



Energy Assessment

Jean Talon [DRAFT]

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Executive Summary

Alcaide Webster Architects Inc. retained ICF Consulting Canada to conduct comprehensive energy assessments of two facilities for which Brookfield Johnson Controls provides building maintenance services under contract to Public Works and Government Services Canada:

- Standards Lab (151 Tunney's Pasture Dr., Ottawa)
- Jean Talon (170 Tunney's Pasture Dr., Ottawa)

This report pertains to the Jean Talon building.

The objectives of the assessment were to assess the current energy performance of the facility, identify and evaluate potential energy and water reduction opportunities, and to develop recommendations for energy performance improvements. This study was carried out in support of the Canadian Government's Federal Sustainable Development Strategy. The results provide PWGSC with the information needed to plan and implement energy and cost reduction improvements in their facility operations.

The results of the assessment indicate that there are significant opportunities for energy and cost savings in the areas of lighting retrofits, recommissioning and controls optimisation, improved operations and maintenance, and water fixtures.

Exhibit ES.1 overleaf provides a summary of the four recommended energy and water reduction measures evaluated in this study. As shown, the total cost savings for the measures are estimated to be \$256,000 per year, with an estimated implementation cost of \$912,000. The simple payback is 3.6 years, and the resulting GHG emissions reductions are 400 tonnes of eCO₂ per year.

The total savings represent a 20% reduction in electricity, a 16% decrease in steam, a 4% reduction in chilled water consumption, and a 29% decrease in water consumption. The implementation of these measures would decrease the energy intensity from the current baseline of 16.5 ekWh/ft²/year to a post-retrofit intensity of 14.0 ekWh/ft²/year, representing a 16% decrease in overall energy use and a 17% decrease in operating costs.

Exhibit ES.1 Measure Summary

Energy Reduction Measure	Annual Savings									Estimated Total Cost [\$]	Simple Payback [years]	GHG Reduction [teCO ₂]	
	Electricity [kWh/yr]	Electricity [kW]	[\$]	Steam [GJ/yr]	[\$]	Chilled Water [GJ/yr]	[\$]	Water [m ³ /yr]	[\$]				Total [\$]
Lighting Retrofit	883,215	310	\$120,777	0	\$0	0	\$0	0	\$0	\$120,777	\$781,213	6.5	185.5
RCx & Controls Optimisation	600,658	0	\$61,627	546	\$14,827	333	\$9,235	0	\$0	\$85,689	\$40,875	0.5	166.6
O&M Measures	0	0	\$0	733	\$19,916	111	\$3,078	5,279	\$18,365	\$41,360	\$43,750	1.1	48.7
Water Fixtures	0	0	\$0	0	\$0	0	\$0	2,354	\$8,191	\$8,191	\$46,498	5.7	0.0
Total	1,483,873	310	\$182,405	1,279	\$34,743	445	\$12,314	7,633	\$26,556	\$256,017	\$912,336	3.6	400.7
Baseline Consumption	7,400,036			7,796		11,113		26,091					2,237
Estimated Savings	20%			16%		4%		29%					18%
Post-Retrofit Target	5,916,164			6,517		10,669		18,457					1,837

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1 Introduction

1.1 Background

Alcaide Webster Architects Inc. retained ICF Consulting Canada to conduct a detailed energy assessment of the Jean Talon building located at 170 Tunney's Pasture Dr., Ottawa. The objectives of this assessment are to assist PWGSC in making asset investment decisions as part of the Canadian Government's Sustainable Development Strategy. This involves completing an evaluation of current energy use and potential energy and water reduction opportunities as well as the development of a set of recommendations for energy performance improvements.

These results provide PWGSC with the information needed to plan and implement energy and cost reduction improvements in their facility operations.

1.2 Scope and Methodology

The scope and structure of this report is closely tied to the requirements set forward by PWGSC in the original request for proposal. This methodology encompasses the following task areas and activities:

Facility Information

- Collection and review of facility information including available building documentation, drawings and maintenance logs.
- Collection and review of electricity, steam, chilled water, and domestic water utility information over a five year period.

Site Audit

- Site visit to conduct walk-through audit of mechanical, electrical and architectural systems.
- Interviews and discussions with facility personnel regarding operation and maintenance (O&M) practices and energy-efficiency issues.

Analysis and Findings

- Utility data analysis.
- Identification and evaluation of energy reduction measures, including estimates of project cost and associated energy savings.
- Preparation of an energy model to verify calculations.
- Preparation of a report to document the findings.

1.3 Acknowledgements

ICF Consulting Canada gratefully acknowledges the assistance of the following people in carrying out this study:

- Vincent Alcaide, Alcaide Webster Architects Inc.
- Matthew McNaughton, Associate Property Manager, Brookfield Johnson Controls
- Joseph Sullivan, Maintenance Team Lead II, Brookfield Johnson Controls
- Darren Richardson, Building Technician - Electrician, Brookfield Johnson Controls
- Sean Parker, Building Technician, Brookfield Johnson Controls
- Steve Frazier, Building Technician, Brookfield Johnson Controls
- Mike Platt, Building Technician, Brookfield Johnson Controls
- Greg Deernsted, Energy Task Group Project Manager, PWGSC
- Taylor Graf, Junior Engineer, PWGSC

1.4 This Report

The remainder of this report is structured as follows:

- **Section 2 Facility Description** provides an overview of the facility's demographics including building type, age, size and construction.
- **Section 3 Utility Data Analysis** presents the results of the analysis of utility data including historical consumption, energy end-use analysis, and a utility billing overview.
- **Section 4 Mechanical and Electrical Systems** presents a summary of the mechanical and electrical systems within the building including building envelope, lighting, HVAC, DHW and plug loads.
- **Section 5 Energy Conservation Measures** presents a summary of the financial justification for each proposed measure including the total project cost, energy cost savings, simple payback period and reduction in GHG emissions.

2 Facility Description

2.1 General

The Jean Talon building was built in 1979 and is occupied by Statistics Canada. The gross area of the building is 763,915 ft² and the rentable area is 655,587 ft², with thirteen storeys above grade, one full basement level, and a partial basement level. The facility is located at 170 Tunney's Pasture Dr. within the Tunney's Pasture federal campus in the inner west district of Ottawa. The facility is Crown-owned and managed by Brookfield Johnson Controls under contract to Public Works and Government Services Canada.

2.2 Space Utilization

Overall space utilization as it was at the time of the site audit is described in Exhibit 1 below and descriptions of each main area are included below the table.

Exhibit 1 Space Utilization Table

Space Category	Floor(s)	% of Space
Office	Ground - 13	76%
Common Areas	All	10%
Mechanical & Other	B2, B1, Penthouse	14%

- Office
 - This includes office space and administrative areas.
- Common Areas
 - These spaces include lobbies, kitchens, and washrooms.
- Mechanical and Other
 - Includes spaces for mechanical and electrical equipment, and miscellaneous spaces.

2.3 Space Occupancy

There are approximately 2,380 full time equivalent employees currently in the building. Occupancy patterns follow typical office hours, generally 6 am to 6 pm, Monday to Friday. There are security guards in the building continuously.

3 Utility Data Analysis

This section presents the results of the analysis of electricity, steam, chilled water and water consumption data over the most recent full year of data and includes the following:

- Baseline energy use
- Energy end-use estimates
- Utility rates

The results of these analyses yielded valuable insights into all aspects of building energy performance and efficiency and helped to identify and inform the proposed energy-efficiency measures.

3.1 Baseline Energy Use

The baseline energy profile is typically selected using the most recent full year with available utility data. For Jean Talon, this is the period of January 2014 to December 2014.

This baseline was used to calibrate energy end-use estimates and as the reference case for calculating energy savings. All costs shown in the baseline are actual; all savings calculations are generated using the current rates identified in Section 3.2. Exhibit 2 presents the baseline energy use and costs; Exhibits 3 presents the historical electricity consumption profile, Exhibit 4 presents the baseline electricity consumption profile; Exhibits 5 and 6 present the historical steam and baseline steam use profiles; Exhibits 7 and 8 present the historical chilled water and baseline chilled water use profiles; Exhibits 9 and 10 present the historical water and baseline water use profiles.

Key Observations

A review of the baseline energy and water cost profiles reveals that:

- The total annual utility costs for the site are approximately \$1,469,792. Electricity costs amount to \$847,210 (58% of total costs), steam accounts for \$216,642 (15% of total costs), chilled water accounts for \$307,843 (21% of total costs), and water accounts for \$98,097 (7% of total costs).
- The annual electrical consumption is 7,400 MWh, the annual steam consumption is 2,166 eMWh, and the annual chilled water consumption is 3,087 eMWh, resulting in a total site energy intensity of 16.5 ekWh/ ft²/yr. This is better than the Canadian average energy intensity for office buildings of 28.4 ekWh/ ft²/yr by 41.9%, as reported by Natural Resources Canada¹.
- The annual water consumption is 26,091 m³ which results in an intensity of 34.1 L/ft²/yr. This is lower than the Canadian average of 91.0 L/ft²/yr by 62.5%, as reported by the Real Property Association of Canada².

¹ 2014 BOMA BEST Energy and Environmental Report, p. 28

² 2014 BOMA BEST Energy and Environmental Report, p. 44

Exhibit 2 Baseline Energy Consumption

	Electricity				Steam				Chilled Water				Water			Total			
	Usage	Intensity	GHG Emissions	Cost	Usage	Intensity	GHG Emissions	Cost	Usage	Intensity	GHG Emissions	Cost	Usage	Intensity	Cost	Usage	Intensity	GHG Emissions	Cost
	[kWh]	[kWh/ft ²]	[teCO ₂]	[\$]	GJ	[ekWh/ft ²]	[teCO ₂]	[\$]	GJ	[ekWh/ft ²]	[teCO ₂]	[\$]	[m ³]	[L/ft ²]	[\$]	[ekWh]	[ekWh/ft ²]	[teCO ₂]	[\$]
Jan-14	656,737	0.9	137.9	\$74,211	1,980	0.7	126.5	\$55,727	0	0.0	0.0	\$0	2,215	2.9	\$7,906	1,206,686	1.6	264.4	\$137,844
Feb-14	599,757	0.8	125.9	\$67,773	1,462	0.5	93.4	\$41,159	0	0.0	0.0	\$0	2,129	2.8	\$7,599	1,005,933	1.3	219.4	\$116,530
Mar-14	640,348	0.8	134.5	\$72,359	1,489	0.5	95.1	\$41,919	0	0.0	0.0	\$0	1,931	2.5	\$6,894	1,054,026	1.4	229.6	\$121,172
Apr-14	623,698	0.8	131.0	\$71,725	660	0.2	42.2	\$17,928	9	0.0	0.2	\$257	2,622	3.4	\$10,016	809,580	1.1	173.3	\$99,926
May-14	662,203	0.9	139.1	\$76,153	96	0.0	6.1	\$2,603	1,353	0.5	22.5	\$37,465	2,295	3.0	\$8,768	1,064,554	1.4	167.7	\$124,990
Jun-14	626,964	0.8	131.7	\$72,101	0	0.0	0.0	\$0	2,423	0.9	40.4	\$67,107	1,953	2.6	\$7,459	1,299,970	1.7	172.0	\$146,666
Jul-14	628,301	0.8	131.9	\$72,255	0	0.0	0.0	\$0	2,594	0.9	43.2	\$71,844	2,006	2.6	\$7,662	1,348,814	1.8	175.2	\$151,760
Aug-14	617,165	0.8	129.6	\$70,974	0	0.0	0.0	\$0	2,470	0.9	41.2	\$68,432	1,923	2.5	\$7,345	1,303,456	1.7	170.8	\$146,751
Sep-14	597,134	0.8	125.4	\$68,670	0	0.0	0.0	\$0	1,679	0.6	28.0	\$46,508	2,356	3.1	\$9,000	1,063,554	1.4	153.4	\$124,178
Oct-14	597,963	0.8	125.6	\$68,766	49	0.0	3.1	\$1,336	586	0.2	9.8	\$16,230	2,577	3.4	\$9,842	774,393	1.0	138.5	\$96,174
Nov-14	548,144	0.7	115.1	\$63,037	654	0.2	41.8	\$17,778	0	0.0	0.0	\$0	2,482	3.2	\$9,482	729,919	1.0	156.9	\$90,297
Dec-14	601,623	0.8	126.3	\$69,187	1,406	0.5	89.8	\$38,192	0	0.0	0.0	\$0	1,604	2.1	\$6,125	992,116	1.3	216.2	\$113,504
Total	7,400,036	9.7	1,554.0	\$847,210	7,796	2.8	498.1	\$216,642	11,113	4.0	185.2	\$307,843	26,091	34.1	\$98,097	12,653,002	16.5	2,237.3	\$1,469,792

Exhibit 3 shows the historical electricity consumption from April 2009 to December 2014. Consumption has fallen consistently over the period, with 2014 consumption 13% lower than 2010 consumption.

Exhibit 3 Historical Electricity Consumption Profile

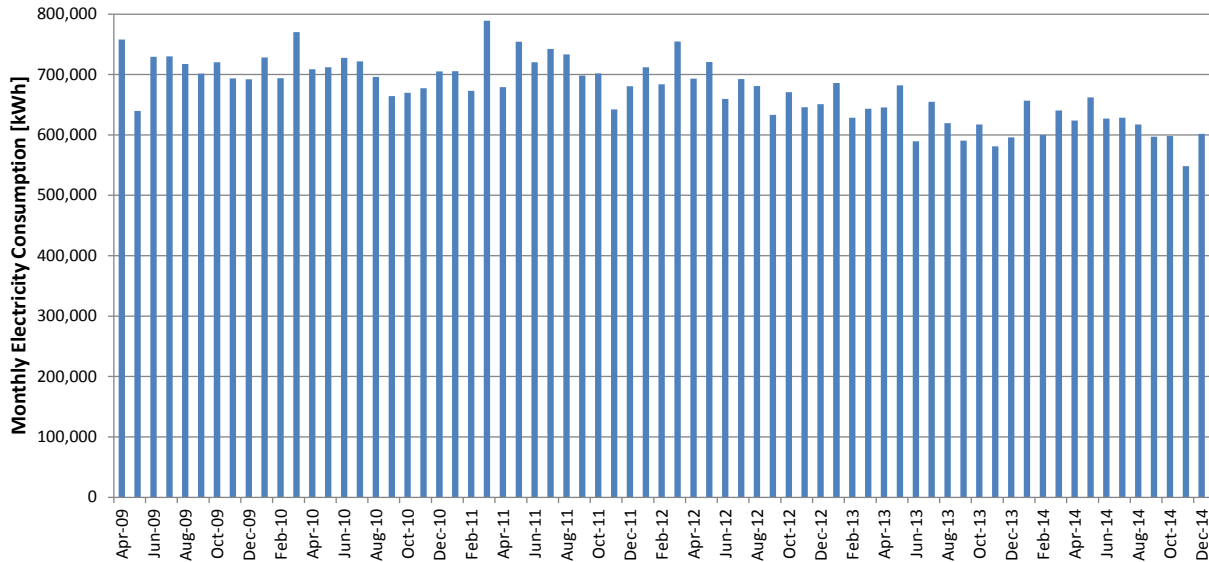


Exhibit 4 shows the monthly electricity use profile for the baseline period of January 2014 to December 2014. The majority of the electricity consumption is baseload, with a small increase in the summer and winter months that is due to pumping energy for the hydronic cooling and heating systems.

Exhibit 4 Baseline Electricity Use Profile

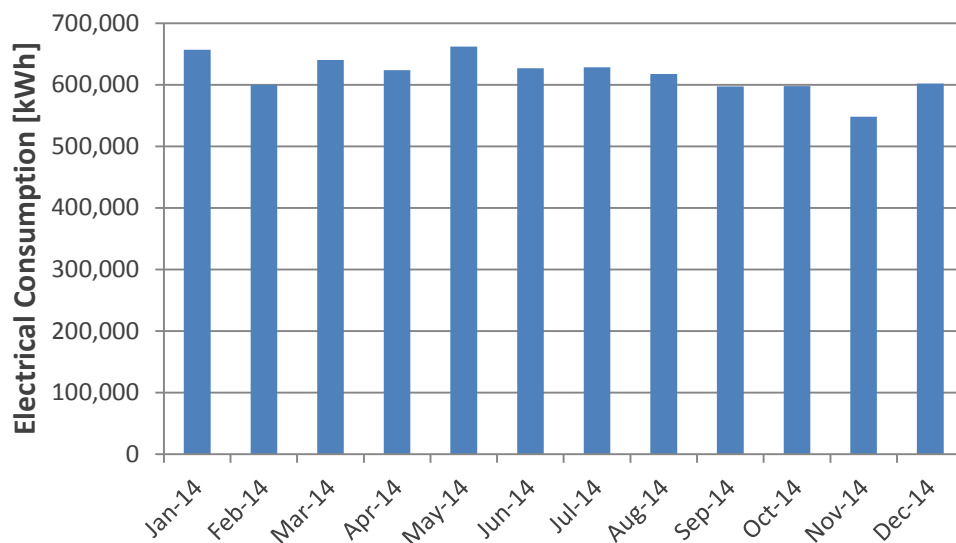


Exhibit 5 shows the historical steam use profile from April 2009 to December 2014. Steam consumption correlates well with heating degree days, indicating a good control strategy.

Exhibit 5 Historical Steam Use Profile

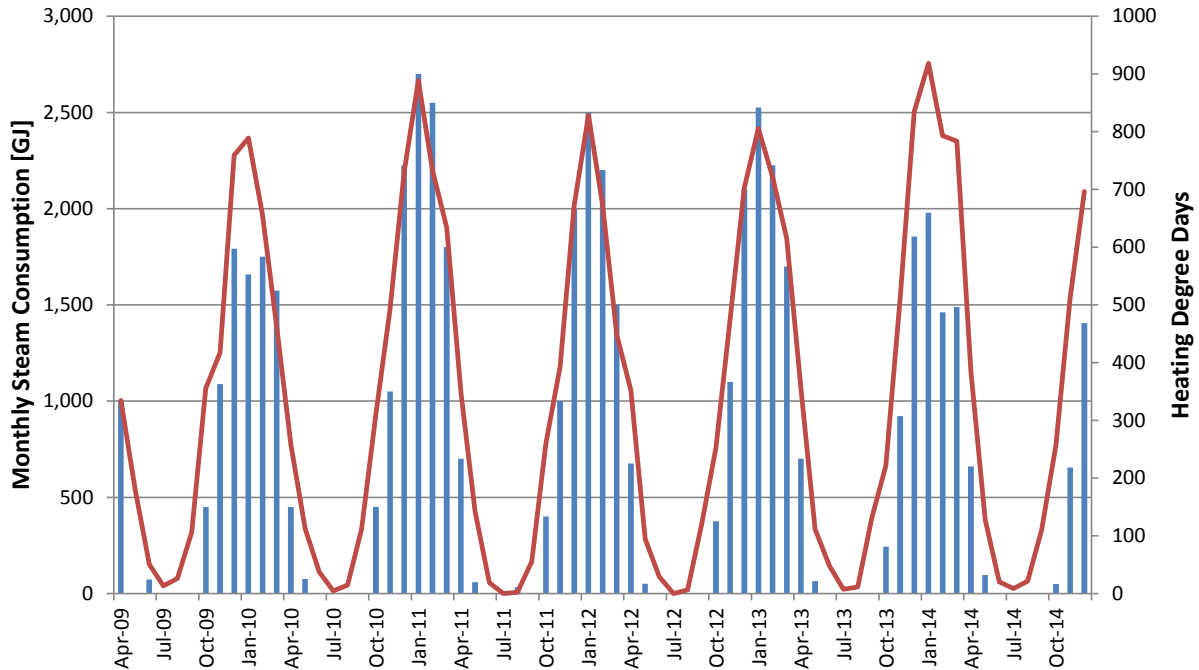


Exhibit 6 shows the monthly steam use profile for the baseline period of January 2014 to December 2014. The utility bills only reflect the consumption due to space heating and humidification, even though there is a baseload of steam consumption due to domestic hot water heating. The most likely explanation is that the flow rate of steam in the summer months is too small to be recorded by the steam flow meter.

Exhibit 6 Baseline Steam Use Profile

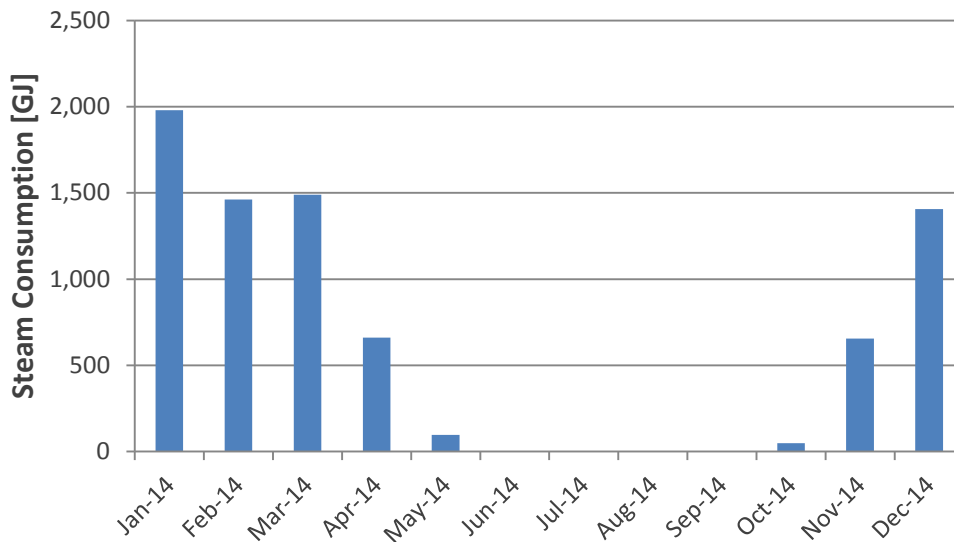


Exhibit 7 shows the historical chilled water use profile from April 2009 to December 2014. Consumption correlates well with cooling degree days, indicating a good control strategy.

Exhibit 7 Historical Chilled Water Use Profile

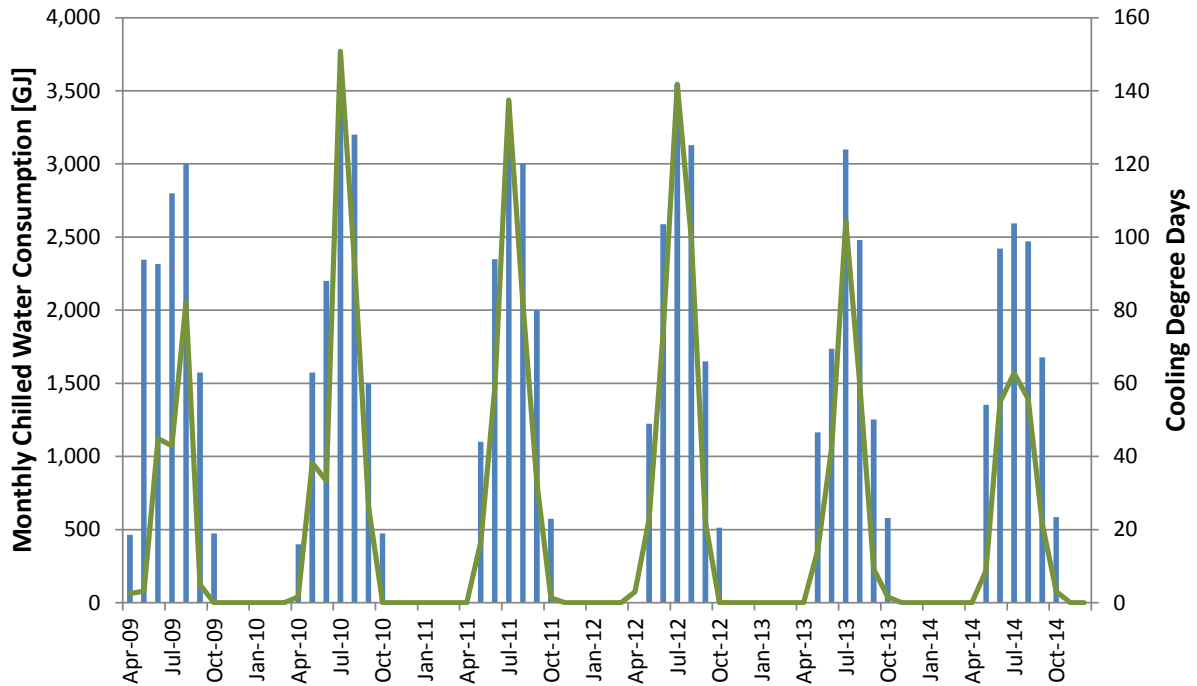


Exhibit 8 shows the monthly chilled water use profile for the baseline period of January 2014 to December 2014. The utility bills only reflect the consumption due to seasonal space cooling, even though there is a baseload of chilled water consumption due to year round cooling in certain spaces. The most likely explanation is that the flow rate of chilled water outside of the summer months is too small to be recorded by the chilled water flow meter.

Exhibit 8 Baseline Chilled Water Use Profile

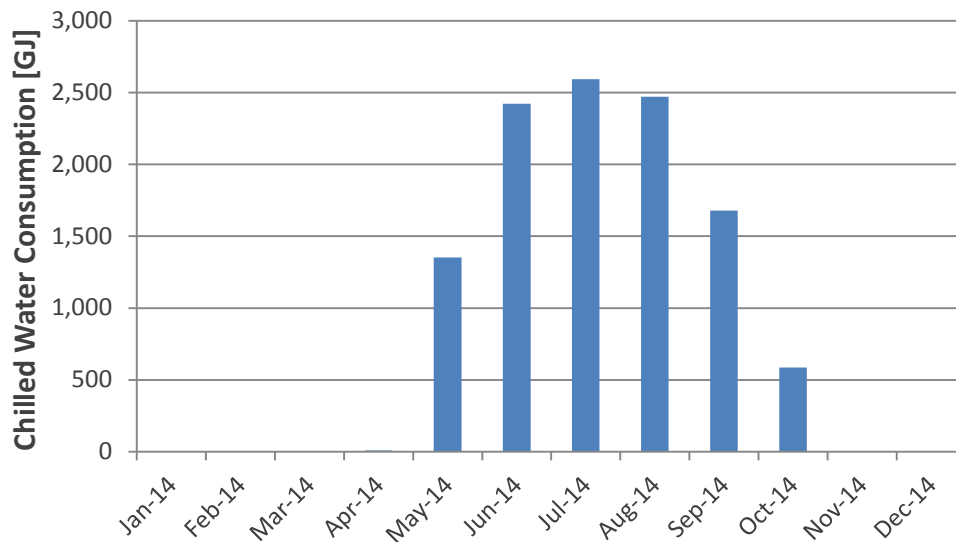


Exhibit 9 shows the historical water use profile from April 2009 to December 2014. Water consumption has dropped by 25% between 2010 and 2014, likely as a result of replacing the water fixtures with lower flow models.

Exhibit 9 Historical Water Use Profile

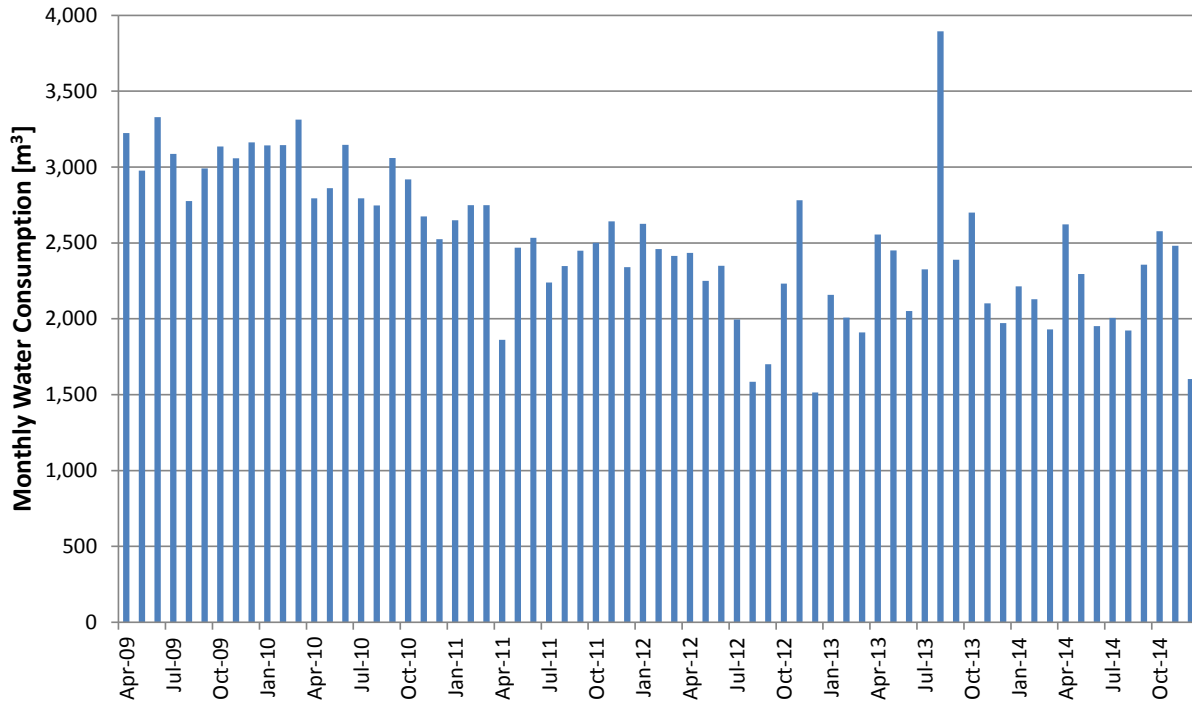
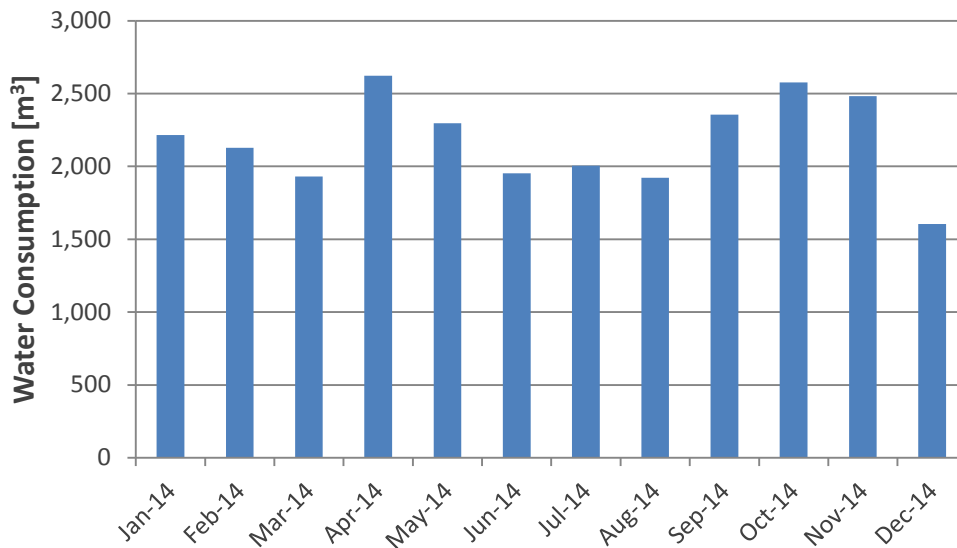


Exhibit 10 shows the monthly water use profile for January 2014 to December 2014. Water bills are typically regarded as the least reliable for identifying trends due to infrequent meter reading, so the variation in water consumption over the year is most likely due to billing estimates and corrections, as the majority of the water use is baseload.

Exhibit 10 Baseline Water Use Profile



3.2 Utility Rates

This sub section presents an overview of utility services and rates for electricity, steam, chilled water, and water. The utility costs were used in this study for the purposes of calculating marginal costs to accurately assess savings. Avoided costs are based on the current marginal rates sourced from the utility's billing structure.

3.2.1 Electricity

Electricity is provided to the Jean Talon building by Hydro Ottawa through their C1, C2 and C3 (50 kW to less than 1,500 kW) rate for commercial customers. The rate is structured as follows:

- Consumption Charges
 - Regulatory Charge: 0.57 cents/kWh
 - Debt Retirement Charge: 0.694 cents/kWh
- Demand Charges
 - Transmission Network Charge: \$2.9072/kW
 - Transmission Connection Charge: \$1.6232/kW
 - Hydro Ottawa Delivery Charge: \$3.5691/kW
 - Low Voltage Services Charge: \$0.02354/kW

In addition, there are consumption charges set by the Independent Electricity System Operator. These are adjusted monthly, so the average cost to date for 2014 has been used. At the time of this report, the most recent data available was for November 2014.

- Consumption Charges
 - Average Weighted Hourly Price: 3.73 cents/kWh
 - Global Adjustment (Class B): 5.27 cents/kWh

Using this rate structure, the marginal electrical rates used for this study are **10.26 cents per kWh and \$8.12 per kW**.

3.2.2 Steam

Steam is provided by the Tunney's Pasture Central Heating Plant. The rate was adjusted in the Summer of 2014, and the current price is \$27.18/GJ. For the purposes of this study, the marginal steam rate used is **\$27.18 per GJ**.

3.2.3 Chilled Water

Chilled Water is provided by the Tunney's Pasture Central Heating Plant. The rate was adjusted in November 2014 to \$28.00/GJ. For the purposes of this study, the marginal chilled water rate used is **\$28.00 per GJ**.

3.2.4 Water

Water is supplied to the Jean Talon building by the City of Ottawa at the following rates:

- Water Rate: \$1.603 per m³
- Sewer Rate: \$1.876 per m³ (117% of water charge)

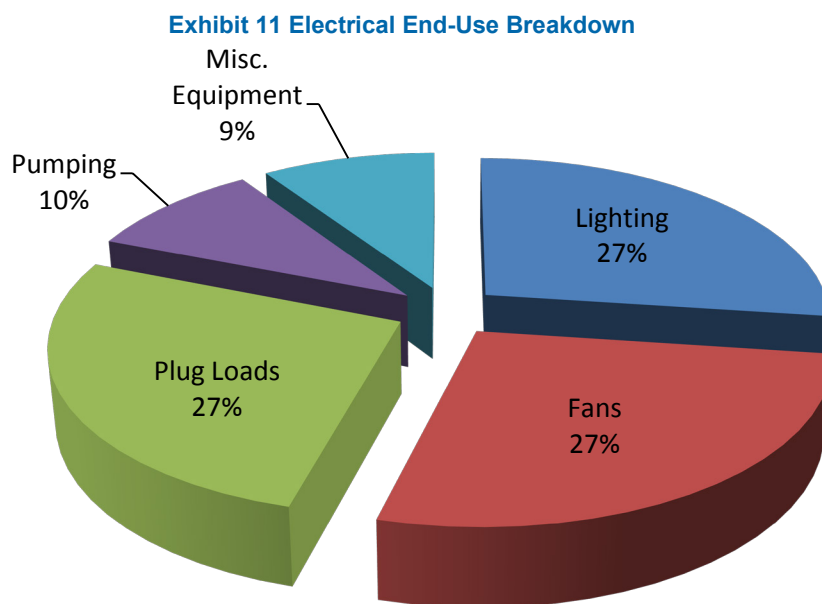
Therefore, the marginal rate for avoided water costs is **\$3.479 per m³**.

3.3 Energy End Use Breakdown

Estimates of energy end-use consumption were carried out for electricity, steam, chilled water and water. End-use estimates were calculated using spreadsheet-based tools in conjunction with a review of utility profiles. Specific energy uses that may overlap several categories are explained in their respective sections. Please see [Appendix C](#) for the original ICF Consulting Canada energy balance reports.

3.3.1 Electricity

Exhibit 11 illustrates the electrical energy end-use distribution. The approach used was to develop a ground-up estimate of each electricity end use in the building, calibrated to utility data.

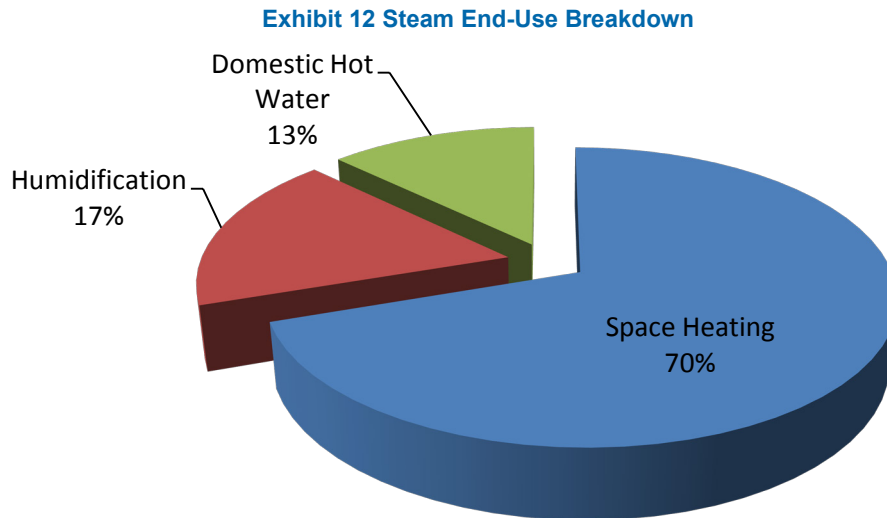


Observations on Electrical End-Use Breakdown:

- Lighting: 27%
 - The lighting power density and energy consumption is within the expected range.
- Fans: 27%
 - The main air handling units operate outside of the building's core occupancy period, resulting in high fan energy use.
- Plug Loads: 27%
 - This category includes computer and IT equipment, and is within the expected range.
- Pumping: 10%
 - The building heating and cooling systems account for the majority of the pumping energy.
- Misc. Equipment: 9%
 - This category includes elevators, compressors, and space heating and cooling.

3.3.2 Steam

Exhibit 13 illustrates the steam end use distribution for Jean Talon, created using collected data in conjunction with the utility bills. Since the utility bills do not reflect the baseload steam consumption used for domestic hot water heating, this load has been estimated from the water balance.



Observations on Steam End-Use Breakdown:

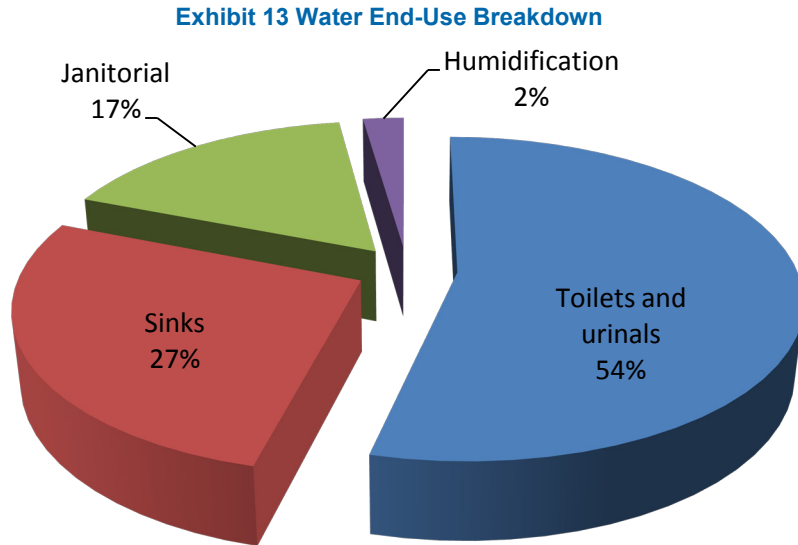
- Space Heating: 70%
 - This is within the expected range considering that all space heating is provided by steam.
- Air Handler Humidification: 17%
 - Humidification for ventilation air is provided exclusively by steam. The humidification load is within the expected range.
- Domestic Hot Water: 13%
 - The utility bills underestimate the amount of steam used for DHW heating, most likely because the steam meter is not capable of measuring low flow rates. The DHW heating load has been estimated from the water balance.

3.3.3 Chilled Water

The entirety of the chilled water consumption at Jean Talon is used for space cooling loads.

3.3.4 Water

Exhibit 13 illustrates the water end use distribution for Jean Talon, created using collected data in conjunction with the utility bills.



Observations on Water End-Use Breakdown:

- Toilets and Urinals: 54%
 - This falls within the expected range.
- Sinks: 27%
 - This falls within the expected range.
- Janitorial: 17%
 - This falls within the expected range.
- Humidification: 2%
 - This represents the water consumed by the steam to steam humidifiers, and falls within the expected range.

4 Mechanical and Electrical Systems

This section provides a concise description of Jean Talon’s energy and water consuming systems. Refer to Section 5 for details of recommended energy conservation measures.

4.1 Heating and Cooling

System Description

The Tunney’s Pasture Central Heating Plant (CHP) supplies steam and chilled water to Jean Talon. The steam pressure is reduced in the basement mechanical room for space heating, domestic hot water heating, and humidification. All condensate is collected and then supplied back to the CHP.

The main air handling units are equipped with glycol heating coils. Floors 1 to 13 are served by VAV boxes working in conjunction with perimeter radiation units. The local zone thermostats are incorporated into the BAS. There are also a number of fan coil units serving the loading bay.

Humidification is supplied by steam to steam generators supplying the main air handling units which serve office spaces.

The major air handling units are equipped with chilled water cooling coils. Most of the cooling load is seasonal, but the fan coil units serving the film storage area provide year round cooling. There are three chilled water circulation pumps, two operating in a lead/lag configuration, and the third on standby.

Audit Findings

- There is uninsulated steam piping in some of the mechanical rooms in the facility, as well as uninsulated steam traps.
- There is a small amount of electric heating and DX cooling in the building.
- The relative humidity setpoints in many spaces are high, and the humidifiers are unable to achieve them despite operating at 100% capacity.
- The bypass valve on the pump serving the AHU heating coils is broken and has been jammed open, resulting in excessive flow and causing the VFD to operate at full speed.



From Left: Steam heat exchangers, perimeter radiant heating unit, AHU heating coil bypass valve

4.2 Ventilation Systems

System Description

Ventilation is provided by sixteen main air handling units within the building. The units are listed in Exhibit 14 below. This section is intended to provide an overview of the systems as well as general recommendations; specific details on measures are included in Section 5.

Exhibit 14 Main AHU Schedule

AHU #	Serving	Type	Motor Supply/Return [HP]	Heating Coil	Cooling Coil	Humidification	Hours of Operation
AHU#1	2nd Basement	CAV	1.5 / none	Glycol	Chilled Water	None	5.30am-6pm, Mon, 6am-6pm Tue-Fri
AHU#2	1st Basement Loading Dock	CAV	1.5 / none	Glycol	Chilled Water	None	5am-6pm, Mon, 6am-6pm Tue-Fri
AHU#3	Kitchen Make-Up Air	CAV	5 / none	None	None	None	4am-6pm, Mon-Fri
AHU#4	Cafeteria	CAV	15 / 5	Glycol	Chilled Water	None	5am-6pm, Mon-Fri
AHU#5	Basement Mail Room	CAV	1 / 0.75	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Fri
AHU#6	1st Basement Census Area	CAV	7.5 / none	Glycol	Chilled Water	None	5am-6pm, Mon, 6am-6pm Tue-Fri
AHU#7	1st Floor & 2nd Basement	VAV	60 / 20	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Thu, 4.30am-6pm Fri
AHU#8	1st Floor & 2nd Basement	VAV	60 / 20	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Thu, 4.30am-6pm Fri
AHU#9	1st Floor & 2nd Basement	VAV	20 / 20	Glycol	Chilled Water	None	5am-6pm, Mon, 6am-6pm Tue-Thu, 4.30am-6pm Fri
AHU#10	Floors 2 to 13 North Perimeter	VAV	20 / 20	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Fri
AHU#11	Floors 3 to 13 East Perimeter	VAV	75 / 30	Glycol	Chilled Water	Steam	5am-6pm, Mon-Fri
AHU#12	Lobby to Floor 13 South Perimeter	VAV	40 / 20	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Fri
AHU#13	Floors 2 to 13 West Perimeter	VAV	100 / 40	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Fri
AHU#14	Floors 6 to 13 East Interior	VAV	100 & 100 / 75	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Fri
AHU#15	Floors 6 to 13 West Interior	VAV	100 & 100 / 75	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Fri
AHU#16	Floors 2 to 5 Core & Main Lobby	VAV	75 & 75 / 60	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Fri

Exhaust Fans

There is also a large network of exhaust fans serving the building.

Audit Findings

- The main air handling units are scheduled to operate during the core building occupancy, as shown in Exhibit 14 above, approximately twelve hours per day, five days per week. Facility staff report that the schedules are overridden in the winter so that the AHUs operate continuously in order to maintain the space temperature setpoint. An analysis of the electricity consumption indicates that the fans are running approximately 30% longer than scheduled over the course of the year.
- AHUs 7, 8, 9, 14, 15, and 16 are equipped with CO₂ sensors in the return air plenums, but these appear to be out of calibration based on the reported CO₂ levels. Facility staff report that the CO₂ levels are not being used to control ventilation rates.



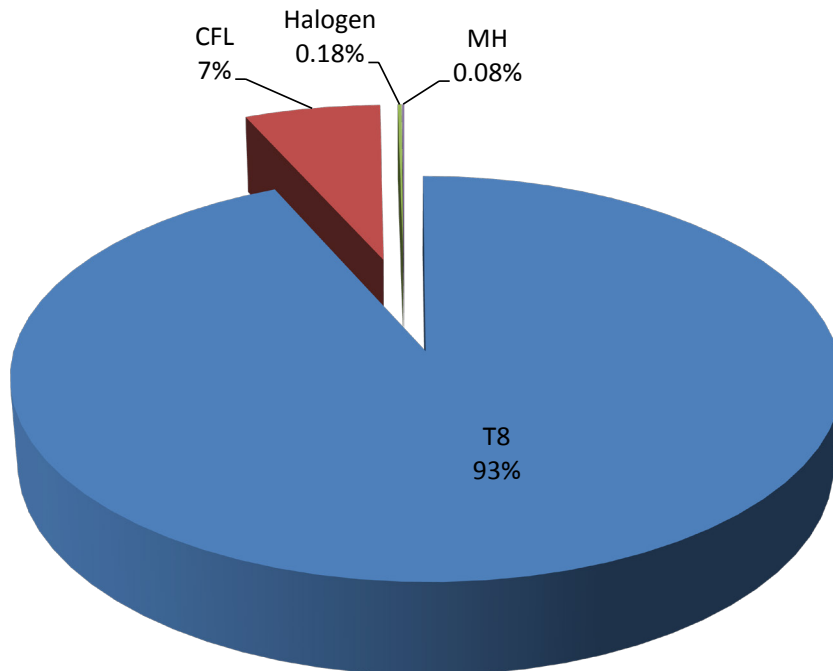
From Left: CAV air handling unit, exhaust fan, VAV air handling unit

4.3 Lighting

System Description

Exhibit 15 below shows the breakdown of lamps found in the Jean Talon building. For more detailed information as well as a line-by-line summary of replacement recommendations, please see [Appendix A](#) for the lighting spreadsheet included in the set of EAR templates.

Exhibit 15 Lighting Fixture Breakdown



Observations on Lighting Breakdown:

- T8 Fluorescent: 93%
 - The majority of the general area and office lighting is provided by 32W 4' T8 fluorescent fixtures utilising electronic ballasts. There is also a small quantity of 2' T8 fixtures in washrooms.
- Compact Fluorescent: 7%
 - The majority of these fixtures are architectural pot lights in the public areas.
- Halogen: 0.18%
 - These fixtures include emergency lighting, track lighting, and soffit mounted fixtures on the exterior of the building.
- Metal Halide: 0.08%
 - These fixtures are metal halide wallpacks on the exterior of the building.

Audit Findings

- Almost all general area lighting consists of T8 fluorescent lamps coupled with electronic ballasts.
- There are a small number of LED T8 tubes being used in the mechanical rooms.
- Illuminance levels as measured with a photometer were found to be generally in compliance with IESNA recommended guidelines. A summary of the lighting levels recorded during the audit is shown below:

Floor	Area	Ave. Light Level (lux)	IESNA Light Level (lux)
Basement	Office	250 - 350	300 - 500
Basement	Corridor	450 - 500	40 - 150
3	Office	500 - 550	300 - 500
3	Washroom	350 - 400	55 - 220
3	Corridor	450 - 500	40 - 150
9	Office	500 - 550	300 - 500
9	Corridor	450 - 500	40 - 150



From Left: Interior office area lighting, perimeter office area lighting, lighting controls in the lobby

4.4 Building Automation

System Description

The facility utilizes a Delta Controls BAS to control the major ventilation systems, and the heating and cooling systems.

There is a standalone GE Lighting SmarTLC lighting control system which controls the majority of lighting in the facility.

Audit Findings

- The controllers on floors 8 to 13 are not connected to the BAS, but a project to have the controllers replaced and integrated is underway.
- AHUs 7, 8, 9, 14, 15, and 16 are equipped with CO₂ sensors in the return air plenums, but these appear to be out of calibration based on the reported CO₂ levels. Facility staff report that the CO₂ levels are not being used to control ventilation rates.
- The LAS shuts light off at 6 pm. Between 6 pm and 6 am, lights only stay on for one hour if activated.

4.5 Water

System Description

Domestic Cold Water

There are three 7.5 hp VFD equipped DCW booster pumps in the basement operating continuously on a duty/standby cycle.

Domestic Hot Water

The main domestic hot water system consists of two steam to hot water heat exchangers, one serving the lowrise floors and the other serving the highrise floors. There is one circulation pump for each DHW loop.

Plumbing Fixtures

Exhibit 16 below shows schedule of water consuming fixtures in the facility.

Exhibit 16 Water Fixture Schedule

Type	Fixture Mounting	Supply	Quantity	Flow Rate
Toilet	Floor	Valve	153	6 LPF
Urinal	Wall	Valve	62	3.8 LPF
Sink	Wall	Valve	181	7.6 LPM

Audit Findings

- Most sinks have 2 gpm aerators.
- The DCW booster pumps are supplying water to the rooftop penthouse at 115 psig.



From Left: Toilet, urinal, sink

5 Energy Conservation Measures

This section summarizes the potential energy efficiency measures. It includes a discussion of each measure, a description of the existing system, and the results of the financial analysis. Further information, including internal rate of return (IRR), net present value (NPV), and a list of assumptions made for each measure can be found in [Appendix B](#).

5.1 Lighting Retrofit

Description of Existing System

Most office and general area lighting is provided by 32W 4' T8 fluorescents. There are also a number of halogen fixtures used for architectural track lighting. Exterior lighting consists of HID wallpacks and halogen soffit fixtures.

Proposed Energy Efficiency Measures

The following lighting measures are proposed:

- Relamp all 4' T8 fixtures with 16.5W LED lamps.
- Relamp all 2' T8 fixtures with 8.5W LED lamps.
- Relamp all halogen track light fixtures with LED lamps.
- Relamp all exterior halogen fixtures with LED lamps.
- Replace all HID wallpack fixtures with LED fixtures.
- Install occupancy sensors in areas with sporadic use such as kitchenettes, mechanical rooms, boardrooms, and washrooms.

Exhibit 17 below presents a summary of the financial justification for the measure including total project cost, energy cost savings, simple payback period, and GHG emissions reduction. Refer to [Appendix B](#) for details of costs and savings.

Exhibit 17 Lighting Retrofit Measure Summary

Energy Reduction Measure	Electricity			Total Savings [\$]	Estimated Cost [\$]	Simple Payback [Years]	GHG Reduction [teCO ₂]
	[kW]	[kWh]	[\$]				
Lighting Retrofit	310	883,215	\$120,777	\$120,777	\$781,213	6.5	185.5

Impact on Operations and Maintenance

The frequency of lamp replacements will be reduced as the lifetime of the LED lamps is greater than that of the existing fluorescent and halogen lamps.

Estimated Service Life

- LED lamps – 50,000 hours.

Implementation Guidelines

- It is important that this retrofit results in light levels that are within the guidelines of the IESNA. It is recommended to carry out a full lighting photometric study and/or a pilot project before proceeding with the full implementation of this measure in order to ensure that the resulting light levels are within the applicable guidelines for all of the spaces.
- The proposed LED lamps are designed to be compatible with most electronic ballasts. Ballast compatibility should be confirmed before the retrofit takes place. A small quantity of LED T8 tubes are being used in the facility, so the ballasts are likely compatible, but a contingency cost to replace 10% of the ballasts has been included in the cost estimate above.

Available Incentives

The Ontario Power Authority offers incentives for energy savings projects through the saveONenergy program. It is estimated that this lighting retrofit may qualify for \$124,000 of incentive financing, which would have the effect of reducing the project's simple payback time from 6.5 years to 5.4 years. Please note that the project costs shown in Exhibit 17 do not include the potential incentive payments. Hydro Ottawa should be consulted for details of the requirements and payments for incentive programs. The website for this program can be found at <https://www.saveonenergy.ca>, and provides details on the types of incentives available.

5.2 Recommissioning and Controls Optimisation

Description of Existing Systems

A review of the HVAC and lighting system controls and operations has identified several opportunities for optimization of energy performance including improved control strategies and re-commissioning.

Energy Efficiency Measure

The following measures are proposed:

- Add the exhaust fans to the BAS and schedule based on building occupancy.
- Schedule all air handling units based on core occupancy, 6am to 6pm.
- Implement space temperature setback during unoccupied hours.
- Recommission the CO₂ sensors on AHUs 7, 8, 9, 14, 15, and 16 and control ventilation rates based on CO₂ level.
- Reduce the relative humidity setpoints to 30% RH.
- Reduce the static pressure of the DCW supplied to the penthouse to 35 psig from 115 psig.
- Repair the bypass valve on the AHU hot water pump, close off and control the pump speed with the VFD.

Exhibit 18 below presents a summary of the financial justification for the measure including total project cost, energy cost savings, simple payback period, and GHG emissions reduction. Refer to [Appendix B](#) for details of costs and savings.

Exhibit 18 Recommissioning and Controls Optimisation Measure Summary

Energy Reduction Measure	Electricity			Steam		Chilled Water		Total Savings	Estimated Cost	Simple Payback	GHG Reduction
	[kW]	[kWh]	[\$]	[GJ]	[\$]	[GJ]	[\$]	[\$]	[\$]	[Years]	[teCO ₂]
RCx & Controls Optimisation	0	600,658	\$61,627	546	\$14,827	333	\$9,235	\$85,689	\$40,875	0.5	166.6

Impact on Operations and Maintenance

- Reducing the run time of equipment will reduce the maintenance requirements and extend equipment lifetimes.
- It is expected that operations and maintenance staff will assist and participate in the recommissioning process.

Estimated Service Life

- Re-commissioning – 5 years.

Implementation Guidelines

- The toilets on the 13th floor are rated to operate with a static pressure of 35 psig. Should there be any issues flushing the toilets, the static pressure setpoint can be adjusted until the DCW pumps provide the appropriate pressure for flushing.

5.3 O&M Measures

Description of Existing System

The audit identified various opportunities to improve the energy performance of the facility through improved O&M practices and low-cost measures.

Energy Efficiency Measure

The following O&M measures are proposed:

- Install removable insulation jackets on exposed steam traps.
- Insulate exposed steam pipes in the mechanical rooms.
- Install weather stripping around leaky exterior doors.
- Install low flow 0.5 gpm aerators on all sinks.

Exhibit 19 presents a summary of the financial justification for the measure including total project cost, cost savings, simple payback period, and GHG emissions reduction. Refer to [Appendix B](#) for details of costs and savings.

Exhibit 19 O&M Measure Summary

Energy Reduction Measure	Steam		Chilled Water		Water		Total Savings	Estimated Cost	Simple Payback	GHG Reduction
	[GJ]	[\$]	[GJ]	[\$]	[m ³]	[\$]				
O&M Measures	733	\$19,916	111	\$3,078	5,279	\$18,365	\$41,360	\$43,750	1.1	48.7

Impact on Operations and Maintenance

- It is anticipated that the measures identified above would be implemented by the present maintenance staff as part of their routine maintenance activities.
- Insulating exposed piping and steam traps will improve the safety of the mechanical spaces by covering up exposed hot surfaces.

Estimated Service Life

- 5 years.

5.4 Water Fixtures

Description of Existing System

Urinals are 3.8 LPF wall mounted flush valve type.

Energy Efficiency Measure

- Replace all 3.8 LPF urinals with 1.9 LPF equivalents.

Exhibit 20 presents a summary of the financial justification for the measure including total project cost, cost savings, simple payback period, and GHG emissions reduction. Refer to [Appendix B](#) for details of costs and savings.

Exhibit 20 Water Fixtures Measure Summary

Energy Reduction Measure	Water		Total Savings	Estimated Cost	Simple Payback	GHG Reduction
	[m ³]	[\$]	[\$]	[\$]	[Years]	[teCO ₂]
Water Fixtures	2,354	\$8,191	\$22,600	\$46,498	2.1	33.9

Impact on Operations and Maintenance

- The new equipment will require initial commissioning but very little ongoing maintenance.

Estimated Service Life

- Plumbing fixtures - 20 years.

5.5 Measures Considered and Not Recommended

At the request of PWGSC, ICF considered the following measures which we do not recommend implementing:

- **Daylight Controls**

A measure to install daylight controls on the perimeter of floors 3 to 13 and dim the light fixtures to adjust for the presence of daylight was evaluated. The measure was found to have a payback that was longer than the 15 year life of the measure. A summary of the project costs and savings are presented below:

Energy Generation Opportunity	Electricity			Total Savings	Estimated Cost	Simple Payback	GHG Reduction
	[kW]	[kWh]	[\$]	[\$]	[\$]	[Years]	[teCO ₂]
Daylight Controls	14.5	45,302	\$6,063	\$6,063	\$144,125	23.8	9.5

Due to the long payback, which would exceed the life of the measure, it is not recommended to proceed with this project.

Appendix A EAR Templates

- Table 1: Description of Facility
- Table 2: Space Occupancy
- Table 3: Existing Drawing References
- Table 4: Lighting Template
- Table 5: AHU & Fan Summary
- Table 6: Pump Summary
- Table 7: Water Audit
- Table 8: Utility Usage Summary
- Table 9: Measure Summary

Table 1: Description of Facility

Name of Facility			Address	
Owner (if not PWGSC)			Address	
Building Management	Brookfield Johnson Controls	Address		
Building Name	Jean Talon	Building #		
Address (Street or P.O. Box)	170 Tunney's Pasture Dr., Ottawa	City, Province/Territory, Postal Code		Ottawa, ON K1A 0T6
Building Manager (administrator responsible)	Matthew McNaughton		Bldg. Manager's Phone 613-567-6721	
Date of Audit December 8, 2011	Type of Facility Office <input checked="" type="checkbox"/> Laboratory <input type="checkbox"/> Other <input type="checkbox"/> Date of construction: <u>1979</u> Population of Facility: <u>2380 FTE</u>			
Original Architects (if known)		Original Engineers (if known)		
Building Modifications or Changes In Use Anticipated in the next 15 years: Building recently refitted, no modifications or changes anticipated.			Remaining Useful life of the building: At least 20 Years	
Does the Facility have an ongoing energy management program?				<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Previous Energy Audits Completed? (if yes, give dates) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Any other audits which may exist were not provided for this project. Since the building has recently undergone a significant refit, it is unlikely that any previous energy audit would encompass the building as it currently exists.				
Previous Architectural/Engineering Studies Undertaken? (if Yes, Specify) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
Name of Utility Suppliers	Electricity: Hydro Ottawa Steam: Central Heating Plant Chilled Water: Central Heating Plant Water: City of Ottawa			

Table 2: Space Occupancy

Space Category	Floor(s)	% of Space
Office	Ground - 13	76%
Common Areas	All	10%
Mechanical & Other	B2, B1, Penthouse	14%

Table 3: Existing Drawing References

Project / Drawing #	Rev	Title/Description	Date	Location Where Stored
N/A	N/A	Floor Plans	N/A	PWGSC

Table 4: Lighting Template

		Existing System							Proposed System							Costs					Savings							
Floor	Area	Description	Fixture	Lamp	Qty.	Watts	Hours	kWh	kW	Measure	Lamp	Watts	Occ. Sensor	Hours	kWh	kW	Unit Matl.	Unit Labour	Sensor Cost	Material	Labour	Total Cost	Project Costs	Total Project	kWh Savings	kW Savings	Cost Savings	Simple Payback
1st Basement		Storage	Strip	T8	40	30	260	312	1.20	Relamp	LED	16.5	0	260	172	0.66	\$22	\$5	\$0	\$880	\$180	\$1,060	\$265	\$1,325	140	0.54	\$67	19.8
1st Basement		Storage	Strip	T8	35	30	260	273	1.05	Relamp	LED	16.5	0	260	150	0.58	\$22	\$5	\$0	\$770	\$158	\$928	\$232	\$1,159	123	0.47	\$59	19.8
1st Basement		Storage Area	Strip	T8	45	30	260	351	1.35	Relamp	LED	16.5	0	260	193	0.74	\$22	\$5	\$0	\$990	\$203	\$1,193	\$298	\$1,491	158	0.61	\$75	19.8
1st Basement		Storage Area	Strip	T8	58	30	260	452	1.74	Relamp	LED	16.5	0	260	249	0.96	\$22	\$5	\$0	\$1,276	\$261	\$1,537	\$384	\$1,921	204	0.78	\$97	19.8
1st Basement		Storage Area	Strip	T8	48	30	260	374	1.44	Relamp	LED	16.5	0	260	206	0.79	\$22	\$5	\$0	\$1,056	\$216	\$1,272	\$318	\$1,590	168	0.65	\$80	19.8
1st Basement		Shipping Receiving Area	Strip	T8	116	30	260	905	3.48	Relamp	LED	16.5	0	260	498	1.91	\$22	\$5	\$0	\$2,552	\$522	\$3,074	\$769	\$3,843	407	1.57	\$194	19.8
1st Basement	B-1W-7	Staircase No 5	Troffer	T8	2	30	8,736	524	0.66	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
1st Basement		Vestibule	Troffer	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	52	0.01	\$7	5.0
1st Basement		Staircase No 4	Troffer	T8	2	30	8,736	524	0.66	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
1st Basement		Sprinkler Room	Troffer	T8	3	30	3,822	344	0.09	Relamp	LED	16.5	0	3,822	189	0.05	\$22	\$5	\$0	\$66	\$14	\$80	\$20	\$99	155	0.04	\$20	5.0
1st Basement		Sprinkler Room	Strip	T8	3	30	3,822	344	0.09	Relamp	LED	16.5	0	3,822	189	0.05	\$22	\$5	\$0	\$66	\$14	\$80	\$20	\$99	155	0.04	\$20	5.0
1st Basement		Mechanical Room	Strip	T8	23	30	3,120	2,153	0.69	Relamp/Occ. Sensor	LED	16.5	1	2,184	829	0.38	\$22	\$5	\$160	\$666	\$104	\$770	\$192	\$962	1,324	0.31	\$166	5.8
1st Basement		Fan Room	Strip	T8	5	30	3,822	573	0.15	Relamp	LED	16.5	0	3,822	315	0.08	\$22	\$5	\$0	\$110	\$23	\$133	\$33	\$166	258	0.07	\$33	5.0
1st Basement		Fan Room	Sconce	CFL	2	13	3,822	99	0.03	None	CFL	13	0	3,822	99	0.03	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		Storage	Pot Light	CFL	2	18	260	9	0.04	None	CFL	18	0	260	9	0.04	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		Telephone Room	Strip	T8	2	30	3,822	229	0.06	Relamp	LED	16.5	0	3,822	126	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	103	0.03	\$13	5.0
1st Basement		Corridor	Troffer	T8	1	30	4,368	131	0.03	Relamp	LED	16.5	0	4,368	72	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	59	0.01	\$7	4.5
1st Basement		Corridor	Troffer	T8	2	59	4,368	515	0.12	Relamp	LED	33	0	4,368	288	0.07	\$42	\$5	\$0	\$84	\$9	\$93	\$23	\$116	227	0.05	\$28	4.1
1st Basement		Corridor	Troffer	T8	1	59	4,368	258	0.06	Relamp	LED	33	0	4,368	144	0.03	\$42	\$5	\$0	\$42	\$5	\$47	\$12	\$58	114	0.03	\$14	4.1
1st Basement		Staircase No 12	Troffer	T8	1	30	8,736	262	0.03	Relamp	LED	16.5	0	8,736	144	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	118	0.01	\$13	2.5
1st Basement		Garbage Room	Strip	T8	4	30	3,822	459	0.12	Relamp	LED	16.5	0	3,822	252	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	206	0.05	\$26	5.0
1st Basement		Elec Room	Troffer	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	52	0.01	\$7	5.0
1st Basement		Elec Room	Emergency	Halogen	1	0	0	0	0.00	None	Halogen	0	0	0	0	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		Staircase	Troffer	T8	1	30	8,736	262	0.03	Relamp	LED	16.5	0	8,736	144	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	118	0.01	\$13	2.5
1st Basement		Corridor	Troffer	T8	4	59	4,368	1,031	0.24	Relamp	LED	33	0	4,368	577	0.13	\$42	\$5	\$0	\$168	\$18	\$186	\$47	\$233	454	0.10	\$57	4.1
1st Basement		Corridor	Troffer	T8	5	59	4,368	1,289	0.30	Relamp	LED	33	0	4,368	721	0.17	\$42	\$5	\$0	\$210	\$23	\$233	\$58	\$291	568	0.13	\$71	4.1
1st Basement		Kitchen Storage	Troffer	T8	6	59	260	92	0.35	Relamp	LED	33	0	260	51	0.20	\$42	\$5	\$0	\$252	\$27	\$279	\$70	\$349	41	0.16	\$19	18.0
1st Basement		Men's Changing Room	Pot Light	CFL	9	18	3,822	619	0.16	None	CFL	18	0	3,822	619	0.16	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		Washroom	Troffer	T8	1	30	1,560	47	0.03	Relamp/Occ. Sensor	LED	16.5	1	1,092	18	0.02	\$22	\$5	\$160	\$182	\$5	\$187	\$47	\$233	29	0.01	\$4	54.6
1st Basement		Washroom	Troffer	T8	1	30	1,560	47	0.03	Relamp/Occ. Sensor	LED	16.5	0	1,092	18	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	29	0.01	\$4	7.8
1st Basement		Men's Washroom	Pot Light	CFL	6	18	1,560	168	0.11	None/Occ. Sensor	CFL	18	1	1,092	118	0.11	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	51	0.00	\$5	38.6
1st Basement		Men's Washroom	Recessed Troffe	T8	2	30	1,560	94	0.06	Relamp/Occ. Sensor	LED	16.5	0	1,092	36	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	58	0.03	\$9	7.8
1st Basement		Office	Strip	T8	11	30	2,600	858	0.33	Relamp	LED	16.5	0	2,600	472	0.18	\$22	\$5	\$0	\$242	\$50	\$292	\$73	\$364	386	0.15	\$54	6.7
1st Basement	B-1W-22	Office	Strip	T8	14	30	2,600	1,092	0.42	Relamp	LED	16.5	0	2,600	601	0.23	\$22	\$5	\$0	\$308	\$63	\$371	\$93	\$464	491	0.19	\$69	6.7
1st Basement		Corridor	Troffer	T8	14	59	4,368	3,608	0.83	Relamp	LED	33	0	4,368	2,018	0.46	\$42	\$5	\$0	\$588	\$63	\$651	\$163	\$814	1,590	0.36	\$199	4.1
1st Basement		Storage	Sconce	CFL	8	13	260	27	0.10	None	CFL	13	0	260	27	0.10	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		High Voltage Room	Strip	T8	8	30	3,822	917	0.24	Relamp	LED	16.5	0	3,822	505	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	413	0.11	\$53	5.0
1st Basement		Storage	Sconce	CFL	8	13	260	27	0.10	None	CFL	13	0	260	27	0.10	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		South entrance	Recessed Troffe	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	52	0.01	\$7	5.0
1st Basement	B-1E-16	High Voltage Room	Troffer	T8	12	30	3,822	1,376	0.36	Relamp	LED	16.5	0	3,822	757	0.20	\$22	\$5	\$0	\$264	\$54	\$318	\$80	\$398	619	0.16	\$79	5.0
1st Basement		High Voltage Room	Emergency	Halogen	2	0	0	0	0.00	None	Halogen	0	0	0	0	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		Cleaning Storage	Troffer	T8	4	59	260	61	0.24	Relamp	LED	33	0	260	34	0.13	\$42	\$5	\$0	\$168	\$18	\$186	\$47	\$233	27	0.10	\$13	18.0
1st Basement		Cleaning Office	Troffer	T8	4	59	2,600	614	0.24	Relamp	LED	33	0	2,600	343	0.13	\$42	\$5	\$0	\$168	\$18	\$186	\$47	\$233	270	0.10	\$38	6.1
1st Basement		Mechanical Room	Strip	T8	2	30	3,120	187	0.06	Relamp/Occ. Sensor	LED	16.5	1	2,184	72	0.03	\$22	\$5	\$160	\$204	\$9	\$213	\$53	\$266	115	0.03	\$14	18.4
1st Basement		Mechanical Room	Troffer	T8	4	30	3,120	374	0.12	Relamp/Occ. Sensor	LED	16.5	1	2,184	144	0.07	\$22	\$5	\$160	\$248	\$18	\$266	\$67	\$333	230	0.05	\$29	11.5
1st Basement		Storage	Strip	T8	2	30	260	16	0.06	Relamp	LED	16.5	0	260	9	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	7	0.03	\$3	19.8
1st Basement		Storage	Strip	T8	2	30	260	16	0.06	Relamp	LED	16.5	0	260	9	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	7	0.03	\$3	19.8
1st Basement	B-1E-12	Office Area	Strip	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	281	0.11	\$39	6.7
1st Basement		Corridor	Recessed Troffe	T8	14	30	4,368	1,835	0.42	Relamp	LED	16.5	0	4,368	1,009	0.23	\$22	\$5	\$0	\$308	\$63	\$371	\$93	\$464	826	0.19	\$103	4.5
1st Basement		Elevator Lobby	Pot Light	CFL	9	18	4,368	708	0.16	None	CFL	18	0	4,368	708	0.16	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		Elevator Room	Strip	T8	3	30	3,822	344	0.09	Relamp	LED	16.5	0	3,822	189	0.05	\$22	\$5	\$0	\$66	\$14	\$80	\$20	\$99	155	0.04	\$20	5.0
1st Basement		Telecom	Troffer	T8	5	30	3,822	573	0.15	Relamp	LED	16.5	0	3,822	315	0.08	\$22	\$5	\$0	\$110	\$23	\$133	\$33	\$166	258	0.07	\$33	5.0
1st Basement	B-1E-8	Telecom	Troffer	T8	4	30	3,822	459	0.12	Relamp	LED	16.5	0	3,822	252	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	206	0.05	\$26	5.0
1st Basement		Telecom	Strip	T8	4	30	3,822	459	0.12	Relamp	LED	16.5	0	3,822	252	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	206	0.05	\$26	5.0
1st Basement		Women's Washroom	Pot Light	CFL	5	18	1,560	140	0.09	None/Occ. Sensor	CFL	18	1	1,092	98	0.09	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	42	0.00	\$4	46.3
1st Basement		Women's Washroom	Recessed Troffe	T8	2	30	1,560																					

Table 4: Lighting Template

Floor	Area	Description	Existing System						Proposed System						Costs					Savings								
			Fixture	Lamp	Qty.	Watts	Hours	kWh	kW	Measure	Lamp	Watts	Occ. Sensor	Hours	kWh	kW	Unit Matl.	Unit Labour	Sensor Cost	Material	Labour	Total Cost	Project Costs	Total Project	kWh Savings	kW Savings	Cost Savings	Simple Payback
1st Basement		Staircase	Strip	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
1st Basement		Staircase No. 2	Troffer	T8	1	30	8,736	262	0.03	Relamp	LED	16.5	0	8,736	144	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	118	0.01	\$13	2.5
1st Basement		Staircase No. 6	Troffer	T8	3	30	8,736	786	0.09	Relamp	LED	16.5	0	8,736	432	0.05	\$22	\$5	\$0	\$66	\$14	\$80	\$20	\$99	354	0.04	\$40	2.5
1st Basement		Staircase Corridor	Recessed Troffe	T8	1	30	4,368	131	0.03	Relamp	LED	16.5	0	4,368	72	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	59	0.01	\$7	4.5
1st Basement		Storage Area	Recessed Troffe	T8	282	30	260	2,200	8.46	Relamp	LED	16.5	0	260	1,210	4.65	\$22	\$5	\$0	\$6,204	\$1,269	\$7,473	\$1,868	\$9,341	990	3.81	\$473	19.8
1st Basement		Filing Area	Recessed Troffe	T8	234	30	3,822	26,830	7.02	Relamp	LED	16.5	0	3,822	14,757	3.86	\$22	\$5	\$0	\$5,148	\$1,053	\$6,201	\$1,550	\$7,751	12,074	3.16	\$1,547	5.0
1st Basement		Office Area	Recessed Troffe	T8	80	30	2,600	6,240	2.40	Relamp	LED	16.5	0	2,600	3,432	1.32	\$22	\$5	\$0	\$1,760	\$360	\$2,120	\$530	\$2,650	2,808	1.08	\$393	6.7
1st Basement		Elec Room	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	52	0.01	\$7	5.0
1st Basement		Corridor	Strip	T8	1	30	4,368	131	0.03	Relamp	LED	16.5	0	4,368	72	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	59	0.01	\$7	4.5
1st Basement		Staircase No 3	Strip	T8	1	30	8,736	262	0.03	Relamp	LED	16.5	0	8,736	144	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	118	0.01	\$13	2.5
1st Basement		Staircase No 3	Troffer	T8	1	30	8,736	262	0.03	Relamp	LED	16.5	0	8,736	144	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	118	0.01	\$13	2.5
1st Basement		Tel Room	Pot Light	CFL	1	18	3,822	69	0.02	None	CFL	18	0	3,822	69	0.02	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		Office & Filing Area	Recessed Troffe	T8	377	30	2,600	29,406	11.31	Relamp	LED	16.5	0	2,600	16,173	6.22	\$22	\$5	\$0	\$8,294	\$1,697	\$9,991	\$2,498	\$12,488	13,233	5.09	\$1,854	6.7
1st Basement		LAN Room	Recessed Troffe	T8	4	30	3,822	459	0.12	Relamp	LED	16.5	0	3,822	252	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	206	0.05	\$26	5.0
1st Basement	B-1E-34	Office Area	Recessed Troffe	T8	36	30	2,600	2,808	1.08	Relamp	LED	16.5	0	2,600	1,544	0.59	\$22	\$5	\$0	\$792	\$162	\$954	\$239	\$1,193	1,264	0.49	\$177	6.7
1st Basement		Corridor	Recessed Troffe	T8	13	30	4,368	1,704	0.39	Relamp	LED	16.5	0	4,368	937	0.21	\$22	\$5	\$0	\$286	\$59	\$345	\$86	\$431	767	0.18	\$96	4.5
1st Basement	B-1E-22	Corridor	Troffer	T8	12	59	4,368	3,093	0.71	Relamp	LED	33	0	4,368	1,730	0.40	\$42	\$5	\$0	\$504	\$54	\$558	\$140	\$698	1,363	0.31	\$170	4.1
1st Basement		Corridor	Troffer	T8	4	59	4,368	1,031	0.24	Relamp	LED	33	0	4,368	577	0.13	\$42	\$5	\$0	\$168	\$18	\$186	\$47	\$233	454	0.10	\$57	4.1
1st Basement		Corridor	Troffer	T8	12	59	4,368	3,093	0.71	Relamp	LED	33	0	4,368	1,730	0.40	\$42	\$5	\$0	\$504	\$54	\$558	\$140	\$698	1,363	0.31	\$170	4.1
1st Basement		Storage	Troffer	T8	4	59	260	61	0.24	Relamp	LED	33	0	260	34	0.13	\$42	\$5	\$0	\$168	\$18	\$186	\$47	\$233	27	0.10	\$13	18.0
1st Basement		Storage	Pot Light	CFL	4	18	260	19	0.07	None	CFL	18	0	260	19	0.07	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		Storage	Troffer	T8	4	59	260	61	0.24	Relamp	LED	33	0	260	34	0.13	\$42	\$5	\$0	\$168	\$18	\$186	\$47	\$233	27	0.10	\$13	18.0
1st Basement		Storage	Pot Light	CFL	4	18	260	19	0.07	None	CFL	18	0	260	19	0.07	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		Storage	Troffer	T8	4	59	260	61	0.24	Relamp	LED	33	0	260	34	0.13	\$42	\$5	\$0	\$168	\$18	\$186	\$47	\$233	27	0.10	\$13	18.0
1st Basement		Storage	Pot Light	CFL	4	18	260	19	0.07	None	CFL	18	0	260	19	0.07	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		Storage	Troffer	T8	4	59	260	61	0.24	Relamp	LED	33	0	260	34	0.13	\$42	\$5	\$0	\$168	\$18	\$186	\$47	\$233	27	0.10	\$13	18.0
1st Basement		Storage	Pot Light	CFL	4	18	260	19	0.07	None	CFL	18	0	260	19	0.07	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		Boardroom B-1E-32	Troffer	T8	4	59	3,822	902	0.24	Relamp/Occ. Sensor	LED	33	1	2,675	353	0.13	\$42	\$5	\$160	\$328	\$18	\$346	\$87	\$433	549	0.10	\$66	6.5
1st Basement		Boardroom B-1E-32	Pot Light	CFL	4	18	3,822	275	0.07	None/Occ. Sensor	CFL	18	0	2,675	193	0.07	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	83	0.00	\$8	0.0
1st Basement		Storage	Troffer	T8	4	59	260	61	0.24	Relamp	LED	33	0	260	34	0.13	\$42	\$5	\$0	\$168	\$18	\$186	\$47	\$233	27	0.10	\$13	18.0
1st Basement		Storage	Troffer	T8	4	59	260	61	0.24	Relamp	LED	33	0	260	34	0.13	\$42	\$5	\$0	\$168	\$18	\$186	\$47	\$233	27	0.10	\$13	18.0
1st Basement		Storage	Pot Light	CFL	4	18	260	19	0.07	None	CFL	18	0	260	19	0.07	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		Storage	Troffer	T8	3	59	260	46	0.18	Relamp	LED	33	0	260	26	0.10	\$42	\$5	\$0	\$126	\$14	\$140	\$35	\$174	20	0.08	\$10	18.0
1st Basement		Storage	Pot Light	CFL	4	18	260	19	0.07	None	CFL	18	0	260	19	0.07	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement	B-1E-24	Office	Troffer	T8	2	59	2,600	307	0.12	Relamp	LED	33	0	2,600	172	0.07	\$42	\$5	\$0	\$84	\$9	\$93	\$23	\$116	135	0.05	\$19	6.1
1st Basement	B-1E-25	Conference Room	Troffer	T8	4	59	3,822	902	0.24	Relamp	LED	33	0	3,822	505	0.13	\$42	\$5	\$0	\$168	\$18	\$186	\$47	\$233	397	0.10	\$51	4.6
1st Basement	B-1E-26	Storage	Troffer	T8	2	59	260	31	0.12	Relamp	LED	33	0	260	17	0.07	\$42	\$5	\$0	\$84	\$9	\$93	\$23	\$116	14	0.05	\$6	18.0
1st Basement		Kitchen	Pot Light	CFL	2	18	3,822	138	0.04	None	CFL	18	0	3,822	138	0.04	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		Open Area	Troffer	T8	4	59	3,822	902	0.24	Relamp	LED	33	0	3,822	505	0.13	\$42	\$5	\$0	\$168	\$18	\$186	\$47	\$233	397	0.10	\$51	4.6
1st Basement		Open Area	Pot Light	CFL	4	18	3,822	275	0.07	None	CFL	18	0	3,822	275	0.07	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		Meeting Room	Troffer	T8	4	59	3,822	902	0.24	Relamp	LED	33	0	3,822	505	0.13	\$42	\$5	\$0	\$168	\$18	\$186	\$47	\$233	397	0.10	\$51	4.6
1st Basement		Meeting Room	Pot Light	CFL	4	18	3,822	275	0.07	None	CFL	18	0	3,822	275	0.07	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement		Staircase No 9	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
1st Basement		Office/ Storage	Recessed Troffe	T8	276	30	2,600	21,528	8.28	Relamp	LED	16.5	0	2,600	11,840	4.55	\$22	\$5	\$0	\$6,072	\$1,242	\$7,314	\$1,829	\$9,143	9,688	3.73	\$1,357	6.7
1st Basement	B-1E-40	Vault	Pot Light	CFL	17	18	3,822	1,170	0.31	None	CFL	18	0	3,822	1,170	0.31	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
1st Basement	B-1E-41A	Filing Area	Troffer	T8	44	59	3,822	9,922	2.60	Relamp	LED	33	0	3,822	5,550	1.45	\$42	\$5	\$0	\$1,848	\$198	\$2,046	\$512	\$2,558	4,372	1.14	\$560	4.6
1st Basement	B-1E-41A	Filing Area	Troffer	T8	128	30	3,822	14,676	3.84	Relamp	LED	16.5	0	3,822	8,072	2.11	\$22	\$5	\$0	\$2,816	\$576	\$3,392	\$848	\$4,240	6,604	1.73	\$846	5.0
1st Basement		Staircase No. 7	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
1st Basement																												

Table 4: Lighting Template

		Existing System							Proposed System							Costs					Savings								
Floor	Area	Description	Fixture	Lamp	Qty.	Watts	Hours	kWh	kW	Measure	Lamp	Watts	Occ. Sensor	Hours	kWh	kW	Unit Matl.	Unit Labour	Sensor Cost	Material	Labour	Total Cost	Project Costs	Total Project	kWh Savings	kW Savings	Cost Savings	Simple Payback	
Ground Floor		Cafeteria	Recessed Troffe	T8	18	30	3,822	2,064	0.54	Relamp	LED	16.5	0	3,822	1,135	0.30	\$22	\$5	\$0	\$396	\$81	\$477	\$119	\$596	\$29	0.24	\$119	5.0	
Ground Floor		Cafeteria	Troffer	T8	38	30	3,822	4,357	1.14	Relamp	LED	16.5	0	3,822	2,396	0.63	\$22	\$5	\$0	\$836	\$171	\$1,007	\$252	\$1,259	\$1,961	0.51	\$251	5.0	
Ground Floor		Cafeteria	Pot Light	CFL	21	18	3,822	1,445	0.38	None	CFL	18	0	3,822	1,445	0.38	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Terrace Area Vestibule 2	Strip	T8	1	30	4,368	131	0.03	Relamp	LED	16.5	0	4,368	72	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	\$9	0.01	\$7	4.5	
Ground Floor		Cafeteria	Pot Light	CFL	100	18	3,822	6,880	1.80	None	CFL	18	0	3,822	6,880	1.80	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Staircase No 1	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$236	0.03	\$27	2.5	
Ground Floor		Starbucks Coffee	Pot Light	CFL	13	18	3,822	894	0.23	None	CFL	18	0	3,822	894	0.23	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Starbucks Coffee	Track Lighting	Halogen	5	50	3,822	956	0.25	Relamp	LED	12	0	3,822	229	0.06	\$15	\$2	\$0	\$75	\$8	\$83	\$21	\$103	\$726	0.19	\$93	1.1	
Ground Floor		Cafeteria	Pot Light	CFL	36	18	3,822	2,477	0.65	None	CFL	18	0	3,822	2,477	0.65	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Cafeteria	Recessed Troffe	T8	5	30	3,822	573	0.15	Relamp	LED	16.5	0	3,822	315	0.08	\$22	\$5	\$0	\$110	\$23	\$133	\$33	\$166	\$258	0.07	\$33	5.0	
Ground Floor		Kitchen Staircase	Troffer	T8	2	30	3,822	229	0.06	Relamp	LED	16.5	0	3,822	126	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$103	0.03	\$13	5.0	
Ground Floor		Kitchen	Recessed Troffe	T8	30	30	3,822	3,440	0.90	Relamp/Occ. Sensor	LED	16.5	1	2,675	1,324	0.50	\$22	\$5	\$160	\$820	\$135	\$955	\$239	\$1,194	2,115	0.41	\$257	4.7	
Ground Floor		Kitchen Servery	Recessed Troffe	T8	4	30	3,822	459	0.12	Relamp/Occ. Sensor	LED	16.5	1	2,675	177	0.07	\$22	\$5	\$160	\$248	\$18	\$266	\$67	\$333	\$282	0.05	\$34	9.7	
Ground Floor		Kitchen Storage	Recessed Troffe	T8	1	30	260	8	0.03	Relamp	LED	16.5	0	260	4	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	4	0.01	\$2	19.8	
Ground Floor		Kitchen Office	Recessed Troffe	T8	2	30	2,600	156	0.06	Relamp/Occ. Sensor	LED	16.5	1	1,820	60	0.03	\$22	\$5	\$160	\$204	\$9	\$213	\$53	\$266	\$96	0.03	\$12	21.3	
Ground Floor		Freezer	Sconce	CFL	1	13	3,822	50	0.01	None	CFL	13	0	3,822	50	0.01	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Freezer	Sconce	CFL	1	13	3,822	50	0.01	None	CFL	13	0	3,822	50	0.01	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Servery	Recessed Troffe	T8	7	30	3,822	803	0.21	Relamp	LED	16.5	0	3,822	441	0.12	\$22	\$5	\$0	\$154	\$32	\$186	\$46	\$232	\$361	0.09	\$46	5.0	
Ground Floor		Cafeteria Serving Area	Recessed Troffe	T8	8	30	3,822	917	0.24	Relamp	LED	16.5	0	3,822	505	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	\$413	0.11	\$53	5.0	
Ground Floor		Cafeteria Serving Area	Pot Light	CFL	19	18	3,822	1,307	0.34	None	CFL	18	0	3,822	1,307	0.34	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Cafeteria Entrance Corridc	Pot Light	CFL	8	18	4,368	629	0.14	None	CFL	18	0	4,368	629	0.14	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Staircase No. 10	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$236	0.03	\$27	2.5	
Ground Floor		West Entrance Vestibule	Pot Light	CFL	9	18	4,368	708	0.16	None	CFL	18	0	4,368	708	0.16	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Main Lobby	Pot Light	CFL	106	18	4,368	8,334	1.91	None	CFL	18	0	4,368	8,334	1.91	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Lobby	Track Lighting	Halogen	18	50	4,368	3,931	0.90	Relamp	LED	12	0	4,368	943	0.22	\$15	\$2	\$0	\$270	\$27	\$297	\$74	\$371	\$2,988	0.68	\$373	1.0	
Ground Floor		Rotunda	Troffer	T8	16	30	3,822	1,835	0.48	Relamp	LED	16.5	0	3,822	1,009	0.26	\$22	\$5	\$0	\$352	\$72	\$424	\$106	\$530	\$826	0.22	\$106	5.0	
Ground Floor		Rotunda	Pot Light	CFL	8	18	3,822	550	0.14	None	CFL	18	0	3,822	550	0.14	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Corridor	Pot Light	CFL	5	18	4,368	393	0.09	None	CFL	18	0	4,368	393	0.09	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Corridor	Pot Light	CFL	38	18	4,368	2,988	0.68	None	CFL	18	0	4,368	2,988	0.68	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Elevator Lobby	Pot Light	CFL	14	18	4,368	1,101	0.25	None	CFL	18	0	4,368	1,101	0.25	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Elevator Lobby	Pot Light	CFL	14	18	4,368	1,101	0.25	None	CFL	18	0	4,368	1,101	0.25	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Elec Room	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	\$52	0.01	\$7	5.0	
Ground Floor		Mail Room	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	\$52	0.01	\$7	5.0	
Ground Floor		Storage	Pot Light	CFL	12	18	260	56	0.22	None	CFL	18	0	260	56	0.22	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Storage	Pot Light	CFL	1	18	260	5	0.02	None	CFL	18	0	260	5	0.02	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Storage	Track Lighting	Halogen	2	50	260	26	0.10	Relamp	LED	12	0	260	6	0.02	\$15	\$2	\$0	\$30	\$3	\$33	\$8	\$41	\$20	0.08	\$9	4.4	
Ground Floor		Tel. Room	Troffer	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	\$52	0.01	\$7	5.0	
Ground Floor		Boardroom	Pot Light	CFL	44	18	3,822	3,027	0.79	None/Occ. Sensor	CFL	18	1	2,675	2,119	0.79	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	\$908	0.00	\$93	2.1	
Ground Floor		Boardroom	Troffer	T8	16	59	3,822	3,608	0.94	Relamp/Occ. Sensor	LED	33	0	2,675	1,413	0.53	\$42	\$5	\$0	\$672	\$72	\$744	\$186	\$930	\$2,195	0.42	\$266	3.5	
Ground Floor		Staircase No. 4	Troffer	T8	1	30	8,736	262	0.03	Relamp	LED	16.5	0	8,736	144	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	\$118	0.01	\$13	2.5	
Ground Floor		Staircase No. 4	Troffer	T8	1	30	8,736	262	0.03	Relamp	LED	16.5	0	8,736	144	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	\$118	0.01	\$13	2.5	
Ground Floor		Boardroom Storage/Close	Pot Light	CFL	2	18	260	9	0.04	None	CFL	18	0	260	9	0.04	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Boardroom/Stairs Corrido	Pot Light	CFL	4	18	4,368	314	0.07	None	CFL	18	0	4,368	314	0.07	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Southwest small room 1	Pot Light	CFL	2	18	3,822	138	0.04	None	CFL	18	0	3,822	138	0.04	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Security Office	Strip	T8	4	30	2,600	312	0.12	Relamp	LED	16.5	0	2,600	172	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	\$140	0.05	\$20	6.7	
Ground Floor		Security Office Supply Room	Strip	T8	1	30	260	8	0.03	Relamp	LED	16.5	0	260	4	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	4	0.01	\$2	19.8	
Ground Floor		Southwest small room 2	Strip	T8	4	30	3,822	459	0.12	Relamp	LED	16.5	0	3,822	252	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	\$206	0.05	\$26	5.0	
Ground Floor		South Entrance Vestibule	Pot Light	CFL	9	18	4,368	708	0.16	None	CFL	18	0	4,368	708	0.16	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		South Entrance Lobby	Pot Light	CFL	14	18	4,368	1,101	0.25	None	CFL	18	0	4,368	1,101	0.25	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		South Entrance Lobby	Troffer	T8	11	30	4,368	1,441	0.33	Relamp	LED	16.5	0	4,368	793	0.18	\$22	\$5	\$0	\$242	\$50	\$292	\$73	\$364	\$649	0.15	\$81	4.5	
Ground Floor		Office Area	Recessed Troffe	T8	36	30	2,600	2,808	1.08	Relamp	LED	16.5	0	2,600	1,544	0.59	\$22	\$5	\$0	\$792	\$162	\$954	\$239	\$1,193	\$1,264	0.49	\$177	6.7	
Ground Floor		Training Centre	Recessed Troffe	T8	28	30	3,822	3,210	0.84	Relamp	LED	16.5	0	3,822	1,766	0.46	\$22	\$5	\$0	\$616	\$126	\$742	\$186	\$928	\$1,445	0.38	\$185	5.0	
Ground Floor		Storage	Recessed Troffe	T8	5	30	260	39	0.15	Relamp	LED	16.5	0	260	21	0.08	\$22	\$5	\$0	\$110	\$23	\$133	\$33	\$166	\$18	0.07	\$8	19.8	
Ground Floor		Janitor Room	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	\$52	0.01	\$7	5.0	
Ground Floor		Elevator 12 Lobby	Recessed Troffe	T8	8	30	4,368	1,048	0.24	Relamp	LED	16.5	0	4,368	577	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	\$472	0.11	\$59	4.5	
Ground Floor		Washroom Lobby	Recessed Troffe	T8	12	30	4,368	1,572	0.36	Relamp/Occ. Sensor	LED	16.																	

Table 4: Lighting Template

Floor	Area	Description	Existing System						Proposed System						Costs					Savings								
			Fixture	Lamp	Qty.	Watts	Hours	kWh	kW	Measure	Lamp	Watts	Occ. Sensor	Hours	kWh	kW	Unit Matl.	Unit Labour	Sensor Cost	Material	Labour	Total Cost	Project Costs	Total Project	kWh Savings	kW Savings	Cost Savings	Simple Payback
Ground Floor		Boardroom	Recessed Troffe	T8	23	30	3,822	2,637	0.69	Relamp/Occ. Sensor	LED	16.5	1	2,675	1,015	0.38	\$22	\$5	\$160	\$666	\$104	\$770	\$192	\$962	1,622	0.31	\$197	4.9
Ground Floor		Office	Recessed Troffe	T8	131	30	2,600	10,218	3.93	Relamp	LED	16.5	0	2,600	5,620	2.16	\$22	\$5	\$0	\$2,882	\$590	\$3,472	\$868	\$4,339	4,598	1.77	\$644	6.7
Ground Floor		Office	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	281	0.11	\$39	6.7
Ground Floor		Boardroom	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	423	0.08	\$51	7.8
Ground Floor		Tel Room	Sconce	CFL	1	13	3,822	50	0.01	None	CFL	13	0	3,822	50	0.01	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Staircase No 3	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
Ground Floor		Corridor	Recessed Troffe	T8	67	30	4,368	8,780	2.01	Relamp	LED	16.5	0	4,368	4,829	1.11	\$22	\$5	\$0	\$1,474	\$302	\$1,776	\$444	\$2,219	3,951	0.90	\$493	4.5
Ground Floor		Office & Filing Area	Recessed Troffe	T8	200	30	2,600	15,600	6.00	Relamp	LED	16.5	0	2,600	8,580	3.30	\$22	\$5	\$0	\$4,400	\$900	\$5,300	\$1,325	\$6,625	7,020	2.70	\$983	6.7
Ground Floor		Staircase No 9	Recessed Troffe	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
Ground Floor		Office Area	Recessed Troffe	T8	285	30	2,600	22,230	8.55	Relamp	LED	16.5	0	2,600	12,227	4.70	\$22	\$5	\$0	\$6,270	\$1,283	\$7,553	\$1,888	\$9,441	10,004	3.85	\$1,401	6.7
Ground Floor		Office	Recessed Troffe	T8	6	30	2,600	468	0.18	Relamp	LED	16.5	0	2,600	257	0.10	\$22	\$5	\$0	\$132	\$27	\$159	\$40	\$199	211	0.08	\$30	6.7
Ground Floor		Boardroom	Recessed Troffe	T8	8	30	3,822	917	0.24	Relamp/Occ. Sensor	LED	16.5	1	2,675	353	0.13	\$22	\$5	\$160	\$336	\$36	\$372	\$93	\$465	564	0.11	\$68	6.8
Ground Floor		Staircase Corridor	Troffer	T8	1	30	8,736	262	0.03	Relamp	LED	16.5	0	8,736	144	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	118	0.01	\$13	2.5
Ground Floor		Staircase No 8	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
Ground Floor		Conference Room	Recessed Troffe	T8	9	30	3,822	1,032	0.27	Relamp	LED	16.5	0	3,822	568	0.15	\$22	\$5	\$0	\$198	\$41	\$239	\$60	\$298	464	0.12	\$59	5.0
Ground Floor		Kitchen	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	423	0.08	\$51	7.8
Ground Floor		Kitchen	Recessed Troffe	T8	8	30	3,822	917	0.24	Relamp/Occ. Sensor	LED	16.5	1	2,675	353	0.13	\$22	\$5	\$160	\$336	\$36	\$372	\$93	\$465	564	0.11	\$68	6.8
Ground Floor		Filing Area	Recessed Troffe	T8	35	30	3,822	4,013	1.05	Relamp	LED	16.5	0	3,822	2,207	0.58	\$22	\$5	\$0	\$770	\$158	\$928	\$232	\$1,159	1,806	0.47	\$231	5.0
Ground Floor		Storage	Troffer	T8	2	59	260	31	0.12	Relamp	LED	33	0	260	17	0.07	\$42	\$5	\$0	\$84	\$9	\$93	\$23	\$116	14	0.05	\$6	18.0
Ground Floor		omen's Washroom Entranc	Pot Light	CFL	1	18	1,560	28	0.02	None/Occ. Sensor	CFL	18	0	1,092	20	0.02	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	8	0.00	\$1	0.0
Ground Floor		Women's Washroom	Pot Light	CFL	10	18	1,560	281	0.18	None/Occ. Sensor	CFL	18	1	1,092	197	0.18	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	84	0.00	\$9	23.1
Ground Floor		Women's Washroom	Recessed Troffe	T8	5	30	1,560	234	0.15	Relamp/Occ. Sensor	LED	16.5	0	1,092	90	0.08	\$22	\$5	\$0	\$110	\$23	\$133	\$33	\$166	144	0.07	\$21	7.8
Ground Floor		Men's Washroom Corrido	Pot Light	CFL	1	18	4,368	79	0.02	None/Occ. Sensor	CFL	18	0	3,058	55	0.02	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	24	0.00	\$2	0.0
Ground Floor		Com. Closet	Strip	T8	1	30	260	8	0.03	Relamp	LED	16.5	0	260	4	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	4	0.01	\$2	19.8
Ground Floor		Janitors Room	Strip	T8	1	30	260	8	0.03	Relamp	LED	16.5	0	260	4	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	4	0.01	\$2	19.8
Ground Floor		Men's Washroom	Pot Light	CFL	8	18	1,560	225	0.14	None/Occ. Sensor	CFL	18	1	1,092	157	0.14	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	67	0.00	\$7	28.9
Ground Floor		Men's Washroom	Recessed Troffe	T8	2	30	1,560	94	0.06	Relamp/Occ. Sensor	LED	16.5	0	1,092	36	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	58	0.03	\$9	7.8
Ground Floor		Elec Room	Recessed Troffe	T8	2	30	3,822	229	0.06	Relamp	LED	16.5	0	3,822	126	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	103	0.03	\$13	5.0
Ground Floor		Storage	Recessed Troffe	T8	3	30	260	23	0.09	Relamp	LED	16.5	0	260	13	0.05	\$22	\$5	\$0	\$66	\$14	\$80	\$20	\$99	11	0.04	\$5	19.8
Ground Floor		Boardroom	Recessed Troffe	T8	15	30	3,822	1,720	0.45	Relamp/Occ. Sensor	LED	16.5	1	2,675	662	0.25	\$22	\$5	\$160	\$490	\$68	\$558	\$139	\$697	1,058	0.20	\$128	5.4
Ground Floor		Office	Recessed Troffe	T8	6	30	2,600	468	0.18	Relamp	LED	16.5	0	2,600	257	0.10	\$22	\$5	\$0	\$132	\$27	\$159	\$40	\$199	211	0.08	\$30	6.7
Ground Floor		Computer Room	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp	LED	16.5	0	3,822	378	0.10	\$22	\$5	\$0	\$132	\$27	\$159	\$40	\$199	310	0.08	\$40	5.0
Ground Floor		Staircase No 6	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
Ground Floor		Staircase 7 Corridor	Troffer	T8	1	30	4,368	131	0.03	Relamp	LED	16.5	0	4,368	72	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	59	0.01	\$7	4.5
Ground Floor		Staircase No 7	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
Ground Floor		Duct Shaft	Sconce	CFL	3	13	3,822	149	0.04	None	CFL	13	0	3,822	149	0.04	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		Sprinkler/ Valve Room	Troffer	T8	2	30	3,822	229	0.06	Relamp	LED	16.5	0	3,822	126	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	103	0.03	\$13	5.0
Ground Floor		Sprinkler/ Valve Room	Recessed Troffe	T8	23	30	3,822	2,637	0.69	Relamp	LED	16.5	0	3,822	1,450	0.38	\$22	\$5	\$0	\$506	\$104	\$610	\$152	\$762	1,187	0.31	\$152	5.0
Ground Floor		inkler/ Valve East Side Ro	Sconce	CFL	3	13	3,822	149	0.04	None	CFL	13	0	3,822	149	0.04	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Ground Floor		inkler/ Valve West Side R	Troffer	T8	3	30	3,822	344	0.09	Relamp	LED	16.5	0	3,822	189	0.05	\$22	\$5	\$0	\$66	\$14	\$80	\$20	\$99	155	0.04	\$20	5.0
Ground Floor		Office Area	Recessed Troffe	T8	865	30	2,600	67,470	25.95	Relamp	LED	16.5	0	2,600	37,109	14.27	\$22	\$5	\$0	\$19,030	\$3,893	\$22,923	\$5,731	\$28,653	30,362	11.68	\$4,253	6.7
2nd Floor		Office Area	Recessed Troffe	T8	82	30	2,600	6,396	2.46	Relamp	LED	16.5	0	2,600	3,518	1.35	\$22	\$5	\$0	\$1,804	\$369	\$2,173	\$543	\$2,716	2,878	1.11	\$403	6.7
2nd Floor		Corridor	Recessed Troffe	T8	4	30	4,368	524	0.12	Relamp	LED	16.5	0	4,368	288	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	236	0.05	\$29	4.5
2nd Floor		Boardroom	Recessed Troffe	T8	16	30	3,822	1,835	0.48	Relamp/Occ. Sensor	LED	16.5	1	2,675	706	0.26	\$22	\$5	\$160	\$512	\$72	\$584	\$146	\$730	1,128	0.22	\$137	5.3
2nd Floor		Boardroom	Sconce	CFL	8	13	3,822	397	0.10	None/Occ. Sensor	CFL	13	0	2,675	278	0.10	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	119	0.00	\$12	0.0
2nd Floor		Corridor	Strip	T8	2	30	4,368	262	0.06	Relamp	LED	16.5	0	4,368	144	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	118	0.03	\$15	4.5
2nd Floor		Corridor	Recessed Troffe	T8	5	30	4,368	655	0.15	Relamp	LED	16.5	0	4,368	360	0.08	\$22	\$5	\$0	\$110	\$23	\$133	\$33	\$166	295	0.07	\$37	4.5
2nd Floor		LAN Room	Recessed Troffe	T8																								

Table 4: Lighting Template

Floor	Area	Description	Existing System						Proposed System						Costs					Savings								
			Fixture	Lamp	Qty.	Watts	Hours	kWh	kW	Measure	Lamp	Watts	Occ. Sensor	Hours	kWh	kW	Unit Matl.	Unit Labour	Sensor Cost	Material	Labour	Total Cost	Project Costs	Total Project	kWh Savings	kW Savings	Cost Savings	Simple Payback
2nd Floor		Storage Room	Strip	T8	4	30	260	31	0.12	Relamp	LED	16.5	0	260	17	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	14	0.05	\$7	19.8
2nd Floor		Corridor	Pot Light	CFL	2	18	4,368	157	0.04	None	CFL	18	0	4,368	157	0.04	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
2nd Floor		Washroom	Troffer	T8	1	33	1,560	51	0.03	Relamp/Occ. Sensor	LED	22	1	1,092	24	0.02	\$42	\$5	\$160	\$202	\$5	\$207	\$52	\$258	27	0.01	\$4	66.4
2nd Floor		Telephone Room	Recessed Troffe	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	52	0.01	\$7	5.0
2nd Floor		Men's Washroom	Pot Light	CFL	9	18	1,560	253	0.16	None/Occ. Sensor	CFL	18	1	1,092	177	0.16	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	76	0.00	\$8	25.7
2nd Floor		Men's Washroom	Recessed Troffe	T8	1	30	1,560	47	0.03	Relamp/Occ. Sensor	LED	16.5	0	1,092	18	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	29	0.01	\$4	7.8
2nd Floor		omen's Washroom Entranc	Pot Light	CFL	1	18	1,560	28	0.02	None/Occ. Sensor	CFL	18	0	1,092	20	0.02	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	8	0.00	\$1	0.0
2nd Floor		Women's Washroom	Pot Light	CFL	6	18	1,560	168	0.11	None/Occ. Sensor	CFL	18	1	1,092	118	0.11	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	51	0.00	\$5	38.6
2nd Floor		Women's Washroom	Recessed Troffe	T8	4	30	1,560	187	0.12	Relamp/Occ. Sensor	LED	16.5	0	1,092	72	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	115	0.05	\$17	7.8
2nd Floor		Corridor	Recessed Troffe	T8	11	30	4,368	1,441	0.33	Relamp	LED	16.5	0	4,368	793	0.18	\$22	\$5	\$0	\$242	\$50	\$292	\$73	\$364	649	0.15	\$81	4.5
2nd Floor		Elevators 9 & 10 Lobby	Pot Light	CFL	8	18	4,368	629	0.14	None	CFL	18	0	4,368	629	0.14	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
2nd Floor		Boardroom B1	Pot Light	CFL	20	18	3,822	1,376	0.36	None/Occ. Sensor	CFL	18	0	2,675	963	0.36	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	413	0.00	\$42	0.0
2nd Floor		Boardroom B1	Troffer	T8	8	33	3,822	1,009	0.26	Relamp/Occ. Sensor	LED	22	1	2,675	471	0.18	\$42	\$5	\$160	\$496	\$36	\$532	\$133	\$665	538	0.09	\$64	10.4
2nd Floor		Meeting Room	Recessed Troffe	T8	4	30	3,822	459	0.12	Relamp	LED	16.5	0	3,822	252	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	206	0.05	\$26	5.0
2nd Floor		Kitchen	Recessed Troffe	T8	5	30	3,822	573	0.15	Relamp/Occ. Sensor	LED	16.5	1	2,675	221	0.08	\$22	\$5	\$160	\$270	\$23	\$293	\$73	\$366	353	0.07	\$43	8.6
2nd Floor		Kitchen Room	Troffer	T8	2	30	3,822	229	0.06	Relamp/Occ. Sensor	LED	16.5	1	2,675	88	0.03	\$22	\$5	\$160	\$204	\$9	\$213	\$53	\$266	141	0.03	\$17	15.6
2nd Floor		South Staircase No. 2	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
2nd Floor		Office	Recessed Troffe	T8	6	30	2,600	468	0.18	Relamp	LED	16.5	0	2,600	257	0.10	\$22	\$5	\$0	\$132	\$27	\$159	\$40	\$199	211	0.08	\$30	6.7
2nd Floor		Office	Recessed Troffe	T8	325	30	2,600	25,350	9.75	Relamp	LED	16.5	0	2,600	13,943	5.36	\$22	\$5	\$0	\$7,150	\$1,463	\$8,613	\$2,153	\$10,766	11,408	4.39	\$1,598	6.7
2nd Floor		Staircase 2D	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
2nd Floor		Staircase No 10	Troffer	T8	10	30	8,736	2,621	0.30	Relamp	LED	16.5	0	8,736	1,441	0.17	\$22	\$5	\$0	\$220	\$45	\$265	\$66	\$331	1,179	0.14	\$134	2.5
2nd Floor		Storage Room	Recessed Troffe	T8	8	30	260	62	0.24	Relamp	LED	16.5	0	260	34	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	28	0.11	\$13	19.8
2nd Floor		Storage Room	Pot Light	CFL	9	18	260	42	0.16	None	CFL	18	0	260	42	0.16	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
2nd Floor		Storage/Boardroom Lobby	Recessed Troffe	T8	2	30	260	16	0.06	Relamp	LED	16.5	0	260	9	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	7	0.03	\$3	19.8
2nd Floor		Storage/Boardroom Lobby	Pot Light	CFL	2	18	260	9	0.04	None	CFL	18	0	260	9	0.04	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
2nd Floor		Boardroom Lobby	Recessed Troffe	T8	2	30	4,368	262	0.06	Relamp	LED	16.5	0	4,368	144	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	118	0.03	\$15	4.5
2nd Floor		Boardroom Lobby	Pot Light	CFL	2	18	4,368	157	0.04	None	CFL	18	0	4,368	157	0.04	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
2nd Floor		Boardroom	Troffer	T8	34	59	3,822	7,667	2.01	Relamp/Occ. Sensor	LED	33	1	2,675	3,002	1.12	\$42	\$5	\$160	\$1,588	\$153	\$1,741	\$435	\$2,176	4,665	0.88	\$565	3.9
2nd Floor		Small Room	Recessed Troffe	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	52	0.01	\$7	5.0
2nd Floor		Northeast Staircase No 2	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
2nd Floor		Northeast Staircase No 2	Pot Light	CFL	1	18	8,736	157	0.02	None	CFL	18	0	8,736	157	0.02	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
2nd Floor		omen's Washroom Entranc	Pot Light	CFL	1	18	1,560	28	0.02	None/Occ. Sensor	CFL	18	0	1,092	20	0.02	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	8	0.00	\$1	0.0
2nd Floor		Women's Washroom	Pot Light	CFL	11	18	1,560	309	0.20	None/Occ. Sensor	CFL	18	1	1,092	216	0.20	\$0	\$0	\$160	\$160	\$40	\$200	\$93	\$00	\$10	21.0		
2nd Floor		Women's Washroom	Recessed Troffe	T8	5	30	1,560	234	0.15	Relamp/Occ. Sensor	LED	16.5	0	1,092	90	0.08	\$22	\$5	\$110	\$23	\$133	\$33	\$166	144	0.07	\$21	7.8	
2nd Floor		Men's Washroom Entranc	Pot Light	CFL	1	18	1,560	28	0.02	None/Occ. Sensor	CFL	18	0	1,092	20	0.02	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	8	0.00	\$1	0.0
2nd Floor		Janitor's Room	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	52	0.01	\$7	5.0
2nd Floor		Men's Washroom	Pot Light	CFL	5	18	1,560	140	0.09	None/Occ. Sensor	CFL	18	1	1,092	98	0.09	\$0	\$0	\$160	\$160	\$40	\$200	\$42	\$00	\$4	46.3		
2nd Floor		Men's Washroom	Strip	T8	2	30	1,560	94	0.06	Relamp/Occ. Sensor	LED	16.5	0	1,092	36	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	58	0.03	\$9	7.8
2nd Floor		Men's Washroom	Recessed Troffe	T8	1	30	1,560	47	0.03	Relamp/Occ. Sensor	LED	16.5	0	1,092	18	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	29	0.01	\$4	7.8
2nd Floor		Southeast Staircase No 2	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
2nd Floor		Southeast Vestibule	Pot Light	CFL	1	18	4,368	79	0.02	None	CFL	18	0	4,368	79	0.02	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
2nd Floor		Office Area	Recessed Troffe	T8	###	30	2,600	96,642	37.17	Relamp	LED	16.5	0	2,600	53,153	20.44	\$22	\$5	\$0	\$27,258	\$5,576	\$32,834	\$8,208	\$41,042	43,489	16.73	\$6,092	6.7
3rd Floor		Staircase 3A	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
3rd Floor		Staircase 3B	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
3rd Floor		North Office Area	Recessed Troffe	T8	168	30	2,600	13,104	5.04	Relamp	LED	16.5	0	2,600	7,207	2.77	\$22	\$5	\$0	\$3,696	\$756	\$4,452	\$1,113	\$5,565	5,897	2.27	\$826	6.7
3rd Floor		West Office Area	Recessed Troffe	T8	144	30	2,600	11,232	4.32	Relamp	LED	16.5	0	2,600	6,178	2.38	\$22	\$5	\$0	\$3,168	\$648	\$3,816	\$954	\$4,770	5,054	1.94	\$708	6.7
3rd Floor		East Office Area	Recessed Troffe	T8	93	30	2,600	7,254	2.79	Relamp	LED	16.5	0	2,600	3,990	1.53	\$22	\$5	\$0	\$2,046	\$419	\$2,465	\$616	\$3,081	3,264	1.26	\$457	6.7
3rd Floor		Center Office Area	Recessed Troffe	T8	432	30	2,600	33,696	12.96	Relamp	LED	16.5	0	2,600	18,533	7.13	\$22	\$5	\$0									

Table 4: Lighting Template

		Existing System								Proposed System								Costs						Savings					
Floor	Area	Description	Fixture	Lamp	Qty.	Watts	Hours	kWh	kW	Measure	Lamp	Watts	Occ. Sensor	Hours	kWh	kW	Unit Matl.	Unit Labour	Sensor Cost	Material	Labour	Total Cost	Project Costs	Total Project	kWh Savings	kW Savings	Cost Savings	Simple Payback	
3rd Floor		Office	Recessed Troffe	T8	6	30	2,600	468	0.18	Relamp	LED	16.5	0	2,600	257	0.10	\$22	\$5	\$0	\$132	\$27	\$159	\$40	\$199	\$199	211	0.08	\$30	6.7
3rd Floor		Corridor	Recessed Troffe	T8	5	30	4,368	655	0.15	Relamp	LED	16.5	0	4,368	360	0.08	\$22	\$5	\$0	\$110	\$23	\$133	\$33	\$166	\$166	295	0.07	\$37	4.5
3rd Floor		Test Room	Recessed Troffe	T8	16	30	3,822	1,835	0.48	Relamp	LED	16.5	0	3,822	1,009	0.26	\$22	\$5	\$0	\$352	\$72	\$424	\$106	\$530	\$530	826	0.22	\$106	5.0
3rd Floor		Test Room	Troffer	T8	4	33	3,822	505	0.13	Relamp	LED	22	0	3,822	336	0.09	\$42	\$5	\$0	\$168	\$18	\$186	\$47	\$233	\$233	168	0.04	\$22	10.8
3rd Floor		Office Area	Recessed Troffe	T8	24	30	2,600	1,872	0.72	Relamp	LED	16.5	0	2,600	1,030	0.40	\$22	\$5	\$0	\$528	\$108	\$636	\$159	\$795	\$795	842	0.32	\$118	6.7
3rd Floor		Storage Room	Recessed Troffe	T8	4	30	260	31	0.12	Relamp	LED	16.5	0	260	17	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	\$133	14	0.05	\$7	19.8
3rd Floor		Meeting Room	Recessed Troffe	T8	18	30	3,822	2,064	0.54	Relamp	LED	16.5	0	3,822	1,135	0.30	\$22	\$5	\$0	\$396	\$81	\$477	\$119	\$596	\$596	929	0.24	\$119	5.0
3rd Floor		Southeast Office Room	Recessed Troffe	T8	9	30	2,600	702	0.27	Relamp	LED	16.5	0	2,600	386	0.15	\$22	\$5	\$0	\$198	\$41	\$239	\$60	\$298	\$298	316	0.12	\$44	6.7
4th Floor		Staircase 4A	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$66	236	0.03	\$27	2.5
4th Floor		Staircase 4B	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$66	236	0.03	\$27	2.5
4th Floor		North Office Area	Recessed Troffe	T8	463	30	2,600	36,114	13.89	Relamp	LED	16.5	0	2,600	19,863	7.64	\$22	\$5	\$0	\$10,186	\$2,084	\$12,270	\$3,067	\$15,337	\$15,337	16,251	6.25	\$2,276	6.7
4th Floor		Northwest Office Room	Recessed Troffe	T8	9	30	2,600	702	0.27	Relamp	LED	16.5	0	2,600	386	0.15	\$22	\$5	\$0	\$198	\$41	\$239	\$60	\$298	\$298	316	0.12	\$44	6.7
4th Floor		West Office Area	Recessed Troffe	T8	120	30	2,600	9,360	3.60	Relamp	LED	16.5	0	2,600	5,148	1.98	\$22	\$5	\$0	\$2,640	\$540	\$3,180	\$795	\$3,975	\$3,975	4,212	1.62	\$590	6.7
4th Floor		South Office Area	Recessed Troffe	T8	472	30	2,600	36,816	14.16	Relamp	LED	16.5	0	2,600	20,249	7.79	\$22	\$5	\$0	\$10,384	\$2,124	\$12,508	\$3,127	\$15,635	\$15,635	16,567	6.37	\$2,321	6.7
4th Floor		Staircase 4D	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$66	236	0.03	\$27	2.5
4th Floor		Staircase 4C	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$66	236	0.03	\$27	2.5
4th Floor		East Office Area	Recessed Troffe	T8	156	30	2,600	12,168	4.68	Relamp	LED	16.5	0	2,600	6,692	2.57	\$22	\$5	\$0	\$3,432	\$702	\$4,134	\$1,034	\$5,168	\$5,168	5,476	2.11	\$767	6.7
4th Floor		Storage Room	Recessed Troffe	T8	6	30	260	47	0.18	Relamp	LED	16.5	0	260	26	0.10	\$22	\$5	\$0	\$132	\$27	\$159	\$40	\$199	\$199	21	0.08	\$10	19.8
4th Floor		Lounge	Recessed Troffe	T8	10	30	3,822	1,147	0.30	Relamp	LED	16.5	0	3,822	631	0.17	\$22	\$5	\$0	\$220	\$45	\$265	\$66	\$331	\$331	516	0.14	\$66	5.0
4th Floor		Boardroom	Recessed Troffe	T8	18	30	3,822	2,064	0.54	Relamp/Occ. Sensor	LED	16.5	1	2,675	795	0.30	\$22	\$5	\$160	\$556	\$81	\$637	\$159	\$796	\$796	1,269	0.24	\$154	5.2
4th Floor		Corridor	Recessed Troffe	T8	14	30	4,368	1,835	0.42	Relamp	LED	16.5	0	4,368	1,009	0.23	\$22	\$5	\$0	\$308	\$63	\$371	\$93	\$464	\$464	826	0.19	\$103	4.5
4th Floor		Elev Lobby	Strip	T8	2	30	4,368	262	0.06	Relamp	LED	16.5	0	4,368	144	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$66	118	0.03	\$15	4.5
4th Floor		Tel Closet	Strip	T8	1	30	260	8	0.03	Relamp	LED	16.5	0	260	4	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	\$33	4	0.01	\$2	19.8
4th Floor		Tel Closet	Sconce	CFL	1	13	260	3	0.01	None	CFL	13	0	260	3	0.01	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
4th Floor		Elec Room	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	\$33	52	0.01	\$7	5.0
4th Floor		Elec Room	Emergency	Halogen	1	0	0	0	0.00	None	Halogen	0	0	0	0	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
4th Floor		Filing Area	Strip	T8	2	30	3,822	229	0.06	Relamp	LED	16.5	0	3,822	126	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$66	103	0.03	\$13	5.0
4th Floor		Kitchen	Strip	T8	2	30	3,822	229	0.06	Relamp/Occ. Sensor	LED	16.5	1	2,675	88	0.03	\$22	\$5	\$160	\$204	\$9	\$213	\$53	\$266	\$266	141	0.03	\$17	15.6
4th Floor		Elevator Lobby	Pot Light	CFL	8	18	4,368	629	0.14	None	CFL	18	0	4,368	629	0.14	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
4th Floor		Corridor	Pot Light	CFL	26	18	4,368	2,044	0.47	None	CFL	18	0	4,368	2,044	0.47	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
4th Floor		Washroom	Troffer	T8	1	33	1,560	51	0.03	Relamp/Occ. Sensor	LED	22	1	1,092	24	0.02	\$42	\$5	\$160	\$202	\$5	\$207	\$52	\$258	\$258	27	0.01	\$4	66.4
4th Floor		Washroom Corridor	Pot Light	CFL	2	18	4,368	157	0.04	None/Occ. Sensor	CFL	18	0	3,058	110	0.04	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	47	0.00	\$5	0.0
4th Floor		Telephone Room	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	\$33	52	0.01	\$7	5.0
4th Floor		Men's Washroom	Pot Light	CFL	9	18	1,560	253	0.16	None/Occ. Sensor	CFL	18	1	1,092	177	0.16	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	\$200	76	0.00	\$8	25.7
4th Floor		Men's Washroom	Recessed Troffe	T8	1	30	1,560	47	0.03	Relamp/Occ. Sensor	LED	16.5	0	1,092	18	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	\$33	29	0.01	\$4	7.8
4th Floor		omen's Washroom Entrar	Pot Light	CFL	1	18	1,560	28	0.02	None/Occ. Sensor	CFL	18	0	1,092	20	0.02	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	8	0.00	\$1	0.0
4th Floor		Women's Washroom	Pot Light	CFL	6	18	1,560	168	0.11	None/Occ. Sensor	CFL	18	1	1,092	118	0.11	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	\$200	51	0.00	\$5	38.6
4th Floor		Women's Washroom	Recessed Troffe	T8	4	30	1,560	187	0.12	Relamp/Occ. Sensor	LED	16.5	0	1,092	72	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	\$133	115	0.05	\$17	7.8
4th Floor		Boardroom AB	Recessed Troffe	T8	12	30	3,822	1,376	0.36	Relamp/Occ. Sensor	LED	16.5	1	2,675	530	0.20	\$22	\$5	\$160	\$424	\$54	\$478	\$120	\$598	\$598	846	0.16	\$103	5.8
4th Floor		Boardroom C	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	\$399	423	0.08	\$51	7.8
4th Floor		Boardroom DE	Recessed Troffe	T8	12	30	3,822	1,376	0.36	Relamp/Occ. Sensor	LED	16.5	1	2,675	530	0.20	\$22	\$5	\$160	\$424	\$54	\$478	\$120	\$598	\$598	846	0.16	\$103	5.8
4th Floor		Boardroom F	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	\$399	423	0.08	\$51	7.8
5th Floor		Staircase 5A	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$66	236	0.03	\$27	2.5
5th Floor		Staircase 5B	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$66	236	0.03	\$27	2.5
5th Floor		North Office Area	Recessed Troffe	T8	433	30	2,600	33,774	12.99	Relamp	LED	16.5	0	2,600	18,576	7.14	\$22	\$5	\$0	\$9,526	\$1,949	\$11,475	\$2,869	\$14,343	\$14,343	15,198	5.85	\$2,129	6.7
5th Floor		Northeast Office Room	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	\$265	281	0.11	\$39	6.7
5th Floor		Storage	Recessed Troffe	T8	6	30	260	47	0.18	Relamp	LED	16.5	0	260	26	0.10	\$22	\$5	\$0	\$132	\$27	\$159	\$40	\$199	\$199	21	0.08	\$10	19.8
5th Floor		Office	Recessed Troffe	T8	6	30	2,600	468	0.18	Relamp	LED	16.5	0	2,600	257	0.10	\$22	\$5	\$0	\$132	\$27	\$159	\$40	\$199	\$199	211	0.08	\$30	6.7
5th Floor		Boardroom	Recessed Troffe	T8	18	30	3,822	2,064	0.54	Relamp/Occ. Sensor	LED	16.5	1	2,675	795	0.30	\$22	\$5	\$160	\$556	\$81	\$637	\$159	\$796	\$796	1,269	0.24	\$154	5.2
5th Floor		West Office Area	Recessed Troffe	T8	120	30	2,600	9,360	3.60	Relamp	LED	16.5	0	2,600	5,148	1.98	\$22	\$5	\$0	\$2,640	\$540	\$3,180	\$795	\$3,975	\$3,975	4,212	1.62	\$590	6.7
5th Floor		South Office Area	Recessed Troffe	T8	472	30	2,600	36,816	14.16	Relamp	LED	16.5	0	2,600	20,249	7.79	\$22	\$5	\$0	\$10,384	\$2,124	\$12,508	\$3,127	\$15,635	\$15,635	16,567	6.37	\$2,321	6.7
5th Floor		Staircase 5D	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22												

Table 4: Lighting Template

Floor	Area	Description	Existing System						Proposed System						Costs						Savings							
			Fixture	Lamp	Qty.	Watts	Hours	kWh	kW	Measure	Lamp	Watts	Occ. Sensor	Hours	kWh	kW	Unit Matl.	Unit Labour	Sensor Cost	Material	Labour	Total Cost	Project Costs	Total Project	kWh Savings	kW Savings	Cost Savings	Simple Payback
5th Floor		Boardroom ABC	Recessed Troffe	T8	18	30	3,822	2,064	0.54	Relamp/Occ. Sensor	LED	16.5	1	2,675	795	0.30	\$22	\$5	\$160	\$556	\$81	\$637	\$159	\$796	1,269	0.24	\$154	5.2
5th Floor		Boardroom D	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	423	0.08	\$51	7.8
5th Floor		Boardroom E	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	423	0.08	\$51	7.8
5th Floor		Boardroom F	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	423	0.08	\$51	7.8
6th Floor		Staircase 6A	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
6th Floor		Staircase 6B	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
6th Floor		North Office Area	Recessed Troffe	T8	405	30	2,600	31,590	12.15	Relamp	LED	16.5	0	2,600	17,375	6.68	\$22	\$5	\$0	\$8,910	\$1,823	\$10,733	\$2,683	\$13,416	14,216	5.47	\$1,991	6.7
6th Floor		theast Corner Office Roo	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	281	0.11	\$39	6.7
6th Floor		theast Corner Office Roo	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	281	0.11	\$39	6.7
6th Floor		thwest Corner Office Roo	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	281	0.11	\$39	6.7
6th Floor		thwest Corner Office Roo	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	281	0.11	\$39	6.7
6th Floor		Office Room	Recessed Troffe	T8	6	30	2,600	468	0.18	Relamp	LED	16.5	0	2,600	257	0.10	\$22	\$5	\$0	\$132	\$27	\$159	\$40	\$199	211	0.08	\$30	6.7
6th Floor		Office Room	Recessed Troffe	T8	6	30	2,600	468	0.18	Relamp	LED	16.5	0	2,600	257	0.10	\$22	\$5	\$0	\$132	\$27	\$159	\$40	\$199	211	0.08	\$30	6.7
6th Floor		Office Room	Recessed Troffe	T8	9	30	2,600	702	0.27	Relamp	LED	16.5	0	2,600	386	0.15	\$22	\$5	\$0	\$198	\$41	\$239	\$60	\$298	316	0.12	\$44	6.7
6th Floor		Office Area	Recessed Troffe	T8	12	30	2,600	936	0.36	Relamp	LED	16.5	0	2,600	515	0.20	\$22	\$5	\$0	\$264	\$54	\$318	\$80	\$398	421	0.16	\$59	6.7
6th Floor		West Office Area	Recessed Troffe	T8	120	30	2,600	9,360	3.60	Relamp	LED	16.5	0	2,600	5,148	1.98	\$22	\$5	\$0	\$2,640	\$540	\$3,180	\$795	\$3,975	4,212	1.62	\$590	6.7
6th Floor		South Office Area	Recessed Troffe	T8	459	30	2,600	35,802	13.77	Relamp	LED	16.5	0	2,600	19,691	7.57	\$22	\$5	\$0	\$10,098	\$2,066	\$12,164	\$3,041	\$15,204	16,111	6.20	\$2,257	6.7
6th Floor		uthwest Corner Boardroc	Recessed Troffe	T8	8	30	3,822	917	0.24	Relamp/Occ. Sensor	LED	16.5	1	2,675	353	0.13	\$22	\$5	\$160	\$336	\$36	\$372	\$93	\$465	564	0.11	\$68	6.8
6th Floor		Office Room	Recessed Troffe	T8	4	30	2,600	312	0.12	Relamp	LED	16.5	0	2,600	172	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	140	0.05	\$20	6.7
6th Floor		Staircase 6C	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
6th Floor		Staircase 6D	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
6th Floor		East Office Area	Recessed Troffe	T8	156	30	2,600	12,168	4.68	Relamp	LED	16.5	0	2,600	6,692	2.57	\$22	\$5	\$0	\$3,432	\$702	\$4,134	\$1,034	\$5,168	5,476	2.11	\$767	6.7
6th Floor		Office Room	Recessed Troffe	T8	35	30	2,600	2,730	1.05	Relamp	LED	16.5	0	2,600	1,502	0.58	\$22	\$5	\$0	\$770	\$158	\$928	\$232	\$1,159	1,229	0.47	\$172	6.7
6th Floor		Corridor	Recessed Troffe	T8	13	30	4,368	1,704	0.39	Relamp	LED	16.5	0	4,368	937	0.21	\$22	\$5	\$0	\$286	\$59	\$345	\$86	\$431	767	0.18	\$96	4.5
6th Floor		Elev Lobby	Strip	T8	2	30	4,368	262	0.06	Relamp	LED	16.5	0	4,368	144	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	118	0.03	\$15	4.5
6th Floor		Tel Closet	Strip	T8	1	30	260	8	0.03	Relamp	LED	16.5	0	260	4	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	4	0.01	\$2	19.8
6th Floor		Tel Closet	Sconce	CFL	1	13	260	3	0.01	None	CFL	13	0	260	3	0.01	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
6th Floor		Elec Room	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	52	0.01	\$7	5.0
6th Floor		Elec Room	Emergency	Halogen	1	0	0	0	0.00	None	Halogen	0	0	0	0	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
6th Floor		Filing Area	Strip	T8	2	30	3,822	229	0.06	Relamp	LED	16.5	0	3,822	126	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	103	0.03	\$13	5.0
6th Floor		Lunch Room	Strip	T8	3	30	3,822	344	0.09	Relamp	LED	16.5	0	3,822	189	0.05	\$22	\$5	\$0	\$66	\$14	\$80	\$20	\$99	155	0.04	\$20	5.0
6th Floor		Lunch Room	Sconce	CFL	1	13	3,822	50	0.01	None	CFL	13	0	3,822	50	0.01	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
6th Floor		Lunch Room	Troffer	T8	2	30	3,822	229	0.06	Relamp	LED	16.5	0	3,822	126	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	103	0.03	\$13	5.0
6th Floor		Elevator Lobby	Pot Light	CFL	8	18	4,368	629	0.14	None	CFL	18	0	4,368	629	0.14	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
6th Floor		Corridor	Pot Light	CFL	26	18	4,368	2,044	0.47	None	CFL	18	0	4,368	2,044	0.47	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
6th Floor		Washroom	Troffer	T8	1	33	1,560	51	0.03	Relamp/Occ. Sensor	LED	22	1	1,092	24	0.02	\$42	\$5	\$160	\$202	\$5	\$207	\$52	\$258	27	0.01	\$4	66.4
6th Floor		Washroom Corridor	Pot Light	CFL	2	18	4,368	157	0.04	None/Occ. Sensor	CFL	18	0	3,058	110	0.04	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	47	0.00	\$5	0.0
6th Floor		Telephone Room	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	52	0.01	\$7	5.0
6th Floor		Men's Washroom	Pot Light	CFL	9	18	1,560	253	0.16	None/Occ. Sensor	CFL	18	1	1,092	177	0.16	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	76	0.00	\$8	25.7
6th Floor		Men's Washroom	Recessed Troffe	T8	1	30	1,560	47	0.03	Relamp/Occ. Sensor	LED	16.5	0	1,092	18	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	29	0.01	\$4	7.8
6th Floor		omen's Washroom Entrar	Pot Light	CFL	1	18	1,560	28	0.02	None/Occ. Sensor	CFL	18	0	1,092	20	0.02	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	8	0.00	\$1	0.0
6th Floor		Women's Washroom	Pot Light	CFL	6	18	1,560	168	0.11	None/Occ. Sensor	CFL	18	1	1,092	118	0.11	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	51	0.00	\$5	38.6
6th Floor		Women's Washroom	Recessed Troffe	T8	4	30	1,560	187	0.12	Relamp/Occ. Sensor	LED	16.5	0	1,092	72	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	115	0.05	\$17	7.8
6th Floor		Boardroom A	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	423	0.08	\$51	7.8
6th Floor		Boardroom B	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	423	0.08	\$51	7.8
6th Floor		Boardroom C	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	423	0.08	\$51	7.8
6th Floor		Boardroom DE	Recessed Troffe	T8	18	30	3,822	2,064	0.54	Relamp/Occ. Sensor	LED	16.5	1	2,675	795	0.30	\$22	\$5	\$160	\$556	\$81	\$637	\$159	\$796	1,269	0.24	\$154	5.2
7th Floor		Staircase 7A	Troffer	T8	2	30																						

Table 4: Lighting Template

Floor	Area	Description	Existing System							Proposed System							Costs						Savings				
			Fixture	Lamp	Qty.	Watts	Hours	kWh	kW	Measure	Lamp	Watts	Occ. Sensor	Hours	kWh	kW	Unit Matl.	Unit Labour	Sensor Cost	Material	Labour	Total Cost	Project Costs	Total Project	kWh Savings	kW Savings	Cost Savings
7th Floor	Women's Washroom	Pot Light	CFL	6	18	1,560	168	0.11	None/Occ. Sensor	CFL	18	1	1,092	118	0.11	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	51	0.00	\$5	38.6
7th Floor	Women's Washroom	Recessed Troffe	T8	4	30	1,560	187	0.12	Relamp/Occ. Sensor	LED	16.5	0	1,092	72	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	115	0.05	\$17	7.8
7th Floor	LAN Room A	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp	LED	16.5	0	3,822	378	0.10	\$22	\$5	\$0	\$132	\$27	\$159	\$40	\$199	310	0.08	\$40	5.0
7th Floor	Boardroom B	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	423	0.08	\$51	7.8
7th Floor	Boardroom C	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	423	0.08	\$51	7.8
7th Floor	Boardroom DE	Recessed Troffe	T8	18	30	3,822	2,064	0.54	Relamp/Occ. Sensor	LED	16.5	1	2,675	795	0.30	\$22	\$5	\$160	\$556	\$81	\$637	\$159	\$796	1,269	0.24	\$154	5.2
8th Floor	Staircase 8A	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
8th Floor	Staircase 8B	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
8th Floor	North Office Area	Recessed Troffe	T8	451	30	2,600	35,178	13.53	Relamp	LED	16.5	0	2,600	19,348	7.44	\$22	\$5	\$0	\$9,922	\$2,030	\$11,952	\$2,988	\$14,939	15,830	6.09	\$2,217	6.7
8th Floor	North Office Area	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	281	0.11	\$39	6.7
8th Floor	Conference Room	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp	LED	16.5	0	3,822	378	0.10	\$22	\$5	\$0	\$132	\$27	\$159	\$40	\$199	310	0.08	\$40	5.0
8th Floor	Conference Room	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp	LED	16.5	0	3,822	378	0.10	\$22	\$5	\$0	\$132	\$27	\$159	\$40	\$199	310	0.08	\$40	5.0
8th Floor	West Office Area	Recessed Troffe	T8	136	30	2,600	10,608	4.08	Relamp	LED	16.5	0	2,600	5,834	2.24	\$22	\$5	\$0	\$2,992	\$612	\$3,604	\$901	\$4,505	4,774	1.84	\$669	6.7
8th Floor	West Office Area	Strip	T8	4	30	2,600	312	0.12	Relamp	LED	16.5	0	2,600	172	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	140	0.05	\$20	6.7
8th Floor	Corridor	Recessed Troffe	T8	24	30	4,368	3,145	0.72	Relamp	LED	16.5	0	4,368	1,730	0.40	\$22	\$5	\$0	\$528	\$108	\$636	\$159	\$795	1,415	0.32	\$177	4.5
8th Floor	South Office Area	Recessed Troffe	T8	451	30	2,600	35,178	13.53	Relamp	LED	16.5	0	2,600	19,348	7.44	\$22	\$5	\$0	\$9,922	\$2,030	\$11,952	\$2,988	\$14,939	15,830	6.09	\$2,217	6.7
8th Floor	South Office Area	Recessed Troffe	T8	8	30	3,822	917	0.24	Relamp/Occ. Sensor	LED	16.5	1	2,675	353	0.13	\$22	\$5	\$160	\$336	\$36	\$372	\$93	\$465	564	0.11	\$68	6.8
8th Floor	Meeting Room	Recessed Troffe	T8	8	30	3,822	917	0.24	Relamp	LED	16.5	0	3,822	505	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	413	0.11	\$53	5.0
8th Floor	LAN Room	Recessed Troffe	T8	4	30	3,822	459	0.12	Relamp	LED	16.5	0	3,822	252	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	206	0.05	\$26	5.0
8th Floor	Staircase 8C	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
8th Floor	Staircase 8D	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
8th Floor	East Office Area	Recessed Troffe	T8	156	30	2,600	12,168	4.68	Relamp	LED	16.5	0	2,600	6,692	2.57	\$22	\$5	\$0	\$3,432	\$702	\$4,134	\$1,034	\$5,168	5,476	2.11	\$767	6.7
8th Floor	Elev Lobby	Strip	T8	2	30	4,368	262	0.06	Relamp	LED	16.5	0	4,368	144	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	118	0.03	\$15	4.5
8th Floor	Tel Closet	Strip	T8	1	30	260	8	0.03	Relamp	LED	16.5	0	260	4	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	4	0.01	\$2	19.8
8th Floor	Tel Closet	Sconce	CFL	1	13	260	3	0.01	None	CFL	13	0	260	3	0.01	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	0.00
8th Floor	Elec Room	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	52	0.01	\$7	5.0
8th Floor	Elec Room	Emergency	Halogen	1	0	0	0	0.00	None	Halogen	0	0	0	0	0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	0.00
8th Floor	Photocopier Room	Strip	T8	2	30	3,822	229	0.06	Relamp	LED	16.5	0	3,822	126	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	103	0.03	\$13	5.0
8th Floor	Elevator Lobby	Pot Light	CFL	8	18	4,368	629	0.14	None	CFL	18	0	4,368	629	0.14	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	0.00
8th Floor	Elevator Lobby	Pot Light	CFL	8	18	4,368	629	0.14	None	CFL	18	0	4,368	629	0.14	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	0.00
8th Floor	Corridor	Pot Light	CFL	26	18	4,368	2,044	0.47	None	CFL	18	0	4,368	2,044	0.47	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	0.00
8th Floor	Corridor	Strip	T8	2	30	4,368	262	0.06	Relamp	LED	16.5	0	4,368	144	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	118	0.03	\$15	4.5
8th Floor	Washroom	Troffer	T8	1	33	1,560	51	0.03	Relamp/Occ. Sensor	LED	22	1	1,092	24	0.02	\$42	\$5	\$160	\$202	\$5	\$207	\$52	\$258	27	0.01	\$4	66.4
8th Floor	Washroom Corridor	Pot Light	CFL	2	18	4,368	157	0.04	None/Occ. Sensor	CFL	18	0	3,058	110	0.04	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	47	0.00	\$5	0.00
8th Floor	Telephone Room	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	52	0.01	\$7	5.0
8th Floor	Men's Washroom	Pot Light	CFL	9	18	1,560	253	0.16	None/Occ. Sensor	CFL	18	1	1,092	177	0.16	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	76	0.00	\$8	25.7
8th Floor	Men's Washroom	Recessed Troffe	T8	1	30	1,560	47	0.03	Relamp/Occ. Sensor	LED	16.5	0	1,092	18	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	29	0.01	\$4	7.8
8th Floor	Men's Washroom Entrar	Pot Light	CFL	1	18	1,560	28	0.02	None/Occ. Sensor	CFL	18	0	1,092	20	0.02	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	8	0.00	\$1	0.00
8th Floor	Women's Washroom	Pot Light	CFL	6	18	1,560	168	0.11	None/Occ. Sensor	CFL	18	1	1,092	118	0.11	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	51	0.00	\$5	38.6
8th Floor	Women's Washroom	Recessed Troffe	T8	4	30	1,560	187	0.12	Relamp/Occ. Sensor	LED	16.5	0	1,092	72	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	115	0.05	\$17	7.8
8th Floor	Boardroom C	Recessed Troffe	T8	12	30	3,822	1,376	0.36	Relamp/Occ. Sensor	LED	16.5	1	2,675	530	0.20	\$22	\$5	\$160	\$424	\$54	\$478	\$120	\$598	846	0.16	\$103	5.8
8th Floor	Boardroom E	Recessed Troffe	T8	18	30	3,822	2,064	0.54	Relamp/Occ. Sensor	LED	16.5	1	2,675	795	0.30	\$22	\$5	\$160	\$556	\$81	\$637	\$159	\$796	1,269	0.24	\$154	5.2
8th Floor	Boardroom F	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	423	0.08	\$51	7.8
9th Floor	Staircase 9A	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
9th Floor	Staircase 9B	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
9th Floor	North Office Area	Recessed Troffe	T8	448	30	2,600	34,944	13.44	Relamp	LED	16.5	0	2,600	19,219	7.39	\$22	\$5	\$0	\$9,856	\$2,016	\$11,872	\$2,968	\$14,840	15,725	6.05	\$2,203	6.7
9th Floor	North Office Area	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	281	0.11	\$39	6.7
9th Floor	Office Room	Recessed Troffe	T8	6	30	2,600	468	0.18	Relamp	LED	16.5	0	2,600	257	0.10	\$22	\$5	\$0	\$132	\$27	\$159	\$40	\$199	310	0.08	\$30	6.7
9th Floor																											

Table 4: Lighting Template

		Existing System							Proposed System							Costs					Savings							
Floor	Area	Description	Fixture	Lamp	Qty.	Watts	Hours	kWh	kW	Measure	Lamp	Watts	Occ. Sensor	Hours	kWh	kW	Unit Matl.	Unit Labour	Sensor Cost	Material	Labour	Total Cost	Project Costs	Total Project	kWh Savings	kW Savings	Cost Savings	Simple Payback
9th Floor	Women's Washroom	Recessed Troffe	T8	4	30	1,560	187	0.12	Relamp/Occ. Sensor	LED	16.5	0	1,092	72	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	\$115	0.05	\$17	7.8	
9th Floor	Boardroom A	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	\$423	0.08	\$51	7.8	
9th Floor	Boardroom B	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	\$423	0.08	\$51	7.8	
9th Floor	Boardroom CD	Recessed Troffe	T8	15	30	3,822	1,720	0.45	Relamp/Occ. Sensor	LED	16.5	1	2,675	662	0.25	\$22	\$5	\$160	\$490	\$68	\$558	\$139	\$697	\$1,058	0.20	\$128	5.4	
9th Floor	Boardroom E	Recessed Troffe	T8	9	30	3,822	1,032	0.47	Relamp/Occ. Sensor	LED	16.5	1	2,675	397	0.15	\$22	\$5	\$160	\$358	\$41	\$399	\$100	\$498	\$635	0.12	\$77	6.5	
10th Floor	Staircase 10A	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$236	0.03	\$27	2.5	
10th Floor	Staircase 10B	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$236	0.03	\$27	2.5	
10th Floor	North Office Area	Recessed Troffe	T8	454	30	2,600	35,412	13.62	Relamp	LED	16.5	0	2,600	19,477	7.49	\$22	\$5	\$0	\$9,988	\$2,043	\$12,031	\$3,008	\$15,039	\$15,935	6.13	\$2,232	6.7	
10th Floor	rtheast Corner Office Ro	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	\$281	0.11	\$39	6.7	
10th Floor	Meeting Room	Recessed Troffe	T8	9	30	3,822	1,032	0.27	Relamp	LED	16.5	0	3,822	568	0.15	\$22	\$5	\$0	\$198	\$41	\$239	\$60	\$298	\$464	0.12	\$59	5.0	
10th Floor	West Office Area	Recessed Troffe	T8	155	30	2,600	12,090	4.65	Relamp	LED	16.5	0	2,600	6,650	2.56	\$22	\$5	\$0	\$3,410	\$698	\$4,108	\$1,027	\$5,134	\$5,441	2.09	\$762	6.7	
10th Floor	South Office Area	Recessed Troffe	T8	455	30	2,600	35,490	13.65	Relamp	LED	16.5	0	2,600	19,520	7.51	\$22	\$5	\$0	\$10,010	\$2,048	\$12,058	\$3,014	\$15,072	\$15,971	6.14	\$2,237	6.7	
10th Floor	uthwest Corner Office Ro	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	\$281	0.11	\$39	6.7	
10th Floor	Staircase 10D	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$236	0.03	\$27	2.5	
10th Floor	Staircase 10C	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$236	0.03	\$27	2.5	
10th Floor	East Office Area	Recessed Troffe	T8	156	30	2,600	12,168	4.68	Relamp	LED	16.5	0	2,600	6,692	2.57	\$22	\$5	\$0	\$3,432	\$702	\$4,134	\$1,034	\$5,168	\$5,476	2.11	\$767	6.7	
10th Floor	Storage Room	Recessed Troffe	T8	4	30	260	31	0.12	Relamp	LED	16.5	0	260	17	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	\$115	0.05	\$17	7.8	
10th Floor	Corridor	Recessed Troffe	T8	9	30	4,368	1,179	0.27	Relamp	LED	16.5	0	4,368	649	0.15	\$22	\$5	\$0	\$198	\$41	\$239	\$60	\$298	\$531	0.12	\$66	4.5	
10th Floor	Elev Lobby	Strip	T8	2	30	4,368	262	0.06	Relamp	LED	16.5	0	4,368	144	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$118	0.03	\$15	4.5	
10th Floor	Tel Closet	Sconce	CFL	1	13	260	3	0.01	None	CFL	13	0	260	3	0.01	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
10th Floor	Elec Room	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	\$52	0.01	\$7	5.0	
10th Floor	Photocopier Area	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	\$52	0.01	\$7	5.0	
10th Floor	Elevator Lobby	Pot Light	CFL	8	18	4,368	629	0.14	None	CFL	18	0	4,368	629	0.14	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
10th Floor	Elevator Machine Room	Troffer	T8	12	30	3,822	1,376	0.36	Relamp	LED	16.5	0	3,822	757	0.20	\$22	\$5	\$0	\$264	\$54	\$318	\$80	\$398	\$619	0.16	\$79	5.0	
10th Floor	Corridor	Pot Light	CFL	26	18	4,368	2,044	0.47	None	CFL	18	0	4,368	2,044	0.47	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
10th Floor	Washroom	Troffer	T8	1	33	1,560	51	0.03	Relamp/Occ. Sensor	LED	22	1	1,092	24	0.02	\$42	\$5	\$160	\$202	\$5	\$207	\$52	\$258	\$27	0.01	\$4	66.4	
10th Floor	Washroom Corridor	Pot Light	CFL	2	18	4,368	157	0.04	None/Occ. Sensor	CFL	18	0	3,058	110	0.04	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$5	0.0
10th Floor	Telephone Room	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	\$52	0.01	\$7	5.0	
10th Floor	Men's Washroom	Pot Light	CFL	9	18	1,560	253	0.16	None/Occ. Sensor	CFL	18	1	1,092	177	0.16	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	\$76	0.00	\$8	25.7	
10th Floor	Men's Washroom	Recessed Troffe	T8	1	30	1,560	47	0.03	Relamp/Occ. Sensor	LED	16.5	0	1,092	18	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	\$29	0.01	\$4	7.8	
10th Floor	omen's Washroom Entranc	Pot Light	CFL	1	18	1,560	28	0.02	None/Occ. Sensor	CFL	18	0	1,092	20	0.02	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$1	0.0
10th Floor	Women's Washroom	Pot Light	CFL	6	18	1,560	168	0.11	None/Occ. Sensor	CFL	18	1	1,092	118	0.11	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	\$151	0.00	\$5	38.6	
10th Floor	Women's Washroom	Recessed Troffe	T8	4	30	1,560	187	0.12	Relamp/Occ. Sensor	LED	16.5	0	1,092	72	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	\$115	0.05	\$17	7.8	
10th Floor	Boardroom A	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	\$423	0.08	\$51	7.8	
10th Floor	Boardroom B	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	\$423	0.08	\$51	7.8	
10th Floor	Boardroom CD	Recessed Troffe	T8	18	30	3,822	2,064	0.54	Relamp/Occ. Sensor	LED	16.5	1	2,675	795	0.30	\$22	\$5	\$160	\$556	\$81	\$637	\$159	\$796	\$1,269	0.24	\$154	5.2	
10th Floor	Boardroom E	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	\$423	0.08	\$51	7.8	
11th Floor	Staircase 11A	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$236	0.03	\$27	2.5	
11th Floor	Staircase 11B	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$236	0.03	\$27	2.5	
11th Floor	North Office Area	Recessed Troffe	T8	455	30	2,600	35,490	13.65	Relamp	LED	16.5	0	2,600	19,520	7.51	\$22	\$5	\$0	\$10,010	\$2,048	\$12,058	\$3,014	\$15,072	\$15,971	6.14	\$2,237	6.7	
11th Floor	rtheast Corner Office Ro	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	\$281	0.11	\$39	6.7	
11th Floor	rthwest Corner Office Ro	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	\$281	0.11	\$39	6.7	
11th Floor	West Office Area	Recessed Troffe	T8	136	30	2,600	10,608	4.08	Relamp	LED	16.5	0	2,600	5,834	2.24	\$22	\$5	\$0	\$2,992	\$612	\$3,604	\$901	\$4,505	\$4,774	1.84	\$669	6.7	
11th Floor	South Office Area	Recessed Troffe	T8	471	30	2,600	36,738	14.13	Relamp	LED	16.5	0	2,600	20,206	7.77	\$22	\$5	\$0	\$10,362	\$2,120	\$12,482	\$3,120	\$15,602	\$16,532	6.36	\$2,316	6.7	
11th Floor	uthwest Corner Office Ro	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	\$281	0.11	\$39	6.7	
11th Floor	Staircase 11D	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$236	0.03	\$27	2.5	
11th Floor	Staircase 11C	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$236	0.03	\$27	2.5	
11th Floor	East Office Area	Recessed Troffe	T8	156	30	2,600	12,168	4.68	Relamp	LED	16.5	0	2,600	6,692	2.57	\$22	\$5	\$0	\$3,432	\$702	\$4,134	\$1,034	\$5,168	\$5,476	2.11	\$767	6.7	
11th Floor	Boardroom E	Recessed Troffe	T8	12	30	3,822	1,376	0.36	Relamp/Occ. Sensor	LED	16.5	1	2,675	530	0.20	\$22	\$5	\$160	\$424	\$54	\$478	\$120	\$598	\$846	0.16	\$103	5.8	
11th Floor	Boardroom F	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	\$423	0.08	\$51	7.8	
11th Floor	Storage Room	Recessed Troffe	T8	6	30	260	47	0.18	Relamp	LED	16.5	0	260	26	0.10	\$22	\$5	\$0	\$132	\$27	\$159	\$40	\$199	\$21	0.08	\$10	19.8	
11th Floor	Corridor	Recessed Troffe	T8	8	30	4,368	1,048	0.24	Relamp	LED	16.5	0	4,368	577	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	\$472	0.11	\$59	4.5	
11th Floor	Elev Lobby	Strip	T8	2	30	4,368	262	0.06	Relamp	LED	16.5	0	4,368	144	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	\$118	0.03	\$15	4.5	
11th Floor	Tel Closet	Sconce	CFL	1	13	260	3	0.01	None	CFL	13	0	260	3	0.01	\$0	\$0											

Table 4: Lighting Template

Floor	Area	Description	Existing System						Proposed System						Costs						Savings							
			Fixture	Lamp	Qty.	Watts	Hours	kWh	kW	Measure	Lamp	Watts	Occ. Sensor	Hours	kWh	kW	Unit Matl.	Unit Labour	Sensor Cost	Material	Labour	Total Cost	Project Costs	Total Project	kWh Savings	kW Savings	Cost Savings	Simple Payback
12th Floor		theast Corner Office Ro	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	281	0.11	\$39	6.7
12th Floor		rthwest Corner Office Ro	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	281	0.11	\$39	6.7
12th Floor		West Office Area	Recessed Troffe	T8	120	30	2,600	9,360	3.60	Relamp	LED	16.5	0	2,600	5,148	1.98	\$22	\$5	\$0	\$2,640	\$540	\$3,180	\$795	\$3,975	4,212	1.62	\$590	6.7
12th Floor		South Office Area	Recessed Troffe	T8	472	30	2,600	36,816	14.16	Relamp	LED	16.5	0	2,600	20,249	7.79	\$22	\$5	\$0	\$10,384	\$2,124	\$12,508	\$3,127	\$15,635	16,567	6.37	\$2,321	6.7
12th Floor		Staircase 12D	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
12th Floor		Staircase 12C	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
12th Floor		East Office Area	Recessed Troffe	T8	156	30	2,600	12,168	4.68	Relamp	LED	16.5	0	2,600	6,692	2.57	\$22	\$5	\$0	\$3,432	\$702	\$4,134	\$1,034	\$5,168	5,476	2.11	\$767	6.7
12th Floor		Server Room	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp	LED	16.5	0	3,822	378	0.10	\$22	\$5	\$0	\$132	\$27	\$159	\$40	\$199	310	0.08	\$40	5.0
12th Floor		Boardroom F	Recessed Troffe	T8	9	30	3,822	1,032	0.27	Relamp/Occ. Sensor	LED	16.5	1	2,675	397	0.15	\$22	\$5	\$160	\$358	\$41	\$399	\$100	\$498	635	0.12	\$77	6.5
12th Floor		Office Room	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	281	0.11	\$39	6.7
12th Floor		Office Room	Recessed Troffe	T8	12	30	2,600	936	0.36	Relamp	LED	16.5	0	2,600	515	0.20	\$22	\$5	\$0	\$264	\$54	\$318	\$80	\$398	421	0.16	\$59	6.7
12th Floor		Corridor	Recessed Troffe	T8	13	30	4,368	1,704	0.39	Relamp	LED	16.5	0	4,368	937	0.21	\$22	\$5	\$0	\$286	\$59	\$345	\$86	\$431	767	0.18	\$96	4.5
12th Floor		Elev Lobby	Strip	T8	2	30	4,368	262	0.06	Relamp	LED	16.5	0	4,368	144	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	118	0.03	\$15	4.5
12th Floor		Tel Closet	Sconce	CFL	1	13	260	3	0.01	None	CFL	13	0	260	3	0.01	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
12th Floor		Elec Room	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	52	0.01	\$7	5.0
12th Floor		Filing Area	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	52	0.01	\$7	5.0
12th Floor		Elevator Lobby	Pot Light	CFL	8	18	4,368	629	0.14	None	CFL	18	0	4,368	629	0.14	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
12th Floor		Lunch Room	Strip	T8	2	30	3,822	229	0.06	Relamp	LED	16.5	0	3,822	126	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	103	0.03	\$13	5.0
12th Floor		Photocopy Room	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	52	0.01	\$7	5.0
12th Floor		Kitchen	Strip	T8	3	30	3,822	344	0.09	Relamp/Occ. Sensor	LED	16.5	1	2,675	132	0.05	\$22	\$5	\$160	\$226	\$14	\$240	\$60	\$299	212	0.04	\$26	11.7
12th Floor		Corridor	Pot Light	CFL	26	18	4,368	2,044	0.47	None	CFL	18	0	4,368	2,044	0.47	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
12th Floor		Washroom	Troffer	T8	1	33	1,560	51	0.03	Relamp/Occ. Sensor	LED	22	1	1,092	24	0.02	\$42	\$5	\$160	\$202	\$5	\$207	\$52	\$258	27	0.01	\$4	66.4
12th Floor		Washroom Corridor	Pot Light	CFL	2	18	4,368	157	0.04	None/Occ. Sensor	CFL	18	0	3,058	110	0.04	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	47	0.00	\$5	0.0
12th Floor		Telephone Room	Strip	T8	1	30	3,822	115	0.03	Relamp	LED	16.5	0	3,822	63	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	52	0.01	\$7	5.0
12th Floor		Men's Washroom	Pot Light	CFL	9	18	1,560	253	0.16	None/Occ. Sensor	CFL	18	1	1,092	177	0.16	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	76	0.00	\$8	25.7
12th Floor		Men's Washroom	Recessed Troffe	T8	1	30	1,560	47	0.03	Relamp/Occ. Sensor	LED	16.5	0	1,092	18	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	29	0.01	\$4	7.8
12th Floor		omen's Washroom Entrar	Pot Light	CFL	1	18	1,560	28	0.02	None/Occ. Sensor	CFL	18	0	1,092	20	0.02	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	8	0.00	\$1	0.0
12th Floor		Women's Washroom	Pot Light	CFL	6	18	1,560	168	0.11	None/Occ. Sensor	CFL	18	1	1,092	118	0.11	\$0	\$0	\$160	\$160	\$0	\$160	\$40	\$200	51	0.00	\$5	38.6
12th Floor		Women's Washroom	Recessed Troffe	T8	4	30	1,560	187	0.12	Relamp/Occ. Sensor	LED	16.5	0	1,092	72	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	115	0.05	\$17	7.8
12th Floor		Boardroom A	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	423	0.08	\$51	7.8
12th Floor		Boardroom B	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	423	0.08	\$51	7.8
12th Floor		Boardroom C	Recessed Troffe	T8	6	30	3,822	688	0.18	Relamp/Occ. Sensor	LED	16.5	1	2,675	265	0.10	\$22	\$5	\$160	\$292	\$27	\$319	\$80	\$399	423	0.08	\$51	7.8
12th Floor		Boardroom D	Recessed Troffe	T8	18	30	3,822	2,064	0.54	Relamp/Occ. Sensor	LED	16.5	1	2,675	795	0.30	\$22	\$5	\$160	\$556	\$81	\$637	\$159	\$796	1,269	0.24	\$154	5.2
13th Floor		Staircase 13A	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
13th Floor		Staircase 13B	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
13th Floor		North Office Area	Recessed Troffe	T8	425	30	2,600	33,150	12.75	Relamp	LED	16.5	0	2,600	18,233	7.01	\$22	\$5	\$0	\$9,350	\$1,913	\$11,263	\$2,816	\$14,078	14,918	5.74	\$2,090	6.7
13th Floor		theast Corner Office Roo	Recessed Troffe	T8	7	30	2,600	546	0.21	Relamp	LED	16.5	0	2,600	300	0.12	\$22	\$5	\$0	\$154	\$32	\$186	\$46	\$232	246	0.09	\$34	6.7
13th Floor		rtheast Corner Office Roo	Recessed Troffe	T8	7	30	2,600	546	0.21	Relamp	LED	16.5	0	2,600	300	0.12	\$22	\$5	\$0	\$154	\$32	\$186	\$46	\$232	246	0.09	\$34	6.7
13th Floor		theast Corner Office Roo	Recessed Troffe	T8	9	30	2,600	702	0.27	Relamp	LED	16.5	0	2,600	386	0.15	\$22	\$5	\$0	\$198	\$41	\$239	\$60	\$298	316	0.12	\$44	6.7
13th Floor		theast Corner Office Roo	Recessed Troffe	T8	9	30	2,600	702	0.27	Relamp	LED	16.5	0	2,600	386	0.15	\$22	\$5	\$0	\$198	\$41	\$239	\$60	\$298	316	0.12	\$44	6.7
13th Floor		rthwest Corner Office Ro	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	281	0.11	\$39	6.7
13th Floor		West Office Area	Recessed Troffe	T8	144	30	2,600	11,232	4.32	Relamp	LED	16.5	0	2,600	6,178	2.38	\$22	\$5	\$0	\$3,168	\$648	\$3,816	\$954	\$4,770	5,054	1.94	\$708	6.7
13th Floor		South Office Area	Recessed Troffe	T8	463	30	2,600	36,114	13.89	Relamp	LED	16.5	0	2,600	19,863	7.64	\$22	\$5	\$0	\$10,186	\$2,084	\$12,270	\$3,067	\$15,337	16,251	6.25	\$2,276	6.7
13th Floor		theast Corner Office Ro	Recessed Troffe	T8	8	30	2,600	624	0.24	Relamp	LED	16.5	0	2,600	343	0.13	\$22	\$5	\$0	\$176	\$36	\$212	\$53	\$265	281	0.11	\$39	6.7
13th Floor		Staircase 13D	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
13th Floor		Staircase 13C	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
13th Floor		East Office Area	Recessed Troffe	T8	138	30	2,600	10,764	4.14	Relamp	LED	16.5	0	2,600	5,920	2.28	\$22	\$5	\$0	\$3,								

Table 4: Lighting Template

Floor	Area	Description	Existing System							Measure	Proposed System						Costs					Savings						
			Fixture	Lamp	Qty.	Watts	Hours	kWh	kW		Lamp	Watts	Occ. Sensor	Hours	kWh	kW	Unit Matl.	Unit Labour	Sensor Cost	Material	Labour	Total Cost	Project Costs	Total Project	kWh Savings	kW Savings	Cost Savings	Simple Payback
Penthouse		Mechanical Room	Pot Light	CFL	7	18	3,120	393	0.13	None	CFL	18	0	3,120	393	0.13	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Penthouse		Mechanical Room	Strip	T8	1	30	3,120	94	0.03	Relamp	LED	16.5	0	3,120	51	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	42	0.01	\$6	5.9
Penthouse		Mechanical Room	Sconce	CFL	1	13	3,120	41	0.01	None	CFL	13	0	3,120	41	0.01	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Penthouse		Staircase No 2	Troffer	T8	1	30	8,736	262	0.03	Relamp	LED	16.5	0	8,736	144	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	118	0.01	\$13	2.5
Penthouse		Center Staircase	Troffer	T8	1	30	8,736	262	0.03	Relamp	LED	16.5	0	8,736	144	0.02	\$22	\$5	\$0	\$22	\$5	\$27	\$7	\$33	118	0.01	\$13	2.5
Penthouse		Staircase No. 4	Troffer	T8	4	30	8,736	1,048	0.12	Relamp	LED	16.5	0	8,736	577	0.07	\$22	\$5	\$0	\$88	\$18	\$106	\$27	\$133	472	0.05	\$54	2.5
Roof		Mechanical	Troffer	T8	5	30	3,120	468	0.15	Relamp	LED	16.5	0	3,120	257	0.08	\$22	\$5	\$0	\$110	\$23	\$133	\$33	\$166	211	0.07	\$28	5.9
Roof		Staircase	Troffer	T8	2	30	8,736	524	0.06	Relamp	LED	16.5	0	8,736	288	0.03	\$22	\$5	\$0	\$44	\$9	\$53	\$13	\$66	236	0.03	\$27	2.5
Exterior		Exterior	Wallpack	MH	19	115	4,452	9,728	2.19	Retrofit	LED	50	0	4,452	4,229	0.95	\$125	\$60	\$0	\$2,375	\$1,140	\$3,515	\$879	\$4,394	5,498	1.24	\$684	6.4
Exterior		Exterior	Sconce	CFL	5	13	4,536	295	0.07	None	CFL	13	0	4,536	295	0.07	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	0	0.00	\$0	
Exterior		Exterior	Pot Light	Halogen	6	75	4,620	2,079	0.45	Relamp	LED	18	0	4,620	499	0.11	\$30	\$2	\$0	\$180	\$9	\$189	\$47	\$236	1,580	0.34	\$195	1.2

Table 5: Fan Schedule

AHU #	Serving	Type	Volume ¹ [cfm]	Motor Supply/Return [HP]	Heating Coil	Cooling Coil	Humidification	Hours of Operation
AHU#1	2nd Basement	CAV	Unknown	1.5 / none	Glycol	Chilled Water	None	5.30am-6pm, Mon, 6am-6pm Tue-Fri
AHU#2	1st Basement Loading Dock	CAV	Unknown	1.5 / none	Glycol	Chilled Water	None	5am-6pm, Mon, 6am-6pm Tue-Fri
AHU#3	Kitchen Make-Up Air	CAV	Unknown	5 / none	None	None	None	4am-6pm, Mon-Fri
AHU#4	Cafeteria	CAV	Unknown	15 / 5	Glycol	Chilled Water	None	5am-6pm, Mon-Fri
AHU#5	Basement Mail Room	CAV	Unknown	1 / 0.75	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Fri
AHU#6	1st Basement Census Area	CAV	Unknown	7.5 / none	Glycol	Chilled Water	None	5am-6pm, Mon, 6am-6pm Tue-Fri
AHU#7	1st Floor & 2nd Basement	VAV	Unknown	60 / 20	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Thu, 4.30am-6pm Fri
AHU#8	1st Floor & 2nd Basement	VAV	Unknown	60 / 20	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Thu, 4.30am-6pm Fri
AHU#9	1st Floor & 2nd Basement	VAV	Unknown	20 / 20	Glycol	Chilled Water	None	5am-6pm, Mon, 6am-6pm Tue-Thu, 4.30am-6pm Fri
AHU#10	Floors 2 to 13 North Perimeter	VAV	Unknown	20 / 20	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Fri
AHU#11	Floors 3 to 13 East Perimeter	VAV	Unknown	75 / 30	Glycol	Chilled Water	Steam	5am-6pm, Mon-Fri
AHU#12	Lobby to Floor 13 South Perimeter	VAV	Unknown	40 / 20	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Fri
AHU#13	Floors 2 to 13 West Perimeter	VAV	Unknown	100 / 40	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Fri
AHU#14	Floors 6 to 13 East Interior	VAV	Unknown	100 & 100 / 75	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Fri
AHU#15	Floors 6 to 13 West Interior	VAV	Unknown	100 & 100 / 75	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Fri
AHU#16	Floors 2 to 5 Core & Main Lobby	VAV	Unknown	75 & 75 / 60	Glycol	Chilled Water	Steam	5am-6pm, Mon, 6am-6pm Tue-Fri

1. No data on ventilation rates was available in any of the building documentation.

Table 6: Pump Summary

Pump ID	Service	Motor Power [HP]	Flow Rate [gpm]	Head [ft]	Operation
20-400-27	Radiation / Serves Radiators in All the Building	25.0	500		Winter
20-400-28	Hot Water Circulation / Serves all AHU Heating Coils	20.0	500		Winter
20-400-29	Reheat / Serves All Reheat Boxes in the Building	15.0	240		Winter
20-400-30	Circulation / Serves Glycol Dock Heating		70		Winter
20-400-35	Circulation / Serves Glycol Dock Heating		70		Winter
20-405-17	Condensate / Serves Glycol Dock Heating		70		Winter
20-405-18	Condensate / Serves Glycol Dock Heating	3.0			Winter
25-400-24	Chilled Water Pump / Serves All Chilled Water Coils	25.0	600		Summer
25-400-25	Chilled Water Pump / Serves All Chilled Water Coils	25.0	600		Summer
25-400-26	Chilled Water Pump / Serves All Chilled Water Coils	25.0	600		Summer

Table 7: Water Audit

Type	Fixture Mounting	Supply	Quantity	Flow Rate
Toilet	Floor	Valve	153	6 LPF
Urinal	Wall	Valve	62	3.8 LPF
Sink	Wall	Valve	181	7.6 LPM

Table 8: Utility Data

Month	Electricity				Steam				Chilled Water				Water			Total			Weather Data		
	Usage	Cost	Usage Intensity	Cost Intensity	Usage		Cost	Usage Intensity	Cost Intensity	Usage		Cost	Usage Intensity	Cost Intensity	Usage	Cost	Usage	Cost	Cost Intensity	HDD	CDD
	[kWh]	[\$]	[kWh/m ²]	[\$/m ²]	[GJ]	[ekWh]	[\$]	[ekWh/m ²]	[\$/m ²]	[GJ]	[ekWh]	[\$]	[ekWh/m ²]	[\$/m ²]	[m ³]	[\$]	[ekWh]	[\$]	[\$/m ²]	[@18°C]	[@18°C]
January	656,737	\$74,211	9.2	\$1.04	1,980	549,949	\$55,727	7.7	\$0.78	0	0	\$0	0.0	\$0.00	2,215	\$7,906	1,206,686	\$137,844	\$1.94	918.3	0
February	599,757	\$67,773	8.4	\$0.95	1,462	406,176	\$41,159	5.7	\$0.58	0	0	\$0	0.0	\$0.00	2,129	\$7,599	1,005,933	\$116,530	\$1.64	793.2	0
March	640,348	\$72,359	9.0	\$1.02	1,489	413,678	\$41,919	5.8	\$0.59	0	0	\$0	0.0	\$0.00	1,931	\$6,894	1,054,026	\$121,172	\$1.70	783.6	0
April	623,698	\$71,725	8.8	\$1.01	660	183,305	\$17,928	2.6	\$0.25	9	2,577	\$257	0.0	\$0.00	2,622	\$10,016	809,580	\$99,926	\$1.41	384.2	0
May	662,203	\$76,153	9.3	\$1.07	96	26,615	\$2,603	0.4	\$0.04	1,353	375,736	\$37,465	5.3	\$0.53	2,295	\$8,768	1,064,554	\$124,990	\$1.76	127.3	8.8
June	626,964	\$72,101	8.8	\$1.01	0	0	\$0	0.0	\$0.00	2,423	673,007	\$67,107	9.5	\$0.94	1,953	\$7,459	1,299,970	\$146,666	\$2.06	20.3	54.9
July	628,301	\$72,255	8.8	\$1.02	0	0	\$0	0.0	\$0.00	2,594	720,514	\$71,844	10.1	\$1.01	2,006	\$7,662	1,348,814	\$151,760	\$2.13	8.8	62.8
August	617,165	\$70,974	8.7	\$1.00	0	0	\$0	0.0	\$0.00	2,470	686,292	\$68,432	9.7	\$0.96	1,923	\$7,345	1,303,456	\$146,751	\$2.06	21.4	55.8
September	597,134	\$68,670	8.4	\$0.97	0	0	\$0	0.0	\$0.00	1,679	466,420	\$46,508	6.6	\$0.65	2,356	\$9,000	1,063,554	\$124,178	\$1.75	110.3	21.6
October	597,963	\$68,766	8.4	\$0.97	49	13,660	\$1,336	0.2	\$0.02	586	162,770	\$16,230	2.3	\$0.23	2,577	\$9,842	774,393	\$96,174	\$1.35	257.9	3.1
November	548,144	\$63,037	7.7	\$0.89	654	181,775	\$17,778	2.6	\$0.25	0	0	\$0	0.0	\$0.00	2,482	\$9,482	729,919	\$90,297	\$1.27	510.6	0
December	601,623	\$69,187	8.5	\$0.97	1,406	390,492	\$38,192	5.5	\$0.54	0	0	\$0	0.0	\$0.00	1,604	\$6,125	992,116	\$113,504	\$1.60	696.4	0
Total	7,400,036	\$847,210	104.1	\$11.91	7,796	2,165,650	\$216,642	30.5	\$3.05	11,113	3,087,316	\$307,843	43.4	\$4.33	26,091	\$98,097	12,653,002	\$1,469,792	\$20.67	4,632.3	207.0

Table 9: Measure Summary

Measure Description	Total Utility [\$]	Electrical		Annual Utility Savings				CO ₂ e [MT/yr]	Total Cost [\$]	Simple Payback [yrs]
		[kW]	[kWh/yr]	Chilled Water [GJ/yr]	Steam [GJ/yr]	Water [m ³ /yr]	Total [GJ/yr]			
RCx & Controls Optimisation	\$85,689	0	600,658	333	546	0	3,041	166.6	\$40,875	0.5
O&M Measures	\$41,360	0	0	111	733	5,279	844	48.7	\$43,750	1.1
Water Fixtures	\$8,191	0	0	0	0	2,354	0	0.0	\$46,498	5.7
Measure Totals (< 6 year Simple Payback)	\$135,240	0	600,658	445	1,279	7,633	3,886	215.2	\$131,123	1.0
Measure Description	Total Utility [\$]	Electrical		Annual Utility Savings				CO ₂ e [MT/yr]	Total Cost [\$]	Simple Payback [yrs]
		[kW]	[kWh/yr]	Chilled Water [GJ/yr]	Steam [GJ/yr]	Water [m ³ /yr]	Total [GJ/yr]			
Lighting Retrofit	\$120,777	310	883,215	0	0	0	3,180	185.5	\$781,213	6.5
Measure Totals (> 6 year Simple Payback)	\$120,777	310	883,215	0	0	0	3,180	185.5	\$781,213	6.5
Measure Totals (All Measures)	\$256,017	310	1,483,873	445	1,279	7,633	7,065	400.7	\$912,336	3.6

Appendix B Measure Worksheets

Measure Cost and Savings Work-Up Sheet

Facility: Jean Talon

Measure: Lighting Retrofit

Existing:

The facility is currently illuminated by:

- 32W T8 4' fixtures in most areas.
- T8 2' fixtures in washrooms.
- Halogen track lights on the 1st and 7th floor.
- Halogen and HID fixtures on the exterior of the building.

Proposed:

The following lighting measures are proposed:

- Relamp all 4' T8 fixtures with 16.5W LED lamps.
- Relamp all 2' T8 fixtures with 8.5W LED lamps.
- Relamp all halogen track lights with LED lamps.
- Relamp all halogen fixtures on the building exterior with LED lamps.
- Replace all exterior HID fixtures with LED fixtures.
- Install occupancy sensors in areas with sporadic use such as kitchenettes, mechanical rooms, boardrooms, and washrooms.

Cost:

Material:	\$525,067
Labour:	\$99,903
Sub-Total:	\$624,970
(15%) Eng. & Proj. Man.:	\$93,746
(10%) Contingency:	\$62,497
Total Cost:	\$781,213
Annual Savings:	\$120,777
Service Life (Years):	10
Simple Payback:	6.5
Net Present Value:	\$107,720
ROI:	9%

Assumptions:

- Cost of LED 4' tube: \$20, relamp assumed to take 1/12 hour/lamp relamping technician time.
- Cost of LED 2' tube: \$20, relamp assumed to take 1/12 hour/lamp relamping technician time.
- Cost of LED tracklight lamp: \$15, relamp assumed to take 1/12 hour/lamp relamping technician time.
- Cost of 50W LED wallpack (100W MH replacement): \$125, installation assumed to take 1 hour/fixture electrician time.
- Cost of 18W LED lamp (75W halogen replacement): \$30, relamp assumed to take 1/12 hour/lamp relamping technician time.
- Cost of occupancy sensor: \$160 installed.
- Assume that 10% of the ballasts need to be replaced.
- Labour rates set as follows:
 - relamping technician at \$18/hour.
 - electrician at \$60/hour.
- Incentives are based on saveONenergy Engineered rates of \$400/kW or \$0.05/kWh.

Savings:

Energy Reduction Measure	Electricity			Total Savings	Estimated Cost	Simple Payback	GHG Reduction
	[kW]	[kWh]	[\$]				
Lighting Retrofit	310	883,215	\$120,777	\$120,777	\$781,213	6.5	185.5

Notes:

Approximately \$124,000 may be available in incentive funding from the Ontario Power Authority's saveonenergy Retrofit program. See <http://saveonenergy.ca> for details.

Measure Cost and Savings Work-Up Sheet

Facility: Jean Talon

Measure: RCx & Controls Optimisation

Existing:

A review of the HVAC and lighting system controls and operations has identified several opportunities for optimization of energy performance including improved control strategies, and re-commissioning.

Proposed:

The following measures are proposed:

- Add the exhaust fans serving the washrooms, kitchens, and boardrooms to the BAS and schedule based on building occupancy.
- Schedule all air handling units based on core occupancy, 6am to 6pm.
- Implement space temperature setback during unoccupied hours.
- Recommission the CO₂ sensors on AHUs 7, 8, 9, 14, 15, and 16 and control ventilation rates based on CO₂ level.
- Reduce the relative humidity setpoints to 30% RH.
- Reduce the static pressure of the DCW supplied to the penthouse to 35 psig from 115 psig.
- Repair the bypass valve on the AHU hot water pump, close off and control the pump speed with the VFD.

Cost:

Material: \$13,000
Labour: \$19,700
Sub-Total: \$32,700
(15%) Eng. & Proj. Man.: \$4,905
(10%) Contingency: \$3,270
Total Cost: \$40,875

Annual Savings: \$85,689

Service Life (Years): 5
Simple Payback: 0.5
Net Present Value: \$320,080
ROI: 209%

Assumptions:

- 6 exhaust fans need to be added to the BAS.
 - 32 hours to adjust the schedules for 16 AHUs.
 - 40 hours to implement space temperature setback.
 - 20 hours to recommission the CO₂ sensors, \$2,000 in material costs.
 - 20 hours to reprogram the relative humidity setpoints.
 - 5 hours to reprogram the static pressure setpoint of the DCW pumps.
 - 20 hours to replace the AHU hot water pump bypass valve, \$5,000 in material costs.
 - The toilets in the building require a static pressure of 35 psig to operate.
- Labour rate: \$100/hour.
 - BAS Points: \$2,000/point (50% materials, 50% labour).

Savings:

Energy Reduction Measure	Electricity			Steam		Chilled Water		Total Savings [\$]	Estimated Cost [\$]	Simple Payback [Years]	GHG Reduction [teCO ₂]
	[kW]	[kWh]	[\$]	[GJ]	[\$]	[GJ]	[\$]				
RCx & Controls Optimisation	0	600,658	\$61,627	546	\$14,827	333	\$9,235	\$85,689	\$40,875	0.5	166.6

Notes:

Measure Cost and Savings Work-Up Sheet

Facility: Jean Talon

Measure: O&M Measures

Existing:

The audit identified various opportunities to improve the energy performance of the facility through improved O&M practices and low-cost measures.

Proposed:

The following O&M measures are proposed:

- Install removable insulation jackets on exposed steam traps.
- Insulate exposed steam pipes in the mechanical rooms.
- Install weather stripping around leaky exterior doors.
- Install low flow 0.5 gpm aerators on all sinks.

Cost:

Material: \$10,000
Labour: \$25,000
Sub-Total: \$35,000
(15%) Eng. & Proj. Man.: \$5,250
(10%) Contingency: \$3,500
Total Cost: \$43,750

Annual Savings: \$41,360

Service Life (Years): 5
Simple Payback: 1.06
Net Present Value: \$130,472
ROI: 91%

Assumptions:

- Faucet aerators: \$5/aerator, 1/12 hours/aerator installation time.
- Labour rate: \$60/hour.

Savings:

Energy Reduction Measure	Steam		Chilled Water		Water		Total Savings [\$]	Estimated Cost [\$]	Simple Payback [Years]	GHG Reduction [teCO ₂]
	[GJ]	[\$]	[GJ]	[\$]	[m ³]	[\$]				
O&M Measures	733	\$19,916	111	\$3,078	5,279	\$18,365	\$41,360	\$43,750	1.1	48.7

Notes:

Measure Cost and Savings Work-Up Sheet

Facility: Jean Talon

Measure: Water Fixtures

Existing:

Urinals are 3.8 LPF wall mounted flush valve type.

Proposed:

Replace all 3.8 LPF urinals with 1.9 LPF equivalents.

Cost:

Material:	\$24,800
Labour:	\$12,399
Sub-Total:	\$37,199
(15%) Eng. & Proj. Man.:	\$5,580
(10%) Contingency:	\$3,720
Total Cost:	\$46,498

Annual Savings: \$22,600

Service Life (Years):	20
Simple Payback:	2.1
Net Present Value:	\$212,723
ROI:	49%

Assumptions:

- 62 urinals at \$400/urinal materials, \$200/urinal labour.
- Savings based on a 50% reduction in urinal water use (3.8 LPF to 1.9 LPF).
- Labour rate: \$60/hour.

Savings:

Energy Reduction Measure	Water		Total Savings [\$]	Estimated Cost [\$]	Simple Payback [Years]	GHG Reduction [teCO ₂]
	[m ³]	[\$]				
Water Fixtures	2,354	\$8,191	\$22,600	\$46,498	2.1	33.9

Notes:

Prior to undertaking water conservation measures, staff should ensure that the water meter is working properly.

Appendix C Energy Balance Reports

Building:
Date:
Purpose:

Jean Talon
Mar-15
Electrical End-Use Estimates and Energy Balance

Area = 765,042 sq.ft.

End-Use Estimates	Base				Winter Extra				Summer Extra				Total		
	[kW]	[kWh]	[kWh/ft ²]	[\$]	[kW]	[kWh]	[kWh/ft ²]	[\$]	[kW]	[kWh]	[kWh/ft ²]	[\$]	[kWh]	[kWh/ft ²]	[\$]
Lighting															
Interior Lighting	711.5	2,003,568	2.6	\$274,894									2,003,568	2.6	\$274,894
Exterior Lighting	2.7	5,023	0.0	\$778									5,023	0.0	\$778
Plug Loads/Miscellaneous															
Computer Equipment and Plug Loads	765.0	1,989,109	2.6	\$278,628									1,989,109	2.6	\$278,628
Compressors	14.9	26,140	0.0	\$4,136									26,140	0.0	\$4,136
Elevators	396.6	330,000	0.4	\$72,506									330,000	0.4	\$72,506
Space Heating					54.8	240,000	0.3	\$29,963					240,000	0.3	\$29,963
Space Cooling									45.7	100,000	0.1	\$14,709	100,000	0.1	\$14,709
Air Handling Systems															
AHU#1 - 2nd Basement	0.4	1,661	0.0	\$210									1,661	0.0	\$210
AHU#2 - 1st Basement Loading Dock	1.1	4,614	0.0	\$582									4,614	0.0	\$582
AHU#3 - Kitchen Make-Up Air	3.7	17,650	0.0	\$2,174									17,650	0.0	\$2,174
AHU#4 - Cafeteria	8.4	37,118	0.0	\$4,631									37,118	0.0	\$4,631
AHU#5 - Basement Mail Room	1.3	5,383	0.0	\$680									5,383	0.0	\$680
AHU#6 - 1st Basement Census Area	3.4	13,906	0.0	\$1,755									13,906	0.0	\$1,755
AHU#7 - 1st Floor & 2nd Basement	26.6	112,297	0.1	\$14,112									112,297	0.1	\$14,112
AHU#8 - 1st Floor & 2nd Basement	48.6	205,494	0.3	\$25,823									205,494	0.3	\$25,823
AHU#9 - 1st Floor & 2nd Basement	15.2	64,293	0.1	\$8,079									64,293	0.1	\$8,079
AHU#10 - Floors 2 to 13 North Perimeter	9.6	39,483	0.1	\$4,984									39,483	0.1	\$4,984
AHU#11 - Floors 3 to 13 East Perimeter	32.7	143,531	0.2	\$17,909									143,531	0.2	\$17,909
AHU#12 - Lobby to Floor 13 South Perimeter	17.9	73,744	0.1	\$9,309									73,744	0.1	\$9,309
AHU#13 - Floors 2 to 13 West Perimeter	44.1	181,833	0.2	\$22,953									181,833	0.2	\$22,953
AHU#14 - Floors 6 to 13 East Interior	89.4	368,606	0.5	\$46,529									368,606	0.5	\$46,529
AHU#15 - Floors 6 to 13 West Interior	70.9	292,161	0.4	\$36,879									292,161	0.4	\$36,879
AHU#16 - Floors 2 to 5 Core & Main Lobby	70.8	291,760	0.4	\$36,829									291,760	0.4	\$36,829
Misc. Supply Fans	1.3	11,436	0.0	\$1,301									11,436	0.0	\$1,301
Exhaust Fans	15.4	135,328	0.2	\$15,390									135,328	0.2	\$15,390
Pumping															
Condensate	2.2	3,921	0.0	\$620									3,921	0.0	\$620
Storm & Sanitary	7.5	6,535	0.0	\$1,397									6,535	0.0	\$1,397
DCW Booster	16.8	147,037	0.2	\$16,721									147,037	0.2	\$16,721
DHW Circulation	7.5	65,350	0.1	\$7,432									65,350	0.1	\$7,432
Perimeter Radiation					18.7	81,687	0.1	\$10,198					81,687	0.1	\$10,198
Hot Water Heating Coils					14.9	65,350	0.1	\$8,159					65,350	0.1	\$8,159
Reheat Coils					11.2	49,012	0.1	\$6,119					49,012	0.1	\$6,119
Loading Dock Glycol Coil					11.2	49,012	0.1	\$6,119					49,012	0.1	\$6,119
Chilled Water									37.3	245,061	0.3	\$28,778	245,061	0.3	\$28,778
Totals	2,386	6,576,980	8.6	\$907,242	111	485,061	0.6	\$60,558	83	345,061	0.5	\$43,487	7,407,102	9.7	\$1,011,288
Baseline	2,386	6,577,724	8.6	\$907,319	111	480,255	0.6	\$60,065	83	342,057	0.4	\$43,179	7,400,036	9.7	\$847,210
Difference		0.0%				1.0%				0.9%			0.1%		

Notes:

Building: Jean Talon
Date: Mar-15
Purpose: Steam End-Use Estimate and Energy Balance

Floor Area 765,042 sq.ft.
Marginal Rate \$27.17 /GJ
Average Rate \$27.79 /GJ

System Estimates	Base Load			Winter Extra			Total		
	[GJ]	[ekWh/sq.ft.]	[\$]	[GJ]	[ekWh/sq.ft.]	[\$]	[GJ]	[ekWh/sq.ft.]	[\$]
DHW									
Hot Water	1,145	0.4	\$31,816				1,145	0.4	\$31,816
Space Heating									
Space Heating			\$0	6,237	2.3	\$173,314	6,237	2.3	\$173,314
Humidification			\$0	1,559	0.6	\$43,328	1,559	0.6	\$43,328
Total	1,145	0.4	\$31,816	7,796	2.8	\$216,642	8,941	3.2	\$248,458
Baseline	1,145	0.4	\$31,816	7,796	2.8	\$216,642	8,941	3.2	\$248,458
Difference	0.0%			0.0%			0.0%		

Notes:

Building: Jean Talon
Date: Mar-15
Purpose: Chilled Water End-Use Estimate and Energy Balance

Floor Area 765,042 sq.ft.
Marginal Rate \$27.70 /GJ
Average Rate \$27.70 /GJ

System Estimates	Base Load			Summer Extra			Total		
	[GJ]	[ekWh/sq.ft.]	[\$]	[GJ]	[ekWh/sq.ft.]	[\$]	[GJ]	[ekWh/sq.ft.]	[\$]
AHU#1 - 2nd Basement				18	0.0	\$485	18	0.0	\$485
AHU#2 - 1st Basement Loading Dock				18	0.0	\$485	18	0.0	\$485
AHU#4 - Cafeteria				175	0.1	\$4,853	175	0.1	\$4,853
AHU#5 - Basement Mail Room				12	0.0	\$324	12	0.0	\$324
AHU#6 - 1st Basement Census Area				88	0.0	\$2,427	88	0.0	\$2,427
AHU#7 - 1st Floor & 2nd Basement				701	0.3	\$19,412	701	0.3	\$19,412
AHU#8 - 1st Floor & 2nd Basement				701	0.3	\$19,412	701	0.3	\$19,412
AHU#9 - 1st Floor & 2nd Basement				234	0.1	\$6,471	234	0.1	\$6,471
AHU#10 - Floors 2 to 13 North Perimeter				234	0.1	\$6,471	234	0.1	\$6,471
AHU#11 - Floors 3 to 13 East Perimeter				876	0.3	\$24,265	876	0.3	\$24,265
AHU#12 - Lobby to Floor 13 South Perimeter				467	0.2	\$12,941	467	0.2	\$12,941
AHU#13 - Floors 2 to 13 West Perimeter				1,168	0.4	\$32,353	1,168	0.4	\$32,353
AHU#14 - Floors 6 to 13 East Interior				2,336	0.8	\$64,707	2,336	0.8	\$64,707
AHU#15 - Floors 6 to 13 West Interior				2,336	0.8	\$64,707	2,336	0.8	\$64,707
AHU#16 - Floors 2 to 5 Core & Main Lobby				1,752	0.6	\$48,530	1,752	0.6	\$48,530
Total	0	0.00	\$0	11,113	4.0	\$307,843	11,113	4.0	\$307,843
Baseline	0	0.00	\$0	11,113	4.0	\$307,843	11,113	4.0	\$307,843
Difference	0.0%			0.0%			0.0%		

Notes:

Building: Jean Talon
Date: Mar-15
Purpose: Water End-Use Estimate

Water Rate: \$3.48 /m³

System Estimates	Base Load [m³]	Cost [\$]
Toilets and urinals	14,003	\$52,648
Sinks	7,035	\$26,452
Janitorial	4,361	\$16,396
Humidification	592	\$2,226
Total	25,991	\$97,721
Baseline	26,091	\$98,097
Difference	0%	0%