




**CITY OF HAMILTON**  
**PUBLIC WORKS DEPARTMENT**  
**Transportation Operations and Maintenance Division**

<b>TO:</b>	Chair and Members Public Works Committee
<b>COMMITTEE DATE:</b>	October 5, 2020
<b>SUBJECT/REPORT NO:</b>	Street Lighting Level of Service (PW07024(a)) (City Wide)
<b>WARD(S) AFFECTED:</b>	City Wide
<b>PREPARED BY:</b>	Peter Locs (905) 546-2424 Ext. 6015 Mike Field (905) 546-2424 Ext. 4576
<b>SUBMITTED BY:</b>  <b>SIGNATURE:</b>	Edward Soldo Director, Transportation Operations & Maintenance Public Works Department  

## RECOMMENDATIONS

That the revised street lighting maintenance level of service attached as Appendix "A" to Report PW07024(a) be approved.

## EXECUTIVE SUMMARY

Street lighting maintenance service levels were introduced in March of 2007 when Council approved Report PW07024, attached to Report PW07024(a) as Appendix "B", referred as 'Streetlighting Maintenance Standards. The service levels were introduced in response to the need for improved street lighting system reliability and to establish a level of response for residents when reporting a street light outage.

Subsequent to the above noted changes the reliability of the street lighting system improved dramatically. In 2008, the City reactively repaired 9,200 street lights compared to 1,300 in 2019, a reduction of 86 percent in the annual volume of repairs.

A key driver in the improved reliability of the street lighting system was the replacement of aged luminaires, which were completed as part of the High-Pressure Sodium (HPS) to Light Emitting Diode (LED) conversions as 40,000 of the 45,000 street lights in the City have been converted.

---

OUR Vision: To be the best place to raise a child and age successfully.

OUR Mission: To provide high quality cost conscious public services that contribute to a healthy, safe and prosperous community, in a sustainable manner.

OUR Culture: Collective Ownership, Steadfast Integrity, Courageous Change, Sensational Service, Engaged Empowered Employees.

As a result of the increased reliability, the street lighting maintenance level of service was reviewed and determined that it would be beneficial to revise them to better suit the status and needs of the current system. The level of service exceeds, in most instances, Ontario Regulation 239/02 - Minimum Maintenance Standards for Municipal Highways - made under the Municipal Act, 2001 (MMS). The existing level of service also contained some gaps which will be resolved by the new proposed level of service revisions.

The proposed street lighting maintenance level of service, attached to Report PW07024(a) as Appendix “A”, has little to no perceived impacts to the efficiency of the street lighting system’s overall operation and reliability.

### **Alternatives for Consideration – See Page 7**

### **FINANCIAL – STAFFING – LEGAL IMPLICATIONS**

Financial/Staffing/Legal: N/A

### **HISTORICAL BACKGROUND**

In March of 2007, City Council approved Report PW07024 which initiated several changes to the City’s street lighting maintenance program recognizing the need for increased internal oversight and resourcing to improve overall system operation and reliability. Changes included increasing internal staff compliment, reduction in the annual operating budget, establishing a level of service (attached to Report PW07024(a) as Appendix “B”) and proceeding with contracted maintenance services, replacing a long-standing maintenance arrangement with the local hydro utility (Hamilton Hydro).

In 2010, Transportation Operations & Maintenance standardized on the use of light-emitting diode (LED) street lighting technology. Between 2015 and 2018, the majority of street lights City-wide were retrofitted and modernized with LED technology. LED street lights use less energy, require reduced maintenance and are more reliable when compared to previous legacy technologies.

### **POLICY IMPLICATIONS AND LEGISLATED REQUIREMENTS**

Street lighting maintenance standards (levels of service) were established via the approval of Report PW07024 in 2007. Approval of the recommendation in Report PW07024(a) will replace the previously approved levels of service.

## **RELEVANT CONSULTATION**

The following key stakeholders have been consulted with respect to the development and content of this report:

- Legal and Risk Management Services

## **ANALYSIS AND RATIONALE FOR RECOMMENDATIONS**

Street lighting maintenance levels of service, attached to Report PW07024(a) as Appendix “B”, were established in 2007 via the approval of Report PW07024. The levels of service were put in place to ensure that the City’s street lighting system was being maintained appropriately and reliably. It also provided operational expectations, response and repair timelines to Council and residents when issues, such as burnt out street lights, were identified.

Following the approval of the level of service in 2007, the City’s street lighting system’s operational performance improved considerably. Between 2007 and 2013 resident reported burnt out street lights decreased by 63% and burnt out street lights identified by night patrol decreased by 85%.

Further improvements to the system’s operation and reliability were realized as a result of the adoption of LED technology and recent large-scale street lighting replacements of legacy High Pressure Sodium (HPS) lighting technology with LED. As a result of the LED conversion, between 2015 and 2019 resident reported burnt out street lights decreased by 53% and burnt out street lights identified by night patrol decreased by 68%. Forty thousand (40,000) of the City’s forty-five thousand (45,000) street lights are LED; the remaining five thousand (5,000) street lights are comprised of mostly decorative styles and a retrofit business case is being developed for future consideration.

In total between 2007 and 2019, resident reported burnt out street lights have decreased by 76% and burnt out street lights identified by night patrol have decreased by 91%. This demonstrates that efforts to date have significantly improved the performance and reliability of the City’s street lighting system.

Since changing to LED technology, annual electricity costs have been reduced by \$1,870,000 (\$5,330,000 in 2014 compared to \$3,460,000 in 2019). Annual group re-lamping capital costs (proactive mass replacement of lamps) of approximately \$300,000 have been eliminated as this maintenance activity is no longer required. As a result of the reduction in the quantity of burnt out street lights, funds that were traditionally used for repairs were leveraged to replace approximately 350 concrete street light poles that

needed replacement due to condition issues. The 2021 operating budget will be further reduced by \$180,00 in recognition of additional maintenance cost savings. The adoption of LED street lighting has resulted in significant savings in excess of \$2,350,000 annually. These savings have been realized by the City via equivalent capital and operating budget reductions.

The 2007 street lighting level of service was developed to address the maintenance needs of legacy technology which are different and more intensive than LED technology and therefore is outdated.

Taking the adoption of LED technology and improvements in reliability of the street lighting system into consideration, Transportation Operations & Maintenance reviewed the previous level of service and updated it to better attend to current needs. The previous and proposed level of service were reviewed against the MMS to ensure overall compliance. Gaps in the previous level of service were addressed so that the updated level of service is comprehensive. The revised recommended street lighting maintenance level of service is attached to Report PW07024(a) as Appendix “A”.

The following summarizes the proposed level of service revisions:

<b>Non-functioning Luminaires: Public or Staff Identified</b>	
Existing:	Proposed:
Respond within five (5) working days and complete repairs on first maintenance visit 95% of the time.	Repairs completed within seven (7) calendar days.

#### Rationale for Change:

The proposed revisions are minor and will facilitate improved reporting on metrics and eliminate confusion surrounding the implications due to weekends and holidays relating to response times. There are no perceived service level impacts due to this proposed change.

<b>Patrol Frequency</b>	
Existing:	Proposed:
Full City night patrol to identify burnt-out lights conducted twelve (12) times per year, once per month, and full City day patrol to identify lights stuck on, conducted two (2) times per year.	Night patrol to identify non-functioning luminaires to be completed on a monthly basis to the following frequency: 1. Four (4) times per calendar year on all Class 1 and 2 roadways; and 2. Two (2) times per calendar year on all Class 3 through 6 roadways.

---

OUR Vision: To be the best place to raise a child and age successfully.

OUR Mission: To provide high quality cost conscious public services that contribute to a healthy, safe and prosperous community, in a sustainable manner.

OUR Culture: Collective Ownership, Steadfast Integrity, Courageous Change, Sensational Service, Engaged Empowered Employees.

**Rationale for Change:**

MMS requires municipalities to inspect all street lights for proper operation once per calendar year. The City presently inspects all street lights 12 times more frequently (once per month, or 12 times per year) than the required standard. The original rationale which supported this enhanced level of service was to improve the street lighting system's reliability. Presently, night patrols on average identify 91% fewer light deficiencies than when the service level was originally introduced in 2007. With the change to LED technology and reliability/performance improvements, the enhanced level of night patrol inspection (12 times per year) has yielded less benefit for the resource and cost required to complete the task.

Night patrol inspections are targeted at luminaire operation. However, other components of the street lighting system which require inspection and maintenance do not benefit from the night inspections such as arms, poles and power distribution equipment. Transportation Operations & Maintenance recommend reducing night patrol frequency to focus resources on other aspects of the system while maintaining the same objective of sustainable system reliability and longevity. It is not recommended to reduce the level of service to the minimum required level set by the MMS of one inspection per year as the overall system performance could suffer.

Statistics of light outs reported by the public show that within residential neighbourhoods, street lighting deficiencies are actively reported by the public while street lighting deficiencies on major arterials remain unreported more consistently. Where street lighting deficiencies are not reported by the public, the night patrol inspection identifies the deficiency leading to the repair of the street light. To support system performance on major arterial roads, it is recommended that a more frequent level of inspection on arterial roads would be beneficial.

By inspecting major arterials quarterly, and residential neighbourhoods bi-annually the level of inspection remains two to four times higher than what is required by MMS.

Day patrols to identify lights stuck on have proven ineffective in practice with limited benefit to system reliability. Each street light is controlled by a photocell, or light sensor, which, when operating normally, will keep the street light off during the hours of daylight. As photocells age they operate less consistently sometimes turning street lights on during the day. As part of the LED conversions, 88% of the aged photocells have recently been replaced reducing this type of deficiency from occurring. It also should be noted that where a street light is stuck on during the day, it will continue to operate during the night as intended as the light sensors 'fail on'. The MMS does not require any inspections of street lights during the day. It is recommended to discontinue day patrols.

While the night patrol frequency will be reduced, there are no perceived service level impacts due to this proposed change as new LED street lights are more reliable and longer lasting.

<b>Non-functioning Luminaires: Patrol Identified</b>	
Existing:	Proposed:
Burnt-out lights found during patrol repaired within two (2) weeks of the end of the patrol cycle. Identify 100% of burnt-out lights and minimum 50% of cycling lights on first patrol.	Repairs completed within 14 calendar days of the completion of the monthly patrol cycle.

**Rationale for Change:**

The proposed revisions are minor and will facilitate improved reporting on metrics and eliminate confusion surrounding the implications due to weekends and holidays related to response times. There are no perceived level of service impacts due to this proposed change.

<b>Locates</b>	
Existing:	Proposed:
Emergency locates completed within two (2) hours of notification. Priority locates completed within the timeframe defined by Ontario One-Call (1-5 days). Regular locates completed within five (5) working days of notification.	Delete part 'D. Locates'.

**Rationale for Change:**

Locating underground street lighting infrastructure is legislated by the Ontario Underground Infrastructure Notification System Act, 2012 (Bill 8). The City's existing level of service duplicates the language of the legislation and is therefore redundant and not required. There are no perceived level of service impacts due to this proposed change.

<b>Non-functioning Luminaires: Consecutive Outage (new addition)</b>
Proposed:
Where 3 or more lights in a row, or 30% or more luminaires on one-kilometre of roadway, are identified as non-functioning, repairs completed as soon as practicable, up to a maximum of 7 calendar days on all Class 1

**SUBJECT: Street Lighting Level of Service (PW07024(a)) (City Wide)**  
**– Page 7 of 8**

---

or Class 2 roadways, or up to a maximum of 14 calendar days on all Class 3 through 6 roadways.
--

**Rationale for Change:**

The proposed standard fills a gap between the existing level of service and what is required by MMS. Where these conditions above are identified, the City is obligated to resolve the issue within 7 or 14 days depending on the class of highway as per MMS. In practice staff strive to resolve issues of this scale as soon as possible. This proposed standard identifies the approach of staff and the maximum allowable time permitted through MMS.

Non-functioning Luminaires: Lincoln M. Alexander Parkways and Red Hill Valley Parkway (new addition)
Proposed:
Where 50% or more lights are identified as non-functioning on one-kilometre of roadway on the Lincoln Alexander Parkway or the Red Hill Valley Parkway, complete repairs as soon as practicable.

**Rationale for Change:**

The proposed standard is a requirement of MMS. The proposed standard identifies how it applies within the City of Hamilton.

**ALTERNATIVES FOR CONSIDERATION**

Council may choose to reduce the level of service for the repair of street lights and night inspection to what is required by the MMS. This is not recommended as in all cases the revised services levels recommended are higher than what is required by the MMS and necessary to sustain high system reliability. Reducing the service levels to the MMS would result in increased light outages with poorer system reliability. As street lights have a direct impact on road-user safety during night time hours, pro-longed light outages may increase the City's exposure to liability. It should be noted that with street lighting outages, delaying repairs does not equate to savings as the cost is deferred to a later date, but remains the same cost to repair when eventually addressed.

**ALIGNMENT TO THE 2016 – 2025 STRATEGIC PLAN**

**Community Engagement and Participation**

Hamilton has an open, transparent and accessible approach to City government that engages with and empowers all citizens to be involved in their community.

**Economic Prosperity and Growth**

Hamilton has a prosperous and diverse local economy where people have opportunities to grow and develop.

**Healthy and Safe Communities**

Hamilton is a safe and supportive City where people are active, healthy, and have a high quality of life.

**Built Environment and Infrastructure**

Hamilton is supported by state of the art infrastructure, transportation options, buildings and public spaces that create a dynamic City.

**APPENDICES AND SCHEDULES ATTACHED**

Appendix “A” to Report PW07024(a) – Street Lighting Maintenance Level of Service

Appendix “B” to Report PW07024(a) – City of Hamilton Report PW07024 Streetlighting Maintenance Standards