

<b>TO:</b>	<b>CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON JUNE 7, 2017</b>
<b>FROM:</b>	<b>KELLY SCHERR, P.ENG., MBA, FEC MANAGING DIRECTOR, ENVIRONMENTAL &amp; ENGINEERING SERVICES AND CITY ENGINEER</b>
<b>SUBJECT:</b>	<b>2016 RENEW LONDON INFRASTRUCTURE POST CONSTRUCTION OVERVIEW REPORT</b>

**RECOMMENDATION**

That, on the recommendation of the Managing Director, Environmental & Engineering Services and City Engineer, the following information report regarding the 2016 Renew London Infrastructure Post Construction Program **BE RECEIVED** for information.

**PREVIOUS REPORTS PERTINENT TO THIS MATTER**

Civic Works Committee – January 10, 2017. II, 7. [2017 Renew London Infrastructure Construction Program](#)

**2015-19 STRATEGIC PLAN**

The following report supports the Strategic Plan through the strategic focus areas of *Building a Sustainable City* and *Leading in Public Service* directly and indirectly as follows: Addressing the infrastructure gap, building robust infrastructure, enhancing safety for all road users in the city, and managing and improving our water, wastewater and stormwater infrastructure and services.

The 2016 Renew London program committed to delivering excellent customer service and providing great customer experiences to residents, business and visitors by communicating projects in advance and coordinating all work to help build and deliver efficient infrastructure and minimize delays and inconveniences to the public during construction.

**BACKGROUND**

**Purpose**

On January 10<sup>th</sup> 2017, a report was presented to the Civic Works Committee (CWC) with respect to the 2017 Renew London Infrastructure Program. At that time, the following direction was approved:

*The Civic Administration BE DIRECTED to report back to the Civic Works Committee with an overview of the various projects undertaken during the 2016 Renew London Infrastructure Construction Program, including the estimated and actual duration of the*

*projects, the budgeted and actual expenditures, along with any lessons learned that will be incorporated in designing, tendering or overseeing similar projects in the future; (2017 Renew London Infrastructure Construction Program, CWC Deferred Matters List No. 77).*

This report provides an overview and evaluation of the 2016 Renew London program, outlines lessons learned and identifies potential risks for the upcoming construction season.

## **Context**

The Environmental and Engineering Services Department, through the Construction Administration Office, is responsible for Renew London, which is the delivery of a sustainable infrastructure construction program through the provision of road, sewer, water, sidewalk, traffic signal and streetlight assets. Coordination from the various City Divisions takes place to ensure that construction is designed, managed, planned and sequenced in a manner that will minimize disruption to the public.

The program addresses existing lifecycle needs, system improvements, and growth related priorities. Construction Administration is responsible to provide onsite inspection where required and maintain oversight of City construction projects to ensure the projects are built in accordance with plans, specifications and City standards, completed on time, within set budget limits and following proper safety procedures.

The City of London's 2016 road construction season came to an end in December, with all City's projects successfully complete or on track to finish in 2017.

The 2016 construction season was very busy overall and the City was able to deliver on our commitment of building better roads for London residents and visitors. The completion of these significant projects are a large part of the City's ongoing commitment to



*Figure 1 - Sarnia Road*

provide safe, dependable, affordable and environmentally responsible services that help London's communities thrive and the City prosper. The roads belong to all Londoners, and the City makes it a priority to provide residents with infrastructure that will serve them for years to come.

Projects completed in 2016 included local infrastructure renewal in mature neighborhoods such as Old North, Old South and Old East, which had extensive work done underground and on roads, sidewalks, curbs, gutters and traffic lights. Major Infrastructure projects included Commissioners Road Improvements, Fanshawe Park Improvements, Sarnia Road Improvements, Florence Street Reconstruction and resurfacing on Veterans Memorial Parkway.

Work on most projects generally began back in May 2016, and even with a stretch of cold and snow in early October, the projects were all finished within days of their target completion dates, except two. The end result are complete streets that have water main and sewer infrastructure that is built for the future, and improved pavements and sidewalks. With the completion of the construction season, traffic flow has improved and the transportation system is able to more efficiently handle the movement of goods and people. All roadways were fully opened to traffic by December 2016. This spring, crews will return to most projects for touch up work, landscaping, surface asphalt where necessary and final site cleanup.

The Civic Administration uses a continuous improvement process in its capital works programs to minimize negative effects on the public and community during construction. While the investment in the renewal of the City's infrastructure helps address the City's significant infrastructure gap, provides longer term benefits and enhances the quality of life for residents, the construction activities have impacts in the short term. A coordinated approach that uses targeted, flexible phasing and extended work hours allows the City to improve services and complete the work in an efficient manner. The goal is to minimize the impact to residents, businesses and essential services while the work is being completed.

## DISCUSSION

### Overview of 2016 Projects

A number of large construction projects were identified to Council in March 2016 and scheduled for implementation in 2016. Figure 3 provides an overview of major projects that were projected to have an impact on traffic flows across the City noting extensive coordination was carried out at project and program levels to reduce these impacts.



*Figure 2 - South Street*

In addition to those projects, there were a number of other medium scale reconstruction / resurfacing projects to rehabilitate infrastructure throughout the City which had local impacts and required minor traffic detours.

In 2016, the City reconstructed 95 lane km of road, 21 km of sanitary and storm sewer, and 11.8 km of watermains. The City also relined approximately 7.5 km of watermain and 15 km of sewer using trenchless

technologies. These trenchless programs have allowed for significant capital avoidance and minimized social impact by avoiding open cut construction, which avoids the cost and social impact of open excavations.

All City projects are reviewed from a traffic and construction detour impact perspective. Some locations required road closures to complete the planned construction safely. Each closure included a detour to redirect traffic around the disturbed areas and permit the work to be completed in a timely manner. The planned detours were as short a route as possible while keeping traffic on a similar class of roadway and not directing

traffic through local streets. Notwithstanding the detour routes, residents did experience increased traffic volumes on some local roads near construction areas as drivers looked for other routes around the closures. In some cases, temporary neighborhood traffic calming measures were successfully implemented to mitigate this behavior. In addition, traffic signal changes were made to accommodate changes in traffic flows as a result of construction and planned detours in order to help reduce delays.

In 2016, three development projects (Southdale Southwest Community Center; Talbot High Rise; Fanshawe College Carling Street, formerly Kingsmills) had significant impacts to surrounding streets noting the projects were coordinated with nearby City projects to help mitigate traffic impacts to commuters and communities.

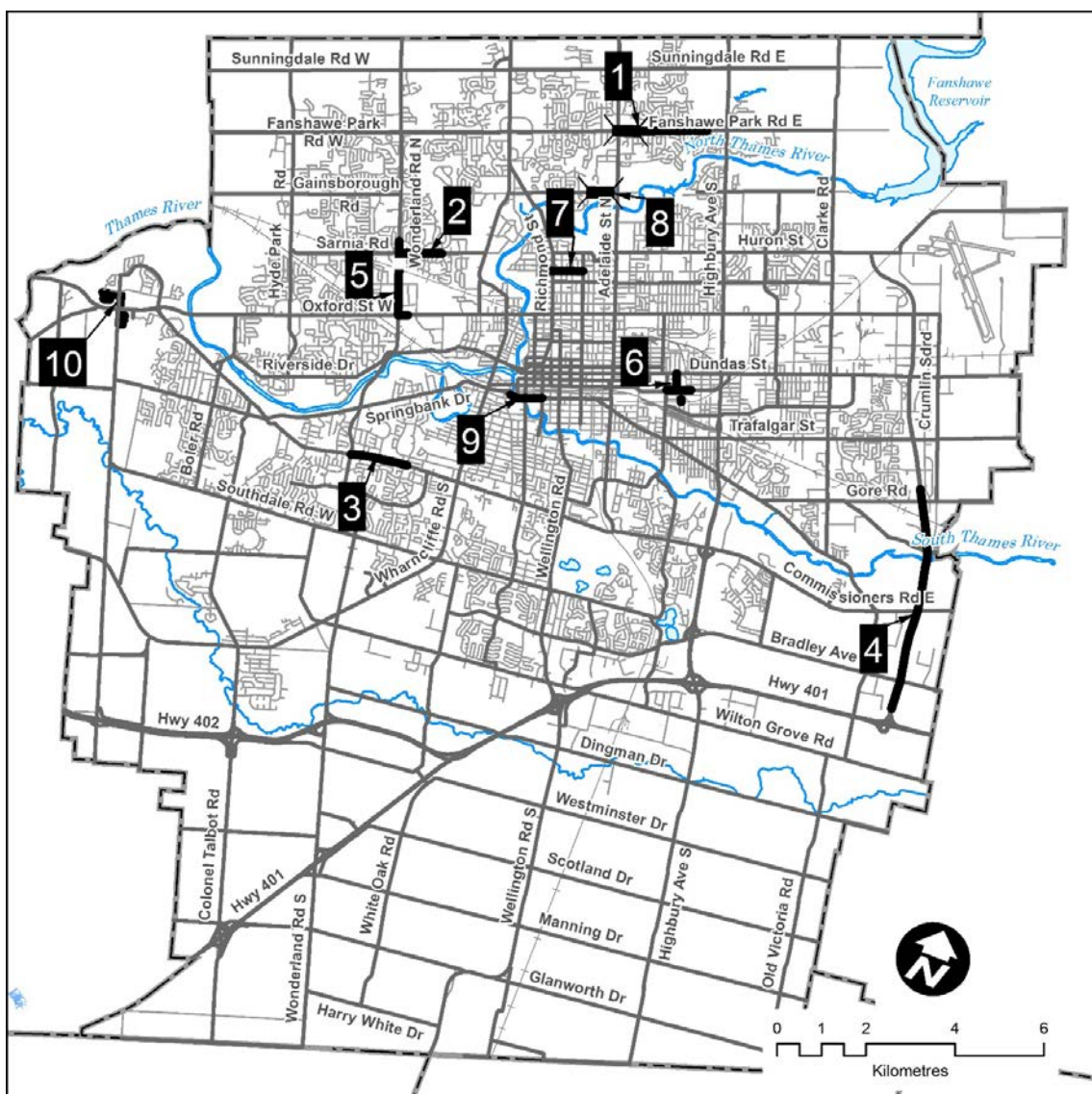


Figure 3 - Map of "Top 10 Projects" in 2016

For 2017, as in previous years, the goal is to reduce traffic disruption on City-led construction projects on the transportation network by taking effective and responsible action to coordinate all aspects of City projects in advance as much as possible. There are many other construction activities by third parties within the road that also impact the flow of traffic such as utility cuts for service repairs or new installations, street events and parades, and lane closures to support development projects. These activities are compounded by the hundreds of required maintenance and operational repairs (emergency and routine) to be undertaken on roadways by City Transportation, Water, Sewer and Forestry Operation teams annually.

Advanced cumulative planning allows the City to better respond to proposed and unplanned work and helps visualize the effects of all projects relative to others and promotes better definition of specifications around scheduling of our contracts. The Corporate goal is to ensure that construction is planned and sequenced in a manner that will minimize impacts on traffic and disruption to the public.

## **Communication Plan**

Every effort was made to ensure Londoners were aware of construction zones and traffic detours resulting from road work. Property owner letters were sent out in advance of construction and daily updates were provided through the City's website, [www.london.ca/roadwork](http://www.london.ca/roadwork) with information about road closures, and ongoing/upcoming projects on city streets. Working with the City's communication team, large scale closures and impacts were communicated to Londoners through Facebook and Twitter.

As part of the Municipal Council approved Service London Implementation Plan, 2016 was the first year of Customer Relationship Management (CRM) implementation as it relates to construction projects. The software captures all customer interactions and complaints and filters them back to Project Managers assigned to City construction projects. Construction Administration received and responded to over 700 calls in 2016. Program features will be enhanced in upcoming years which will make the interaction with our customers even better over time.

## **Budget and Schedule**

The City managed \$146 million in infrastructure construction project work in 2016. To-date about 80% has been paid on those projects with only one project that may potentially exceed budget due to unforeseen underground circumstances. In the worst case the project will exceed the budget by 10%. All other projects are nearing completion and are all within the approved contract value.

Construction contracts for the City of London are usually tendered based on a specified number of "working days" allowed to reach substantial completion. Rain days, Saturdays, Sundays and holidays do not count towards the working day count. Additional work and unforeseen conditions may increase the number of working days allowed within a contract. Liquidated damages (cost for lateness charges) are assessed against the contractor once the number of allowed working days has been exceeded.

In response to City projects delayed in the past, liquidated damage penalties were increased a couple of years ago from \$500/working day (\$2,500/week) to \$1000/calendar day (\$7,000/week) plus administrative costs for a typical project. This basis for the increase was a key recommendation arising from a PWC audit of best practices. These liquidated damages are increased even higher for major projects.

In 2016, the Florence Street and McCormick Street projects encountered scheduling challenges associated with their underground trenchless work. These projects were completed later than originally anticipated, however these changes to the schedule were due to unforeseen challenges that could not have been anticipated by the contractor, consultant, or the City. In both of these cases, the City did not have a contractual basis to charge the contractor liquidated damages.

The majority of 2016 reconstruction projects have surface works (top coat of pavement, landscaping) to be completed in 2017. All project are currently within their contractually allotted number of working days. A summary of project statistics related to project working time frames and costs are included in Appendix A.

## **Lessons Learned From 2016 Construction Season**

### Specialized Construction Methods

In order to overcome technical challenges and to minimize disruption to the public, projects often employ specialized sub-contractors to perform certain aspects of the work, such as trenchless work around railway tracks. Consideration on future projects will be given to awarding higher risk specialized work as a separate contract. Allowing for a separate contract will minimize the trickle-down schedule and budget impacts that can occur when a specialized sub-contractor's work is delayed.



*Figure 4 - Campbell St.*

### Construction Impact To Trees

The protection of trees always plays a crucial role in any City construction project. Specialized construction methods, such as trenchless technologies, are employed wherever reasonable in order to minimize the disturbance to trees. The City requires

that all contractors follow a rigorous tree protection plan to ensure damage to trees is minimized during construction. While City staff and their consultants diligently monitor the contractor's use of tree protection strategies, damage can still occur. Contractors who damage trees are financially penalized through the City contract. In 2016, one contractor was fined for damage to trees on Queenston Crescent.

This past fall during a City presentation to the London District Heavy Construction Association, all attendees were reminded of the importance of tree protection and the fines associated with damaging trees.

The City's Construction Administration group also presented an overview of London's tree protection policies and procedures to the Trees and Forests Advisory Committee in the fall of 2016. Ongoing education is essential and the City will take every opportunity to remind the construction industry of the importance of tree protection and best practices surrounding tree protection.

## Tree Protection Strategy – Construction Impact Mitigation



Figure 5 - City of London EESD Tree Protection Strategy

### Road Closures And Pedestrian Access

The City strives to minimize the disruption to the public during construction and maintain access to the maximum extent possible. There are however times when road closures are necessary for the safety of the contractor and the public. Road closures allow the contractor to expedite their work, shortening the duration of their work. Road closures will continue to be evaluated moving forward in order to ensure the safety of the public and minimize the duration of social impacts due to construction.

Moving pedestrians safely and efficiently through and around construction sites remains a priority noting in some cases, sidewalks need to be closed for safety and other construction related reasons. Challenges were noted with access and housekeeping around bus stops on arterial roads. Safeguarding corridors near schools and heavy pedestrian sites to ensure access is important along with keeping these locations clean and free of dangerous material.

## Construction Hours And Night Work

City of London construction projects are exempt from the City's noise by-law. Generally speaking, most of our work is completed during the day (7 am to 6 pm). In some rare cases, the City does allow for 24 hour construction (where operations are required to be continuous).

Line painting on road construction projects is always always done exclusively at night. In addition a number of City Construction projects incorporate more significant night and/or weekend work, primarily on major arterial roadways. The following projects in 2016 included night time work:

- Arterial Road Contract
- Burbrook Trunk Sewer
- Commissioners Road
- Fanshawe Park Road
- Huron Street Watermain Crossing
- Mill & Overlay Contract
- Sarnia Road
- Sewer Lining Contract

Night time construction is an appropriate way to mitigate traffic impacts on these arterials as this is the time when traffic volume is typically at its lowest point. There are, however, a number of drawbacks to night time construction associated with local community impacts.

Night time construction can cause significant noise disturbances to surrounding residential areas and introduce additional lighting and traffic controls. There are also health and safety issues related to construction when the work involves underground utilities.

Ultimately, the City does look to incorporate night time work if necessary, but the goal remains to continue to find better ways to improve traffic flow through work zones during the day (e.g., through public information campaigns, better signage, etc.) as this would decrease the pressure on contractors to perform work at night. While 24-hour work may be considered on future projects, significant analysis will be required to prove its effectiveness over daytime work.





*Figure 6 - Commissioners Road*

The City does receive complaints about absent work zones and lack of construction activity. While it may appear at times that little work is being completed, scheduling may be required by the contractor to ensure all work is completed in a coordinated fashion given the complexity of the work, number of subcontractors and other external utility providers. The required work must be completed in the proper sequence and must be finished prior to lane shifts, starting another phase or moving on to the next critical path operation.

Contractors are governed by their collective agreement and a contractor's work week is limited to 50 hours from Monday to Friday. Unless specified in the contract most contractors will stay within these limits to avoid paying time and a half past 50 hours. A contractor's workday usually starts at 7:00 am and ends at 6:00 pm with a half hour lunch. This represents 10.5 hours per day but this might increase depending on the operation being completed. Based on this the 50 hours is usually achieved by 3:00 pm or earlier on Friday.

#### Evaluation of Contractors

Contractors that perform projects administered by the Construction Administration department all go through an evaluation process that is supported by the City's Procurement of Goods and Services Policy. During the course of their project contractors are assigned a final grade upon completion of their project. Based on their score contractors are then grouped into one of three categories;

1. Acceptable - no action
2. Probationary - be put on a development program for the following year's construction projects
3. Banned - no bidding on future work for up to three years

These evaluations take into account a number of metrics such as contractor interaction with the public, schedule, and quality of work, to name a few. This process is enforceable and is in an ongoing state of improvement with continual feedback from City staff, consultants and the construction industry.

The evaluation is a tool to be used to encourage contractors to improve their performance and will be used consistently across all City of London divisions to assess performance and when considering a contractor's eligibility for future awards. A summary of contractor evaluations done in 2016 shows that all contractors performed at an acceptable level.

<b>CONTRACTOR EVALUATIONS 2016</b>	
Acceptable Range	100%
Probationary Range	0%
Banned (up to 3 years)	0%

### Asphalt And Road Construction Oversight

In response to the Auditor General's report last November *Road Infrastructure Construction Contract Awarding and Oversight*, on February 17, 2017, the Minister of Transportation provided a statement on Improving Road Construction and Oversight on Ontario Roads. In reviewing this report there are a number of important points to note as it relates to the City of London's practices about asphalt paving:

1. Our specifications are more stringent than the provincial standard on a number of key metrics, noting a new City asphalt standard specification was implemented for the 2016 construction season.
  - a. The new specification corrected minor errors in previous versions and better aligns with the Ontario Provincial Standards ("OPS"), however remains more stringent in terms of tolerances on air voids and asphalt cement content.
  - b. The new specification provides clearer definitions of consequences when asphalt quality requirements are not met and provides more guidance for Contract Administrators regarding sampling frequency and collection of referee samples up front.
2. The City applies financial penalties for asphalt that does not meet our specifications.
3. The City does not provide an incentive pay for asphalt that meets specifications.
4. The geotechnical consultant hired by the City maintains care and control of all asphalt samples taken for testing.
5. Contractors are evaluated based on the performance of their sub-contractors and the quality of their asphalt.



*Figure 7 - Commissioners Road*

The City of London has taken steps for both immediate and long-term benefits to road integrity and have implemented a strong plan to strengthen asphalt requirements that ensures value for money, enhances oversight and improves asphalt pavement quality for London's roads.

The following 2016 projects had failed asphalt tests where financial penalties were assigned to the contractor (\$210,000) and/or the contractor was required to replace the deficient asphalt at their own cost:

- Arterial Road Contract
- Commissioners Road
- Mill and Overlay Contract
- Queenston Avenue
- Raywood, Bond, Alexandria, Lincoln
- Sarnia Road
- Veterans Memorial Parkway

#### Customer Satisfaction Surveys

Each year, the City sends out a survey for a number of randomly chosen construction projects to collect feedback from the residents and businesses about how they were impacted. The feedback in 2016 was generally positive with survey respondents expressing appreciation for the communication before the project starts and the professionalism and customer service of all the staff, consultants, and contractors involved in the projects.

The most typical comments on how the City can improve are to decrease the duration of the projects and improve communication during construction related to unexpected localized impacts.

By comparison, the 2015 average rating of 3.89 increased to 4.11 out of 5 in 2016. Overall the rating is good and it will be challenging to improve it significantly. Figure 8 shows the benefits of these surveys as part of a continuous improvement program.

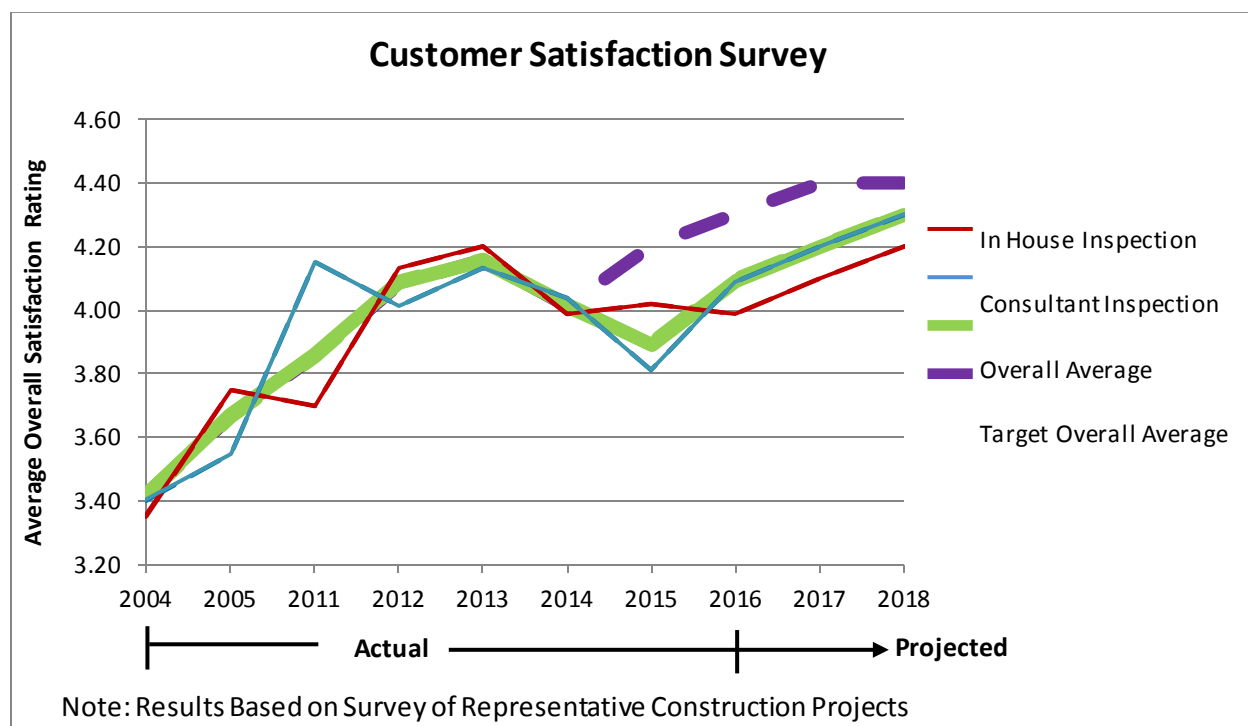


Figure 8 - Customer Survey Results (2004 - 2016)

### Early Tender Calls

Over the past several years, the City has made it a top priority to implement early tender calls noting the clear benefits it provides to taxpayers by reducing the overall price of a project. Early tender calls refer to tenders that are announced in the first quarter of a calendar year with most starting in the second quarter. Early tender calls provide clear and tangible benefit for both the City and the contractor by allowing proper planning for the upcoming construction season and eliminating inefficiencies in the delivery of projects. The process of releasing tenders in the winter months of the year and in a sequenced, methodical manner provides for financial clarity for both the contractor and the City, delivering exceptional final product to the public and leads to best value tender results.

Early tender calls maximize the already limited construction season in London and helps avoid delays due to the lag between tender and actual start of construction, especially when considering the other administrative tasks that must be performed prior to construction starting, such as contract signing and preconstruction meetings.

Tenders not released early can be impeded by the local capacity to build, which can push the completion of construction jobs to late fall / early winter. This has the potential to jeopardize the quality of work and increase costs. Early tender calls also creates many positive outcomes such as providing the City the flexibility to tender the other projects that have shorter schedules over the summer months. It should be noted that projects with external funding (PTIF and CWWF) are subject to funding approvals and completion deadlines which may impact project costs.

### Risks For The 2017 Construction Season

There are several risks for the upcoming construction season that may impact project budgets and schedule. The noted risks are as follows;

1. 2016 was an exceptionally inexpensive year for asphalt cement, however 2017 is likely to see an increase in these costs. It should be noted that due to the falling prices of asphalt cement in 2016, the City saved over \$600,000; however, a rebound should be expected in 2017.
2. In 2017 the federal government implemented a new carbon tax. This tax may impact the cost of all construction operations as increasing costs to the contractor will be passed on to the City.
3. Due to a number of government funding initiatives across the province (Public Transit Infrastructure Fund (PTIF) and the Clean Water and Wastewater Fund (CWWF)), both London and the rest of Ontario is experiencing an increase in the amount of work for 2017. This has put a strain on contractor resources in the London area and will cause an increase in the cost of work. Early tender calls have helped alleviate this, noting that most to all municipalities are in the same situation. It will become difficult to predict budget impacts, contractor availability and project schedules as the tender period and construction season unfolds.
4. Delayed approval of these programs is inhibiting the City's ability to tender these projects early and may create challenges completing projects within the construction season and before eligible cost deadlines. For projects not tendered early and involving significant work, costs associated with year-end completion tasks may increase due to shortages of subcontractors and schedule delays.
5. During this increase in construction volume of work on London roads, it is especially important to reduce potential impacts of construction on businesses, pedestrians and commuters. The City will continue to protect businesses by communicating in advance and working with the business owners to mitigate construction impacts based on their operations through such initiatives as providing signage on construction sites indicating that business are open during construction.

## **CONCLUSION**

Overall, 2016 was a successful construction season with the reconstruction of 95 km of road, 21 km of sanitary and storm sewer, and 11.8 km of watermains. The City managed portfolio of Council approved projects totalled about \$146 M which is about 80% spent. The remaining 2016 contract work is expected to be completed in 2017 and within approved contract values and their their contractually allotted number of working days.

Since the completion of the 2016 construction season, levels of service and safety have been improved for pedestrians, cyclists, transit users and automobile users. Traffic flow has moved more efficiently and roads are better able to handle the large volume of vehicles using the Cities transportation network.

Lessons learned from 2016 include:

- Consideration given to awarding specialized subcontractor work as a separate contract.
- Ongoing education is essential to mitigate construction impacts on trees including a reinforcement message to the construction industry on the importance of tree protection.
- Road closures should continue to be considered to make projects safer and to expedite contractors work in some cases.
- Nighttime work on arterial roads may be an appropriate way to mitigate traffic impacts during the day.
- Contractor performance evaluations are a good tool to encourage contractors to improve their performance.
- Continue to stay current on best practices related to asphalt specifications and ministry standards to ensure proper oversight.
- Consider methods to address the public's stated interest in improving duration of projects and communication related to unexpected events on a project.
- Continue with early tender calls to provide clear and tangible benefits for both the contractor and the City through proper planning for the upcoming construction season and eliminating inefficiencies in the delivery of projects.

There are several risks associated with the 2017 construction season that may impact project budgets and schedule, such as expected increases to Asphalt cement cost and the introduction of the new carbon tax. Due to a number of new government funding initiatives, there may not be adequate contractor resources to deliver the infrastructure program which will also cause an increase in the cost of work. Delays in program approvals may also reduce the ability to complete projects on time.

Lessons learned from 2016 projects and anticipated risks associated with the 2017 construction season have been communicated to Project Managers to support design and future project planning.

Lessons learned, strategies that may be adapted and procedures that can be improved have been identified and will be applied to 2017 construction projects where possible. Under a continuous improvement program, the public opinion on City construction projects has risen since post construction surveys were started in 2004. Opportunities for the collection and utilization of lessons learned have been in all phases of a project life cycle. The early integration of construction knowledge into all phases of a project can be improved by effective use of lessons learned as well.



*Figure 9 – Stoney Creek Bridge*

**ACKNOWLEDGEMENTS:**

This report was prepared by Ugo DeCandido, P.Eng. and Brian Nourse, P.Eng., of the Construction Administration Division, and reviewed by staff in Water Engineering, Wastewater and Drainage Engineering, Stormwater Management, Wastewater Treatment Operations, Roadway Lighting and Traffic Control, and Transportation Planning and Design service areas.

<b>PREPARED BY:</b>	<b>REVIEWED &amp; CONCURRED BY:</b>
<b>UGO DECANDIDO, P. ENG. DIVISION MANAGER, CONSTRUCTION ADMINISTRATION</b>	<b>SCOTT MATHERS, P. ENG. DIRECTOR, WATER AND WASTEWATER</b>
<b>REVIEWED &amp; CONCURRED BY:</b>	<b>RECOMMENDED BY:</b>
<b>EDWARD SOLDI, P. ENG. DIRECTOR, ROADS AND TRANSPORTATION</b>	<b>KELLY SCHERR, P.ENG., MBA, FEC MANAGING DIRECTOR, ENVIRONMENTAL &amp; ENGINEERING SERVICES &amp; CITY ENGINEER</b>

O:\2017 Projects\CWC reports\CWC report Jan 10 17 - Renew London Report\2016 Construction Overview CW Mar 2017\April 11 - 17 CW 2016 Construction Overview Report FINAL.docx

Attached: Appendix "A" – 2016 Project Summary

**Appendix "A" – 2016 Project Summary**

<b>PROJECT</b>	<b>% OF CONTRACTUALLY SPECIFIED TIME USED</b>	<b>WORK IN 2017?</b>	<b>PROJECT BUDGET</b>	<b>PAID AS OF MAR. 31, 2017</b>	<b>% UTILITIZED</b>
Annual Road Reconstruction Program	98%	Y	\$4,789,791	\$3,691,549	77%
Arterial Road - Contract 1	98%	Y	\$5,587,000	\$4,429,187	79%
Arterial Road - Contract 2	98%	Y	\$1,641,797	\$1,491,043	91%
Arterial Road - Contract 3	98%	Y	\$1,137,471	\$1,106,698	97%
Ashland	90%	Y	\$2,242,538	\$1,347,771	60%
Burbrook Trunk Sewer	100%	N	\$9,521,970	\$9,470,000	99%
Campbell	66%	Y	\$3,206,842	\$2,901,026	90%
Commissioners (Phs. 1 and 2)	99%	Y	\$12,900,924	\$12,551,371	97%
Dalmagarry Traffic Signals.	90%	Y	\$203,847	\$10,012	5%
Dingman Creek Muncipal Drain	100%	N	\$142,464	\$112,218	79%
Eastgate, Perkins	78%	Y	\$1,049,411	\$810,272	77%
Fanshawe Noise Wall	84%		\$191,130	\$158,333	83%
Fanshawe Park	94%	Y	\$12,584,810	\$10,051,405	80%

Florence/ Kellogg	95%	Y	\$4,883,887	\$4,274,662	88%
Huron Street Watermain Crossing	95%	Y	\$2,047,910	\$1,800,787	88%
Iroquois	98%	Y	\$2,359,217	\$2,018,545	86%
Landfill W21A	98%	Y	\$2,950,335	\$2,531,179	86%
Landor	88%	Y	\$3,000,845	\$2,257,037	75%
Mccormick	90%	Y	\$3,075,067	\$2,583,280	84%
Mill and Overlay	100%	N	\$895,488	\$858,733	96%
Queenston	97%	Y	\$1,145,645	\$987,877	86%
Raywood, Bond, Lincoln, Alexandra	95%	Y	\$2,495,710	\$1,985,772	80%
Ridgewood	89%	Y	\$1,985,049	\$1,608,993	81%
Sarnia	92%	Y	\$8,090,525	\$7,841,344	97%
Sewer Lining	100%	N	\$3,968,640	\$3,702,624	93%
Single Sewer Replacement	56%		\$1,151,558	\$821,303	71%
Sumner/ Vermont	94%	Y	\$1,823,448	\$1,311,799	72%
Traffic Signal Rebuild - Cheapside, Queen	90%	Y	\$345,456	\$81,513	24%
Traffic Signal Rebuild - Grand Wellington	100%	N	\$392,817	\$355,421	90%
Traffic Signal Rebuild - Hamilton	100%	N	\$255,856	\$248,237	97%
Veterans Memorial Parkway	98%	Y	\$6,098,477	\$5,410,942	89%
Victoria	98%	Y	\$4,471,895	\$3,792,629	85%
Warranted Sidewalk - City	100%	N	\$427,796	\$387,592	91%
Warranted Sidewalk - Col Talbot	100%	N	\$54,559	\$51,273	94%
Waterloo, South, Hill	92%	Y	\$4,327,421	\$3,526,417	81%
Watermain Lining	100%	N	\$5,836,299	\$5,666,234	97%
West London Dykes Construction	90%	Y	\$1,831,680	\$1,610,343	88%
Wickerson Swm Facility	90%	Y	\$1,783,179	\$1,279,591	72%
William, Wellington	95%	Y	\$1,809,354	\$1,415,232	78%
Windermere Bridge	100%	N	\$989,778	\$844,762	85%

Final project costs will be determined upon payment of invoices received after completion of 2017 outstanding works and warranty periods.