

# Long Term Plan



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## Outline of Proposed 10-Year Plan

The following is the proposed 10-yr plan for the Bureau and captures the current issues areas while preparing to head off future problems. The 10-yr plan can be broadly categorized into four major parts: maintenance, System Protection, Lifecycle Replacement, and Support Services. These parts are described after the table. Attachment 1 of the report is a spreadsheet that contains the details behind the high-level summary below. Note that the summary DOES NOT total to \$125M. For ease of reading and understanding, more detailed items, such as related costs, were kept in Attachment 1.

Category	Item Name	Cost
Maintenance	Current Maintenance Budget (Excludes CWPT)	\$33.0 M
	<b>Items funded through other sources (General Fund or Gas)</b>	
Maintenance	CWPT Replacement Program	\$5.8 M
System Protection	CWPT Replacement Enhancement, inc. Fortification	\$6.0 M
System Protection	500 Battery-Enabled Solar Lights	\$1.6 M
System Protection	Smart Cities Field Technology	\$1.5 M
	Subtotal	\$14.9 M
	<b>New Items Proposed as 10-yr plan</b>	
Maintenance	Additional Maintenance Support	\$12.0 M
System Protection	Battery-Enabled Solar Deployment	\$2.2 M
System Protection	Additional Smart Cities Field Technology	\$1.8 M
System Protection	Fortification of Street Lighting Circuits (F22 standard)	\$4.5 M
Lifecycle Replacement	LED Lifecycle Replacement	\$7.0 M
Lifecycle Replacement	Streetlight Pole (electrolier) Replacement	\$15.9 M
Lifecycle Replacement	Conduit Replacement	\$6.4 M
Support Services	GSD, PER, Internal Info Tech, Administration, Call Center, Audit	\$3.7 M
Support Services	New Yard	\$2.0 M
	Subtotal	\$55.5 M

## Maintenance

Before the adoption of LED technologies, maintenance generally consisted of the replacement of high-intensity-discharge fixtures that had burned out and related fuses. Despite the rapid pace of these types of outages and the size of the City, the BSL staffing levels (~180 field staff) were able to address these outages in quick succession as it did not require extensive repairs. In comparison to today, more maintenance is due to theft or vandalism which takes several hours, if not days, to complete. Now, these maintenance crews typically work on theft and vandalism incidents that are affected by thefts that span less than five streetlights. Conversely, the additional strengthening of street lighting infrastructure and reduction of maintenance access has increased the amount of effort to troubleshoot issues that would have otherwise been relatively quick fixes. By hardening the system we now require heavier equipment to go into and fix the streetlights.

Our estimation is that, given the types of outages and increased difficulty of work, it would require an additional ~\$18.0M increase in the maintenance budget on top of the current \$33.0M annually budgeted to comprehensively address theft and vandalism and regular maintenance. The increase will go towards adding an additional 50% staff in the maintenance crews.

### If properly resourced, our estimation is that we would be able to achieve the following outcomes:

- Improving repair time for minor outages (e.g.: single lights out due to light failure, specific grounds) to 7 days. (FY21/22 saw repair time at around 30 days)
- Improving repair time for major repairs (e.g.: larger outages due to system failures which may include theft) to 30 days. (F21/22 saw repair time at around 60 days)
- Increasing the number of poles painted per day to 17, which extends pole life.

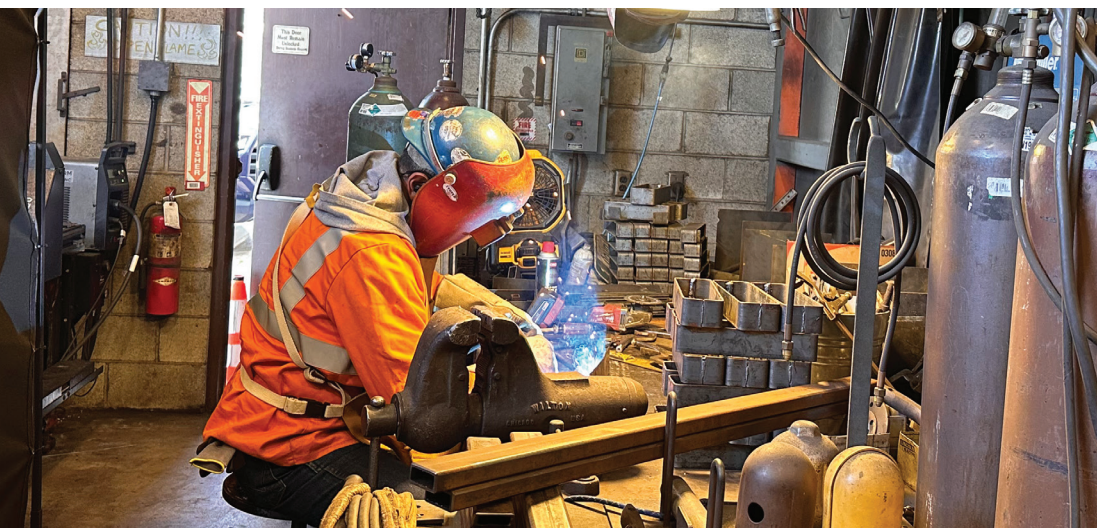
## System Protection

As mentioned, the lighting system was designed with ease of access and maintenance in mind. To harden the lighting system would essentially require a reengineering of its design and a major capital program to undertake the issue. BSL believes that the suite of responses which has been formulated the past two years – fortification, new technology deployments, solar lighting – is the most effective way to address problematic recurring issues of CWPT. While a quick reaction would be to fortify the entire system completely as soon as possible, BSL does not see that as feasible within the 10 year span because of the amount of effort and money required for fortification (previously estimated at \$400M), and that it would make maintenance considerably more difficult and costly. Our advice is to use strategic deployment of these suites of responses and adjust accordingly.

Our estimation is that it would require ~\$17.6M in the line items categorized as System Protection to create a suite of responses that would build effective 'castle walls and watchtowers' to protect the street lighting system. This would include additional crews that are dedicated to fortification capital work, which secures entire electrical circuits, and the purchase of new technologies.

**If properly resourced, our estimation is that it would contribute to the outcomes listed in maintenance. The funding would achieve:**

- A new solar replacement program that deploys 1,000 battery-enabled solar lights per year
- The complete fortification of over 5,600 lights per year, with the 10 year goal of fortifying 25% of the total system.
- The establishment of 100 sensor assets beyond smart nodes throughout the system to monitor and report on issues in real time.



## Lifecycle Replacement

One of the most daunting challenges on the horizon is the lack of a lifecycle replacement strategy. While the poles and pipes of the streetlighting network have exceeded most life span expectations, with some infrastructure in the field approaching a century's worth of work, we consider the average lifespan of the pole to be 75 years and the average lifespan of conduit to be 50 years. Conduit can deteriorate over time or vegetation growth can damage conduit and wires, causing electrical grounds. Poles, if uninspected and deteriorated, can cause damage and liabilities for the City should they fall. Most pressing is the issue of LED replacements, as I mentioned in the summary. Without a maintenance plan to replace failing LED fixtures, thousands to tens of thousands of streetlights can go out every year.

Our estimation is that it would require ~\$26.0M in lifecycle replacement programs that cover conduit, electroliers (poles), and LED fixtures in order to keep the system in good working order.

**If properly resourced, the funding would achieve:**

- An ongoing 10 year LED lifecycle replacement program replacing 10% of the fixtures each year. The lifespan of an LED is currently 10 years, as is their warranty.
- The replacement of all electroliers above 75 years of service.
- The replacement of 51 miles of conduit on an annual basis to prevent electrical grounds and ensure sufficient capacity in the system for the use of new technologies, including the sensors and smart nodes mentioned in the System Protection section.



## SUPPORT SERVICES

Our ability to marshal staff, equip them with the right tools and technology will depend on support and administrative services both within and outside of BSL. As the Bureau grows, the demand for such support only increase.

Our estimation is that it would require ~\$5.7M in order to properly resource additional support functions, including the purchase of at least one new yard. One point to note is our suggestion of a 3-year audit. Given the magnitude of a 3-year audit. Given the magnitude involved, we believe it prudent to place checks and controls to improve public confidence on how their Assessment is being used.

