Clause 2 in Report No. 1 of Committee of the Whole was adopted, without amendment, by the Council of The Regional Municipality of York at its meeting held on January 21, 2016.

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2014 Ministry of Transportation of Ontario Travel Time Study Results

Committee of the Whole recommends:

1. Receipt of the presentation by Stephen Collins, Director, Infrastructure Management and Project Management Office.

2. Adoption of the following recommendation contained in the report dated December 17, 2015 from the Commissioner of Transportation Services:

    1. The Regional Clerk circulate this report to the Clerks of the local municipalities and Ontario Ministry of Transportation.

1. Recommendation

It is recommended that:

1. The Regional Clerk circulate this report to the Clerks of the local municipalities and Ontario Ministry of Transportation.

2. Purpose

This report highlights the findings of the Ontario Ministry of Transportation's (MTO) 2014 Travel Time Study; a comprehensive survey of travel time, speed and delay across the Greater Toronto-Hamilton Area (GTHA).

3. Background

York Region has participated in Travel Time Studies since 2008

MTO has conducted a biennial travel time study of the major provincial highways in the Greater Toronto Area since 1996. The biennial comprehensive study measures travel speeds and travel times, which have become important indicators for traffic congestion.

York Region participated in the 2008 and 2010 Travel Time Studies. However, did not participate in the 2012 Travel Time Study as some of the Region's major corridors were under construction.

MTO's 2014 Travel Time Study (Study) included approximately 22 arterial corridors in York Region including but not limited to Yonge Street, Highway 27, Highway 7, Bloomington Road and Ravenshoe Road, covering approximately 800 km (two-way distance).

Regional corridors included in the 2014 Study are illustrated in Attachment 1. Attachment 2 contains the final report's Executive Summary.

Identifying significant travel delay locations informs the prioritization of future transportation projects and traffic management strategies

The results of the Travel Time Study provide data to monitor roadway performance and help identify critical road sections to be considered in future road and transit improvement projects and traffic management strategies. The travel time measure is used by staff and many transportation agencies as a performance measure for highways and major roadways.

The data also provides consistent and reliable historical data on travel speeds and delays that can be used for transportation planning, as well as traffic operational analysis in York Region to effectively manage traffic congestion under existing and future conditions.

York Region uses the findings of the Study as one of the aids in:

- Understanding variability and reliability of travel time
- Identifying bottleneck improvements locations to relieve the most congested areas and if/how these locations have changed over time

- Identifying opportunities for improvements to signal timings on major arterial corridors to improve traffic flow

- Assessing effectiveness of recently-completed capital road improvement projects

Since completion of the MTO's 2010 Travel Time Study, roadway capital improvement projects have been completed on York Region arterials. Several important corridors were under construction at the time of the Study, such as Highway 7, Davis Drive, Warden Avenue and Bloomington Road. In some cases, the Study results may not show improvements in the travel speeds on the improved corridors because traffic volumes and latent demands in these corridors have increased significantly since 2010.

Travel time data will be shared with appropriate groups within York Region for their information and analysis.

The Study is part of the Region's traffic monitoring program

Prior to 2008, the Region conducted adhoc travel time studies using various methods to inform the traffic monitoring program. In October 2009, Council authorized York Region's participation in 2010 and subsequent Travel Time Studies.

City of Toronto and Regions of Durham and Peel also participated in MTO's 2014 Study

Participating municipalities in the 2014 Study include City of Toronto and the Regional Municipalities of Durham, Peel and York.

The 2014 Study surveyed approximately 29 corridors (816 km) for Toronto, 27 corridors (652 km) for Durham Region, 36 corridors (1,155 km) for Peel Region and 22 corridors (800 km) for York Region. Further it covered approximately 340 kilometres of MTO 400-series highways within York Region such as Highway 404, Highway 400, Highway 427, and Highway 407.

4. Analysis and Options

The 2014 Study used GPS field surveys and purchased data from TomTom for analysis

Data for the Study was collected using a combination of two survey methods. The first method utilized survey vehicles equipped with GPS technology to record travel data on selected corridors. The second method sourced travel time and

speed data from the private data provider TomTom, which provided a database of traffic data aggregated by personal GPS devices located in passenger vehicles and individual smartphone navigation mobile applications.

In 2014, Cities of Markham and Vaughan and the Town of Richmond Hill had roads with highest travel times

Road segments were ranked by average speed surveyed during peak periods to identify roadways with longest travel time. The ranking does not account for the effects of the posted speed limit or the free flow speed.

Generally, the Travel Time Index (TTI) is a comparison between peak period and free flow speeds to indicate additional travel time required during peak periods. For example, a TTI of 3.0 indicates that a motorist's trip will take three times longer during peak periods than during off peak. Free flow speeds may be higher than posted speeds.

Table 1 summarizes the 10 highest travel time segments for AM peak period. The AM peak period is 6:30 AM to 9:30 AM Tuesday through Friday. Of note, Davis Drive was under construction during the survey period.

Table 1
10 Highest Travel Time Segments (AM Peak Period)

Rank	Route	Begins At	Ends At	Posted Speed (km/h)	Surveyed Average Speed (km/h)	Travel Time Index (TTI)
1	Keele St SB	Langstaff Rd	Highway 7	60	24	2.97
2	Centre St WB	Dufferin St	Highway 7	60	24	2.96
3	Keele St SB	Major Mackenzie Dr	Rutherford Rd	50	25	2.37
4	Yonge St SB	Highway 7	Steeles Ave	50	28	2.11
5	Highway 7 WB	Woodbine Ave	Leslie St	60	29	2.45
6	Davis Dr EB	Yonge St	Leslie St	60	29	2.43
7	Donald Cousens Parkway SB	Highway 407	Steeles Ave	60	30	2.37
8	Highway 7 EB	Leslie St	Woodbine Ave	60	30	2.36
9	Davis Dr WB	Leslie St	Yonge St	50	30	2.01
10	16th Ave WB	Woodbine Ave	Leslie St	60	30	2.33

Note: WB = Westbound SB = Southbound EB = Eastbound

It should be noted that TTI cannot be simply calculated using the posted speed limit divided by the average surveyed speed. Flow speed is estimated based on the posted speed and could be higher than posted speed.

Table 2 summarizes the 10 highest travel time segments for PM peak period. PM peak period is 3:30 PM to 6:30 PM, Monday through Thursday.

Table 2
10 Highest Travel Time Segments (PM Peak Period)

Rank	Route	Begins At	Ends At	Posted Speed (km/h)	Surveyed Average Speed (km/h)	Travel Time Index (TTI)
1	Leslie St NB	Highway 407	16th Ave	60	16	4.49
2	Rutherford Rd WB	Keele St	Weston Rd	60	18	3.90
3	Woodbine Ave NB	Steeles Ave	Highway 7	60	18	3.89
4	Highway 7 WB	Woodbine Ave	Leslie St	60	18	3.84
5	Keele St SB	Langstaff Rd	Highway 7	60	19	3.60
6	Davis Dr WB	Leslie St	Yonge St	50	20	3.05
7	Rutherford Rd EB	Weston Rd	Keele St	60	21	3.39
8	Highway 7 EB	Woodbine Ave	Kennedy Rd	70	21	3.85
9	Highway 7 WB	Keele St	Weston Rd	70	21	3.76
10	16th Ave EB	Leslie St	Woodbine Ave	60	22	3.20

Note: WB = Westbound SB = Southbound EB = Eastbound

The Travel Time Index of 4.49 on Leslie Street northbound from Highway 407 to 16th Avenue means that motorists travelling on this section of Leslie Street should expect peak travel times to be almost four and half times longer than travelling at the free flow conditions.

The results of the 2014 Study indicate PM peak period generally has lower average speed than the AM peak period. In the 2010 Study, AM and PM peak period speeds were similar. This indicates PM peak period conditions have deteriorated the past four years. Staff will continue to monitor these conditions and make adjustments to future model forecasting efforts.

Highway 404 between 16th Avenue and Highway 401 is the slowest among the 400-series highways in the GTHA

During AM and PM peak periods, trips on 400-series highways in York Region can take more than three times longer.

Table 3 summarizes the 400-series highway performance in York Region for the AM peak period.

During the AM peak period, Highway 404 general purpose lanes between 16th Avenue and Highway 401 exhibited a TTI value of 3.4, the highest in the GTHA. This means motorists travelling on this section of Highway 404 should expect peak travel times 3.4 times longer than when travelling at the free flow speed.

Table 3
400-series Highway Performance in York Region (AM Peak)

Route	Begins At	Ends At	Segment Length (km)	Surveyed Average Speed (km/h)	Travel Time Index (TTI)
Highway 404 GPL SB	16th Avenue	Highway 401	11 km	29	3.4
Highway 404 SB	Green Lane	16th Ave	25 km	59	1.7
Highway 404 HOV SB	16th Ave	Highway 401	11 km	68	1.4
Highway 427 SB	Highway 7	Highway 401	12 km	69	1.3
Highway 400 SB	Langstaff Rd	Highway 401	11 km	74	1.3
Highway 404 NB	Highway 401	16th Ave	11 km	90	1.1

Note: GPL = General Purpose Lane HOV = High Occupancy Vehicle Lane
SB = Southbound NB = Northbound

Table 4 summarizes the 400-series highway performance in York Region during the PM peak period.

During the PM peak period, the highest TTI was found on Highway 404 northbound GPL with a value of 3.0. This means travellers on this section of Highway 404 should expect peak travel times 3.0 times longer than when travelling at the free flow speed. When compared to the 2012 Study, the TTI of this Highway 404 northbound section was 2.7, meaning traffic conditions have slightly worsened.

Table 4
400-series Highway Performance in York Region (PM Peak)

Route	Begins At	Ends At	Segment Length (km)	Surveyed Average Speed (km/h)	Travel Time Index (TTI)
Highway 404 GPL NB	Highway 401	16th Ave	11 km	34	3.0
Highway 404 HOV NB	Sheppard Ave	16th Ave	10 km	44	2.4
Highway 404 GPL SB	16th Ave	Highway 401	11 km	45	2.3
Highway 427 NB	Highway 401	Highway 7	12 km	48	1.8
Highway 404 HOV SB	16th Ave	Highway 401	11 km	73	1.4
Highway 400 NB	Highway 401	Langstaff Rd	45 km	62	1.2

Note: GPL = General Purpose Lane HOV = High Occupancy Vehicle Lane
SB = Southbound NB = Northbound

Drivers can save up to 10 minutes when using the High Occupancy Vehicle lanes on Highway 404 in peak directions

During the AM peak period, southbound travel time on the Highway 404 High Occupancy Vehicle (HOV) lane (between 16th Avenue and Highway 401) resulted in a travel time reduction of more than nine minutes compared to GPL. HOV travel time advantage increased by four minutes between 2012 and 2014. The northbound HOV lane reduced travel time by 37 seconds when compared to the GPL. The travel time savings in this direction on the HOV lane were similar to the savings in the 2012 Travel Time Study.

During the PM peak period, the northbound travel time of the Highway 404 HOV lane was approximately 10 minutes shorter than the travel time on the GPL. HOV travel time advantage increased by approximately five minutes between 2012 and 2014. Travel time on the southbound HOV lane was about four minutes shorter than the travel time on GPL, which is similar to the results found in 2012.

Travel time survey data will be used in the Transportation Master Plan Update to identify areas of significant congestion

As the Region is currently undertaking the Transportation Master Plan Update, travel time information can be used to identify areas of significant congestion along Regional corridors.

The technical information developed as part of this Study will assist staff to identify areas of significant congestion and the presence of queuing (the extent of traffic back up) on Regional roads.

The 2014 MTO Travel Time Study results also provide Regional staff with additional tools and information to assess road closure requests, road construction activities and other initiatives, such as transportation model calibrations, review of traffic impact studies submitted by the consultants and analysis for future conditions.

York Region will participate in the next biennial Travel Time Study in 2016

York Region will participate in MTO's 2016 Travel Time Study to continue to build the database for performance comparison and testing of new technologies to help congestion management.

Link to key Council-approved plans

The goals of providing sustainable transportation and developing livable cities and complete communities, as stated in Vision 2051, are supported by this report.

This report also supports the 2015 to 2019 Strategic Plan's priority area of managing environmentally sustainable growth, as well as the Regional Official Plan's related policies of moving people and goods.

MTO's 2014 Study results will assist in supporting the Region's Transportation Master Plan Update, congestion management and roadway monitoring.

5. Financial Implications

York Region's share of MTO's 2014 Study was $40,750 and was included in the 2014 Capital Budget.

6. Local Municipal Impact

MTO's 2014 Travel Time Study data and final report are available to local municipalities, stakeholders and other Regional departments. Local municipalities can use the data to assist in their transportation planning, traffic operational activities and to achieve a better understanding of traffic congestion and road network performance in their communities.

7. Conclusion

The partnership with MTO on travel time studies has provided York Region consistent and reliable historical data on travel speeds that will be used for transportation planning and traffic operational planning, to effectively manage traffic congestion under existing and future conditions.

The data will also assist staff to identify significant areas of congestion and the presence of queuing on Regional roads, as part of the Transportation Master Plan Update process.

For more information on this report, please contact Stephen Collins, Director Infrastructure Management and PMO, at ext. 75949.

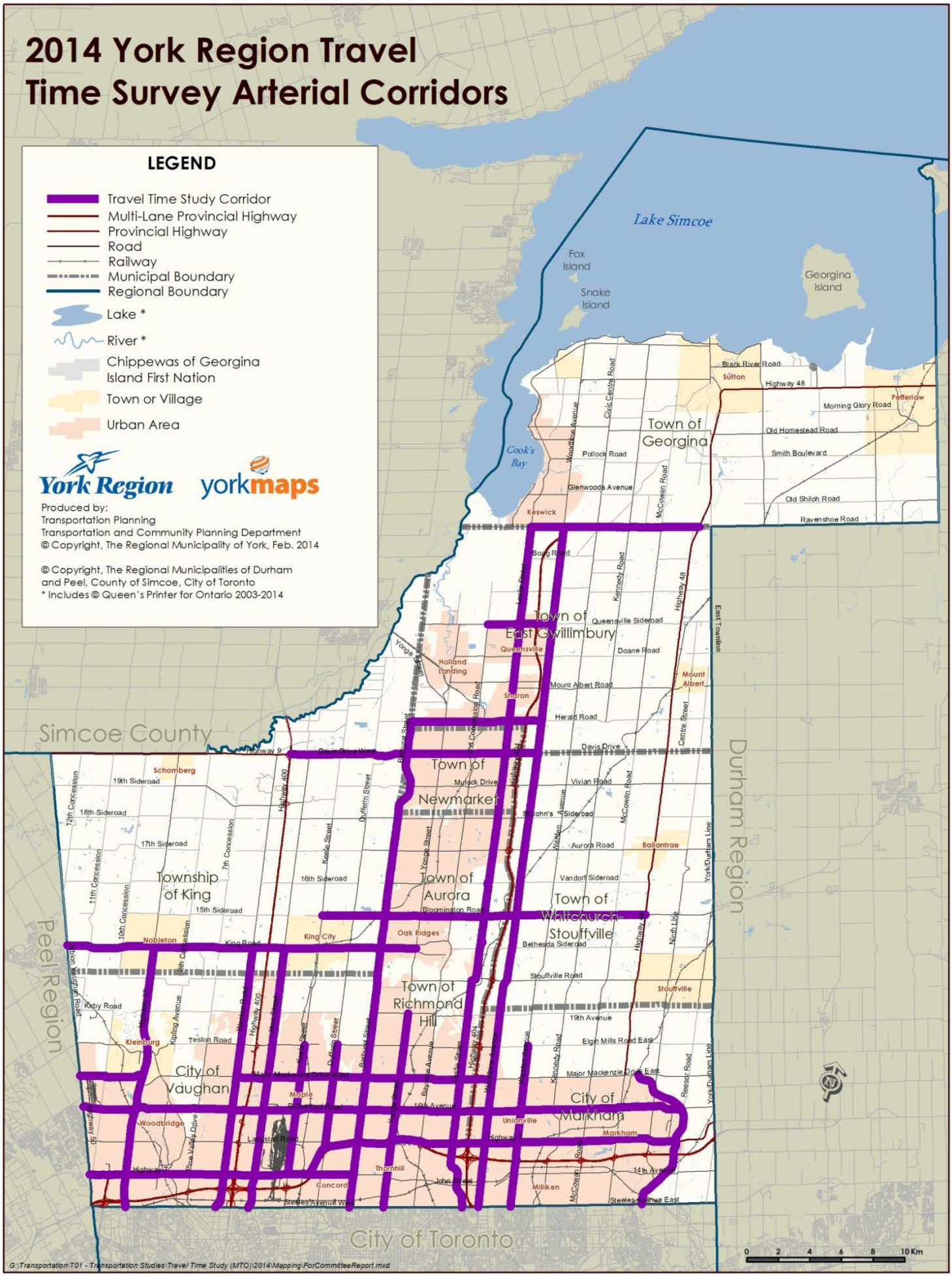
The Senior Management Group has reviewed this report.

December 17, 2015

Attachments (2)

#6510869

Accessible formats or communication supports are available upon request


2014 York Region Travel Time Survey Arterial Corridors
LEGEND
Travel Time Study Corridor
Multi-Lane Provincial Highway
Provincial Highway
Road
Railway
Municipal Boundary
Regional Boundary
Lake *
River *
Chippewas of Georgina Island First Nation
Town or Village
Urban Area
York Region
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Town of Whitchurch-Stouffville
Town of Richmond Hill
City of Vaughan
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Pefferlaw
Queensville
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Sharon
Mount Albert
Schomberg
Nobleton
King City
Oak Ridges
Kleinburg
Woodbridge
Maple
Thornhill
Concord
Unionville
Markham
Milliken
Stouffville
Ballantrae
Aurora Road
Bloomington Road
Vandorf Sideroad
Bethesda Sideroad
Stouffville Road
19th Avenue
Elgin Mills Road East
Major Mackenzie Drive East
Steeles Avenue East
Steeles Avenue West
Davis Drive
Herald Road
Mount Albert Road
Doane Road
Queensville Sideroad
Boag Road
Glenwoods Avenue
Pollock Road
Old Homestead Road
Smith Boulevard
Old Shiloh Road
Ravenshoe Road
Morning Glory Road
Black River Road
Highway 48
Highway 400
Highway 404
Yonge Street
Dufferin Street
Bayview Avenue
Leslie Street
Woodbine Avenue
Civic Centre Road
Kennedy Road
McCowan Road
East Townline
Centre Street
Vivian Road
Mulock Drive
St. John's Sideroad
Warden Avenue
Keele Street
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Kirby Road
Major Mackenzie Drive
Langstaff Road
Blue Valley Drive
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Attachment 2

Ontario

Executive Summary

2014 Travel Time Study

IBI

Prepared for Ministry of Transportation Ontario, the City of Toronto, and the Regional Municipalities of Durham, Peel, and York
By IBI Group

October 2015

Document Control Page

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1 Overview

The Ministry of Transportation Ontario (MTO) has undertaken a biennial travel time study of major provincial roadways in the Greater Toronto Area (GTA) since 1996. The results of the studies provide metrics for assessing facility performance and identifying critical road sections to be considered in future improvement projects and traffic management strategies.

The 2014 Travel Time Study (TTS) includes surveys of 12 provincial 400 series highways in the GTA, three (3) provincial highways, two (2) expressways in the City of Toronto, and 114 arterial corridors from within the City of Toronto and the Regional Municipalities of Durham, Peel, and York. High occupancy vehicle (HOV) lanes and a total of 113 freeway ramps were also surveyed.

This report includes analysis of daily, weekly, monthly, and weekend traffic patterns during fall of 2014, and is supplemented with special analyses of selected holiday weekends and seasonal traffic variation. Additional analysis includes:

- Travel time and delays on freeways and principal arterials within the City of Toronto and the Regional Municipalities of Durham, Peel, and York;
- Ramps between 400 series highways;
- HOV facilities;
- Inter-municipal arterial corridors;
- Parallel 400 series highway/arterial routes;
- Major origin-destination pairs;
- Rail freight access routes;
- Impacts of construction and operational improvements; and
- Validation of purchased data using Bluetooth and Global Positioning System (GPS) probe surveys.

1.1 Methodology

Data for the 2014 TTS was collected using a combination of two survey methods. The first source of data was the purchase of travel time and speed data from the private data provider, TomTom, which provides a database of traffic data aggregated by personal GPS devices located in passenger vehicles and individual's smartphone navigation mobile apps. A second method consisted of survey vehicles equipped with GPS devices dispatched to record travel data on selected corridors.

For each survey, the traffic data source was selected based on survey requirements, with some requiring a combination of both sources as shown in **Exhibit 1**. An additional data source, consisting of roadside Bluetooth transceivers, was applied as a means of validation of purchased data along selected 400 series highway segments. All collected traffic data underwent a verification process prior to application in travel time analysis.

Exhibit 1: Application of Survey Data Sources

Survey	Report Section(s)	GPS Auto Probe Data	Purchased Data
400 Series Highways and Expressways	3.1 to 3.5, 3.10		✓
Operational Improvements	3.6 and 3.7		✓
Lane Closures	3.8		✓
Comparison of Seasonal Factors	3.9		✓
Comparison of Monthly Factors	3.9		✓
Comparison of Weekly Factors	3.9		✓
Ramps	4		✓
Arterials	5	✓	•
Inter-Municipal Arterial Analysis	6	✓	
Parallel Routes	7	✓	✓
Origin-Destination Pairs	8	✓	✓
Rail Access Routes	9	✓	
HOV Facilities	10	✓	
Weekends	11	✓	
Canada Day weekend	12		✓
Labour Day weekend	13	✓	
Validation of Purchased Data*	14	•	•

✓ Primary data source

• Used for comparison only

* Validation of the purchased data using GPS probe surveys and Bluetooth surveys along eight segments that included Highways 400, 401, 404, and 406.

Weekday surveys were conducted during the AM peak, Midday, and PM peak periods (excluding Monday AM and Friday PM peak periods), while weekend surveys were conducted during Saturday and Sunday midday and afternoon. The Canada Day survey was completed on Friday June 27, 2014, Saturday June 28, 2014, and Tuesday, July 1, 2014, while the Labour Day survey was completed on Friday and Monday of the holiday weekend (i.e. August 29, 2014 and September 1, 2014). The sampling times of surveys were deliberately varied within each survey period to capture the temporal variability of traffic conditions inherent to each road segment.

1.2 Performance Measures

The following performance measures were used to track trends in freeway and municipal arterial congestion over time, based on travel time and speed data:

- **Level of Service (LOS)** – Determines the effectiveness of roadways using criteria defined in the Highway Capacity Manual (HCM) 2000. The letter-grade criteria are based on a comparison of free-flow speed to measured speed for each segment;
- **Travel Time Index (TTI)** – Compares peak period to free-flow travel conditions in order to provide a relative indication of the additional travel time incurred at peak

flow conditions (i.e. a TTI of 1.4 indicates that a trip will take 40% longer on average than at the free flow speed);

- **Buffer Time Index (BTI)** – A measure of travel time reliability, the BTI represents the extra travel time (or buffer) that a motorist needs to consistently arrive on time with a high degree of confidence (i.e. a BTI of 24% means that a motorist should allow 24% more travel time for a trip in order to arrive on time 19 times out of 20, or at a 95% level of confidence); and
- **Travel Delay** – Compares observed travel time to theoretical free-flow travel time, and consists of two measures of delay:
  - *Total Delay* is a measure of overall delay impacts on a roadway, and is defined as the product of per-vehicle delay and hourly traffic volume; and
  - *Average Delay per Signal* is the delay per vehicle at a traffic signal, broken down into delay caused by the traffic signal and delay caused by traffic congestion.

1.3 Major Findings

General findings of the 2014 TTS are highlighted below, followed by individual sections on notable survey results.

Overall Network Congestion

- There was a similar level of overall congestion when compared to the 2012 TTS of the roadway and highway system in the GTA. This excluded York Region arterials, as those were not surveyed during the 2012 TTS;
- Despite additions to roadway capacity, the 2014 TTS showed that adequate network capacity continued to be a limiting factor;
- While congestion remained a prevalent issue in the core of the GTA with a number of key highways (i.e. Highway 427 and Highway 401) that degraded in operations, outer areas experienced similar travel times when compared to the 2012 TTS; and
- Congestion during AM and PM peak periods is occurring over a similar duration to the 2012 TTS. However, congestion during the Midday period has worsened.

The Highway Network

- Since 2012, the number of segments operating at LOS A/B/C remained almost unchanged during the AM and PM peak periods, while it increased during the Midday period by 16%. At the same time, the number of segments operating at LOS E/F has decreased by 3% and 6% in the AM peak and Midday periods respectively, while it increased by 5% in the PM peak period;
- The system-wide TTI have remained largely unchanged since 2010, The system-wide BTI dropped significantly since 2012 in both the AM and PM peak periods;
- When compared to the 2012 TTS, during the AM peak periods, there was a slightly larger portion of the network that experienced a noticeable deterioration in average speed (18%) than a noticeable improvement (14%) Similarly, during the PM peak period, a larger portion of the network experienced a noticeable deterioration in average speed (26%) when compared to noticeable improvements in average speed (13%);
- In terms of speed variance comparison to the 2012 TTS, the majority of the segments (i.e. 159 of 171 in the AM peak period and 161 of 171 in the PM peak

period) experienced deterioration representing 98% for both peak periods of the analyzed distance. This was due to the change in calculation methodology of the variance of the samples by the purchased data provider in the 2014 and 2012 studies. As a result, the variance provided was noticeably higher than what was used in the 2012 TTS; and

- The true peak period for the vast majority of highway corridors falls between 8:00 AM and 9:00 AM for the AM peak period, and between 5:00 PM and 6:00 PM for the PM peak period.

Specific Highway Corridors and Routes

- On Highway 401 at Keele Street, the magnitude of volumes reported during the Midday period has grown remarkably since 2012. As a result, the highway section is operating near capacity for much of the working day;
- During the AM peak period, the Highway 404 General Purpose Lanes (GPL) southbound from 16th Avenue to Highway 401 exhibited the highest TTI with a value of 3.4;
- During the PM peak period, the highest TTI was found on the Highway 404 northbound GPL from Highway 401 to 16th Avenue with a value of 3.0;
- The highest BTI for the AM peak period was found on the Highway 404 GPL southbound from 16th Avenue to Highway 401 with value of 126%;
- During the PM peak period, the highest BTI was found on Highway 401 Collector eastbound from Sheppard Avenue to Brock Road with a value of 173%;
- The Express lanes of the Highway 401 eastbound between Guelph Line and Newtonville Road experienced the largest total delay in the AM peak period; and
- The eastbound lanes of Highway 401 Collector between Mississauga Road and Brock Road experienced the largest total delay in the PM peak period.

Weekly, Monthly, and Seasonal Variations in Traffic

All speeds were compared to the average fall speeds to calculate factors.

- Speeds during the AM peak period were on average 4% and 6% higher in the spring and summer, respectively. For the winter season, the speeds were 3% slower than those during the fall;
- During the PM peak period, speeds were generally 2% to 3% higher than fall speeds for all seasons;
- During the AM peak period, the month with the fastest speeds was August (averaging 10% faster), while the months with the slowest speeds were January and February (averaging 5% and 6% slower, respectively);
- During the PM peak period, the months with the fastest speeds were March and April, averaging 4% and 5% faster, respectively. The only months to record a decrease in speeds were November and December, where the speeds averaged 6% and 4% slower, respectively;
- The fastest speeds observed in a week during both the AM peak period and PM peak period occurred during week 52 (December 22, 2014 to December 28, 2014), where speeds averaged 26% and 14% faster, respectively. However, during the PM peak period, the remaining weeks of December were observed to operate at speeds 6% to 9% slower than the fall average, causing the month of December to average a decrease in speeds;

- The slowest speeds observed in a week during both the AM peak period and PM peak period occurred during the second week of December (week 50) and the third week of November (week 47), respectively. During the AM and PM peak periods, recorded speeds were 15% and 17% slower, respectively.

Operational Improvements

- The QEW Niagara bound lane widening and rehabilitations project near the Brant Street interchange showed no changes during the AM peak period, and slower HOV lane operations by 15 km/h during the PM peak period. This can likely be attributed to the increase in traffic volume;
- The rehabilitation and lane addition on Highway 401 between Jane Street and Kipling Avenue resulted with no speed changes during the Midday and PM peak periods. The only changes were during the AM peak period, where the eastbound Collector has decreased in speed by 36 km/h and the westbound Collector has increased in speed by 13 km/h since 2008;
- The rehabilitation and lane addition on Highway 401 Collector expansion and rehabilitation near Hurontario Street has improved operations in the eastbound direction during the AM peak period by 10 km/h since 2008. However, speeds have decreased by 20 km/h in the westbound direction since 2008. During the PM peak period, operations also improved in the eastbound direction, by 8 km/h since 2008.

Weekends and Holidays

- During the weekend studies:
  - On Sunday, there were 5% more segments that reported a LOS of A/B/C compared to Saturday. Furthermore, 22% of highway sections operated at LOS E or F on Sunday, compared to 24% on Saturday;
  - The slowest Saturday segment was Highway 401 Collector eastbound from Dixie Road to Highway 400, operating at 64 km/h, while the slowest Sunday segment was Highway 401 Express eastbound from Dixie Road to Highway 400, at 70 km/h; and
  - For both days analyzed, there were a significant amount of segments that noticeably improved, when compared to the 2012 TTS. This included 33% and 39% of the network on Saturday and Sunday, respectively. There were significantly more segments that improved than deteriorated. Only 6% and 11% of the network noticeably deteriorated for Saturday and Sunday, respectively.
- For the Canada Day survey, all road segments on July 1, 2014 operated at LOS A/B/C. On June 27, 2014 and June 28, 2014, 35% and 43% of segments, respectively, operated at a LOS A/B/C; and
- On the Labour Day weekend, the road sections on Monday, September 1, 2014 operated at a better LOS (i.e. LOS A/B/C) than on Friday, August 29, 2014, with 13% more segments. For road segments that operated poorly (i.e. LOS E or F), the Monday results had 11% fewer road sections compared to Friday. Most of the road sections that operated poorer on Friday compared to Monday were on Highway 401 and Highway 404 close to the City of Toronto.

Other Special Study Findings

- HOV lanes were shown to be effective in reducing travel time for HOV lane users along Highway 403, Highway 404, and the QEW. Increased traffic volume has

resulted in a slight deterioration of the HOV lane performance along Highway 403 in the eastbound direction, while the Highway 404 and QEW HOV performance has remained consistent since 2012;

- In an analysis of construction related lane closures, it was found that night time lane closures did not generally result in a significant reduction in speed, with most lanes still operating close to the speed limit. The largest difference observed was operations that slowed to 7 km/h below the posted speed limit at QEW eastbound between Royal Windsor Drive and Winston Churchill Boulevard;
- From the analysis of different ramps between major 400 series highways, it was seen that the ramp from Highway 401 Collector westbound to DVP southbound reported the slowest travel speed during the AM peak period at 21 km/h. The ramp from Highway 409 eastbound to Highway 427 northbound reported the slowest travel speed during the PM peak period at 25 km/h;
- The results of the parallel route analysis showed that correlation between mean speeds on the 400 series highway and its parallel arterial corridor(s) cannot always be predicted, due to factors such as differing segment lengths and unknown travel time between parallel routes;
- Of the rail access routes surveyed, the majority of these routes experienced similar or improved travel times as in 2012, except for the access route from CN Torbram Road Terminal (Brampton) to Highway 427, where the speed reduced by 14 km/h; and
- A special origin-destination survey for Highway 401 was conducted along both Collector and Express lanes between Mississauga Road and Brock Road. PM peak period travel time was generally found to be worse than travel time during the AM peak period. All travel time comparisons to the 2012 TTS have worsened, except for the Collector lanes in the westbound direction which showed a slight improvement during all periods.

2 City of Toronto

The 2014 TTS covered approximately 270 km of MTO 400 series highways within the City of Toronto, the entire Don Valley Parkway (DVP) and F. G. Gardiner Expressway, as well as 816 km of arterial corridors. These included major downtown routes such as Lake Shore Boulevard, Queen Street, and Yonge Street, in addition to arterials throughout the City.

The primary findings within the City of Toronto are highlighted below.

400 Series Highways and Expressways

- The City of Toronto Expressways (i.e. Gardiner Expressway and Don Valley Parkway) operated at a better LOS in 2014 compared to 2012. The number of segments operating at LOS A/B/C increased by 20%, 19%, and 3% during the AM peak, Midday, and PM peak period respectively. The improved sections were reported mostly downstream of the construction area in both directions between South Kingsway and Spadina Avenue on the Gardiner Expressway;
- During both the AM and PM peak periods, there has been a significant increase in TTI values for City of Toronto Expressways since the 2012 TTS, from 1.7 to 2.1 and from 1.8 to 2.8, respectively. This was likely the results of the construction on the City of Toronto Expressways, specifically the Gardiner Expressway, during the survey period for the 2014 TTS;
- During the AM peak period for 400 series highways in the City of Toronto, the TTI was very similar to the value from the 2012 TTS. However, during the PM peak period, the TTI slightly increased when compared to the 2012 TTS, increasing from 1.7 to 1.8;
- During both the AM and PM peak periods, there was a significant decrease in BTI values for the City of Toronto 400 series highways and Expressways. The drop ranged from 14% to 55%. The decrease in BTI signifies that travel times on major highways and Expressways in the City of Toronto are becoming more consistent and predictable;
- The slowest segments on the City of Toronto Expressways were on the F.G. Gardiner Expressway eastbound approaching South Kingsway during the AM peak period and westbound approaching Spadina Avenue during the PM peak period. This was mainly due to the lane reductions from the construction between South Kingsway and Spadina Avenue; and
- The 400 series highway section that operated the poorest within the City of Toronto was the Highway 404 GPL between Highway 401 and 16th Avenue in the southbound direction during the AM peak period (52 km/h), and in the northbound direction during the PM peak period (41 km/h).

Arterials

- In the City of Toronto, there are 68%, 70%, and 43% of the arterials operating at LOS C or better during the AM peak period, Midday period, and PM peak period respectively;
- Sections of Yonge Street, Eglinton Avenue, and Queen Street experienced slow speeds in both directions during the AM and PM peak periods;
- TTI values were greater than 1.5 for 89% of the surveyed corridors during the AM and PM peak periods, and were above 1.0 for all the surveyed corridors;

- Based on the TTI, there are significantly longer travel times observed in the PM peak period compared to the AM peak period. During the PM peak period, 56% of the surveyed corridors had a TTI above 2.0, compared to only 20% during the AM peak period;
- The regional BTI values for AM and PM peak periods were 44% and 39% respectively, as calculated by the distance-based weighting system. These results were compared to the 2012 TTS, where they were 38% and 33% for the AM and PM peak periods respectively;
- Similar to the 2012 TTS, William R Allen Road southbound from Steeprock Drive to Eglinton Avenue experienced large congestion delays in both AM and PM peak periods. This was mainly due to traffic signals and the construction at the terminus of the William R Allen Road expressway section;
- Eglinton Avenue experienced the highest total delay in both the AM peak period and PM peak period. This was mainly due to the Eglinton Crosstown Light Rail Transit (LRT) construction. These led to significantly high total delays observed on Eglinton Avenue;
- During the AM peak period and Midday period, the majority of segments (86%) did not experience a noticeable change in speeds when compared to the 2012 TTS;
- During the PM peak period, 31 segments had a noticeable improvement when compared to the 2012 TTS, translating to 10% of the total distance analyzed. However, 36 segments experienced a noticeable deterioration in speeds, representing 11% of the total distance analyzed; and
- The majority of the segments (averaging 87%) across all periods did not experience a statistically significant change in terms of speed variance.

3 Durham Region

The 2014 TTS covered approximately 190 km of MTO 400 series highways within the Regional Municipality of Durham, and 27 arterial corridors covering approximately 652 km in both directions. The Durham Region arterial analysis included major corridors such as Brock Road, Rossland Road, Brock Street/Baldwin Street, and Taunton Road, among others.

The primary findings within Durham Region are highlighted below.

400 Series Highways

- For 400 series highways in Durham Region, similarly to Peel and York Regions, the TTI values have stayed relatively similar to the 2012 level. Only minor changes were evident for TTI values over the course of the studies for these jurisdictions. Durham Region TTI values were typically higher in the PM peak period (1.2) when compared to the AM peak period (1.0);
- There was an increase of BTI during the PM peak period on the 400 series highways in Durham Region by 8%. The increase of BTI can be attributed to a long-term construction project that has begun on a large stretch of Highway 401 in both directions through the region; and
- The segment in the region that had the slowest speed was Highway 401 Collector westbound between the Brock Road and the Highway 404/DVP interchange during the AM peak period (57 km/h). During the PM peak period, the slowest section was on Highway 401 Express eastbound from Brock Road to Brock Street, averaging 43 km/h.

Arterials

- In Durham Region arterials, 96%, 95%, and 83% of the surveyed corridors operated at LOS C or higher during the AM peak period, Midday period, and PM peak period respectively. This result was slightly better compared to the 2012 TTS;
- The slowest segment in both AM and PM peak periods was Brock Road in the northbound direction between Bayly Road and Highway 2. The interchange of Brock Road at Highway 401 was a location of congestion during the PM peak period, as both the northbound and southbound segments originating from Highway 401 were listed in the top 10 slowest speeds;
- During the AM peak period, only 23% of surveyed arterials had a TTI greater than 1.5, compared to 48% during the PM peak period;
- The regional TTI values were similar between the AM and PM peak periods, with a distance based weighted average of 1.3 in the AM peak period, and 1.5 in the PM peak period;
- The BTI values on a regional level were relatively low for both AM and PM peak periods in Durham Region. The BTI values for the AM and PM peak periods were 28% and 30% respectively, as calculated by the distance-based weighting system;
- The corridor of Courtice Road experienced relatively long congestion delay for both directions during both AM and PM peak periods. This could be mainly attributed to construction projects and lane closures occurring along Courtice Road;
- Durham Region operational improvements resulted in speed improvements for a variety of roadways that included Highway 7/Winchester road, Bayly Street/Victoria Street/Bloor Street, and Thickson Road;

- Taunton Road between York-Durham Line and Martin Road experienced the highest total delay in the westbound direction during the AM peak period, and the second highest total delay in the eastbound direction during the PM peak period. This is due to large traffic volumes experienced on Taunton Road;
- During the AM peak period, 43 segments had a noticeable improvement in harmonic mean speed, totalling to 20% of the surveyed distance when compared to the 2012 TTS;
- During the PM peak period, 26 segments experienced a noticeable improvement, representing 12% of the analyzed distance when compared to the harmonic mean speeds in the 2012 TTS. However, 39 segments underwent noticeable deterioration in speeds, totaling to 18% of the analyzed distance; and
- In terms of speed variance, for both AM and PM peak periods, the majority of segments (82%) have not experienced a statistically significant change when compared to the 2012 study.

4 Peel Region

The 2014 TTS covered approximately 470 km of MTO 400 series highways within the Regional Municipalities of Peel and Halton, as well as approximately 1,155 km of arterial roads in Peel Region. The Peel Region arterial analysis included major corridors such as Dixie Road, Hurontario Street, Burnhamthorpe Road, and Eglinton Avenue, among others.

The primary findings within Peel Region are highlighted below.

400 Series Highways

- In Peel Region, similar to Durham and York Regions, the TTI values have stayed relatively similar to the 2012 level. Only minor changes were evident for TTI values over the course of the studies for these jurisdictions. The PM peak period TTI values (1.3) were slightly higher than the AM peak period (1.2) for Peel Region;
- There was a decrease in BTI during both the AM and PM peak periods along the 400 series highways in Peel Region, by 9% and 5% respectively; and
- The slowest highway section in Peel Region was Highway 401 Express eastbound between Dixie Road and Highway 400 during the AM peak period (38 km/h) and during the PM peak period (32 km/h).

Arterials

- The weekday survey shows that 82%, 85%, and 57% of the arterials operated at LOS C or higher during the AM peak, Midday, and PM peak periods, respectively. The results are similar to those found in the 2012 TTS;
- The results indicate that the PM peak period was worse than the AM peak period as many corridors' TTI values were higher. Similar observations were made in many of the other regions and also in the 2012 TTS;
- Dixie Road northbound from Lakeshore Road to The Queensway experienced the highest TTI during the AM peak period. This was mainly due to the Hanlan Watermain construction project that took place during the survey period. Kennedy Road northbound from Britannia Road to Derry Road experienced the highest TTI during the PM peak period;
- Among the surveyed corridors in Peel Region, 8% and 40% had TTI values above 2.0 in the AM peak period and the PM peak period, respectively. This means that on 8% of the corridors in the AM peak period and 40% of the corridors in the PM peak period, the expected travel time was more than double the travel time under free flow speed;
- The regional distance weighted average TTI was higher in the PM peak period at 1.9 compared to 1.6 in the AM peak period;
- The regional BTI values were 32% in both the AM and PM peak periods, as calculated by the distance-based weighting system. Similar results were presented in 2012 TTS;
- The Gore Road between Mayfield Road and King Street had the longest average delay per signal in both directions in the AM peak period, in the eastbound direction specifically. This was due to the fact that there is a large distance between signals;
- Embleton Road between Winston Churchill Road and Mississauga Road had the longest average delay per signal in both directions in the PM peak period. This was

due to a combination of factors including construction, long distance between signals, and number of lanes;

- Operational improvement projects in Peel Region resulted in performance improvements on Burnhamthorpe Road, Mississauga Road, and Hurontario Street; and
- During the AM peak period, 41 and 43 segments had a noticeable improvement and deterioration in harmonic mean speed, respectively. This translates to 13% and 12% of the analyzed distance experiencing an improvement and deterioration respectively, when compared to the 2012 TTS;
- During the PM peak period, 36 segments had a noticeable improvement in speed, representing 11% of the analyzed distance. However, 53 segments experienced a noticeable deterioration in speed, which represents 16% of the analyzed distance in Peel Region; and
- The majority of the segments (85%) across all periods did not experience a statistically significant change in terms of speed variance;

5 York Region

The 2014 TTS covered approximately 330 km of MTO 400 series highways within the Regional Municipalities of York and Simcoe County, as well as approximately 801 km of arterial roads in York Region. The York Region arterial analysis included major corridors such as Highway 7, Davis Drive, Keele Street, and Yonge Street, among others.

The primary findings within York Region are highlighted below.

400 Series Highways

- In York Region, similar to Durham and Peel Regions, the TTI values have stayed relatively similar to the 2012 level. Only minor changes were evident for TTI values over the course of the studies for these jurisdictions. The TTI values for the AM and PM peak periods were fairly similar for this region;
- During the AM peak period, there was a decrease in BTI when compared to the 2012 TTS, from 38% to 29%. The PM peak period BTI results were fairly similar to those from the 2012 TTS; and
- The slowest highway segment was on Highway 404 GPL between 16th Avenue and Highway 401 in the southbound direction during the AM peak period (52 km/h) and in the northbound direction during the PM peak period (41 km/h).

Arterials

- In York Region, it was noted that 79%, 82%, and 65% of the arterials operated at LOS C or higher during the AM peak, Midday, and PM peak periods, respectively;
- The majority of the slow segments were in the southern portion of York Region near Highway 7. Surveyed arterials in this area were impacted by the vivaNext Bus Rapid Transit (BRT) Rapidway construction on Highway 7. Similarly, the vivaNext BRT construction on Davis Drive had a significant impact on the traffic operations, which led Davis Drive to become one of the slowest segments in York Region;
- The slowest segment during the AM peak period was Keele Street southbound from Langstaff Road to Highway 7. During the PM peak period, the slowest segment was Leslie Street northbound from Highway 407 to 16th Avenue;
- Among the surveyed corridors during the AM peak period in York Region, 9% had TTI values above 2.0. This means that on 9% of the corridors, the expected travel time was more than double the travel time at free flow speed;
- Among the surveyed corridors during the PM peak period in York Region, 25% had TTI values above 2.0;
- The regional distance weighted average TTI was higher in the PM peak period at 1.7, compared to 1.5 in the AM peak period;
- The regional distance weighted average BTI was higher in the AM peak period at 31%, compared to 24% in the PM peak period;
- Major Mackenzie Drive between Highway 27 and Highway 50 had the longest summed and congestion delays per signal in both directions, during both AM and PM peak periods. This was due to the fact that there is a large distance between signals;
- Highway 7 eastbound and westbound experienced the highest total delays in both AM and PM peak periods. This is because Highway 7 is a high capacity corridor carrying three lanes of traffic in both directions for much of the corridor; and

- The operational improvement that was analyzed was the lane addition on Highway 7 from Rouge River to Town Centre Boulevard. When compared to the harmonic mean speeds from the 2010 TTS, the operational improvement project along Highway 7 yielded minimal or minor negative impacts. During the AM peak period, mean speeds dropped by 9 km/h and 5 km/h for the eastbound and westbound directions, respectively. During the PM peak period, mean speeds dropped by 3 km/h and 14 km/h for the eastbound and westbound directions, respectively.

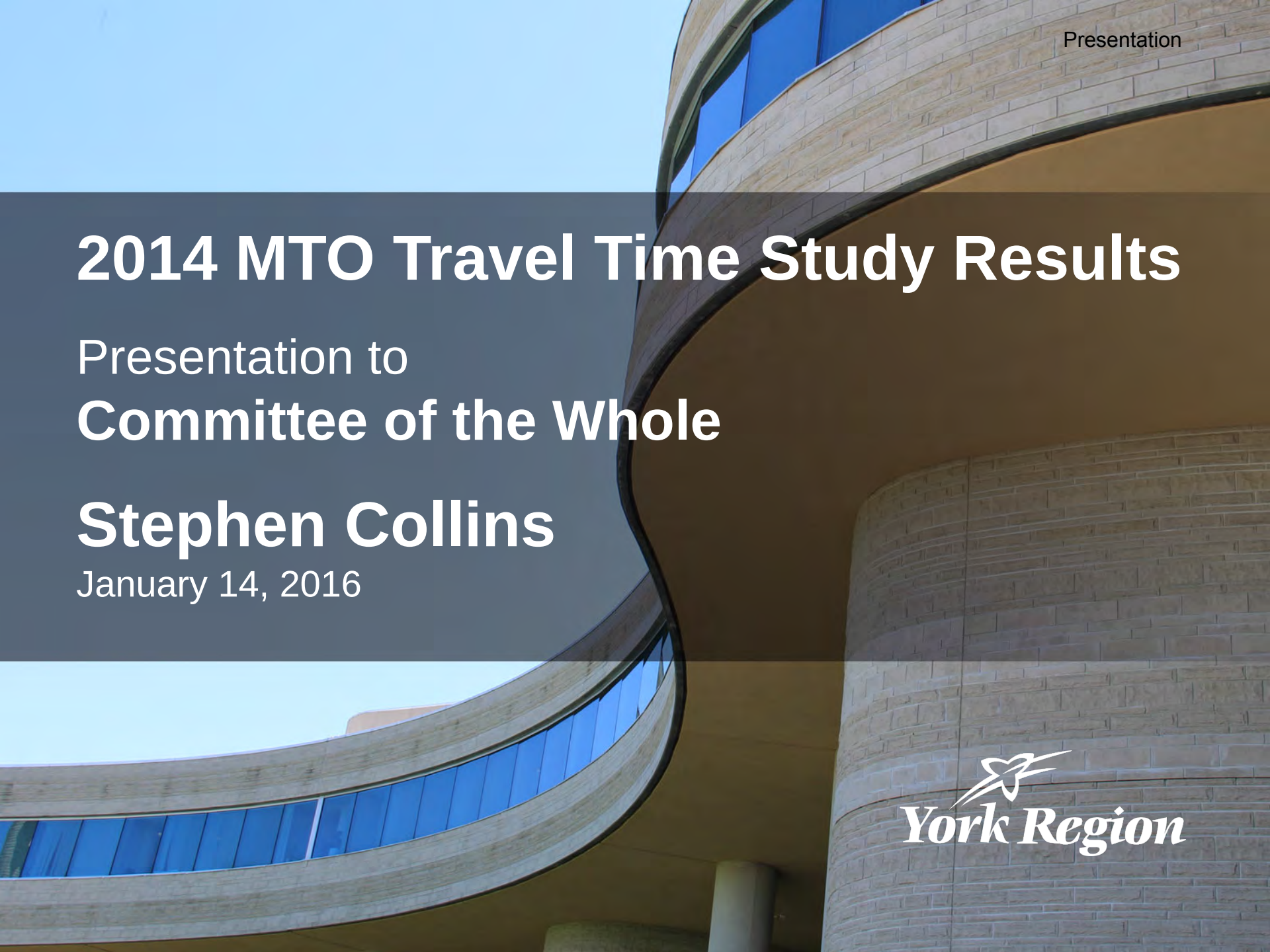
2014 MTO Travel Time Study Results

Presentation to

Committee of the Whole

Stephen Collins

January 14, 2016



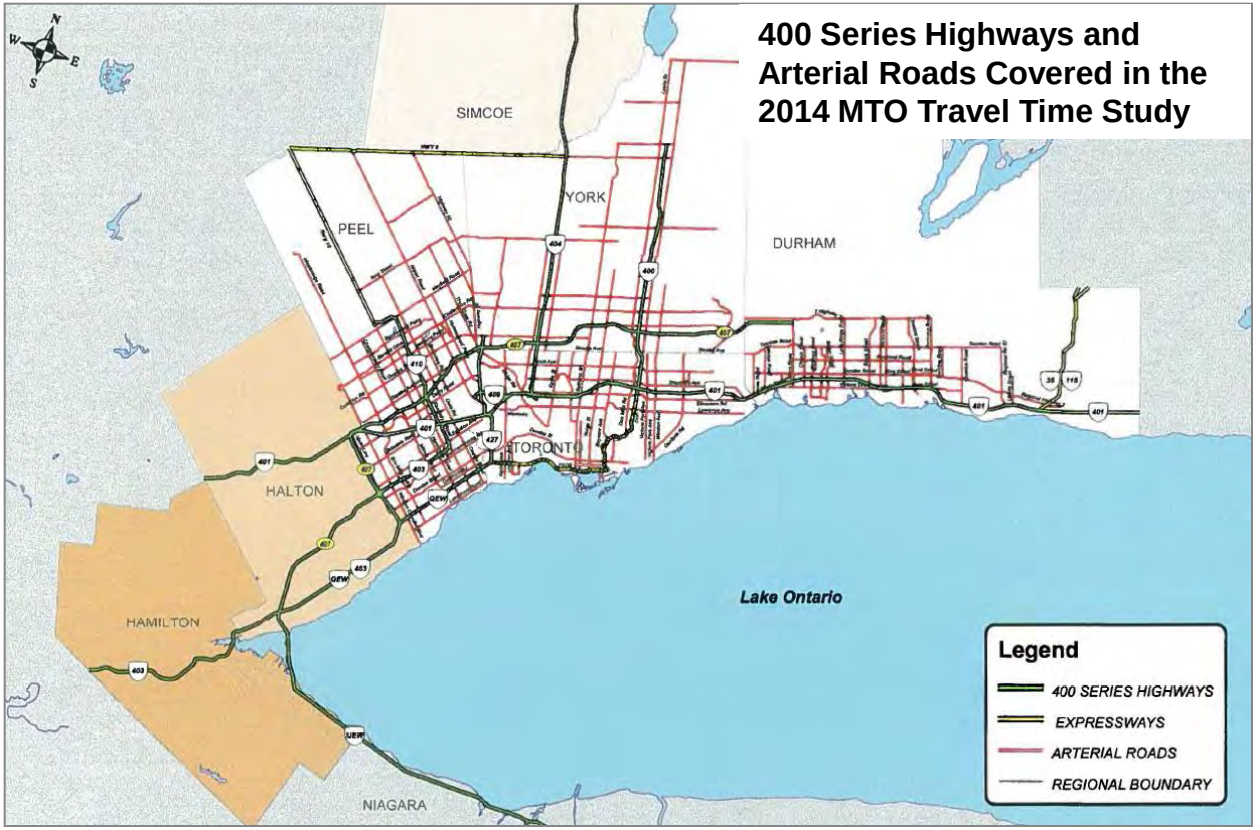
Presentation Outline

This presentation accompanies Agenda Item D.2.1

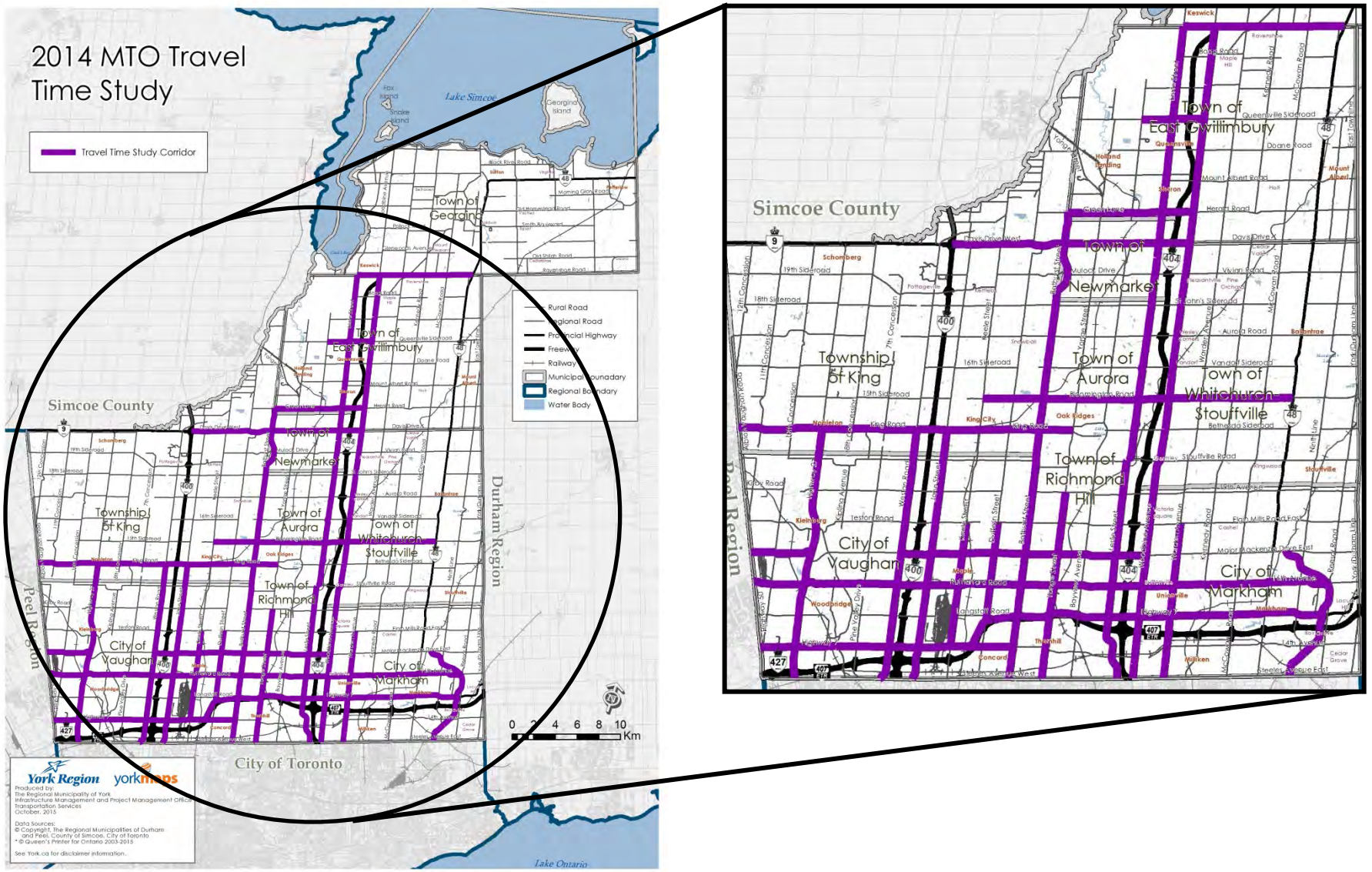
1. Study Overview and Area
2. Study Methodology
3. Study Results
4. Summary

Study Overview

- Travel time study of highways and arterial roadways is done every 2 years
- Includes 12 provincial 400-series highways, 3 provincial highways, 2 expressways and 114 arterial corridors
- Assessment and analysis of daily, weekly, monthly and weekend traffic patterns during 2014



Study Area – York Region

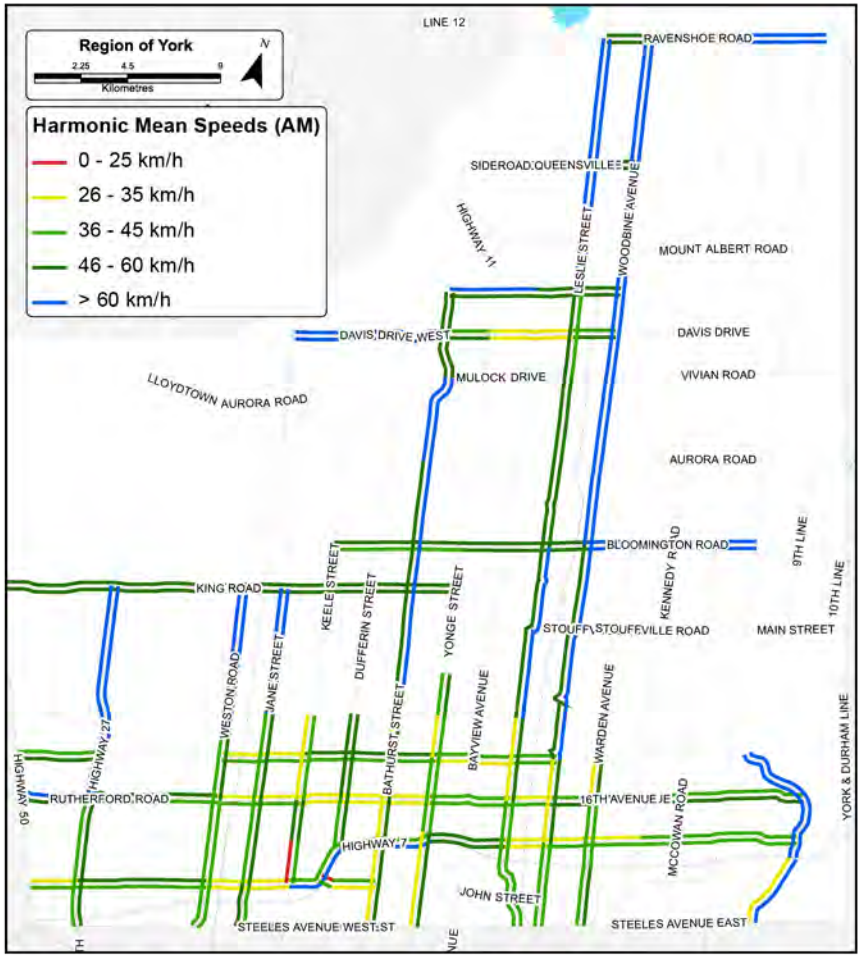


Methodology – Data Collection

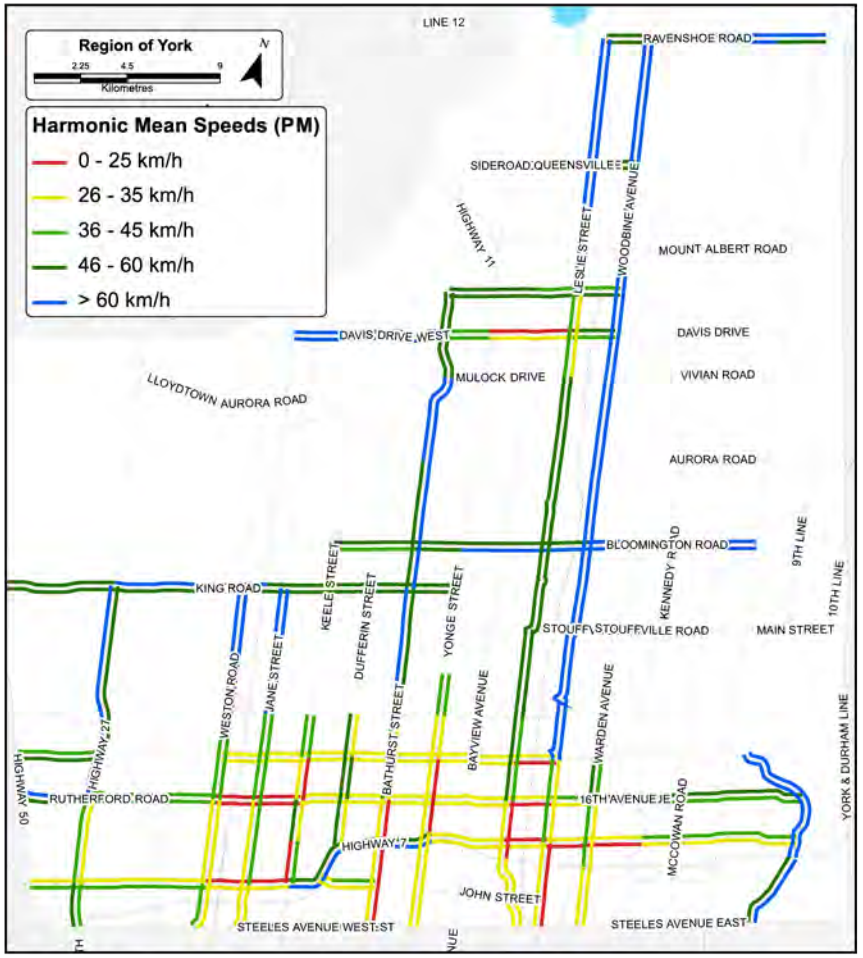
- Collection of traffic data:
  - Measuring travel times using specialized survey vehicles
  - Purchasing data from private vehicle GPS devices (TomTom)
- Validation and verification of data by:
  - Bluetooth transceivers
  - Random sampling
- Weekday surveys include AM Peak, Midday and PM Peak periods
- Weekend and holiday surveys include midday and random sampling
- More than 125,000 vehicle-km surveyed
- Achieved 95% level of statistical confidence in the data

Photo Courtesy of: DCL

York Region Average Mean Speeds – AM and PM Peak

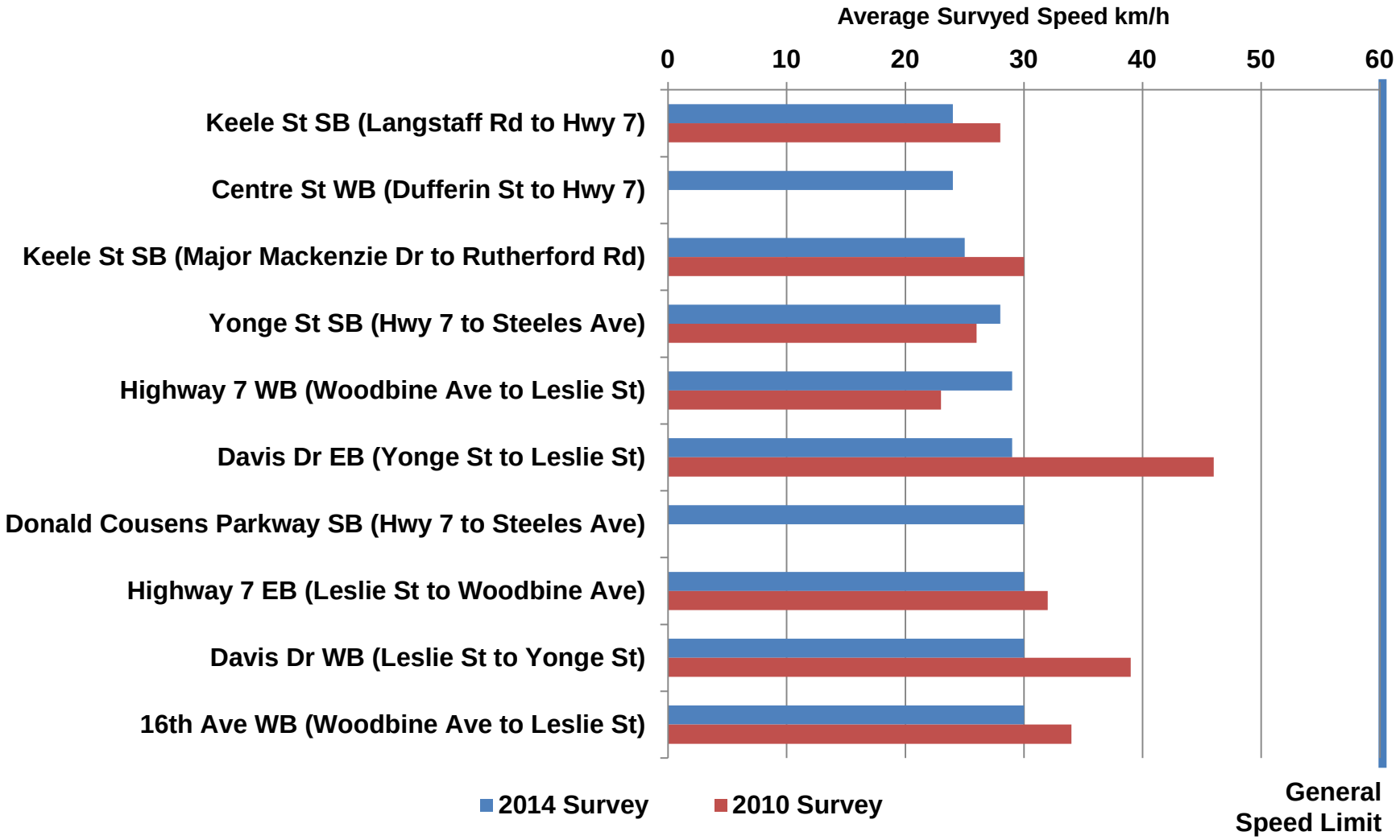


AM Peak



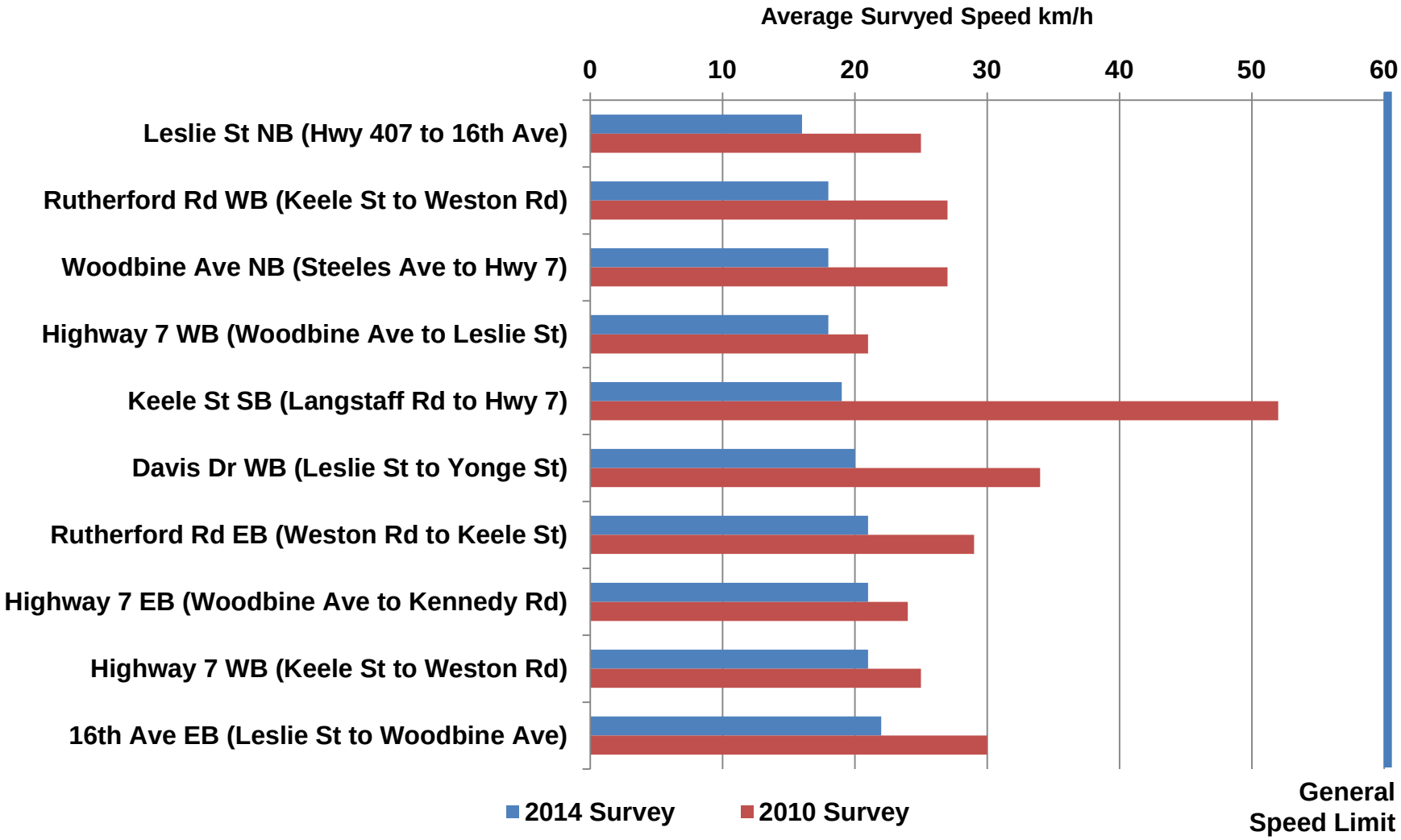
PM Peak

AM Peak Period – 10 Slowest Moving Roads
Comparison between 2014 and 2010 Survey



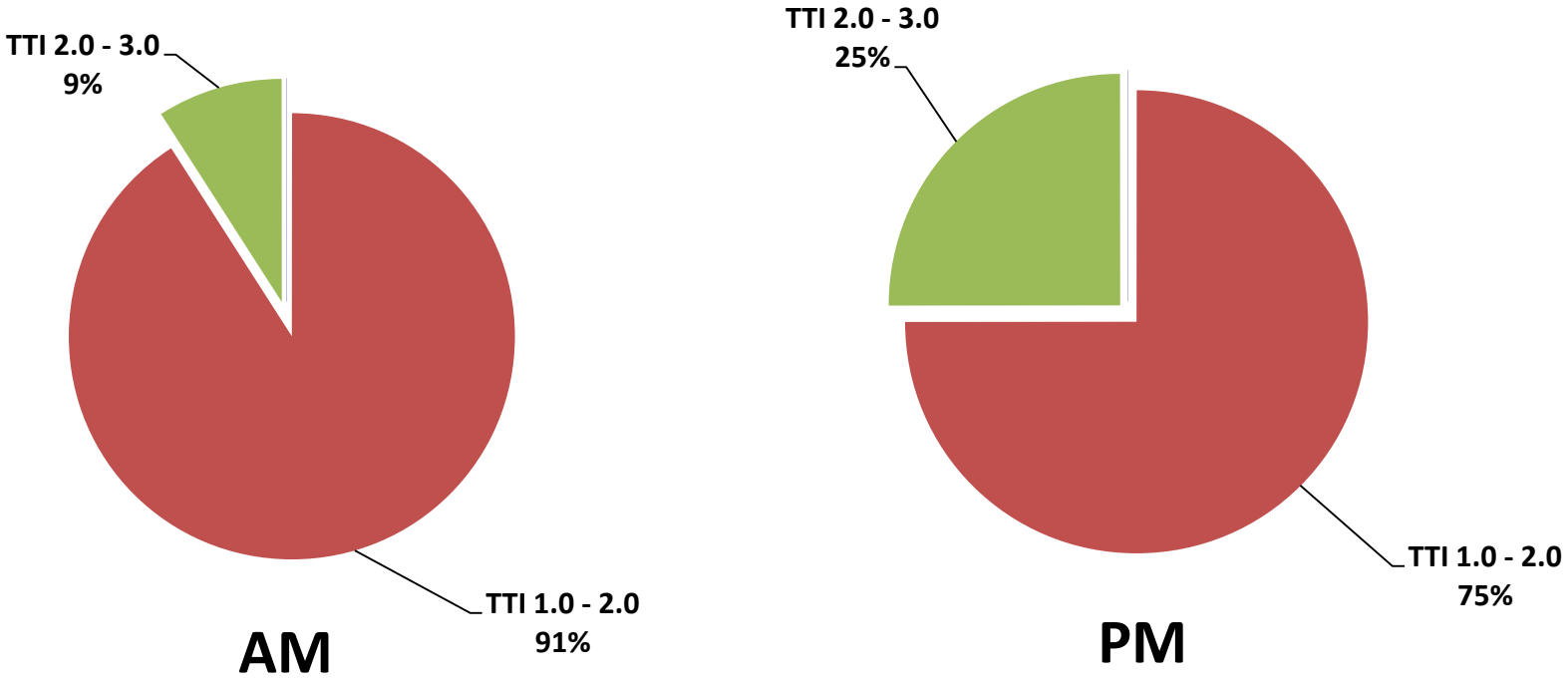
Travel speed was reduced by 50% during the AM peak period

PM Peak Period - 10 Slowest Moving Roads
Comparison between 2014 and 2010



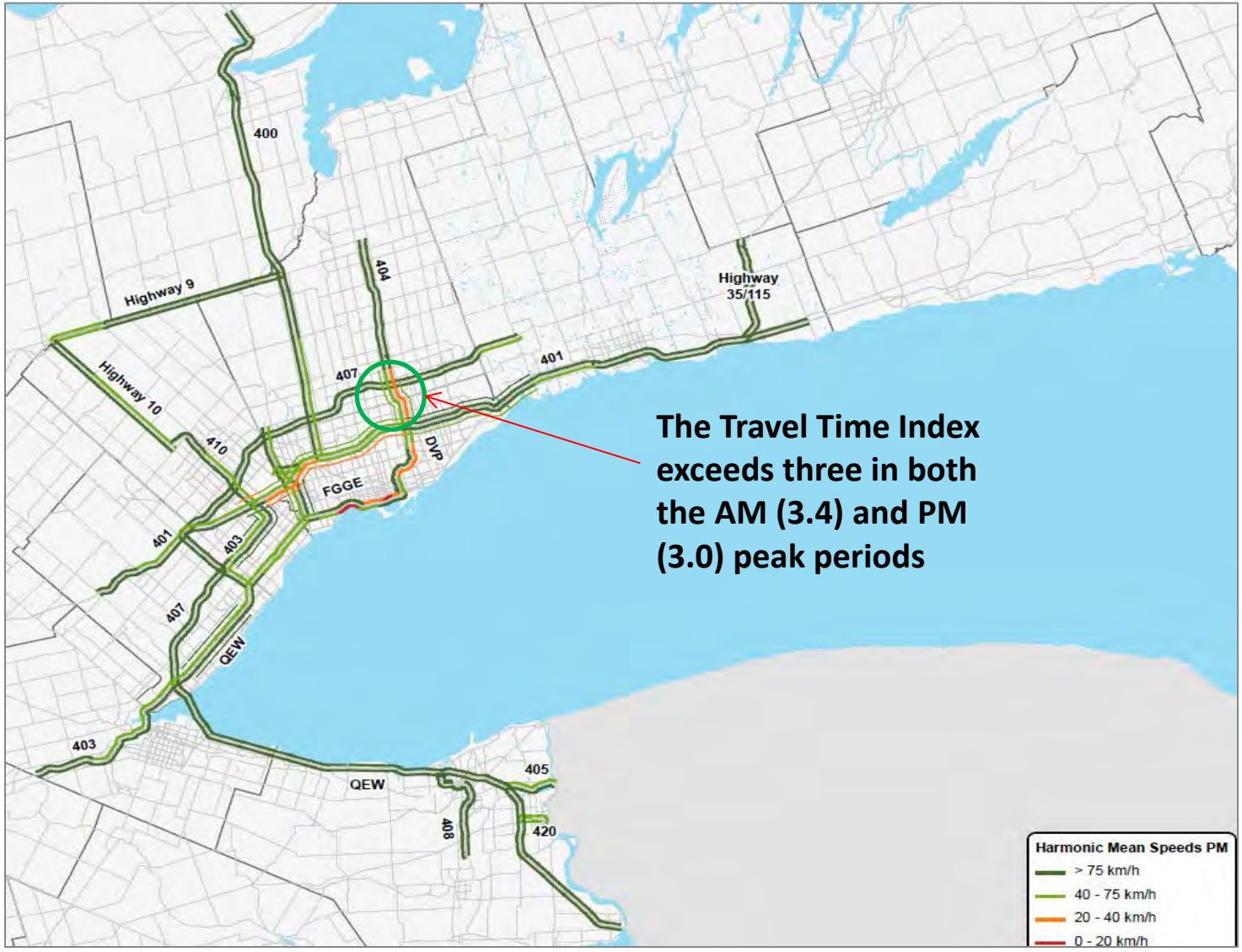
Travel speed was reduced by nearly 70% during the PM peak period

AM and PM Peak Periods - Comparison of Travel Time Index



- During the AM peak period, about 91% of the surveyed corridors within the reasonable range of Travel Time Index (between 1.0 and 2.0)
- PM peak period is worse than the AM peak period, with only 75% of the surveyed corridors within the reasonable range of the Travel Time Index between (1.0 and 2.0)

400 Series Highways Areas of Congestion



Slowest section in GTHA is Highway 404 between Hwy 401 to 16th Avenue

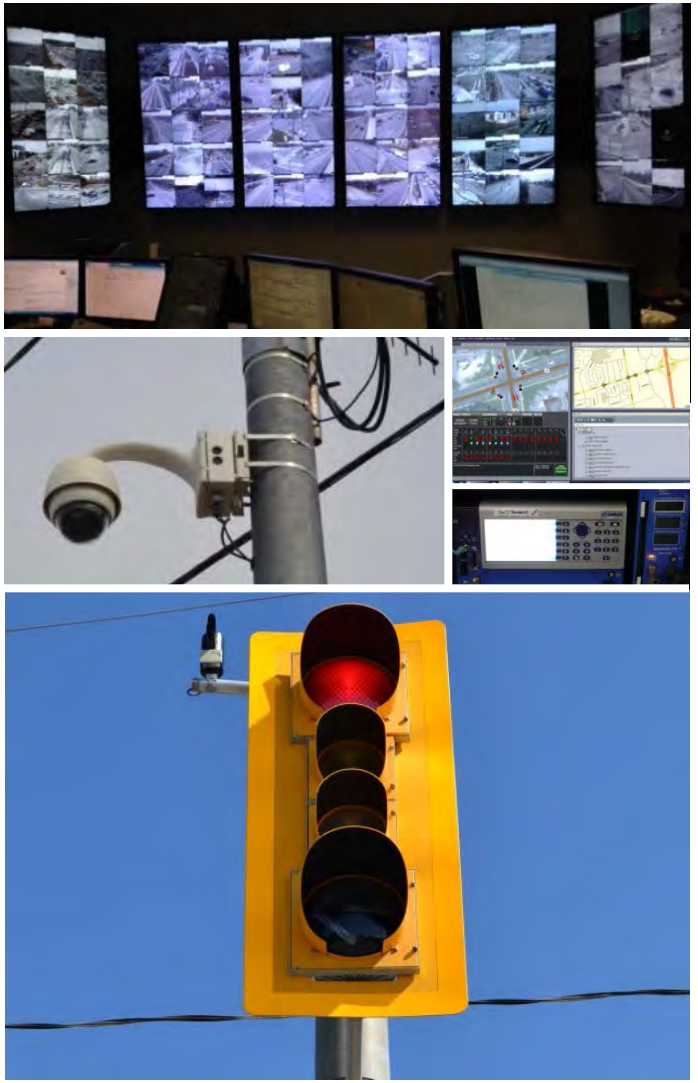
Summary

- The slowest segments in both AM & PM peak periods were in the southern portion of York Region near Highway 7
- Some arterials were impacted by construction activity
- Congestion and delay have increased between 2010 and 2014
- 9% of York Region roads have a Travel Time Index greater than 2.0 during the morning rush hour
- 25% of York Region roads have a Travel Time Index greater than 2.0 during the evening rush hour
- The Travel Time Study is one part of our overall data collection and system monitoring
- York Region is investing in all transportation modes to provide travel choices and manage congestion

What is Being Done to Manage Increases in Travel Time?

Short Term

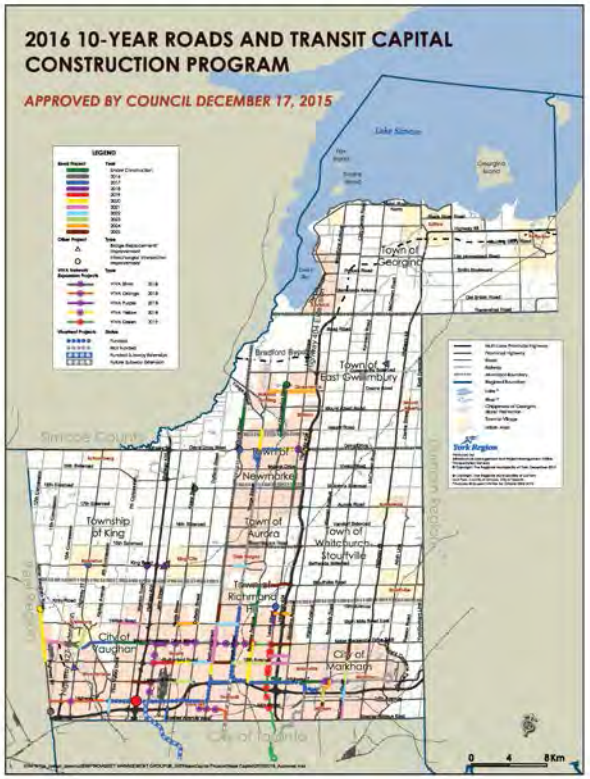
- Congestion management strategy
- Traffic controller upgrades
- Signal optimization
- Traffic Management Centre



What is Being Done to Manage Increases in Travel Time?

Long Term

- Regional investment in network expansion
- Provincial investments in highway expansion
- Regional Express Rail
- TMP policy and network directions



Report Recommendation:

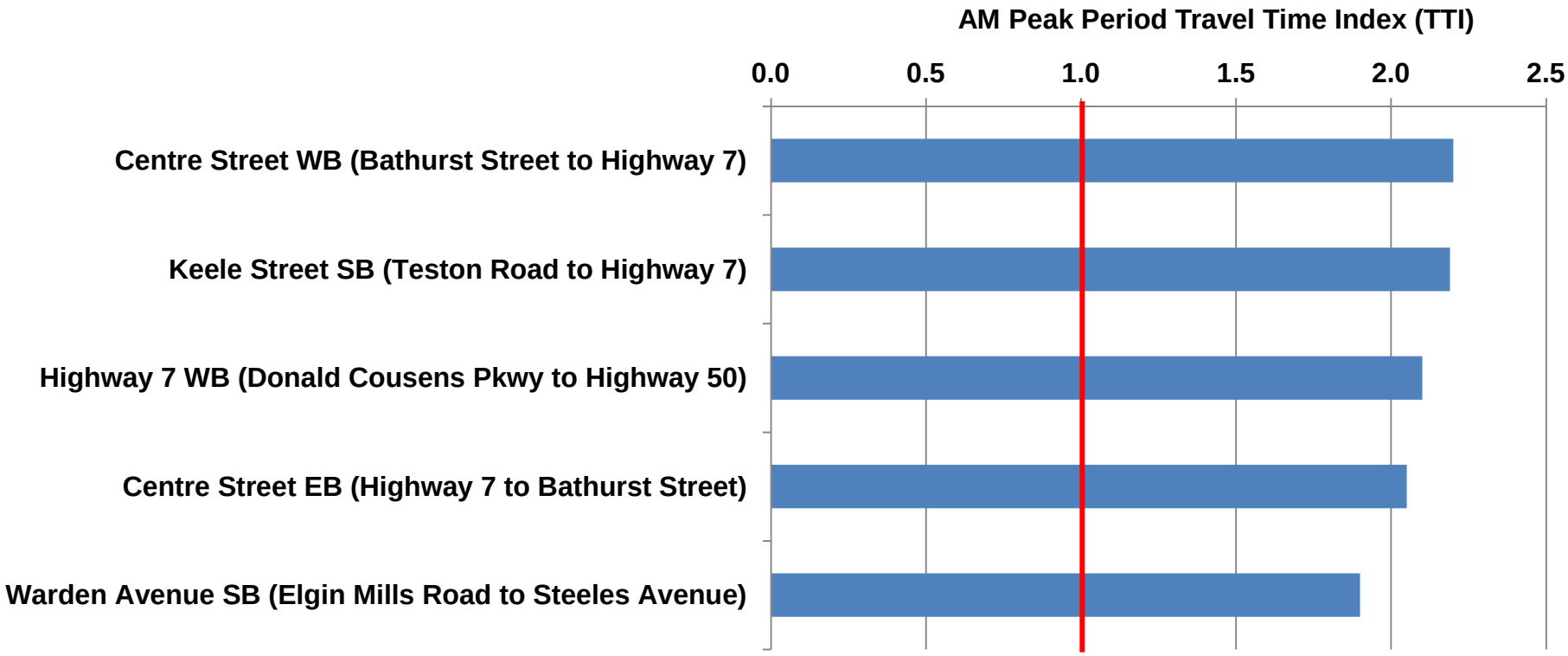
Agenda Item D.2.1:

It is recommended that:

1. The Regional Clerk circulate this report to the Clerks of the local municipalities and Ontario Ministry of Transportation

York Region

York Region Arterial Travel Time Indices – AM Peak Period

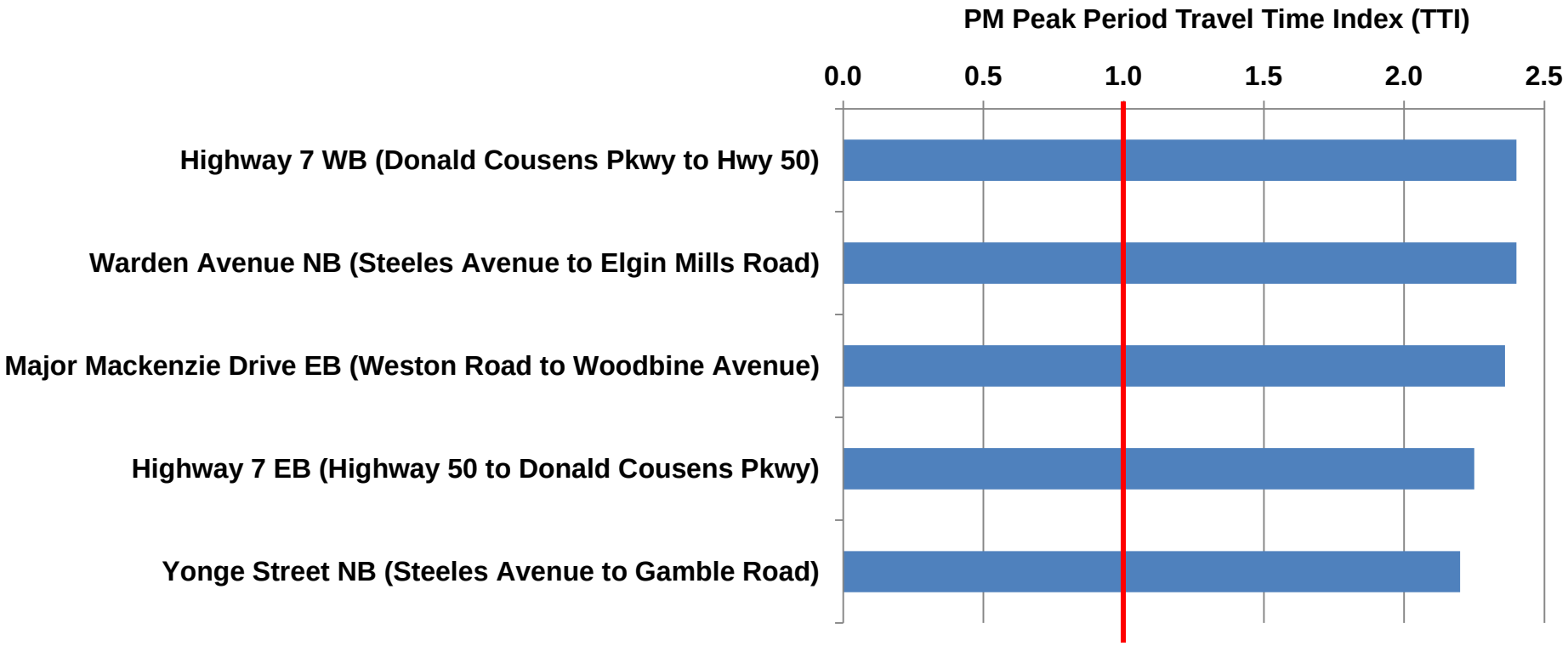


Top 5 corridors that require double the time to travel

- 9% of the arterials surveyed had a Travel Time Index greater than 2.0
- Centre Street WB has the highest Travel Time Index of 2.15

AM travel times are highly influenced by work and school trips

York Region Arterial Travel Time Indices – PM Peak Period

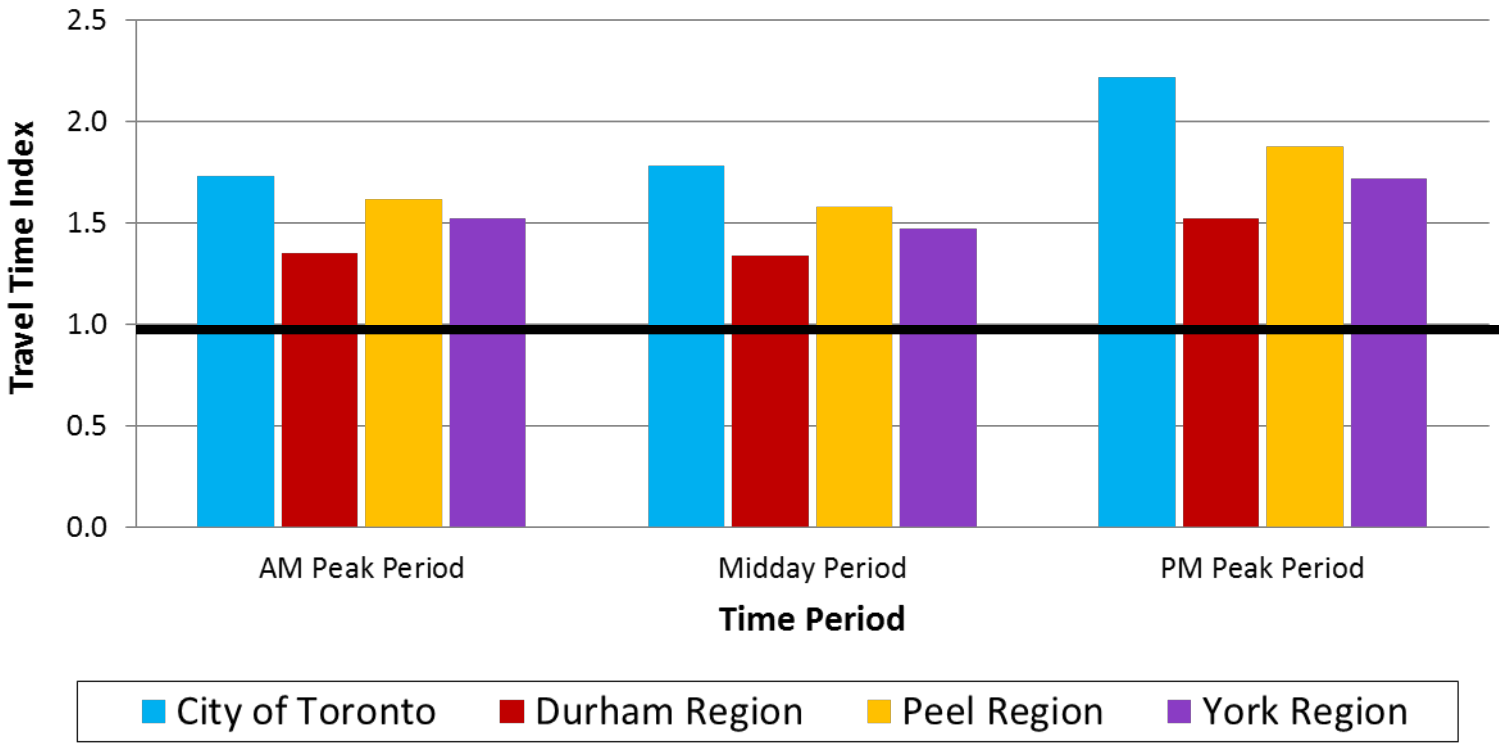


Top 5 corridors that require double the time to travel

- 25% of the arterials had a Travel Time Index greater than 2.0
- Highway 7 WB has the highest Travel Time Index of 2.44

PM travels times are higher because of discretionary and non-work trips

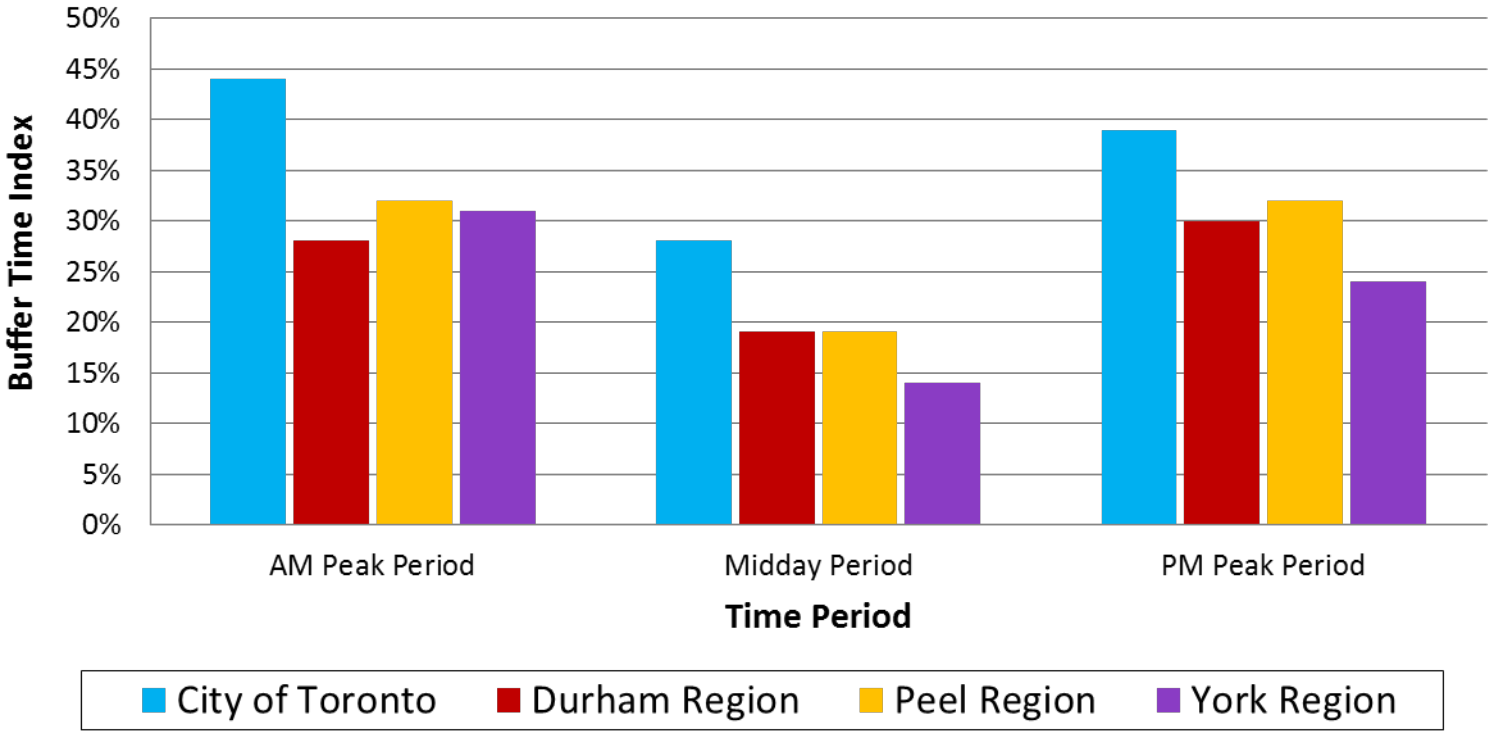
Aggregate TTI Values for Arterials by Jurisdiction



Note: This comparison is only based on the arterials that were surveyed as part of this Study for each municipality

- York Region arterials rank the second lowest by aggregate TTI in all three periods
- The TTI in the AM Peak and Midday period are similar, while the TTI is slightly higher in the PM Peak period

Aggregate BTI Values for Arterials by Jurisdiction



Note: This comparison is only based on the arterials that were surveyed as part of this Study for each municipality

- York Region arterials rank the lowest by aggregate BTI during the Midday and PM peak periods, but average higher BTI values than Durham Region in the AM peak period
- The BTI during the AM and PM Peak periods are noticeably higher than the Midday period

Methodology – Analysis

- Performance Measures to track congestion over time, based on travel time and speed data included:
  - Level of Service
  - Travel Time Index
  - Travel Delay