

Managing Toronto's Congestion Today

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TRANSPORTATION • INFORMATION TECHNOLOGY • WATER

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For:

Toronto

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This report looks at traffic congestion on Toronto's **streets** and **expressways**. It considers traffic congestion across the diversity of Toronto's neighbourhoods – our centres, downtown, and local residential areas.

Introduction

What is Traffic Congestion?

We have all experienced it at one time or another: long line-ups at traffic signals, bumper-to-bumper traffic, and heavy traffic on streets and expressways. **Traffic congestion** is the term used to describe the slower speeds, unreliable travel times and longer waits associated with high volume traffic. It is something that many vibrant, growing, and economically dynamic cities like Toronto face – and will continue to face in the future.

Why Manage Traffic Congestion?

The impact of congestion can be significant. Over the past 30 years, the delay a commuter experiences on roadways in North America's largest cities has nearly tripled from 15 to 43 hours per year. This reflects a cost of \$922 per traveller in 2011 in terms of delay and wasted fuel. By managing traffic congestion and balancing the needs of transportation network users (cyclists, pedestrians, transit, drivers, etc.), we can reduce the negative impacts on residents, businesses, visitors and the environment. The benefits of managing traffic congestion include:

- Reducing travel time and delays;
- Improving the reliability of trips;
- Saving on fuel costs;
- Reducing greenhouse gas emissions; and
- Improving the safety of drivers, pedestrians and cyclists.

In the Greater Toronto Area congestion is a significant issue with commuters currently experiencing 81 hours of delay per year. This reflects a delay of 33 minutes for every hour driven in the peak period.

What Causes Traffic Congestion?

The most common factor contributing to traffic congestion is when demand for using roads is greater than the capacity of road networks. This happens when populations and economies grow, urban areas expand, and people use their vehicles more.

Seven other factors contribute to traffic congestion on a day-to-day basis, and are the focus of this report. These factors are:

- Bottlenecks;
- Collisions and other incidents;
- Parking and stopping;
- Poor weather conditions;
- Construction;
- Traffic signal timing; and
- Special events.

How is this Report Organized?

This report is organized around the seven factors contributing to traffic congestion noted above. It describes how each factor plays a role in impacting traffic congestion, and what the City of Toronto is doing to address each factor. The report focuses on the day-to-day operational activities to manage congestion.

The population in the Greater Toronto and Hamilton Area is growing at **1 million people** per decade and is estimated to reach **8.6 million** by 2031¹. The good news is congestion has decreased since 2011 while population continues to increase and employment levels have improved. However, Toronto still ranks as the 6th worst city in North America for congestion (behind Los Angeles, Vancouver, Honolulu, San Francisco, and Seattle).

¹ The Big Move: Transforming Transportation in the Greater Toronto and Hamilton Area, Metrolinx, 2008

² TomTom North American Congestion Index, TomTom International, 2013

Managing Congestion: An Overview

Much effort goes on behind the scenes to manage Toronto's traffic congestion – including long-term **planning activities** and short-term **operational activities**.

Planning activities address the primary cause of congestion – population and economic growth. These include projects such as developing new transportation infrastructure, restoring road surfaces, and encouraging people to walk, cycle or use public transit more often.

Operational activities include what is done on a day-to-day basis to manage traffic congestion. These activities address the seven day-to-day contributing factors to traffic congestion listed in the Introduction. The figure at right provides an overview of these operational activities (grouped by technical area) and how they address the seven contributing factors.

Did You Know....?

The City of Toronto's **Traffic Management Centre** plays a major role in managing traffic congestion. Through traffic cameras and centralized computer systems, staff at the Centre monitor streets and expressways for any problems. When something happens, staff respond quickly by changing traffic signal timing, notifying drivers, and taking other actions as necessary. The Centre is open 24 hours a day, 7 days a week.



Operational Activities to Manage Traffic Congestion

TRAFFIC MANAGEMENT CENTRE

- Extending engineering staff hours to monitor traffic
- Sharing camera feeds & information with police, TTC, MTO, media, etc.

Factors Addressed: All Seven

CONGESTION & ENGINEERING STUDIES

- Signal timing coordination studies
- 10 most congested intersections

Factors Addressed: Traffic Signal Timing; Bottlenecks

CONSTRUCTION COORDINATION

- Road closure plans
- Construction permit enforcement
- Coordinating timing of large construction projects

Factors Addressed: Construction

CURBSIDE MANAGEMENT

- Review of parking restrictions
- Targeted enforcement
- Traffic cameras

Factors Addressed: Parking & Stopping; Construction

ALTERNATIVE TRANSPORTATION

- Transit signal priority
- HOV/Bus lanes
- Bike facilities
- Pedestrian Signal Timings

Factors Addressed: Bottlenecks

INTELLIGENT TRANSPORTATION SYSTEMS

- Updated traffic control hardware & software
- Wireless communications
- Traffic cameras

Factors Addressed: All Seven

INCIDENT & EVENT RESPONSE

- Improving response time
- Emergency management plans
- Road closure plans
- Emergency vehicle signal pre-emption
- Snow route designation & enforcement

Factors Addressed: Bottlenecks, Collisions and Other Incidents; Poor Weather Conditions; Special Events

TRAVELLER INFORMATION

- Changeable electronic message signs
- Website and social media
- E-mail
- Sharing camera feeds & information with media

Factors Addressed: All Seven

Bottlenecks

What Role does This Play in Traffic Congestion?

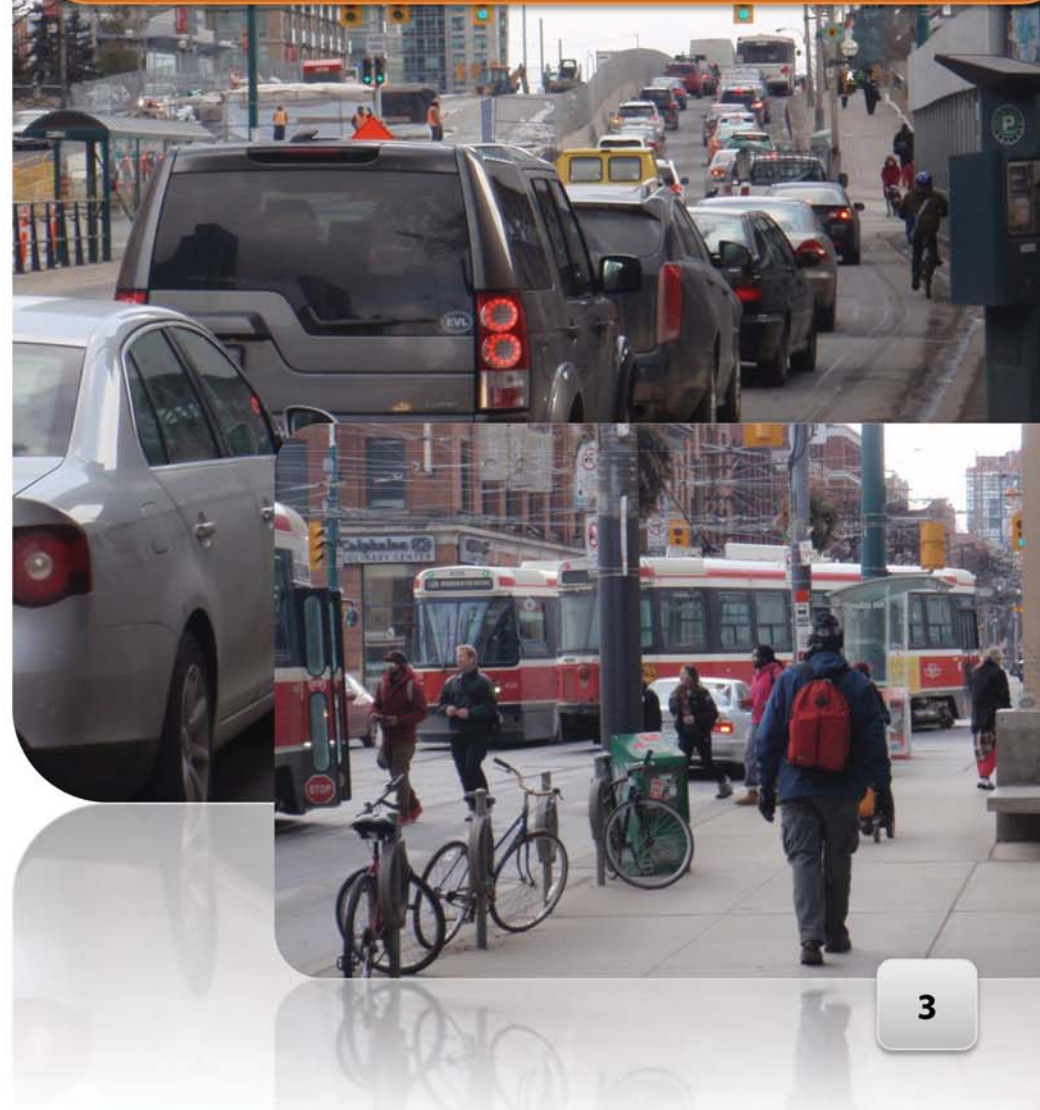
Bottlenecks are where there are physical limitations to the volume of traffic a part of the road network can carry, yet there is high demand for that part of the network. Expressway on/off ramps are one cause of bottlenecks in the City of Toronto, and are a particular challenge in the downtown core. Traffic can back up when vehicles from multiple lanes are required to merge into fewer lanes entering an expressway, or when traffic must merge onto city streets with lower speed limits when exiting an expressway (e.g. Allen Expressway). Bottlenecks can also occur on city streets and intersections.

What is the City Doing Now?

- ✓ Monitoring expressways and responding to incidents as quickly as possible to minimize any additional impact on traffic flow;
- ✓ Reviewed the 10 most congested intersections in Toronto to identify ways that traffic congestion can be better managed;
- ✓ Conducting Signal Timing Coordination Studies to ensure optimal traffic flow on the city's most used corridors;
- ✓ Providing HOV and bus lanes to let higher occupancy vehicles bypass any line-ups;
- ✓ Providing facilities that encourage bicycling such as bike lanes, paths and cycle tracks; and
- ✓ Notifying travellers of congestion issues, to allow them to make informed decisions on their travel route and mode of transportation. Travellers are notified through changeable electronic message signs, e-mails to media, and the City of Toronto website.

Big Savings from Less Congestion

In 2012, traffic signal coordination was improved across Bloor Street, Kennedy Road, Richmond Street and Adelaide Street. The estimated annual benefits have included: cost savings of \$8 million; 2.1 million less litres of fuel consumed; approximately 56,000 kg less of greenhouse gases released to the air; and a decrease in total travel time of ~340,000 hours.



Collisions & Other Incidents

What Role does this Play in Traffic Congestion?

Traffic incidents such as collisions or vehicle breakdowns can block lanes and cause traffic to slow or stop until the area is cleared. In some cases, traffic must be detoured to another route while emergency vehicles work at the incident site. Diverted traffic may flow through streets not accustomed to having a large volume of traffic, further contributing to congestion. Minimizing the impact of these incidents on traffic congestion requires detecting them quickly, clearing the incident as soon as possible, and informing drivers.

What is the City Doing Now?

- ✓ Improving the active monitoring capabilities and efficiency of the RESCU system to detect traffic incidents through hardware and software upgrades;
- ✓ Extending the hours that engineering staff are on hand at the Traffic Management Centre from 12 to 14 hours a day, to reflect Toronto's extended rush hours;
- ✓ Installing 100 more cameras on city streets and intersections to detect collisions, breakdowns or other incidents and adjusting signal timing when needed;
- ✓ Informing drivers about traffic problems through changeable electronic message signs, an automated e-mail service, and a website with information on current and planned road restrictions for city streets and expressways;

- ✓ Timely sharing of information with police, emergency services and media about incidents; and
- ✓ Giving emergency vehicles priority at traffic signals in intersections located close to fire stations.



What is RESCU? RESCU stands for Toronto's Road Emergency Services Communication Unit. The system helps detect collisions with 76 closed circuit television cameras at key locations along 52 km of the city's expressways. Operators at the Traffic Management Centre monitor these cameras 24 hours a day for any traffic incidents that disrupt regular traffic flow – such as collisions, spills, or breakdowns. They then coordinate with emergency response teams when needed, work with traffic engineers to adjust the timing of traffic signals on connecting streets, and notify drivers.

You can see where cameras are located and get updates and maps about current road restrictions by visiting <http://www.toronto.ca/rescu/list.htm>



Parking & Stopping

What Role does this Play in Traffic Congestion?

Illegally parked or stopped vehicles can block lanes – a challenge especially for narrow downtown streets. For example, courier services often park illegally when they cannot find legal space to load or unload goods, absorbing the cost of any fines. Legal parking can also be an issue where parking regulations are not adequately coordinated with times of the day when there is high traffic volumes. Parking and stopping effectively reduced the number of lanes available for vehicles.

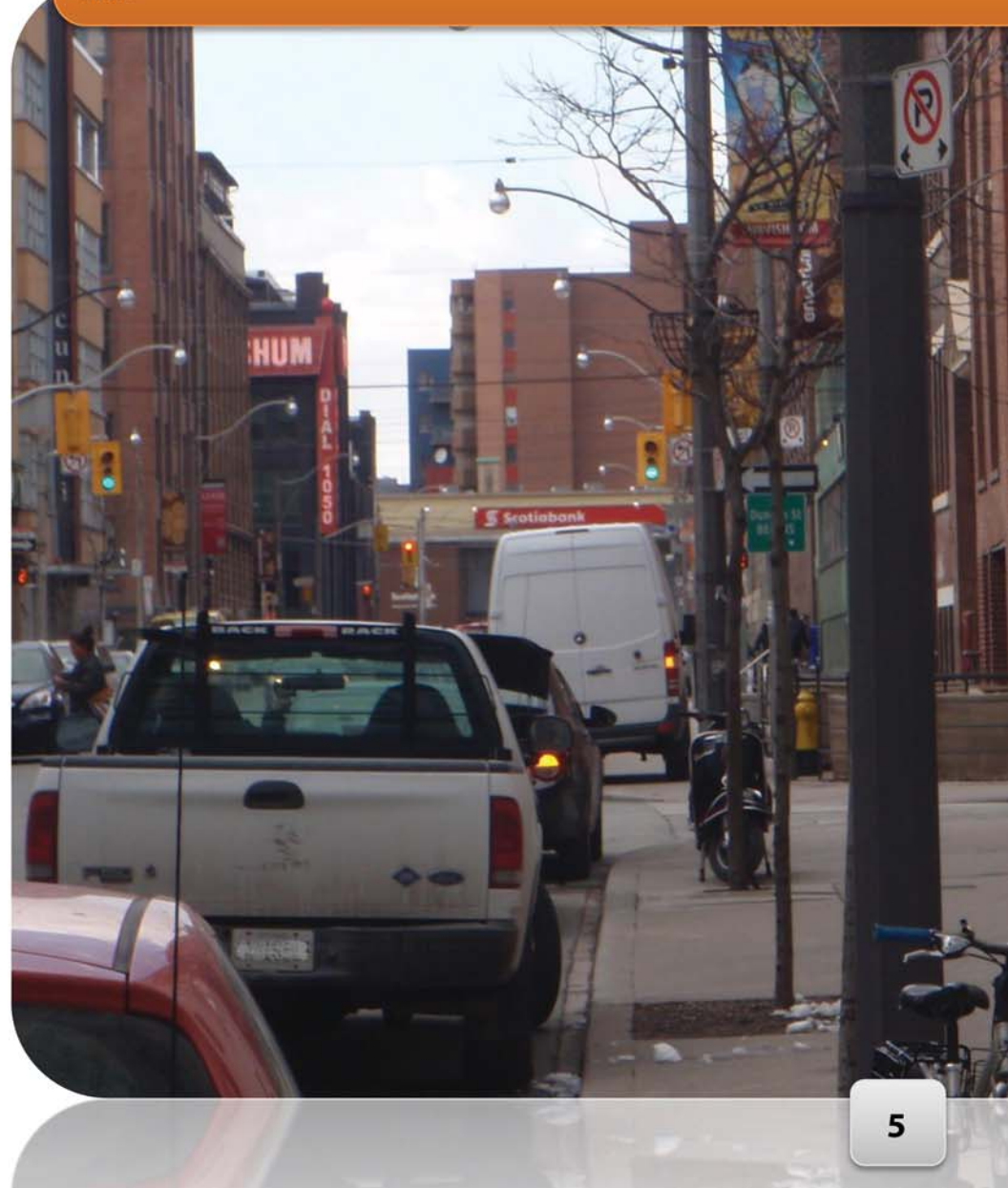
Looking forward, the parking requirements of the City of Toronto's vibrant business community must be balanced with the road needs of vehicles, public transit and others to ensure that the impacts on traffic congestion are as small as possible.

What is the City Doing Now?

- ✓ Reviewing parking restrictions in key corridors;
- ✓ Working with Toronto Police Service to increase enforcement of and awareness about no parking/stopping by-laws in targeted areas;
- ✓ Increasing fines for violations of No Stopping zones
- ✓ Adding more traffic cameras to city intersections to monitor traffic and identify problems as soon as they happen;
- ✓ Working with couriers to understand their loading/unloading needs and schedules, and how to best reduce impacts on traffic flows; and
- ✓ Working with businesses and industry to find solutions that will meet their needs and minimize traffic congestion.

The City of Toronto Central Business District receives a daily average of **81,000 packages** from express delivery alone⁴.

⁴Challenges Facing Express Delivery Services in Canada's Urban Centres, Ryerson University, September 2009.



Poor Weather Conditions

What Role does this Play in Traffic Congestion?

Adverse weather conditions can affect road networks by reducing access to certain routes, for example in the case of flooding or heavy snow. Road or lane closures can contribute to traffic congestion as vehicles are re-routed to different roads which may have less road capacity than the original route.

What is the City Doing Now?

- ✓ Using Emergency Management Plans for poor weather conditions. These plans include designation of detour routes and adjusting signal timing if there are long-term closures of lanes or roads due to extensive damage from events such as flooding;
- ✓ Enforcing parking restrictions during heavy snow falls; and
- ✓ Designating snow routes in the city that prohibit drivers from parking or stopping on these routes during a snow emergency.



Construction

What Role does this Play in Traffic Congestion?

Road maintenance can cause lane closures for days, weeks or months. New development – such as the construction of condominiums or office buildings – may need street or sidewalk space to store heavy machinery or construction material, resulting in lane closures that can last up to a year or more. The City gives out special permits for maintenance and construction projects that need to use part of the road for a limited amount of time.

While road maintenance is a necessary part of keeping road systems in good condition and building construction is a sign of a strong economy, the key is to ensure construction activity is coordinated with local traffic flow.



What is the City Doing Now?

- ✓ Using road "Closure Plans" that adjust traffic signal timing on city streets when the DVP or Gardiner Expressway is closed due to maintenance;
- ✓ Letting drivers know about lane closures and construction zones through changeable electronic message signs, the City of Toronto website, and media;
- ✓ Running a "construction permit blitz" in targeted areas to ensure compliance with hours and location of permits;
- ✓ Reviewing and coordinating the permitting process for construction to minimize impact on traffic (e.g. ensuring there is no construction occurring on parallel routes); and
- ✓ Working with the Toronto Transit Commission (TTC) to ensure that construction activities do not block key routes during planned subway closures, and using special signal timing plans to better accommodate the resulting diverted traffic.



Traffic Signal Timing

What Role does this Play in Traffic Congestion?

Coordinating traffic signal timing is a balancing act – one that involves moving as many people through an intersection as possible safely and efficiently, whether they are in private vehicles, on transit, on bikes or on foot. Most of Toronto's traffic signals are connected to centralized computer systems that control the length of green/red lights based on the time of day, day of the week, and/or traffic demand. Traffic congestion can result when traffic signal timing does not match the flow of vehicles and pedestrians. As the City of Toronto grows and road networks expand, traffic signal timing must keep up with any resulting changes in traffic flow.

What is the City Doing Now?

- ✓ Updating the computer system that coordinates most traffic signals in the city (see box);
- ✓ Studying frequently congested intersections and routes to see how traffic signals can be better coordinated. The City has just completed Signal Timing Coordination Studies for Bloor Street, Kennedy Road, and Richmond Street/Adelaide Street, and has studies in four additional corridors currently underway;
- ✓ Targeting the 10 most congested intersections for improved traffic management;
- ✓ Changing to wireless technology for connecting traffic signals with central systems, increasing the reliability of communication with traffic signals by changing to wireless technology;

- ✓ Adding cameras to intersections to monitor traffic flow and enable Traffic Management Centre staff to change signal timing, when necessary; and
- ✓ Looking at challenges specific to the downtown core through the Downtown Traffic Operations Study.



How Do Toronto Traffic Signals Work?

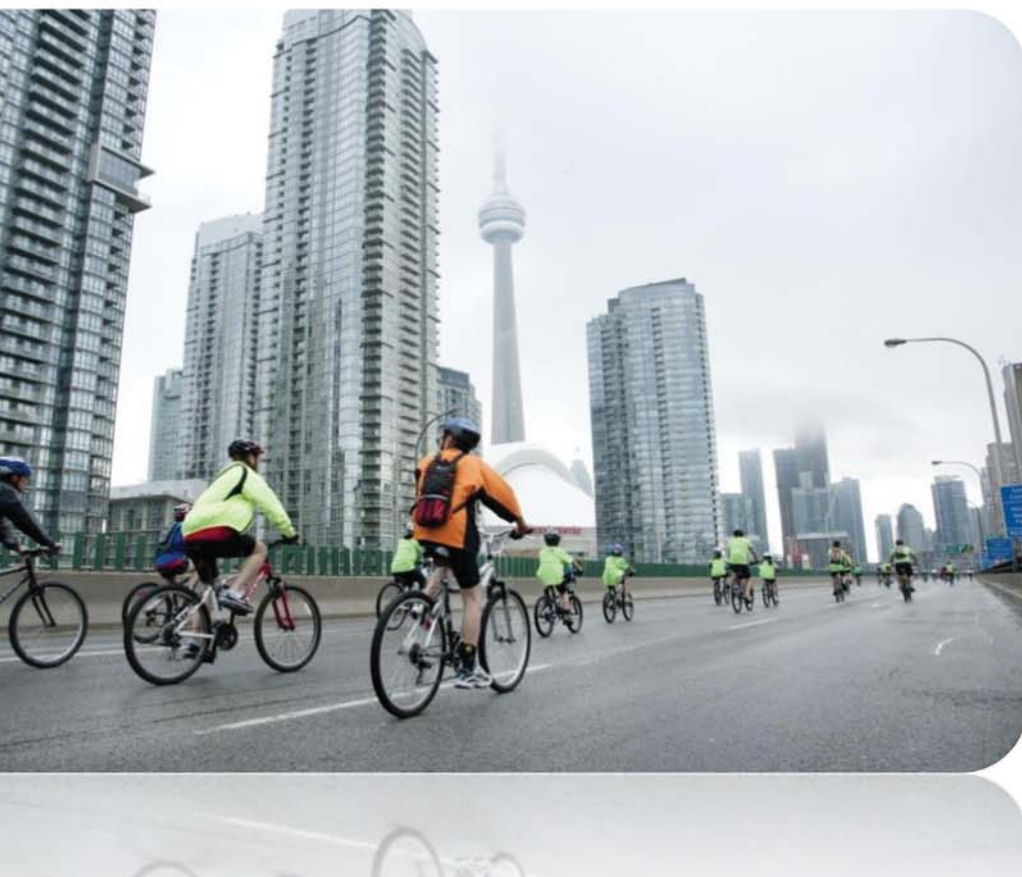
Over 2200 traffic signals are run by central computers that are monitored by staff at the Traffic Management Centre. The computers coordinate the timing of traffic signals at different times of the day based on historical traffic patterns. 350 of these traffic signals are run by a system that automatically adjusts the length of green/red lights based on real time traffic flows detected through sensors in the roads.

Special Events

What Role does this Play in Traffic Congestion?

Special events around the city – such as parades, marathons, and film set locations – can affect traffic flow through lane or road closures. These lane closures can contribute to traffic congestion as vehicles are re-routed to different roads which may have less road capacity than the original route.

Major events that bring a large number of residents and visitors into the city by public transit and vehicles – such as the upcoming **2015 Pan/Parapan American Games** – can also contribute to congestion as the demand for road space increases.



What is the City Doing Now?

- ✓ Implementing road "Closure Plans" during special events;
- ✓ Keeping the public informed in advance of special events so that they can make informed decisions on their travel route and mode of transportation; and
- ✓ Having engineering, events, and emergency services staff on hand at the Traffic Management Centre during events to assist with traffic and emergency operations in real time before and during special events.



Moving Forward

What More Needs to Be Done to Manage Congestion in the City of Toronto?

The City of Toronto is currently developing a Congestion Management Plan to be completed in the Fall of 2013. The plan will identify improvements to be made over the next five years to further manage traffic congestion and address the factors that contribute to congestion.

Operational projects and activities will be grouped under eight technical areas that are closely linked and complementary. The Traffic Management Centre will continue to play a central role. The overarching goals of the plan include:

- Improving the availability and reliability of information;
- Improving detection of and response time to traffic incidents;
- Improving the ability to respond to changing traffic conditions;
- Informing drivers; and
- Benefiting residents, businesses, and the environment.

Planning activities will address primary congestion causes, population and economic growth. The City will focus on projects such as restoring road surfaces, developing new transportation infrastructure, and encouraging walking, cycling or using public transit as an alternative method of travel.

Future Operational Activities to Manage Congestion in the City of Toronto

- **Traffic Management Centre** - Actively managing and responding to changing traffic conditions through monitoring, traffic signal management, and information sharing with other control centres
- **Congestion & Engineering Studies** – Keeping signal timings up-to-date with current traffic patterns and maintaining a library of signal timing plans that can be easily implemented to manage traffic in the event of collisions, adverse weather, construction, or other incidents.
- **Construction Coordination** – Increasing the use of technology to monitor traffic conditions through work zones and streamlining information flow in the construction permit review and approval process.
- **Curbside Management** – Continuing to work with the business community to find solutions to parking and loading challenges.
- **Alternative Transportation** – Continuing to work with TTC, transit operators and the public to improve the accessibility and convenience of transit cycling and walking.
- **Intelligent Transportation Systems** – Expanding monitoring capabilities to better detect changes in traffic conditions and be more responsive through traffic management strategies.
- **Incident & Event Response** – Coordinating with emergency response agencies to reduce the impact of incidents on traffic flow.
- **Traveller Information** – Expanding use of modern data management techniques to improve information sharing, use of third party data and increase public access to current road and traffic information.