

Transportation Innovation Challenges: Fostering Local, Outcomes-Oriented Transformation

Date: April 14, 2021

To: Infrastructure and Environment Committee

From: General Manager, Transportation Services and Acting General Manager, Economic Development and Culture

Wards: All

SUMMARY

Urban transportation is undergoing major transformations, driven in part by the emergence of new technologies—some of which are being developed in Toronto—and accelerated by the COVID-19 pandemic. These shifts are putting pressure on public streets to be used in new and unanticipated ways, while also presenting potential opportunities to improve the transportation system. Like the broader category of smart city technologies, many transportation innovations bring new challenges for cities in terms of safety, accessibility, cybersecurity, privacy, and decision-making. The City of Toronto needs new tools to proactively learn about emerging transportation innovations, in order to strategically regulate or incentivize them according to their potential risks and benefits. The City also has a role to play in supporting local economic development in Toronto's vibrant transportation and start-up sectors.

This work is already underway. In October 2019, the City adopted the Automated Vehicles Tactical Plan and Automated Vehicles Readiness 2022 as roadmaps to ensure that technology adoption in Toronto meets the goals articulated in Council-approved strategies and plans and to get ahead of the curve. In July 2020, City Council approved the use of Exhibition Place as a Transportation Innovation Zone (TIZ), a location where firms, academic groups, and other organizations can test their solutions in a controlled, real-world environment. The October 2020 report from the Toronto Office of Recovery and Rebuild cited the TIZ as an example of a strategic approach to partnerships that can be leveraged to help the City respond to the non-health impacts of COVID-19.

This report proposes a new Transportation Innovation Challenge (TIC) program, and an associated new application fee, that builds on the TIZ and fills a strategic gap in the City's existing innovation programs. Potential innovations that could be tested are devices that move on sidewalks or highways, sensors and monitoring devices, connectivity devices, smart lights and signals, signage, electric vehicle chargers, pavement materials, and paints. No commercial operations, where consumers pay for a service, will be allowed during trials.

RECOMMENDATIONS

The General Manager, Transportation Services and Acting General Manager, Economic Development and Culture, recommend that:

1. City Council authorize the General Manager, Transportation Services to work with the Chief Executive Officer, Exhibition Place as may be required to implement and operate Transportation Innovation Challenges at Exhibition Place, in accordance with the working principles of the Digital Infrastructure Plan.
2. City Council authorize the creation and implementation of a new fee in the amount of \$412.00 for a Transportation Innovation Challenge application and amend City of Toronto Municipal Code Chapter 441, Fees and Charges, to include the new fee generally as set out in Attachment 1 to the report (April 14, 2021) from the General Manager, Transportation Services.
3. City Council authorize the City Solicitor to introduce the necessary bills to give effect to City Council's decision and City Council authorize the City Solicitor to make any necessary clarifications, refinements, minor modifications, technical amendments, or by-law amendments as may be identified by the City Solicitor or General Manager, Transportation Services, in order to give effect to the reasonable operation of Parts 1 and 2 above in relation to Transportation Innovation Challenges.

FINANCIAL IMPACT

Funding for the installation of temporary signage, pavement markings, barriers and other temporary infrastructure to support the implementation of trials are available in the approved 2021 Operating Budget. The proposed user fee (application fee) outlined in this staff report will generate an estimated \$2.5K of revenue in 2021 which is included in the approved 2021 Operating Budget.

There are no immediate financial implications to Exhibition Place from the recommendations in the report. While Exhibition Place typically charges rental fees for outdoor space provided, these fees have been waived for the trials taking place in the Exhibition Place Transportation Innovation Zone, and no revenues were projected in the 2021 Council Approved Operating Budget for the space utilized. The City will work with Exhibition Place to organize trials in the Exhibition Place Transportation Innovation Zone, at locations and times that do not interfere with Exhibition Place's revenue-generating and or event/shows activities. Should any future year costs become materialized, Exhibition Place will include in future year budget submissions for consideration through the annual budget process.

The Chief Financial Officer and Treasurer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

City Council, at its meeting of October 27, 28 and 30, 2020, considered a report from the Toronto Office of Recovery and Rebuild (TORR), titled "COVID-19: Impacts and Opportunities." The report recommends emphasizing partnerships to respond to COVID-19, and cites the Transportation Innovation Zones as an example of a partnership strategy.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2020.EX17.1>

City Council, at its meeting of July 28-29, 2020, authorized the use of the property of Exhibition Place for a Transportation Innovation Zone for up to five years on the condition that the operations of the innovation zone do not interfere with public access to the Exhibition Place grounds used as parks or open space. City Council further requested a report back on the establishment and implementation of the zone at Exhibition Place, along with the framework for, and designation of, innovation zones, as directed for no later than the fourth quarter of 2020.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2020.IE14.13>

City Council, at its meeting of January 29, 2020, adopted the following Working Principles and related vision statements as the guiding framework for the City's Digital Infrastructure Plan - equity and inclusion; a well-run city; social, economic, and environmental benefits; privacy and security; as well as democracy and transparency. City Council further directed staff to proceed with developing a governance model associated with digital infrastructure.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2020.EX12.2>

City Council, at its meeting of January 29, 2020, considered a report about the creation of CivicLabTO and the Toronto Civic Accelerator Program (TCAP), two key initiatives that advance strategic and innovative partnerships with public and private sector partners to support City priorities and directed the Director, Toronto Office of Partnerships, the Chief Technology Officer and the Director, Customer Experience Transformation and Innovation to report back to the Executive Committee on the interim results of these programs in 2021.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2020.EX12.5>

City Council, at its meeting of October 29 and 30, 2019, directed the General Manager, Transportation Services and others to implement the Automated Vehicle Readiness 2022 Schedule, which included the establishment of transportation innovation zones.

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2019.IE8.7>

COMMENTS

Urban transportation is undergoing major transformations, driven in part by the emergence of new technologies—some of which are being developed in Toronto—and accelerated by the COVID-19 pandemic. These shifts are putting pressure on public streets to be used in new and unanticipated ways, while also presenting potential opportunities to advance the City's mobility-related priorities such as Vision Zero,

universal accessibility, and TransformTO. The City of Toronto needs new tools to proactively learn about emerging transportation innovations in order to strategically regulate or incentivize according to their potential risks and benefits.

The City also has a role to play in supporting local economic development in Toronto's vibrant transportation and start-up sectors. Toronto has a globally strong talent pool, particularly in technology and manufacturing, and a robust start-up economy, including in the transportation innovation sector. The region also benefits from provincial investment in mobility innovation through the presence of the Automated Vehicles Innovation Network (AVIN), administered by the Ontario Centre of Innovation (OCI). These assets can be leveraged through municipal innovation programming.

In July 2020, City Council directed staff to work with Exhibition Place to establish a Transportation Innovation Zone at Exhibition Place. This report presents a proposed approach to issuing Transportation Innovation Challenges (TICs), which will involve inviting third parties to conduct temporary transportation technology trials at Exhibition Place. These trials will be an opportunity for local innovators to test emerging technologies and approaches, while creating an opportunity for City staff to learn about these new innovations and communicate the needs of the City of Toronto. Future additions to the program could include a process for facilitating trials in areas outside of Exhibition Place for technologies that require a different kind of testing environment.

The City of Toronto Innovation Ecosystem

As a global talent hub with the largest start-up ecosystem in Canada, the Toronto region is home to many incubators, accelerators, and other supports for innovative enterprises. Further, the City offers several programs that provide opportunities for research and development, growth, and procurement for start-ups and small and medium-sized enterprises developing solutions to civic challenges and needs.

The City's Economic Development & Culture division and Strategic Partnerships Office offer several programs to help local firms navigate relevant resources, including small business skills and training, referrals to funding sources from other organizations, assistance with office site selection, and connections to potential clients or partners. The Green Market Acceleration Program (GMAP) provides local firms and foreign investors with an opportunity to collaborate with the City of Toronto in order to accelerate the development and commercialization of made-in-Toronto green technologies by providing access to City-owned infrastructure and assets for pilots when a City division has capacity to participate. As the program targets technologies in the early stages of product development, participants in GMAP do not receive any preferential treatment or consideration with respect to future procurements. In addition, the Strategic Partnerships Office's Unsolicited Procurement Process (UPP) provides an opportunity for firms to present commercialized technologies to the City for potential purchase, without the City having issued a call through the standard procurement process. Finally, in 2020, City Council directed staff to develop the Toronto Civic Accelerator Program (TCAP), wherein the City would issue specific challenges related to business modernization, and work with TCAP participants to co-develop solutions, which could advance to a non-competitive procurement process depending on results from the test period. These programs are further detailed in Attachment 2.

The Transportation Innovation Challenge (TIC) program, proposed in this report, will leverage these existing programs while filling a specific gap. The TIC program will be designed as City-identified challenges of public interest in the transportation and mobility sector, with the guaranteed involvement of the Transportation Services division. The program will not offer participants preferential treatment with regards to procurement; where the participating technologies could be of interest to the City for purchase, those firms would be directed to the existing procurement pathways.

Strategic Directions and Values for Transportation Innovation

The goals of the TIC program are to help the City learn about emerging transportation innovations and support the local economic development of aligned transportation solutions. Many of the innovations that could be tested in the TIC program will have elements of digital infrastructure, and as such, require new ways of thinking about governance and measuring success. Therefore, the TIC program governance and evaluation is designed, and will be implemented, according to core principles from the following Council-approved strategies:

- The City's Automated Vehicles Tactical Plan, where the innovation zone concept was first proposed to Council, which states that the City of Toronto will encourage the adoption of transportation innovations that improve social equity, health, and environmental sustainability; support economic sectors; enhance data privacy; improve road safety; integrate space-efficient and active travel modes; and enhance the City's management of traffic.
- The City's Digital Infrastructure Plan Working Principles, which state that Digital Infrastructure will create and sustain equity, inclusion, accessibility, and human rights; enable a well-run City; contribute to positive social, economic and environmental benefits; operate in a way that protects the privacy of individuals and be safe from misuse, hacks, theft or breaches; and be developed in a way that is democratic and transparent.

The equity analysis for this program highlighted that one equity-seeking group that is particularly likely to experience benefits and/or harms from transportation innovation are persons with disabilities. While new transportation technologies could make Toronto's streets more accessible, some innovations could also present new obstacles if there is not sufficient input from persons with disabilities in the design process. Through the TICs, the City plans to communicate Toronto-specific needs, realities, regulations and expectations—including designing for equity-seeking groups—directly to innovators to help them build these factors into the development of their technologies.

Global Best Practices in Supporting Transportation Innovation

Municipal innovation programs with real-world test sites are emerging across North America and globally as a way for cities to learn about emerging technologies ahead of regulation, provide guard rails for implementation, and influence the nature of technology development. Most are in the early stages of implementation. Models range from purpose-built test tracks (Singapore), city-wide test programs (Torino, Italy), challenge-based co-development partnerships with participation funding (TransLink in

Vancouver), and open testing on City-owned assets (Calgary). Such programs are often referred to as "living labs" and the testing locations may be referred to as "testbeds."

Some early studies of municipal transportation testing programs have suggested that the criteria for success include: building in public engagement and evaluation; developing knowledge among staff about how the technologies work; offering an open and flexible program design; maximizing learning by involving academic institutions; and clearly defining the purpose with measurable outcomes. Attachment 3 includes a summary of the jurisdictional scan undertaken by staff in developing this report.

Iterative, Evidence-Based Approach

The review of municipal innovation programs also shows that a willingness to iterate, having adequate and consistent staff capacity and funding, and building strong cross-sectoral relationships are key ingredients for success. As a result, staff are proposing a phased approach to developing the City's transportation innovation offering. The table below illustrates the phasing of the program to foster transportation innovation and how it compares to elements of programs present in cities reviewed in a jurisdictional scan:

Table 1. Toronto Phased Approach to Building the Transportation Innovation Program

Program Format	Establish innovation zone/ testbed	Establish challenge-based program at innovation zone	Establish option for open calls city-wide	Establish challenge-based program city-wide	Establish co-development program
Toronto Phased Approach	Approved for Exhibition Place	Proposed for Exhibition Place	Further study	Further study	Further study
Other Cities/ Agencies	Montreal (Quartier de l'innovation)	Los Angeles	Calgary San Jose Torino	Singapore Torino	San Jose Translink

July 2020: Transportation Innovation Zone at Exhibition Place

A Transportation Innovation Zone (TIZ) was established by City Council and the Exhibition Place Board of Governors on the Exhibition Place grounds for up to five years (to 2025) on the condition that the operations of the innovation zone do not interfere with public access to the Exhibition Place grounds used as parks or open space. Exhibition Place may explore installing additional infrastructure to support testing, and may receive unsolicited requests from third parties to host transportation innovation trials. The respective roles of Exhibition Place and the City of Toronto in establishing and implementing the TIZ at Exhibition Place are governed by a letter of understanding between those parties.

Proposed: Challenge-based Calls at Innovation Zone

With this report, staff are proposing a Transportation Innovation Challenge (TIC) program for directed, outcomes-oriented trials on the Exhibition Place grounds. This call-based approach has been determined to be the most effective means of fostering innovation that is aligned with the needs of cities. It employs elements of mission-oriented innovation policy, which refers to using policy to set the direction of change toward societal needs, enabling bottom-up, impact-driven experimentation. To learn more about this approach, staff issued a pilot call for applications in December 2020 to trial technologies that support automated sidewalk winter maintenance at Exhibition Place. While the call received three applications, the trials could not be held in person due to COVID-19 public health restrictions in place in January and February 2021. Nonetheless, staff captured important lessons from the process of issuing the call that will be incorporated into future TICs.

Further Study: City-wide Testing, Co-Development, and Community-First Trials

Future programming in fostering transportation innovation could include a process to authorize the General Manager of Transportation Services to initiate TICs outside of Exhibition Place or invite third parties to propose trials through a city-wide open call. (Some existing municipal innovation programs similarly use an open calls model; including Calgary's Living Labs and the San Jose Demonstration Framework.) Any additional features that necessitate permissions outside of the existing delegated authority would require Council approval and would be based on the lessons learned from trials conducted at Exhibition Place in the first years of this initiative, as well as an assessment of the risks associated with trials of particular technology categories (e.g. devices that move on sidewalks).

Emerging approaches in other jurisdictions include co-development programs, where cities participate alongside participants in technology development; this typically involves providing funding to participants. Further, cities are increasingly taking a "community-first" approach, where people living and working in a testing zone are more directly involved in articulating the needs and terms for transportation trials (this approach is currently being piloted in Los Angeles). Future programming could incorporate these methods.

Public and Industry Consultation

Transportation Services staff hosted a workshop series in September 2020 to gather input for the development of the TIC program. Nearly 100 people participated in the workshops, representing academia, business, government, interest groups and the technology industry, with self-identified interests in mobility/transit, research, economic development, city-building, environment, accessibility, digital infrastructure and data privacy/cybersecurity. In total the workshops received 471 participant-generated questions and ideas, and 3,408 ratings on those contributions. Discussion questions covered what technologies to trial, how to set up the application process, and how to evaluate results. Reports from the consultations are included in Attachments 4 and 5. A draft Transportation Innovation Framework was also posted for public comment from November 17 to December 8, 2020.

Implementing the Transportation Innovation Challenge Program

Transportation Innovations in Scope

While it is common to associate innovation with gadgets and technology, the kind of innovation needed to solve complex problems is much broader and often includes low-tech solutions. For the purposes of the TIC program, transportation innovation has the following ingredients: it involves products, services, and/or processes; it uses research, ideas, and knowledge in an applied way; it creates something new or applies knowledge in a new manner; it involves serving the public interest and generating net social and environmental benefits; and it can be done by any actor (communities, academia, governments, not for profit organizations, or private sector).

Broadly, technologies and approaches in scope for the TIC program are those that: use streets and sidewalks for the movement of people and goods, improve ground transportation and public realm operations, and/or improve the streets and sidewalks themselves. Potential innovations that could be tested are devices that move on sidewalks or highways, sensors and monitoring devices, connectivity devices, smart lights and signals, signage, electric vehicle chargers, pavement materials, and paints. No commercial operations, where consumers pay for a service, will be allowed during trials. The TIC program is designed for pre-commercial solutions that are ready for testing under real-world or near-real-world conditions and are pre-commercial, or have already been deployed but in a context unlike Toronto. As aerial drones and urban air mobility are regulated by Transport Canada, they are not in scope at this time.

Transportation Innovation Challenge Process

The Transportation Services division will lead the proposed TIC program and be responsible for undertaking the sequential steps below, in collaboration with Exhibition Place. Guidelines for implementing each of these steps is presented in Attachment 6.

- Identifying challenge themes, in consultation with Exhibition Place, and submitting them for review by the forthcoming Urban Innovation Steering Committee (see Section "Governance, Engagement, and Equity") and other internal committees;
- Conducting and publishing Market Scans and Challenge Rationale Statements;
- Issuing calls for application including minimum requirements;
- Administering the proposed application fee;
- Reviewing applications against minimum requirements and selecting participants;
- Requesting the Office of the Chief Information Security Officer to develop conceptual cyber and privacy assessments where necessary;
- Assembling and facilitating the input of trial advisors (external and internal);
- Working with Exhibition Place and the applicants to develop a trial plan;
- Supporting Exhibition Place in developing a licencing agreement with the applicant for use of the Exhibition Place grounds, including data-sharing provisions;
- Notifying the public of trials;
- Working with Exhibition Place to monitor the trial activities for adherence to the trial plan, and collecting data;
- Drafting and publishing a learning report on each trial;
- Holding annual stakeholder and public engagement activities on the TIC program;
- Drafting and publishing an annual report on the TIC program.

As further described in Attachment 6, staff will select TIC themes that, following an assessment and market scan, are considered to have potential to solve real problems, are ready for real-world testing but are pre-commercial in the Toronto operational environment, and where a testing environment appropriate for the intended use case of the solution can be offered.

Each call for applications will outline the minimum requirements, set by staff and the Urban Innovation Steering Committee that applicants must meet. Minimum requirements will be tailored to the nature and risks associated with each Challenge, but will always include: being an incorporated organization; having appropriate insurance; having clear measures in place to protect safety, accessibility, cybersecurity and privacy while testing; being willing to share certain data with the City; cooperating with a conceptual cyber and privacy assessment where necessary; and paying the proposed new application fee. Applicants will also be asked to discuss the potential social, economic and environmental benefits of their transportation solution.

Supporting Participants

Participants in a Challenge will benefit from access to a real-world test environment in downtown Toronto, and an opportunity to demonstrate their technology to the City, Exhibition Place, the public, potential investors, partners, and other cities. They will have access to feedback from staff about opportunities to improve their technology to meet municipal needs. Further, participants will have access to staff from the Economic Development and Culture division to help them navigate relevant resources, including small business skills and training, referrals to funding sources from other organizations, assistance with office site selection, and connections to potential clients or partners.

Fees and Authority for Transportation Innovation Challenges

In this phase of the TIC program, all Challenges will be held at the Exhibition Place Transportation Innovation Zone, where the Exhibition Place Board of Governors has existing authority to enter into licencing agreements with participants. With this report, staff are recommending the creation of a new city policy fee of \$412.00 per application to a Transportation Innovation Challenge, to be administered by Transportation Services.

The user fee has been developed as a city policy fee in accordance with the City of Toronto User Fee Policy; the rate reflects the time required for staff to review and process applications, but does not cover the cost of staff resourcing required to implement the overall TIC program.

On April 15, Exhibition Place staff are taking a report to the Exhibition Place Board of Governors, recommending that staff have the option to waive rental fees for the use of Exhibition Place grounds for transportation innovation trials, in order to encourage Challenge participation by start-ups and small and medium-sized enterprises. The City will work with Exhibition Place to organize TICs at locations and times that do not negatively interfere with Exhibition Place's revenue-generating activities.

Governance, Engagement, and Equity

Internal Governance and Collaboration

While Transportation Services is the lead division on the TIC program, this report has been prepared in consultation and coordination with Exhibition Place, Economic Development and Culture, Technology Services, the Office of the Chief Information Security Officer, the Strategic Partnerships Office, Fleet Services, and the Toronto Parking Authority. These divisions and agencies will play an on-going role in the delivery and support of the TIC program.

In particular, the Transportation Services staff leading the TIC program will be responsible for participating as a working group under the governance structure associated with digital infrastructure at the City. As part of this commitment, program staff will report to the soon-to-be established Urban Innovation Steering Committee to ensure alignment with the forthcoming Digital Infrastructure Plan, collaboration with other divisions and agencies, and internal accountability. For trials developed via unsolicited requests submitted by third parties directly to Exhibition Place, Exhibition Place staff will be responsible for reporting to the Urban Innovation Steering Committee.

Public and Stakeholder Access and Engagement

Transparency is one of the core principles of the TIC program. Information that staff will post publicly to the City's website will include: Challenge Rationale Statements, Market Scans, and Trial Reports (see Attachment 6 for further detail). The City will announce trials publicly and will provide information about how the public can observe the trial activities. Information will be shared on the City's website, via 311, and signage on site at Exhibition Place. Where applicable, a Notice of Collection related to any potential collection of Personal Information (e.g. cameras in the public realm) will also be installed.

On an annual basis, the City will hold stakeholder and public engagement activities to gather input on the program, and will publish Annual Reports to report on activities, lessons learned, and opportunities for improvement.

The TIC program includes a requirement to engage persons with disabilities, and other stakeholder groups, at regular intervals to ensure that decision-making includes these perspectives. Staff will use evaluation criteria for technology trials that include variables related to equity and accessibility, in order to learn about how the deployment of innovations could impact the ability of all people to use Toronto's streets—including equity-seeking groups—and to develop future regulations accordingly. In future phases of the program, hosting trials in areas outside of Exhibition Place would support a more equitable geographic distribution of innovation benefits.

CONTACT

Elyse Parker
Director, Policy & Innovation
Transportation Services
Tel: 416-338-2432
E-mail: Elyse.Parker@Toronto.ca

Ryan Lanyon
Manager, Strategic Policy & Innovation
Transportation Services
416-392-1799
Ryan.Lanyon@Toronto.ca

SIGNATURE

Barbara Gray
General Manager
Transportation Services

Cheryl Blackman
A/General Manager
Economic Development & Culture

ATTACHMENTS

Attachment 1: Amendments to Municipal Code, Chapter 441
Attachment 2: Existing and Forthcoming City of Toronto Programs to Support Innovation
Attachment 3: Jurisdictional Scan of Comparable Municipal Innovation Programs
Attachment 4: Transportation Innovation Zones Stakeholder Consultation Report #1 -
Process and Participants
Attachment 5: Transportation Innovation Zones Stakeholder Consultation Report #2 -
Results Summary
Attachment 6: Transportation Innovation Challenge Process

Attachment 1: Amendments to Municipal Code Chapter 441, Fees and Charges

Amendments related to fees for Transportation Innovation Challenge activities:

Addition to Appendix C - Schedule 2, Transportation Services

Ref. #	I Service	II Fee Description	III Category	IV Fee Basis	V Fee	VI Annual Adj.
166	Permits & Applications	Application to temporarily test a transportation technology in the public right of way	City Policy	Per application	\$412.00	Yes

Attachment 6: Transportation Innovation Challenge Process

The Transportation Services Division shall implement each Transportation Innovation Challenge in accordance with the following guidelines:

Selecting Challenge Themes

Staff will select Challenge themes that meet the following criteria:

- **Solves real problems:** The theme is named as a challenge or opportunity in existing City policies and plans.
- **Needs real-world testing:** at least some of the solutions applicable to the theme (1) are ready for testing under real-world or near-real-world conditions and are pre-commercial, or (2) have already been deployed but in an operating environment unlike Toronto.
- **Environment matches the solution:** A testing environment appropriate for the intended use case of the solution can be offered.

Beyond these criteria, staff will use the following list of factors to prioritize from among possible themes:

- **Net benefits:** there is evidence of potential net benefits to road safety, accessibility, and/or the environment from the solutions emerging in this theme area.
- **Local interest:** there are enterprises based in the GTHA working on solutions related to this theme.
- **Multiple participants:** there are two or more organizations who may be interested in participating in a trial on this theme, either individually or in partnership.
- **Relevance:** it is likely that the City will be required to regulate or have an opportunity to procure this transportation innovation in the public right-of-way in the next five years.
- **Scalability:** there is evidence that the solutions to this theme have potential to scale or commercialize in Toronto in the future.
- **Capacity:** There is a staff team within the City and/or its agencies that has capacity to engage with the trial and provide subject matter expertise.
- **Quick implementation:** There are minimal or reasonable infrastructure and equipment needs to support the trial.
- **Synergies:** There is an opportunity to connect a theme to an existing trial already underway to accelerate learning.

The Market Scan (below) will help staff collect information in order to assess a potential Challenge theme against these factors.

Market Scan

Staff will also conduct a Market Scan to ascertain whether a proposed theme is a good fit for the program. The purpose of the market scan is to determine the range of potential solutions, technology readiness, applicability, and presence of local developers, in order to choose Challenge themes that can meet the above criteria and factors. Market Scans will be published on the City's website.

Issuing Calls for Application

Before issuing a call for applications, Transportation Services staff will present proposed Challenge themes, along with any identified risks, to the Urban Innovation Steering Committee for feedback and direction.

Once Challenge themes are selected, the City will issue calls for application, working closely with Exhibition Place. Between one and three calls for application will be issued per year (due to capacity, staff anticipate issuing one in 2021). At the time of issuing the call, staff will also post a Challenge Rationale Statement to the City's website, explaining how the theme was selected and how it relates to addressing an existing need in Toronto. Where possible, calls for application will be structured so as to not pre-determine the solution, but instead target a desired outcome. For example, an outcomes-oriented challenge would call for solutions to "reduce congestion and improve access at the curb" rather than calling for "sensors to detect vehicles at the curb."

Application Process and Minimum Requirements

When applying to a call for applications, applicants (which could be firms, academic institutions, or not-for-profit organizations) will be asked to provide basic information about their solution, discuss their research and development priorities for the trial, and show that they meet minimum requirements. Minimum requirements will be set by staff and the Urban Innovation Steering Committee, and will be tailored to the nature and risks associated with each Challenge. At minimum, requirements for applicants will include:

- being an incorporated organization;
- having appropriate insurance;
- having clear measures in place to protect safety, accessibility, cybersecurity and privacy while testing;
- being willing share certain data with the City;
- cooperating with a conceptual cyber and privacy assessment where necessary; and
- paying the proposed new application fee.

Applicants will also be asked to discuss the potential social, economic and environmental benefits of their transportation solution. Should they meet the minimum requirements, multiple applicants may be invited by the City to participate in a given trial.

Trial Advisors

Transportation Services staff will assemble subject matter experts for each Challenge whose mandate will be to review and provide input on a draft trial plan, evaluation metrics, and trial results. Trial advisors can be individuals both internal and external to the City who represent the perspective of industry and/or user groups and impacted groups, such as people with disabilities. Trial advisors must not have a commercial interest in the industry segment or any other perceived or actual conflicts of interest.

Monitoring, Evaluation and Data Sharing

Transportation Services staff will conduct monitoring and evaluation at three levels:

- evaluation of technical performance,
- evaluation of the public realm and City operations impacts and benefits, and
- evaluation of the TIC program.

The Digital Infrastructure Working Principles and the AV Tactical Plan principles will be a primary source of evaluation criteria, and more specific criteria will be developed to match the context of a given trial.

Via the legal agreement, trial participants will be asked to share certain performance data and/or data summaries with the City in order to help the evaluation and monitoring team assess the impacts and benefits of the solution on the public realm and City operations, in particular with respect to factors such as safety, accessibility, cybersecurity and privacy. Where possible, data collected through the Challenges will be shared by the City via the Open Data portal, except personally identifiable information or data that is specific to a participant technology and that would constitute intellectual property. Intellectual property related to the technology or approach itself will be vested with the participant, unless otherwise agreed upon.

Evaluation Partners

Many public sector institutions and not-for-profit organizations in the region offer expertise that can help participants refine their trial plans and monitor and evaluate results. The TIC program will facilitate connections between trial participants and these organizations, creating stronger networks and relationships across the local transportation innovation sector.