

1. Equity

SOURCE REF #	TACTIC TITLE	TACTIC DESCRIPTION
1. Equity	<i>The City of Toronto should encourage the adoption of advanced driver assistance systems in a manner that improves social equity and health.</i>	
1.1	Equitable Mobility	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure all users have barrier-free access to personal mobility services regardless of age, ability, income level, or other factors; and will ensure reasonably equitable service levels to all neighbourhoods for all trip types.
RS(16)13	1.1.1 Access for Minors	Develop and implement a policy regarding access to uncrewed/unstaffed shared automated vehicle fleet services for unaccompanied children.
RS(16)12 OC51 OC23 CFF8	1.1.2 Access for Individuals with Disabilities	Regulate shared automated vehicle fleet companies to provide an appropriate level of barrier-free access and ensure that unnecessary limitations (ie. visual, auditory, language) are avoided. Regulation of shared automated vehicle fleets must consider the safety needs of vulnerable populations, individuals who require the assistance of an attendant or service animal, and loading needs of seniors, families with children, and individuals with mobility impairments.
EX45	1.1.3 Access for Unbanked Individuals	Regulate shared automated vehicle fleet companies to enable and accept payment through mechanisms that are available to unbanked populations, such as a pre-loaded PRESTO card.
CFF4, CFF10 EX10, PPI19 PPI23, CFF11 IDWG3, EX28 EAS, EAS35 PSA16, TS11 CFF4, CFF15 EX30, IN12 IN22 IN23	1.1.4 Access for Low-income Individuals	Develop and implement a mechanism to subsidize and/or support low-income residents to allow for equitable access to mobility services regardless of trip type, location, time of day, and technical requirements.
	1.1.5 Equitable Service Coverage	Develop and implement a mechanism to coordinate mobility services to provide equitable service in terms of frequency, hours of service per day, and proximity across all neighbourhoods for all trip types.
OC52	1.1.6 Equitable Performance Standards	Regulate shared automated vehicle fleet companies to require reporting against equitable performance standards to monitor wait time and declined rides as a way to enforce against discriminatory practices.

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1. Equity	<i>The City of Toronto should encourage the adoption of advanced driver assistance systems in a manner that improves social equity and health.</i>	
1.2	Community Benefits	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure community benefits agreements are included as part of all related large-scale infrastructure projects and provision of mobility services.
EX6 PSA9 PSA19	1.2.1 Community Benefit Agreements	Develop and implement a mechanism to ensure that large-scale infrastructure projects related to automated vehicles integrate community benefit agreements to ensure that equity-seeking groups also benefit.
1.3	Health Equity	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure equitable health outcomes resulting from mobility.
IDWG36	1.3.1 Health Equity	Integrate an equity lens into automated vehicles policy and decision making through the use of data and evidence on population health, equity and the upstream determinants of health.

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2. Environment	<i>The City of Toronto should encourage the adoption of advanced driver assistance systems in a manner that increases the proportion of low- or zero-emission vehicles operating on streets and highways.</i>	
2.1	Vehicle Emissions Reductions	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure that all vehicles use low- or zero-carbon energy sources.
IDWG31, IDWG57 PSA1, IDWG65 RS(18)2, CFF76 CFF78, OC47	2.1.1 Low or Zero-Carbon Energy Sources	Develop and implement a mechanism to incentivize the adoption of low or zero-carbon energy sources, particularly electric-powered automated vehicles.
EX33	2.1.2 Low or Zero-Carbon Energy Sources for Shared AV Fleets	Regulate shared automated vehicle fleet companies to operate only vehicles that use low- or zero-carbon energy sources.
2.2	Vehicle Waste Reductions	In 2050, the City will have harnessed the widespread adoption of automated vehicles to minimize waste generated from vehicle upgrades and automated fleets.
CFF69	2.2.1 Vehicle Waste Reduction	Develop and implement a mechanism to reduce the lifecycle and environmental impacts of automated vehicles.
HR4 IDWG22	2.2.2 Vehicle Waste Reduction for Shared AV Fleets	Regulate shared automated vehicle fleet companies to reduce their lifecycle and environmental impacts.

3. Road Safety

SOURCE REF #	TACTIC TITLE	TACTIC DESCRIPTION
3. Road Safety <i>The City of Toronto should encourage the adoption of advanced driver assistance systems that are proven to create a net benefit to road safety.</i>		
3.1	Collision Prevention	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure that traffic-related injuries and deaths from automated vehicles are zero.
CFF110	3.1.1 Transition to AVs	Manage the transition to automated vehicles by educating the public on how to appropriately use and interact with automated vehicles, and by updating regulatory and enforcement mechanisms to address vehicles without human drivers.
IDWG29 CFF123	3.1.2 Vehicle Collisions - Human Factors	Support the development and adoption of automated vehicle technology that is proven to positively contribute to realizing the City's Vision Zero Action Plan.
IDWG29 CFF123	3.1.3 Vehicle Collisions - Environmental Conditions	Support the development and adoption of automated vehicle technology that is proven to reduce injuries and deaths from vehicle collisions resulting from Toronto's unique environmental conditions.
TS17 IN16 IDWG94	3.1.4 Vehicle Collisions - Data Redundancy	Develop and implement a standard of "triple redundancy" of traffic regulation to reduce injuries and deaths resulting from automated vehicle system malfunctions.
HPS30 CAV3	3.1.5 Vulnerable Road Users	Support the development and adoption of automated vehicle technology that is proven to increase detection of vulnerable road users and the ability to communicate with them.
EX59, EX60 EX61, IDWG1	3.1.6 Shared AV Fleet Safety Standards	Regulate shared automated vehicle fleet companies to require safety provisions such as redundant vehicle control, ability to contact 911 automatically, etc. Increase the visibility of these vehicles to other road users by requiring an increased amount of branding/trade dress.

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3. Road Safety <i>The City of Toronto should encourage the adoption of advanced driver assistance systems that are proven to create a net benefit to road safety.</i>		
3.2	Infrastructure	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure that all appropriate transportation infrastructure facilitates their use.
TS21, RS(16)1 PPI1, RS(18)28, IDWG7, TS24	3.2.1 AV Readiness	Manage the transition to automated vehicles by identifying and focusing investment on corridors or areas for early integration of and potential exclusive use by automated vehicles.
TS20 IN5 IN11 IN43	3.2.2 New and Revised Standards	Develop and implement maintenance and design standards that integrate the use of automated vehicles while increasing the safety of the transportation system for all users.
3.3	Emergency Response	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure that all emergency services are equipped to address the unique needs of situations involving these vehicles, and receive priority in traffic for faster emergency response.
IDWG24	3.3.1 Emergencies - Vehicle Priority	Develop and implement a mechanism to improve the yielding of automated vehicles to emergency vehicles.
	3.3.2 Emergency Response Policies	Integrate consideration for automated vehicles into existing policies for responding to emergencies.
IDWG25 CFF120	3.3.3 Emergency Response Standards	Develop and implement standards addressing emergency response in an automated vehicle environment.
CFF120 IN19 IN35	3.3.4 Enforcement	Develop and implement operating procedures addressing automated vehicles when responding to infractions.
EX58	3.3.5 Emergencies - Shared AV Fleets	Regulate shared automated vehicle fleet companies to require a 24-hour control facility or response team in the Toronto area to deal with vehicle malfunctions and major city emergencies.

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4. Modal Shift	<i>The City of Toronto should encourage the adoption of advanced driver assistance systems that encourage more space-efficient and active modes of travel and facilitate transportation demand management.</i>	
4.1	Increase Space Efficiency	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure a greater proportion of intraurban travel will be by more space-efficient modes of travel.
OC68 CFF143	4.1.1 Active Transportation Priority	Develop and implement corridors and zones dedicated to walking, and biking in conjunction with automated vehicle infrastructure upgrades.
EX4, OC68 IDWG54, CFF127 OC2,79	4.1.2 High-Occupancy AV Priority	Develop and implement policies to give high-occupant vehicles priority in planning and infrastructure for automated vehicles.
RS(18)13 CFF54 OC69	4.1.3 Multimodal Level of Service	Develop and implement a mechanism to establish performance measures that ensure efficient movement of people and goods in automated vehicles.
4.2	Manage Transportation Demand	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure less acute demand across the transportation system.
HR2,9, HPS8,9 RS(16)2, OC6,17 EX26,49, CFF77,114,143,17	4.2.1 Manage Travel Demand	Develop and implement a pricing mechanism to ensure that the cost to the user of automated vehicle travel reflects economic, social, and environmental impacts.
HR6 HR7	4.2.2 Manage On-Street Parking Demand	Develop and implement a pricing mechanism to ensure that the cost to the user of automated vehicle on-street parking reflects economic, social, and environmental impacts.
HR8 HPS13 EX24	4.2.3 Manage Off-Street Parking Demand	Develop and implement a regulatory framework and/or pricing mechanism to ensure that the cost to the user of automated vehicle off-street parking reflects economic, social, and environmental impacts.
IDWG69	4.2.4 Commuter Mobility Plans	Support the expansion of the Smart Commute program to increase the number of households serviced with commuter transportation planning efforts.
EX44,53, OC7 HR2, IDWG55 TS6, HPS9 OC83,5	4.2.5 Zero-Occupant Vehicle Prevention	Develop and implement a regulatory framework and/or pricing mechanism to prevent and/or discourage empty automated vehicle circulation.

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<p><i>The City of Toronto should take a transit-centric approach to vehicle automation. The City should encourage the adoption of advanced driver assistance systems for public and mass transit vehicles, with the purpose of improving reliability, efficiency, safety, and seamlessness of transit. The City should also encourage the development of advanced driver assistance systems that facilitate increased transit priority.</i></p>		
5.1	Service Reliability	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure that Toronto's transit system is more reliable and more efficient.
IDWG53 HPS24 HPS25	5.1.1 AV Fleet	Integrate automated vehicle technology into the Toronto Transit Commission's vehicle fleet.
RS(16)11, OC54 OC72, EX27 CFF124, PPI12,14	5.1.2 Microtransit	Develop and implement a policy regarding the integration of automated microtransit into the transit system.
HPS27 HPS33 OC44 HPS32	5.1.3 Transit Priority	Develop and implement a mechanism to increase the ability to provide transit priority with automated vehicles.
5.2	Transit Safety	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure that Toronto's transit system is safer for operators, customers, and other road users.
IDWG46 HPS23	5.2.1 AV Transit Readiness	Manage the transition to automated vehicles by identifying and focusing investment on corridors or areas for early integration of automated transit vehicles.
IDWG48 IDWG50 IDWG51 IDWG52	5.2.2 Transition to AVs - Transit	Manage the transition to automated vehicles by educating operators and riders on how to appropriately use and interact with these vehicles, and by updating vehicle specifications to include partial automation that is proven to increase safety.

5. Transit-Centric

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<p><i>The City of Toronto should take a transit-centric approach to vehicle automation. The City should encourage the adoption of advanced driver assistance systems for public and mass transit vehicles, with the purpose of improving reliability, efficiency, safety, and seamlessness of transit. The City should also encourage the development of advanced driver assistance systems that facilitate increased transit priority.</i></p>		
5.3	Service Seamlessness	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure that Toronto's transit system is seamless to the user.
PPI7, PPI9 HPS6, OC80 EX29, IDWG5	5.3.1 Transit-Centric Mobility-as-a-Service (MaaS)	Develop and implement a policy to support a coordinated transportation system to achieve seamless mobility centred around public transit.
HPS5 CFF111	5.3.2 Transit Incentives and Pricing	Develop and implement a pricing mechanism and/or value proposition that ensures transit is more attractive to choice riders than automated vehicle alternatives.
PSA14	5.3.3 Access to Transit for Individuals with Disabilities	Develop and implement a mechanism to provide an appropriate level of barrier-free access and ensure that unnecessary limitations (ie. visual, auditory, language) are avoided in automated transit vehicles.

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6. Traffic Management	The City of Toronto should enhance its ability to manage traffic in real-time through advanced driver assistance systems. The technology should be used for the purpose of measuring traffic congestion, providing improved traveller information, implementing active traffic management, managing curbside uses, as well as increasing capacity for moving people and goods.	
6.1	Active Traffic Management	In 2050, the City will have harnessed the widespread adoption of automated vehicles to better manage all vehicular traffic in real-time conditions.
PSA3	6.1.1 Mobility Neutrality	Develop and implement a policy to ensure that all non-transit passenger vehicles have equal access to and priority within the transportation system, regardless of vehicle class or ownership.
PPI24 IDWG83 IDWG84 RS(18)32	6.1.2 Connected Vehicles and Infrastructure	Develop and implement a policy and mechanism to integrate connected vehicles into the transportation system, including options to finance or supply connected and automated vehicle infrastructure and coordination.
OC4 OC43 OC46	6.1.3 Managing the Peak	Develop and implement a mechanism to improve travel time reliability and system efficiency by maintaining or reducing the number of automated vehicle trips during peak congestion periods.
	6.1.4 Transition to Automated Vehicles - Traffic Flow	Develop and implement a mechanism to improve traffic flow in real-time by managing the mix of non-automated, partially automated, and highly automated vehicles travelling together on city streets and highways.
EX50 IDWG13	6.1.5 Reducing Traffic Infiltration	Develop and implement a policy and mechanism to manage automated vehicle traffic infiltration on local streets and in residential areas.
IN2, IDWG77 OC24, IN9, IN26	6.1.6 Open Data	Coordinate the provision of transportation-related regulatory and traffic data through the City's Open Data portal.

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6.2	Curbside Management	In 2050, the City will have harnessed the widespread adoption of automated vehicles to better manage all curbside space on roads in dense urban areas.
HR3 TS8, TS7 TS16, OC13	6.2.1 Curbside Fee	Develop and implement a pricing mechanism and/or permit system to manage curbside demand from automated vehicles.
HR10 HR10 IDWG23 OC77 IN20	6.2.2 Designated Loading Areas	Develop and implement a standard for designating automated vehicle loading and unloading areas in high-demand places.
TS7 CFF129 TS16	6.2.3 Flexible Curbs	Develop and implement a mechanism to optimize the efficiency of curbside use by automated vehicles.
6.3	Goods Movement	In 2050, the City will have harnessed the widespread adoption of automated vehicles to better manage all traffic impacts from the movement of goods.
OC64, IDWG37 IDWG10, CFF119 CAV12, CAV23 OC85	6.3.1 Urban Goods Movement	Develop and implement a policy and mechanism to manage urban goods movement in automated vehicles.
HR13, IDWG2 TS6, CAV5,39,42	6.3.2 Non-Passenger Avs	Develop and implement a mechanism to effectively manage the movement of non-passenger automated vehicles.
6.4	Increasing Capacity	In 2050, the City will have harnessed the widespread adoption of automated vehicles to increase the capacity of existing transportation infrastructure.
TS9	6.4.1 Road Classification & Use	Develop and implement a policy to increase the role of local streets as facilitators of vehicular access to buildings.
TS10 TS11 TS12 TS14	6.4.2 Street Design	Develop and implement a new standard for street design that addresses the unique needs and challenges of automated vehicles.

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7. Public Service Vehicles	<i>The City of Toronto should encourage the development and adoption of advanced driver assistance systems for municipal and other public service vehicles for the purpose of improving safety and public service delivery.</i>	
7.1	Safety and Effectiveness	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure that public service vehicles are more effective and are the cause of zero traffic-related injuries and deaths.
TS23 TS26 TS30 IN49	7.1.1 Road Safety	Develop and implement policies that address potential safety issues and benefits from the use of automated fleet vehicles.
TS25 IN56,60	7.1.2 Vehicle Effectiveness	Develop and implement a mechanism to review and enhance the cost and operational effectiveness of automated fleet vehicles.
RS(16)9	7.1.3 Vehicle Security	Develop and implement policies and mechanisms to safeguard the operation and data security of automated fleet vehicles.
FS Consultation	7.1.4 Vehicle Fueling	Develop and implement a mechanism to provide fueling services for automated fleet vehicles.
7.2	Service Delivery	In 2050, the City will have harnessed the widespread adoption of automated vehicles to enhance existing services and provide new ones.
CAV43	7.2.1 Non-Passenger AVs for City Services	Support the research and development of non-passenger automated vehicles that can provide municipal services.
TS27 TS28 TS29	7.2.2 Contracted Service Vehicles	Manage the transition to automated vehicles by ensuring long-term contracted services account for the ability to upgrade technology over the contract term. Develop and implement standards for the integration of partial automation into contracted services.
TS26	7.2.3 Data Collection	Develop and implement a mechanism to collect data from automated fleet vehicles. This data should support improved road safety, traffic management, transportation planning, asset management and transportation network security.

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8. Economic Development	<i>The City of Toronto should support and enhance sectors related to automated vehicles, with a particular focus on attracting industries, investment, and employment, as well as on exporting products and services.</i>	
8.1	Sector Expansion	In 2050, the City will have harnessed the widespread adoption of automated vehicles to have retained and attracted additional investment in sectors closely related to automated vehicles.
IDWG40 PSA10 IDWG38 PSA22	8.1.1 Expand Investment and Employment	Develop and implement a policy and mechanism to expand investment and employment in local sectors related to automated vehicles.
CFF62 CFF58	8.1.2 Testing 'Sandbox'	Develop and implement a testing 'sandbox' to allow industry to play, cluster, and innovate quickly.
8.2	Employment	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure a smooth transition in the workforce to meet the needs of tomorrow.
EDC Consultation	8.2.1 Talent Development	Develop and implement a mechanism to increase the local talent base in sectors related to automated vehicles.
RS(18)24 & 29 RS(18)31 & 30 CFF63,67,16 IDWG4,34,41,44	8.2.2 Workforce Reskilling	Develop and implement a policy to address the anticipated need for workforce reskilling as a result of automated vehicles.
8.3	Sector Leadership	In 2050, the City will have harnessed the widespread adoption of automated vehicles to be recognized as a leader in sectors closely related to automated vehicles, particularly in ways that support this tactical plan.
PSA22	8.3.1 Global Competitiveness	Develop and implement a mechanism to increase Toronto's recognition and competitiveness in sectors related to automated vehicles.
EDC Consultation	8.3.2 Cross-Sector Collaboration	Develop and implement a mechanism to facilitate cross-sector collaboration between sectors related to automated vehicles and Toronto's other economic sectors.

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9. Privacy and Security	<i>The City of Toronto should support and enhance data privacy and transportation network security, with a particular focus on the collection and use of information generated by automated vehicles.</i>	
9.1	User Data Protection	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure a robust mechanism is in place to protect the privacy of transportation system users and their data.
RS(16)8 CFF44	9.1.1 Privacy Standards	Develop and implement policies to address privacy issues arising from the collection of data by automated vehicles, both inside and outside of the vehicle.
CFF47 RS(16)6	9.1.2 Privacy Standards: Shared AV Fleets	Develop and implement policies to ensure shared automated vehicle fleet consumers understand what personal data is accessed and collected from them.
9.2	Vehicle Cybersecurity	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure that automated and connected vehicles operate in a secure environment.
	9.2.1 Security Standards	Develop and implement policies to address security issues arising from automated vehicles.

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10. Business Intelligence	<i>The City of Toronto should enhance its ability to collect and analyze data generated by advanced driver assistance systems. The data should be used to inform the implementation and evaluation of this tactical plan and to improve how the City delivers services.</i>	
10.1	Data Collection	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure well-established mechanisms for collecting data generated by these vehicles exist.
TS19	10.1.1 Incident Tracking	Develop and implement a policy and mechanism to collect data on near-misses and technological malfunctions recorded by automated vehicles.
TS7, OC11,12 EX34, EX56 IN27, IN34 CFF45	10.1.2 Collection of Data from Third Parties	Develop and implement a policy and mechanism to collect data from automated vehicles using the transportation system. This data should support improved road safety, traffic management, transportation planning, asset management and transportation network security.
10.2	Data Management	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure well-established tools for managing data generated by these vehicles exist.
IDWG20	10.2.1 Data Tools	Develop and implement robust tools to support new data streams from automated and connected vehicles.
10.3	Forecasting	In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure well-established indicators are created and routinely monitored to provide insight on the impacts of the transition to automated vehicles on business operations.
	10.3.1 Monitoring Indicators	Develop and implement robust indicators to monitor the transition from human-driven vehicles to automated vehicles as well as their associated impacts on the transportation system and delivery of City of Toronto services.