, will be documented.

5.7.2 STRATEGIES FOR EFFECTIVE PROCUREMENT

We will continue to use the Call for Innovation throughout the Implementation Phase for procurement of smart city technologies. For necessary related products and services that are not directly part of the #SmarterTogether program scope, we will employ standard procurement processes.

5.7.3 STRATEGIES FOR STAKEHOLDER IDENTIFICATION, ENGAGEMENT, AND COMMUNICATION

Our team will create a stakeholder register cataloguing the broad mix of internal and external #SmarterTogether program stakeholders. These are the groups and individuals who may be impacted by and/or have influence on the program. Stakeholder analysis will account for types and degrees of influence and interest. The stakeholder registry will also include descriptions of the impact the Program has on each stakeholder, the actions and desired outcomes related to stakeholder engagement, the scheduling of engagement, and resource assignments.

5.7.4 STRATEGIES FOR MANAGING COMMUNICATIONS WITH STAKEHOLDERS

During project delivery, the Program Manager will consult with engagement, communications, and steering groups to assess, plan, and manage project communication needs. Communications plans for each stakeholder type will include descriptions of objectives, distribution, frequency of communication, and deliverables. The same formalized approach will support a broad range of project communications including day-to-day project management control and reporting, performance tracking monitoring, issue tracking and escalation, crisis management, public communications, and consultation and engagement. City Leads will provide regular corporate reports to Mayors and Committees.

5.8 Monitoring, controlling, and reporting strategies and checkpoints

We will follow industry standard project management professional (PMP) methodologies to tightly control, manage, and report on the direction of the #SmarterTogether program and its projects.[19] These include:

- clearly defined roles and responsibilities for project management and decision-making processes;
- clearly defined communication processes, including escalation for managing critical issues;
- standard project documentation for controlling scope, timelines, and costs at the project-level;

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[19] PMP refers to Project Management Professional, a professional certification offered by the Project Management Institute.

- project status and steering checkpoints defined and scheduled by the Program Director, including:
  - weekly checkpoints with the City Sponsors, Program Director, and key discipline leaders to report on progress, and enable rapid issue discussion, resolution, and decision making;
  - weekly checkpoints with project management, engineering, and technology teams across both Cities to track progress, flag issues early, and align efforts;
  - regular program evaluation with subject matter experts, advisory panels, and community groups to maintain visibility and transparency; and
  - regular communications and status reporting across our two-City, cross-functional teams.

5.9 Our approach to sustaining projects beyond the lifecycle of the Smart Cities Challenge

At the outset of the Implementation Phase, we will create a ten-year Total Cost of Ownership (TCO) estimate that supports the full lifecycle of the program. This will enable us to ensure that program scope is commensurate with our operating investment. Throughout the program lifecycle, we will also continuously seek opportunities to establish innovative smart city public-private partnership models in which project operations will be self-funding.

5.10 Identification of key risks and development of appropriate mitigation strategies

Key risks and mitigation strategies related to project management are listed in Table 5.B.

Table 5.B Key project management risks and mitigation strategies

RISK	RISK MITIGATION
Cost estimates are inaccurate due to the use of new technology in a novel transportation solution.	Implement a precise estimate methodology in which estimates are revisited throughout the project selection, planning, and implementation.
Legal and regulatory approvals required for a desired solution could lead to schedule delays.	Establish a dedicated project focused on understanding legal and regulatory requirements that will ultimately put together and execute a plan for obtaining approvals.
Pledged contributions from partners might not materialize, leading to funding shortfalls.	Continue to build strong and inclusive relations with the partner network. Formalize contributions with partners early on in the project before major purchases are finalized.
Authority is unclear and decisions are delayed due to managing initiatives between two autonomous Cities.	Establish a central Program Management Office consisting of representation from both Cities that has a clear authority and mandate to deliver the #SmarterTogether program. Continue to build the strong relationship and governance already formed between the two municipalities in the Application and Finalist Phases of the Smart City Challenge.
The numerous procurements required for selected transportation solutions leads to schedule delays.	Continue to support the progressive and out-of-the-box thinking that led to the responsive Call for Innovation procurement process. Use project management processes existing in both Cities for comprehensive planning between tasks.

6
ENGAGEMENT

6.1 An engagement approach that supports a community-first #SmarterTogether program

From the beginning of the Smart Cities Challenge, we have taken a community-first approach to the development of our vision. This will continue throughout the Implementation Phase. It is vital to the #SmarterTogether program that our residents have the opportunity to guide its direction, provide input that informs project design, influence change, and provide feedback in a continuous cycle. Making our residents the North Star of the program is the key principle that ensures that the technology in our corridors will be appealing, will suit their needs, and will deliver outcomes that are meaningful to them.

Our approach to engagement empowers our residents to shape the focus of the #SmarterTogether initiative during each phase.

- **In the Application Phase,** we engaged our residents so that they could identify the focus areas that mattered most to them. They told us that our focus should be on mobility and safety, and we crafted our Challenge Statement from that starting point.

- **In the Finalist Phase,** we engaged our residents so that they could tell us their needs and preferences related to specific project categories, and provide guidance on how those needs and preferences could be addressed through project selection and design.

- **In the Implementation Phase,** we will engage our residents to help us continuously calibrate corridor projects to their needs, uncover their concerns and address them, and ensure that the #SmarterTogether program outcomes continue to be meaningful to them, making adjustments where necessary.

6.2 Application Phase engagement

An unprecedented joint engagement effort from our two Cities revealed that mobility and safety were the two most meaningful focus areas for our residents and stakeholders. We heard that "mobility is the engine of inclusivity" and "a driver for providing opportunity to everyone, everywhere." We heard one particularly ambitious call to action: "Be the first in Canada to enable autonomous vehicles."

This insight came after comprehensive engagement that included:

For residents:

- multi-lingual staff sent out to busy Surrey and Vancouver locations;
- an online citizen idea platform that allowed residents to submit ideas and interact with others;
- #SmarterTogether social media conversations;
- surveys and messages through Surrey's CitySpeaks and Talk Vancouver platforms; and
- pop up polls and surveys on our website, social media channels, and at stations in our communities

For vendors:

- a call for project ideas through our Call for Innovation; and
- two open industry sessions at the Greater Vancouver Board of Trade

For other stakeholders:

- consultation with our External Advisory Panel of 13 regional thought leaders; and
- an unprecedented Vancouver-Surrey cross-department internal working group comprised of over 70 senior staff from across City departments

The effort yielded a total of over 149,000 interactions across all channels, including:

- over 5,000 unique visitors to the citizen idea platform;
- over 2,600 votes cast for ideas submitted to the #SmarterTogether website;
- over 2,200 survey responses;
- over 1,000 website pop-up poll submissions;
- over 4,100 comments, shares, retweets, replies, and likes;
- over 3,400 engaged users and 136,000 people reached;
- over 250 smart city ideas from residents; and
- over 200 vendor project ideas

6.3 Finalist Phase engagement

6.3.1 OVERVIEW

Engagement in the Finalist Phase brought our residents face-to-face with some of the technology they would interact with in the corridors. Residents also helped our teams understand how corridor projects may impact specific groups of people in our Cities, and the efforts that we could make to maximize positive effects, minimize negative effects, and make the technology as accessible, acceptable, and approachable as possible.

In addition to following International Association for Public Participation (IAP2) best practices for informing and consulting the public, our teams brought new thinking to our engagement and provided practical learning experiences that all residents could join. We did this through:

- **Autonomous vehicle shuttle ride demos in Surrey and Vancouver** The #SmarterTogether team brought ELA — a fully-accessible, 100% electric autonomous vehicle operated by Pacific Western Transportation — to our Cities to give a

hands-on experience to our residents and get their feedback on the #SmarterTogether bid.

ELA arrived in front of Surrey City Hall in February to provide free five-minute demo rides to the public over the course of 11 days. In Vancouver, 15-minute rides along West 1st Avenue were available from February 23rd to March 3rd.

The response was incredible: our residents took **over 4000 rides**, and booked all available advance spots in both Cities. Attention was particularly high when the Mayors of both Cities joined to take a ride together. Resident feedback regarding the experience and the #SmarterTogether bid was overwhelmingly positive.

- **An AV perception survey**
After demo rides, we asked riders to complete surveys on the experience, asking a mix of yes-no and open-ended questions relating to their perception of, and familiarity with, AVs. The survey also posed questions related to how riders would like to be involved in future discussions. We also took this opportunity to share the details of the #SmarterTogether bid and get feedback.

- **Mission Possible, Escape Room Challenge**
Our engagement team — endeavouring to bring gamification to our engagement activities — planned Western Canada's largest outdoor escape room event, Mission: Possible, in front of Surrey City Hall. The event was free for the public, and a ride in ELA was a key part of a successful escape.

Six hundred people registered, selling out the event in three days. Partners including ICBC, the RCMP, SFU, and UBC helped us educate residents about AV shuttle

sensor technologies and transportation corridor design. Due to inclement weather, we had to reschedule the original February event dates to March 20th and 21st.

The Finalist Phase also included events at which we had in-depth face-to-face conversations with subject matter experts. These efforts were supported by two engagement consulting firms. Among these events were:

- **A Greater Vancouver Board of Trade information session** at which we updated industry on new developments and received feedback.

- **A stakeholder workshop** that hosted 17 community stakeholders — including social planners, RCMP officers, and an accessibility consultant — who helped us to understand the potential impacts of corridor technologies on different groups of people and to identify potential design improvements.

- **The VANquish Collisions Hackathon** which brought 115 participants, 15 judges, 8 mentors, and staff together to create data-related solutions to the problem of traffic fatalities and to reinforce the notion that we support talented residents who pursue creative technical solutions that can improve their cities. The winning solution was an application that could help pedestrians find a walking route optimized for safety as opposed to distance or time.

- **The Civic Tech YVR dialogue session** which involved a discussion of how new mobility technology can be designed to benefit all and how it can address challenges facing vulnerable road users. The discussion drew 40 members of Civic Tech YVR, a meetup group of diverse young graduates and tech professionals with an interest in technology projects that impact civic issues.

6.3.2 A FOCUS ON INCLUSION AND ACCESSIBILITY

Corridor projects may impact different groups of people in different ways. A priority of our Finalist Stage engagement was to ensure that corridor technology would be accessible and appealing to all residents, including those from groups that are historically marginalized or at risk of being left on the sidelines as civic technology advances.

To learn about how we could make our corridor technologies as accessible as possible, we reached out to experts and leaders of communities relating to seniors, people with disabilities, Indigenous people, low income residents, immigrants, and youth. This engagement effort resulted in numerous insights regarding concerns specific to each group, ways in which projects can be designed to serve each group, and how engagement can be performed to best communicate with and onboard each group.

Here are some of the things we heard:

- AV shuttles have the potential to reduce the social isolation of some seniors by enabling a new on-demand mobility option. However, AVs could in fact exacerbate isolation if an individual is accustomed to regularly socializing with a public transportation driver. Through the employment of an AV shuttle host, seniors susceptible to social isolation and loneliness can enjoy the mobility benefits that AV shuttles provide without the emotional trade-off of losing personal contact.

- Indigenous people are disproportionately at risk of traffic injuries and death, and are a key group that collision-reducing technologies can help.[20] We heard from community leaders that the most effective form of engagement with Indigenous people with regard to the #SmarterTogether program is in-person, and specifically at events hosted by Indigenous agencies. We will seek out conversations and plan engagement at these events in order to effectively introduce projects to people from Indigenous communities and to ensure that they have the opportunity to influence the #SmarterTogether program and technologies.

- For people with visual impairments, we heard that predictability is paramount. This will be a key design principle as we consider how we will implement digital signage and signals at dynamic crosswalks.

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[20] *Where the Rubber Meets the Road: Reducing the Impact of Motor Vehicle Crashes on Health and Well-being in BC*. Office of the Provincial Health Officer. 2011. Contributed to and reviewed 2014-2016.

Across the province and in Metro Vancouver particularly, Indigenous people are disproportionately at risk of traffic injuries and death. Consider:
- The B.C. age-standardized hospitalization rate is 214.7 per 100,000 for Indigenous people compared 125.8 for all other residents.[20]
- The age-standardized motor vehicle crash fatality rate for Indigenous people in the Vancouver Coastal Health region is 18.6 deaths per 100,000 residents compared to 5.2 for other residents.

These rates are even higher in rural and remote regions. These facts confirm the need for new mobility solutions and heighten the urgency underlying implementations that are replicable and designed with the needs of Indigenous populations in mind.

- Low income residents and seniors may be at risk of missing opportunities due to digital inequality: the unequal landscape of digital literacy skills and access to the Internet and smartphones. As a result of gaining this insight, #SmarterTogether services on smartphone applications will also be made available for free at intuitively-designed digital kiosks placed at high traffic locations in the corridors.

- New immigrants may face two barriers in the corridors: the novelty of smart mobility technologies and the language of their operation. We can reduce these barriers by designing services to operate in multiple languages and by ensuring a multi-lingual human presence is available at designated AV shuttle stops and mobility nodes.

6.4 Implementation Phase engagement

6.4.1 OVERVIEW

Our approach to engagement during the Implementation Phase includes three pillars:

- communications activities that build resident familiarity with the corridors;
- conversation and consultation that enable residents to shape technology implementations and influence change; and
- innovative engagement activities designed to encourage high participation and provide new, interactive experiences that educate about the technology and drive interest in the program.

6.4.2 COMMUNICATIONS THAT BUILD FAMILIARITY AND PRIME RESIDENTS FOR CORRIDOR PROJECTS

Education about the various projects, their functions, and privacy and security considerations will be key to acceptance and enthusiastic onboarding. Over the first two years, as foundational technology projects are being implemented, there will be a strong emphasis on communications that provide information to residents in manageable amounts so that they can build their knowledge and familiarity with the proposed corridors and the technologies involved in the program. This effort is also key to enabling residents to later provide informed opinions about design adjustments and additional projects that could enhance service to meet their needs.

Once connected technology projects are operational in all routes, engagement priority will shift to consultation as our engagement teams seek feedback on resident experiences and thoughts on adjustments.

Communications activities will include:

- exposure in media, including targeted stories provided to well-known technology journalists;
- social media and digital media distribution;
- a dedicated e-newsletter that covers news and provides in-depth project descriptions;
- the exploration of a new mobility lecture series though local universities, with online distribution;
- re-engagement of key stakeholders; and
- a series of data-related roundtable discussions with residents.

6.4.3 REAL CONVERSATIONS AND CONSULTATION ALLOW RESIDENTS TO DRIVE CONTINUOUS CORRIDOR IMPROVEMENT

Consultation will take priority as our Cities plan and implement connected technologies in the intermediate timeframe (years 0-2). Residents will be well-informed after two years of communications activities and exposure to operational projects on the University Drive Pilot route.

Our traditional consultation activities will include:

- focus groups;
- surveys;
- open houses;
- stakeholders workshops;
- expansion and engagement of our external advisory group;
- interactive demonstrations of the technology;
- outreach at community festivals; and
- conversations through the #SmarterTogether website

6.4.4 INNOVATION THAT GAMIFIES, ENHANCES, AND FUTURE-PROOFS ENGAGEMENT

We will explore innovative consultation techniques that anticipate the ways our residents, and youth in particular, want to interact with their Cities. Today, citizen expectations about engagement are not framed by what worked in the past, but are influenced by many other aspects of their digital lives including e-commerce, social networks, and online gaming.

To drive excitement about engagement and the corridors and to future proof our engagement processes, our Cities have to meet new citizen expectations. Our innovative engagement plans will do just this. We will explore:

- virtual and augmented reality technology that can:
  - immerse residents in the corridor from their own homes;
  - provide immediate translation of signage through applications; and
  - allow residents to "look under the hood" of technologies using mobile phones, which can be used on organized walking tours in which they can pose questions and give feedback.
- gamification techniques, like those already in use by utilities, that encourage participation and attention to detail; and
- community digital assets, including kiosks, deployed throughout the corridors as a means of encouraging social connection and onboarding to new technologies.

We will ensure that these engagement activities also have accessible options for those residents with lower levels of digital literacy or access to digital devices.

6.5 Identification of key risks and development of appropriate mitigation strategies

Key risks and mitigation strategies related to engagement are listed in Table 6.A.

Table 6.A Key engagement risks and mitigation

RISK	RISK MITIGATION
Resident familiarity with corridor technology is limited.	Conduct detailed and sustained communications over the five-year program timeline. Surveys, user experience testing with internal staff, and communication with external advisors will be conducted to ascertain levels of familiarity prior to communications.
Members of marginalized groups and those without access to digital channels are not reached.	Perform targeted engagement activities that center on face-to-face conversations where our residents live, work, and play, with multi-lingual teams employed to ensure language is not a barrier to engagement.
The scale of the project and timeline is overwhelming, leading to a loss of interest.	Present information in manageable amounts over time, building residents' knowledge of the program in increments. Fund innovative, people-centric engagement activities to maintain enthusiasm and interest.
Novelty combined with a fast-moving timeline dampens adoption.	Provide ample notification time before new projects are unveiled, and conduct demonstrations well in advance of deployment, with local champions present. Ensure staff is available at project sites to answer questions, record feedback, and provide assistance.
A fast-moving implementation schedule outstrips related engagement activities.	Use the #SmarterTogether website to provide weekly updates.

7
DATA AND PRIVACY

7.1 Overview

The privacy and security of our residents' data is a top priority. The #SmarterTogether program will be compliant with *BC's Freedom of Information and Protection of Privacy Act* (FOIPPA), and our Cities will adhere to generally accepted good practices in privacy management and security as part of our data management plan throughout the implementation of the program.

We will identify the impact that projects might have on the privacy of individuals and set out recommendations for managing, minimizing, or eliminating adverse impacts. We will assess all projects for risks of non-compliance with privacy legislation and identify controls to mitigate those risks. We will also consider broader privacy implications and risks, including whether the planned use of personal information in the project will be acceptable to the community.

7.2 The Joint Preliminary Privacy Impact Assessment (PPIA)

Detailed privacy considerations relating to the #SmarterTogether program are described in our Joint Preliminary Privacy Impact Assessment, which was provided to the Office of the Information and Privacy Commissioner of BC (OIPC) for review on February 28, 2019. We have also drafted Privacy Impact Assessments and consulted with OIPC regarding numerous initiatives leading up to the final submission, including the use of citizen engagement tools, the AV shuttle pilot project, and a citizen engagement contest.

7.3 Data plan compliance with privacy regimes

Our data management plan complies with FOIPPA. Our plan does not directly address the Personal Information Protection and Electronic Documents Act (PIPEDA), other federal privacy regimes, or provincial private sector legislation as these do not pertain to local public bodies in British Columbia.

As a public body under the FOIPPA, our Cities have duties with regard to personal information. We have an obligation under FOIPPA to implement reasonable security measures to protect personal information from risks such as unauthorized access, collection, use, disclosure, storage, transformation, exchange, analytics, or disposal. We are aware of the need to assess and ensure security on each project.

Good planning and design can minimize risk and ensure individual privacy is protected. Such planning includes applying a data minimization approach to the design and operation of the technology, putting in place a privacy and access governance program that includes policies and procedures with strong oversight, and ensuring community engagement and project transparency to help the public understand their options and provide input.

We will build mitigating controls into all projects included in the #SmarterTogether program. Among these controls may include data minimization, anonymization, transparency, contractual provisions with vendors, and meaningful consent. We will conduct privacy impact and threat risk assessments to assess risks and inform appropriate mitigation steps. We do not have plans to re-use or re-distribute any data.

All vendors that provide services to the program will also be legally required to adhere to FOIPPA's privacy protection provisions. We will further ensure vendors' compliance with FOIPPA by including privacy protection schedules with all contracts involving personal information. These schedules define the vendors' responsibilities in relation to personal information and assert City control over all data collected from or on behalf of the Cities. The privacy protection schedules specifically require vendors and contractors to acknowledge that they are familiar with the FOIPPA requirements and confirm that they will comply with any other privacy legislation to which they are subject.

7.4 Types and methods of data collection

Given the wide breadth of projects and activities involved in the program, the following methods of collection may be used and data types collected:

- Tools and applications may collect user account and contact information, citizen feedback, location data, and other data such as device, application, and browser information as allowed by device settings.
- AV shuttles may collect vehicle telemetry data, Global Positioning System (GPS), Light Detection and Ranging (LiDAR), and video imagery.
- Engagement methods may collect personal contact information, demographic information (age, gender, etc.), personal opinions, market research, and survey answers.
- Smart traffic signal sensors may collect radar, traffic flow patterns and counts, and low-resolution camera feeds.

7.5 Integrating security and privacy considerations into project design

The Cities have mature privacy management programs that will enable easy incorporation of privacy and security into project designs. Elements of these programs include:

- designated Heads for the purpose of the FOIPPA Act
- designated Privacy Officers
- corporate records responsibility bylaws
- designated records managers
- designated cybersecurity managers
- records management programs
- records management training
- Freedom of Information bylaws
- privacy awareness training
- Privacy Impact Assessments
- privacy breach incident responses
- information technology policies
- acceptable use policies
- information security risk assessments
- social media policies
- contractual protections
- use of meaningful consent where needed

7.6 Data governance

Data governance for the #SmarterTogether program will clearly communicate:

- the information to be collected, used, and disclosed;
- the purposes for which information is to be collected, used, and disclosed;
- accountabilities for data protection and oversight;
- the requirement that all uses and disclosures of personal information be compliant with sections 32 and 33 of FOIPPA;[21]
- the requirement that no personal information is to be used or shared for unidentified secondary purposes unless otherwise allowed under FOIPPA; and
- the requirement that access to information be based on the concepts of "need to know" and "least privilege."

Furthermore, contract administrators and our Procurement, Privacy, and Legal Departments will follow established procedures to ensure that contractual terms and services protect personal information. Our contract administrators are responsible for regularly monitoring and auditing vendor compliance with contractual privacy provisions.

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[21] Section 32 of FOIPPA stipulates the limited conditions under which public bodies may use personal information in their custody or under their control. Section 33 of FOIPPA requires a public body to only disclose personal information in its custody or under its control if it is permitted under FOIPPA.

7.7 Ownership and control

Vendors will be required to confirm, through contract, that data collected or produced in the course of providing #SmarterTogether program services remains under City control. While vendors may be provided with custody of or access to information for the fulfillment of services, they can make no claim to ownership of the data and have no authority to use or share data for secondary purposes. In relation to personal information, the Cities' Privacy and Data Security Schedule and Privacy Protection Schedule will be included in each vendor contract that potentially involves personal information. These schedules require all personal data to remain in the control of the Cities.

7.8 Consent

The Cities will provide choice to the individual and obtain implicit or explicit consent with respect to the collection, use, and disclosure of personal information. We will only collect personal information if such collection is authorized by or under legislation, essential for operating programs or activities, or collected for law enforcement purposes.

We will limit the use of personal information to the purposes identified in the collection notices and for which the individual has provided implicit or explicit consent. We will retain personal information for only as long as necessary to fulfill the stated purposes or as required by law or regulations, and thereafter will appropriately dispose of such information in accordance with the Cities' Corporate Records bylaws, policies, and record retention schedules.

7.9 Data minimization and de-identification

Prior to any collection of personal information, we will conduct PIAs to confirm that data collection is authorized under section 26 of FOIPPA.[22] Information collected will be de-identified or anonymized to the greatest extent possible at the earliest time possible.

7.10 Accessibility

Individuals will have access to personal information through informal access requests as well as Freedom of Information requests. Our Cities will make every reasonable effort to ensure that personal information used to make a decision about someone is accurate and complete.[23] Individuals will also be able to request correction of their information through processes established by the vendors and/or appropriate City business areas.[24]

Both Cities take an open-by-default approach and have existing Open Data Portals that will be used to publicly share non-personal and anonymized datasets. Other existing access processes include proactive release programs for City business data, informal access requests by which information can be requested from various City departments, and formal FOIPPA requests for information not available via other disclosure methods.

While not made available via Open Data Portals or proactive release processes, the Cities also enable individual access to personal information. The Cities acknowledge that individuals have a right to access information about themselves and have developed processes for enabling

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[22] Section 26 of FOIPPA states that personal information may be collected only if such collection is authorized by or under legislation, essential for operating programs or activities, or collected for law enforcement purposes.
[23] Relating to Section 28 of FOIPPA.
[24] Relating to Section 29 of FOIPPA.

that access. Personal requests are regularly processed as informal departmental requests or as FOIPPA access requests. In either case, personal information is made available to the individual while ensuring the utmost privacy of the data. The Cities also publish Personal Information Directories that list all City repositories of personally identifiable information. These directories offer transparency into the Cities' personal information holdings and inform individuals of the existence and use of their personal information.

The information is anonymized or destroyed promptly and securely as soon as it is no longer needed for the purpose(s) for which it was collected and for legal or business purposes.

Personal information is stored, managed and accessed solely within Canada, except in limited circumstances specified under FOIPPA section 30.1.[25]

7.11 Data and cybersecurity

Our Cities have robust information security risk management processes that are based on recognized risk management frameworks and that will be applied to all projects.[26] Within the scope of the #SmarterTogether program, each project will be assessed for compliance with our security goals. As part of this process, Security Threat and Risk Assessments (STRA) will identify potential threats and determine the level of risk based on impact and probability. Risk mitigation strategies will be identified and implemented for each risk to ensure that residual risk is reduced to an acceptable level.

Each project will also follow a "secure by design" architectural approach, an approach that ensures security is baked into the design at the beginning of every project to mitigate any undue risks. Architectures will be formally reviewed as part of the STRA process to ensure compliance with enterprise security standards, and to ensure any unaccounted risks in the underlying design are identified and mitigated.

A security architect and security analyst will be assigned to each project and will be responsible for generating additional security requirements, conducting risk assessments, and providing security consultation on the projects through each phase of delivery. An overall information security risk assessment, mitigation plan, and threat model for the #SmarterTogether program will also be created. An annual health check will be performed to identify any new emerging threats, assess new risks, and develop additional mitigation strategies.

To ensure the security of partner solutions, especially cloud solutions, security requirements based off the Cloud Security Alliance's (CSA) Consensus Assessments Initiative Questionnaire will be embedded into every public procurement.[27] In addition, specific contract language will be embedded into all contracts specifically addressing data security, data ownership and data privacy, and stipulating the requirement for regular third-party audits, penetration tests, and third party attestations.

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[25] Section 30.1 of FOIPPA requires that personal information in the Cities' custody or control is stored and accessed only in Canada, unless persons provide explicit informed consent to store information in another jurisdiction or FOIPPA allows for limited foreign access or storage.
[26] including NIST SP 800-39 and ISO 27005
[27] These requirements mandate third party security attestations against CSA STAR, ISO 27018 and PCI DSS.

7.12 Identification of key risks and development of appropriate mitigation strategies

Key risks and mitigation strategies related to data and privacy are listed in Table 7.A.

Table 7.A Key data & privacy risks and mitigation

RISK	RISK MITIGATION
Potential for personal information collected under the #SmarterTogether program to be used or disclosed for purposes other than those for which it was originally collected due to 'function creep'.	Ensure clear understanding of and adherence to information governance guidelines across PMO teams, related committees, and external partners. Conduct Privacy Impact Assessments and Security Threat and Risk Assessments. At earliest opportunity, anonymize or de-identify data and guard against re-identification.
Privacy breach	Rights are provided to users on a need-to-know basis only. Extensive privacy training is provided to staff. Adherence to privacy-by-design principles during project development, and employment of tools such as Privacy Impact Assessments and Security Threat and Risk Assessments to identify and mitigate issues. Establish strong privacy and security policies and procedures, including breach response protocols. In the event of a significant breach, provide immediate notification to the Office of the Information and Privacy Commissioner of BC.
Malicious breach of data, information technology systems, or cyber-physical systems.	Apply robust cybersecurity risk management practices, implement strong cybersecurity controls, and develop rigorous cybersecurity incident response processes.

FINANCIAL ⁸

8.1 Financial plan overview

Our financial plan — guided by our performance measurement plan — supports progress towards our ambitious outcomes throughout the five-year #SmarterTogether program.

8.2 Material that informed the development of our estimates

Key material that informed our INFC project contribution estimates include:

- **The corridor and route concept maps.** Published in our CFI, these concept maps indicate locations that would be suitable for technology implementations in each corridor.
- **Vendor responses to our Call for Innovation.** The 81 project proposals from 55 shortlisted vendors[28] include information related to scope, estimate details (including effort, unit costs, licensing costs, etc.) and in-kind value contributions.
- **The performance measurement plan.** This informed the sequencing of technology and project category implementations. This sequencing of implementation by category directly informed the proposed payment schedules.
- **Internal City time tracking reports.** Time tracking reports for #SmarterTogether efforts to date were used to forecast potential ongoing resourcing needs during the program.
- **Comparable category project estimates.** Information about similar technology category projects was also considered.

8.3 Estimation methodology

Our approach to estimating project budget allocations followed a structured approach:

- We first determined budget allocations for each technology category. Allocation amounts were based on estimates provided in vendor project proposals.
- We then determined budget allocations for each project category under each technology category, as follows:
  - 5% of its budget is allocated to engagement (applies only to public-facing projects).
  - 20% of its budget is allocated to the planning and design phase.
  - 10% of its budget is allocated to contingency.
  - The remainder of its budget is allocated to purchasing, implementation, deployment, and overhead.

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[28] The 55 shortlisted vendors and their projects, including their estimates and in-kind contribution details, are included in the **Confidential Annex.** Following award, these shortlisted vendors will participate in a final, detailed evaluation stage to finalize scope and estimates prior to the creation of any work orders for project engagement, planning, and implementation efforts.

8.4 INFC total project contribution summary table

Table 8.A shows the INFC total contributions towards the project categories in each technology category. This allocation will be divided equally across the two Cities.

Table 8.A INFC total project contributions

PROJECT CATEGORY	INFC CONTRIBUTION ALLOCATION '000s	ALLOCATION BY PHASES '000s			
		1. Engagement	2. Planning	3. Deployment	4. Contingency
Foundational technologies					
Smart City Integration Hub	**$7,000**	N/A	$1,400	$4,900	$700
Communication infrastructure	**$2,000**	N/A	$400	$1,400	$200
Connected technologies					
Autonomous vehicle shuttles	**$16,000**	$800	$3,200	$10,400	$1,600
Citizen experience	**$1,000**	$50	$200	$650	$100
Data & analytics	**$5,000**	$250	$1,000	$3,250	$500
ITS infrastructure	**$16,000**	$800	$3,200	$10,400	$1,600
Last mile mobility	**$2,000**	$100	$400	$1,300	$200
City as a Platform technologies	**$0**	N/A	N/A	N/A	N/A
Supporting technologies					
Regulatory	**$500**	N/A	$150	$300	$50
Community engagement tools	**$500**	N/A	$150	$300	$50
Total	**$50,000**	**$2,000**	**$10,100**	**$32,900**	**$5,000**

8.5 Proposed INFC payment schedule

Table 8.B and Table 8.C show the proposed INFC contribution toward each project category and timeframe for the City of Surrey and City of Vancouver, respectively. The allocation of these funds directly maps to progress towards our outcomes, summarized below from the performance measurement plan.

Table 8.B Proposed INFC payment schedule – City of Surrey

PROJECT CATEGORY	PROPOSED INFC PROJECT CONTRIBUTION ALIGNMENT TO OUTCOMES '000s			SCHEDULE DETAILS
	IMMEDIATE 0-2 YEARS	INTERMEDIATE 2-4 YEARS	LONG-TERM 4-5 YEARS	
Foundational technologies				
Smart City Integration Hub	$3,500	-	-	Foundational technologies are required to enable all projects
Communication infrastructure	$1,000	-	-	
Connected technologies				
Autonomous vehicle shuttles	$4,800	$3,200	-	Surrey deploying AV early on controlled route
Citizen experience	$400	$100	-	
Data & analytics	$2,500	-	-	
ITS infrastructure	$4,000	$3,000	$1,000	Significant early ITS infrastructure deployments
Last mile mobility	$200	$800		Bike share deployment in Surrey in second phase
City as a Platform technologies	-	-	-	
Supporting technologies				
Regulatory	$150	$50	$50	
Community engagement tools	$150	$50	$50	
Total	**$16,700**	**$7,200**	**$1,100**	

Table 8.C Proposed INFC payment schedule – City of Vancouver

PROJECT CATEGORY	PROPOSED INFC PROJECT CONTRIBUTION ALIGNMENT TO OUTCOMES '000s			SCHEDULE DETAILS
	IMMEDIATE 0-2 YEARS	INTERMEDIATE 2-4 YEARS	LONG-TERM 4-5 YEARS	
Foundational technologies				
Smart City Integration Hub	$3,500	-	-	Foundational technologies are required to enable all projects
Communication infrastructure	$1,000	-	-	
Connected technologies				
Autonomous vehicle shuttles	$1,600	$4,800	$1,600	Vancouver AV shuttle planned for second phase
Citizen experience	$150	$350	-	
Data & analytics	$2,500	-	-	
ITS infrastructure	$4,000	$3,000	$1,000	Significant early ITS infrastructure deployments
Last mile mobility	$500	$500	-	Expanded bike sharing program
City as a Platform technologies	-	-	-	
Supporting technologies				
Regulatory	$150	$50	$50	
Community engagement tools	$150	$50	$50	
Total	**$13,550**	**$8,750**	**$2,700**	

8.6 Vendor contribution summary

Our 55 shortlisted vendors have provided offers totalling approximately $36.5 million in potential in-kind contributions across project categories. These contributions are listed in Table 8.D.

Table 8.D Vendor contribution summary

PROJECT CATEGORY	TOTAL POTENTIAL VENDOR IN-KIND CONTRIBUTION VALUE
Foundational technologies	
Smart City Integration Hub	$1,269,438
Communication infrastructure	$7,246,004
Connected technologies	
Autonomous vehicle shuttles	$7,707,600
Citizen experience	$1,317,000
Data & analytics	$575,000
ITS infrastructure	$13,255,555
Last mile mobility	$4,093,000
City as a Platform technologies	
Supporting technologies	
Community engagement tools	$5,000
Regulatory	$25,000
Resilience	$1,000,000
Total	**$36,493,597**

8.7 Appropriate financial tools and accounting methodologies for projects

The strong governance processes that exist throughout the #SmarterTogether program apply equally to our project financial management processes.

Below is our financial management process for all projects:

1. Prior to the beginning of a project, a multi-year Total Cost of Ownership assessment is completed as part of a business case to ensure the project is cost-effective and a fit for purpose. Specific TCO timeframes depend on the type of purchase, and are defined by the Cities.
2. Once the business case is approved, a work order can be created and approved by the appropriate level of leadership based on predefined approval limits.
3. The approved work order authorizes the Project/Program Manager to engage in the appropriate procurement activities to deliver a successful project.
4. Each procurement requires that the project follow predefined City rules for engagements to ensure fairness and transparency in the selection process.
5. The output of the procurement process is the issuance of a purchase order, which must be approved by the appropriate level of leadership based on predefined approval limits.
6. Once approvals are obtained, the Project/ Program Manager is accountable for monitoring financial activities to ensure the initiative stays within budget.
7. As outlined in the Chapter 5: Project Management, the Project Manager is to review financials regularly and include the latest updates in status reports, shared with the Project Sponsor and Joint Steering Committee for review.
8. In addition, the Project/Program Manager is to provide regular forecasts to the Joint Steering Committee and key leadership roles, including Finance, to inform appropriate financial decision-making.

To aid the project managers, numerous tools, data, and reports will be available to them within the Cities' financial management systems.

8.8 Grant allocation

In completing our Finalist Stage submission, we built upon the INFC Finalist Stage contribution through significant internal effort investment and external expenditure. In our initial submission, we proposed that the $250,000 Smart Cities Challenge finalist grant would be allocated to three categories:

- $175,000 for project management and professional services;
- $35,000 for community and partner engagement; and
- $40,000 for knowledge transfer

Upon winning the grant, our Cities matched the federal grant and committed a further $125,000 per City, bringing the Finalist Stage submission budget to $500,000. The Cities also contributed internal resources and infrastructure, along with partnerships that attracted $61,000 in external sponsorship for the Surrey Mission Possible public engagement event.

The detailed breakdown of our teams' Finalist Phase expenses are shown in Table 8.E, including a summary of any deviations from our original plan.

Table 8.E Breakdown of Finalist Phase expenses

PROJECT CATEGORY	BUDGET	NOTES
Project Management (Original budget $175,000. Revised budget $225,000)		
Program Director	$100,000	The initial submission contemplated a budget of $50,000 for the Program Director which proved to be insufficient for the large scope of initiatives undertaken. A senior resource from Ernst and Young was selected to act as a joint Program Director as a shared resource for both Cities.
Professional services	$125,000	Consultants from two Engineering firms with extensive experience in mobility and safety, IBI Group and Parsons Engineering, were retained as Owner's Engineers to work with each City's technical and transportation teams. The firms assisted in the evaluation of vendor proposals and contributed to the technical chapters of the #SmarterTogether submission.
Performance measurement workshop	In-kind resources from SFU, UBC, the City of Surrey, and the City of Vancouver	A focused workshop was added to develop the #SmarterTogether Logic Model with input from UBC & SFU subject matter experts.
Community and Partner Engagement (Original budget $35,000, Revised Budget $215,000)		
Engagement plan creation	$ 35,000	The original budgeted amount was used to contract a third party to help develop an ambitious joint engagement plan.
VANquish hackathon	$ 10,000	• As part of our unique community-led approach, our Cities showcased a demonstration of an operational autonomous vehicle shuttle and held events in both Cities attracting 4000 citizens to take a ride on the shuttle, learn about the Smart Cities Challenge proposal, and provide direct feedback to staff. The response to this approach was overwhelmingly positive and, as a result, thousands of citizens became part of the proposal development process. • Additional resources were contracted to assist with design, video creation, and content writing. • A meetup was organized with the local Civic Tech YVR group to extend the reach of our engagement as far as possible and to involve as many stakeholders as possible.
Stakeholder workshop	$ 7,500	
CivicTech YVR	$ 500	
Autonomous vehicle shuttle demo	$ 95,000	
Communications and design	$ 12,000	
Video contractor	$ 25,000	
Proposal writer	$ 30,000	
Knowledge Transfer (Original budget $40,000, Revised Budget $50,000)		
#SmarterTogether website	$ 50,000	The SmarterTogether website was enhanced to act as an enduring legacy of the collaboration and will act as a Library of Learning for the Smart Cities Challenge experience and for future collaborations that will be catalyzed as a result of this competition.
Contingency	$10,000	
REVISED Budget	**$500,000**	

8.9 Partner projects and contribution details

Through the Smart Cities Challenge, Surrey and Vancouver have strengthened existing partnerships and built new ones with organizations interested in improving the quality of life of our residents.

Many of these partners are ready to take the next step with us, and contribute resources to see our plan come to fruition. Upon announcement of the Smart Cities Challenge award, we anticipate contribution from partners in the following major areas:

- program-level support (e.g., strategic consulting, regulatory and policy advisory)
- specific project support (e.g., in-kind resources, facilities, and assets)
- advisory support (e.g., access to experts within advanced research programs)
- reach and network support (e.g., access to global networks for advanced subject matter expertise)

Key examples of partner contributions are outlined in Table 8.F.

Table 8.F Partner contributions

PARTNER	IMPACT AREA						CONTRIBUTION DETAILS
	PROJECT CATEGORIES						
	Program & foundations support	Autonomous vehicle shuttles	Citizen experience	Advanced data & analytics	ITS Infrastructure	Last mile mobility	
UBC	✓	✓	✓	✓	✓	✓	• access to Campus as a Living Lab • Clean Connected and Safe Transportation Test Bed and the AURORA Connected Vehicle and Smart Transportation Test Bed ($12.25m invested) • Transportation Futures research ($7.5m program) • Urban Predicative Analytics Lab performance measurement support ($1 million program)
SFU	✓	✓	✓	✓			• KEY Big Data initiative ($10 million invested) • metrics & data analysis resources • cybersecurity and privacy resources • access to Cities, Health & Active Transportation Research Lab (CHATR) including specific bike share program expertise from Dr. Meghan Winters • potential access to the Sustainable Transportation Action Research Team (START)

Table 8.F Continued

| PARTNER | IMPACT AREA | | | | | | CONTRIBUTION DETAILS |
| | PROJECT CATEGORIES | | | | | | |
	Program & foundations support	Autonomous vehicle shuttles	Citizen experience	Advanced data & analytics	ITS Infrastructure	Last mile mobility	
TransLink	✓		✓	✓	✓	✓	• ITS Infrastructure projects • development of mobility-as-a-service/last mile mobility applications • potential for future Compass Card payment alignment • advisory support
100 Resilient Cities	✓						• in-kind city resiliency strategy development ($1 million)
CUTRIC	✓	✓					• $25,000 in-kind contribution
VEC/GDDP			✓				• City as a Platform projects input

8.10 Further partner commitments

In addition to the above-stated contributions, we also have Letters of Support for our proposal with commitments to our partnership from:

- TransLink, Metro Vancouver's regional transportation authority
- University of British Columbia (UBC)
- Simon Fraser University (SFU)
- Canadian Urban Transit Research and Innovation Consortium (CUTRIC)
- Insurance Corporation of British Columbia (ICBC)
- Honourable Bruce Ralston, Minister of Jobs, Trade and Technology, Province of British Columbia
- Our External Advisory Panel, with letters of support collected from:
  - Deloitte
  - United Way of the Lower Mainland
  - Surrey Schools
  - Port of Vancouver
- BC Tech Association
- Greater Vancouver Board of Trade
- BC Institute of Technology
- Canada's Digital Technology Supercluster Consortium
- Vancouver Airport Authority
- Greater Vancouver Section Institute of Transportation Engineers (GVITE)
- Ministry of Transportation and Infrastructure (MOTI)

We have also engaged the neighbouring municipality of Port Moody, BC, to act as an advisor and provide feedback on the applicability, scalability, and potential adoption of our proposal in a smaller community context.

All Letters of Support have been provided in Appendix 1 Letters of Support.

8.11 Identification of key risks and development of appropriate mitigation strategies

Key risks and mitigation strategies related to the financial plan are listed in Table 8.G.

Table 8.G Key financial risks and mitigation strategies

RISK	MITIGATION
Cost estimates are inaccurate due to the use of new technology in a novel transportation solution.	Implement a precise estimate methodology in which estimates are revisited throughout project selection, planning, and implementation.
Pledged contributions from partners may not materialize, leading to funding shortfalls.	Continue to build strong and inclusive relations with the partner network. Formalize contributions with partners early in the project process and before major purchases are finalized.
Numerous procurements are required for a selected solution and overall procurement processes lead to schedule delays.	Continue to support the progressive and out-of-the-box thinking that led to the Call for Innovation, itself a novel and responsive procurement process. Use the existing project management processes in both Cities that allow for comprehensive planning and dependencies between tasks.

9
IMPLEMENTATION PHASE REQUIREMENTS

9.1 Duty to Consult with Indigenous Groups & Modern Treaty Obligations

The Duty to Consult is not a municipal requirement. It is the constitutional obligation of the federal and provincial governments to consult (and, at times, accommodate) Indigenous people where the government is making a decision that may infringe Indigenous land or other rights. Surrey and Vancouver are not under any Treaty obligations. Nonetheless, our Cities understand that the South False Creek Innovation Corridor is located in an area of significant cultural importance to the Musqueam, Squamish, and Tsleil-Wautuh peoples. As a designated City of Reconciliation, the City of Vancouver also acknowledges that the City is situated on the unceded traditional territories of the Musqueam, Squamish, and Tsleil-Waututh peoples.

The City of Surrey acknowledges the traditional territories of the Semiahmoo, Katzie, Kwikwetlem, Kwantlen, Qayqayt and Tsawwassen First Nations.

We will ensure that Indigenous stakeholders remain informed about the #SmarterTogether program and have the ongoing opportunity to engage our Cities. This will be a continuation of our efforts leading up to this submission. For instance, in late 2018, the City of Surrey presented the #SmarterTogether program concept to the Surrey Urban Indigenous Leadership Committee, which represents a number of the City's Indigenous and community stakeholders, and in early 2019, the City invited the Committee to participate in the #SmarterTogether stakeholder workshop to help the Cities understand the impacts that the corridor technologies would have on different groups of people and to identify potential design improvements.

9.2 Community Employment Benefit

Our Cities' charters, guidelines, and policy frameworks relating to social value and sustainable procurement create an excellent platform from which to establish a joint procurement policy for the #SmarterTogether program that meet Community Employment Benefit (CEB) requirements. Both Cities have programs that embed ethics, social outcomes, and economic prosperity into City activities.

The City of Vancouver has committed to developing a Social Value Procurement Framework, and has completed an external review of leadership peers and an internal review of the City's vendors and purchases to that effect.

The objective of Social Value Procurement is to leverage resources and relationships that:

- increase economic opportunities;
- diversify the supply chain by promoting social value businesses that have recognized certifications and/or are owned/controlled by an equity seeking population (including but not limited to non-profits/coops, women, Indigenous persons, people with disabilities, LGBTQ+);
- improve economic independence and capacities;
- promote workforce diversity – underemployed, unemployed, under-represented groups; and
- advance inclusion, reconciliation, equity and diversity.

The City of Surrey's Sustainability Charter 2.0 drives the City's vision of creating a thriving, green, and inclusive City. Structured around connected community systems, the Charter includes desired outcomes related to inclusion (both social and economic), economic prosperity, and livelihoods. These guidelines parallel requirements related to CEB.

To further cement the development of #SmarterTogether social procurement policies, the City of Surrey will develop sustainable procurement guidelines for Council consideration in 2019 to provide clarity in the procurement of goods and services that align with federal government requirements for federally-funded projects. These guidelines will build on the sustainability principles already outlined in the City of Surrey's Purchase and Payment Process Manual, and draw from research on social procurement completed in 2018 (that includes consideration of employment opportunities for disadvantaged communities in Surrey), a meeting with a social procurement consultant to discuss effective first steps on developing policy, and a workshop to further scope and refine these ideas slated for Spring 2019. #SmarterTogether program employment opportunities have been identified for the following three groups in Surrey: youth, Indigenous peoples, and recent immigrants.

With regard to reporting:

- The Cities will confirm to Infrastructure Canada participation status relating to CEB after the announcement of the Smart City Challenge award.
- After final vendor evaluation and selection is complete, the Cities will report specific targets for the benefits for at least three of the federal target groups.
- The Cities will provide annual reports regarding progress against the targets, along with appropriate data.

SMART IDEAS START HERE