A Combined Proposal for a Cooling Infrastructure Upgrade and Major Lighting Retrofit



Facilities and Services

Office of the Vice-President, Business Affairs January 2006

Executive Summary

The University is faced with mounting challenges in the years ahead due to a large deferred renewal backlog that threatens its teaching and research activities, increases operating costs and new legislation that defines new liabilities. There are opportunities to deal with these challenges in a socially responsible yet cost-effective manner.

There is an urgent need for renewal of the primary infrastructure used to air condition buildings on the St. George campus if the normal functioning of the University of Toronto is to continue without interruption. This report outlines a proposal to combine this renewal, which involves eighteen sets of chillers serving 21 buildings, with an imminent major lighting retrofit in three buildings (Robarts Library, Medical Sciences Building and the Ontario Institute for Studies in Education). The project will place the University in an advantageous position to attract several large external low-interest loans and grants, offsetting unavoidable costs to the University.

In addition to the financial benefit of combining these projects, there are a number of other reasons why a renewal of the cooling infrastructure is imperative and the lighting retrofit is necessary. These relate to reliability and maintenance costs, environmental liability, health and safety, energy and financial viability, as outlined in Table 1.

First, the reliability of both the cooling infrastructure and the lighting is becoming increasingly problematic, making maintenance extremely expensive. Many of the chillers and a large number of the lighting fixtures have exceeded their expected lifetimes by over a decade. For example, in 2005 the Ontario Institute for Studies in Education (OISE) was closed briefly due to the failure of the cooling system.

Second, the technologies on which portions of the existing cooling infrastructure and the lighting depend are out of date and contain substances that have been highly regulated, including polycarbonate biphenyls (PCB's) and chlorofluorocarbons (CFC's). It is expected that in the near future there will be a lack of service providers or materials available to correct or maintain infrastructure that is deemed in non-compliance.

Third, the fluctuation of energy prices due to the deregulation of the electricity market increases financial risk to the University, which spends on the order of \$17 million on electricity annually. It is expected that electricity prices will continue to rise into the future, and it would be prudent of the University to shield itself as much as possible from these effects by reducing electricity consumption. The proposed project would reduce energy use by approximately 12 GWh per year and reduce cost by over \$1.3 million per year, and at the same time reduce the demand on the University's near-capacity electrical distribution system by 4.2 MW. Furthermore, this project will reduce greenhouse gas emissions from the University by 3,100 tonnes of CO_2 per year (the equivalent of permanently removing 600 cars from the road).

Issue	Cooling Infrastructure	Lighting	Combined
Reliability and Maintenance Costs	Replacement now required due to extreme age of equipment. Expected increase in disruptive failures.	Due to much longer lifetime of the proposed lighting retrofits, lamp replacement would be less frequent.	Increased reliability and reduced maintenance costs, especially with respect to the cooling infrastructure.
Environmental Liability, Health and Safety	Fines are possible if CFC's are inadvertently released into environment.	Replacement of lighting fixtures and removal of PCB's. Current lighting is a fire hazard in some locations.	Legislated removal of CFC's and PCB's is beneficial environmentally and fiscally for the university. Reduction of $3,100$ tonnes CO _{2E} /year.
Energy * Based on 20% increase in electricity cost in 2006, 2% per annum thereafter. Financial Viability	Reduction in energy consumption of 3 GWh/year, saving approximately \$0.33 million per year. Long payback period of 42 years. Total cost of approximately \$13.9 million.	Reduction in energy consumption of 9 GWh/year, saving approximately \$0.97 million per year. Short payback of 4.3 years. Total cost approximately \$4.4 million.	Reduction in energy consumption of 12 GWh/year, saving approximately \$1.3 million per year. Access to low-interest loans and grants. Combined payback period of 14 years.
Summary	Essential renewal of infrastructure for St. George Campus.	Required for safety, liability and energy reasons.	Allows the project to attract greater low- interest loans and grants, resulting in acceptable ROI.

Table 1	Summary	v of	project	proposal	benefits	costs and	justifications.
Table 1.	Junnar	y OI	project	proposa	Denemo	costs and	justifications.

Finally, these projects have been combined to enable major financial benefits. To date, the University has qualified for grants totaling \$2.93 million. Furthermore, while the cooling infrastructure project has a long payback period, the lighting retrofit has a short payback period which helps offset the cost of the cooling infrastructure renewal over time.

This project will require the University to initially allocate \$16.94 million of its borrowing capacity. This loan would be repaid through energy savings of approximately \$1.3 million per year. A portion of the debt could be supplied by a zero-interest loan of \$2.74 million expected from the City of Toronto Better Buildings Partnership. A summary of the costs and financing for the proposed project is shown in Table 2.

Overall, this proposal leverages an essential and expensive cooling infrastructure renewal with a financially attractive lighting retrofit that will become necessary within a short time frame. This strategic combination allows the University to take advantage of external project financing, reducing the capital costs and payback periods of the overall project. As a result, a major deferred maintenance project with a value of almost twenty million dollars will be accomplished with virtually no overall long-term cost to the University's cash reserves, while providing a continuing positive cash flow to the operating budget. In addition, it is recommended that staff from the Sustainability Office and Facilities and Services continue to work together to develop a comprehensive Energy Infrastructure Renewal Plan for the entire University.

COST	TS	
Cooli	ng Infrastructure Sub-project Descriptions	(millions)
Ι	OISE Chiller	\$ 1.72
II	Northwest Chiller Plant	1.91
III	Lash Miller Interconnect	2.41
IV	Ramsay Wright Interconnect	3.60
V	Warren Stevens Chillers	1.24
VI	Earth Sciences Centre Chillers	1.47
VII	Bora Laskin Chiller	0.57
VIII	Dentistry Chiller	1.00
	Cooling Infrastructure Sub-total	\$ 13.92
	ing Retrofit Sub-project Descriptions	
Ι	Robarts Library Lighting Retrofit	\$ 2.31
II	Medical Sciences Building Lighting Retrofit	1.23
III	OISE Building Lighting Retrofit	0.83
	Lighting Retrofit Sub-total	\$ 4.37
	Operating Shortfall ¹	\$ 0.66
	Total Construction Financing Costs ²	\$ 0.92
	Total Project Construction Cost	\$ 19.87
FUNI	DING	
	ing Sources	
	nn ³ (confirmed)	\$ 0.25
	to Hydro ³ (confirmed)	0.68
Minis	try of Training, Colleges and Universities (Facilities Renewal Program) ³	2.00
	Total Funding Available	\$ 2.93
	Total Required Funding ⁴	\$ 16.94
	y Savings During Construction ⁵	\$ 3.05
Unive	ersity Long-Term Loan ⁶	13.89
	Payment Plan	\$ 16.94
1	After completion of the project there will be a cash shortfall from ye	ears 4 to 10, as shown

Table 2. Summary of costs and funding sources.

After completion of the project there will be a cash shortfall from years 4 to 10, as shown in Appendix C.

² Construction cost financing at 4% required to complete the project over three years.

- ³ Grants have been successfully awarded based on the terms and conditions of this proposal.
- ⁴ This is the Total Project Construction Cost (\$ 19.68 million) minus the Total External Funding Available (\$ 2.93 million).
- ⁵ Immediate savings over the three year construction phase due to the lower demand on energy.
- ⁶ 15 year term mortgage to be paid by the annual energy savings of approximately \$1.3 million based on an 8% interest rate used for modeling. This assumes there is available funding of \$2.74 million from the City of Toronto Better Building Partnership at an interest free rate to be repaid over 10 years subsequent to completion of the full project.

Recommendations:

- 1. It is recommended that the proposed project encompassing a renewal of the cooling infrastructure and a major retrofit of lighting on the St. George campus with a total project cost estimate of \$19.87 million, and an allocation of borrowing capacity of \$16.94 million be approved.
- 2. It is recommended that the Sustainability Office and staff of Facilities and Services continue to work to harmonize and expand existing initiatives addressing energy consumption, supply and energy reduction to create a comprehensive energy plan for all three campuses that will address the long range requirements of the University, resulting in an Energy Infrastructure Renewal Plan.

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I. Membership

Mr. Ron Swail (Chair), Assistant Vice-President, Facilities and Services
Mr. Julian Binks, Manager, Project Planning, Capital Projects
Professor Phil Byer, Faculty of Applied Science and Engineering
Mr. Chris Caners, Sustainability Office
Mr. Bruce Dodds, Director, Utilities and Building Operations, Facilities and Services
Professor Beth Savan, Director, Sustainability Office
Mr. Farouk Kothdiwala, Project Manager, Facilities and Services
Mr. Demetrios Voudouris, Manager, Accounting Services
Ms. Elizabeth Sisam, Assistant Vice-President, Space and Facilities Planning
Mr. Matto Mildenberger, Student Member, Academic Board
Ms. Coralie D'Souza, Student Member, Governing Council

II. Terms of Reference

The Project Committee must address the following terms:

- 1. Review the existing situation and identify a program of renewal projects that will eliminate the liability associated with operating the St. George Campus' CFC chillers and remaining low-efficiency T-12 fluorescent lights.
- 2. Identify a schedule for the renewal projects.
- 3. Identify all resource implications, including a preliminary estimate of capital costs, and projected costs and savings to the annual operating budget.
- 4. Identify available sources of incentive funding from external governmental agencies.
- 5. Identify a funding plan for the capital costs.
- 6. Report by February, 2006.

III. Background Information

This section contains information on the cooling infrastructure and lighting at the St. George Campus, as well as an outline of the numerous justifications for the proposed project.

3.1. History

Cooling Infrastructure

Cooling for most buildings on the St. George Campus in the spring, summer and fall is provided via chilled water produced by either a central or local refrigeration plant to the air conditioning systems of the buildings. The majority of these refrigeration plants consist of electrically powered chillers, which may provide cooled water to several buildings connected by distribution piping, or else provide the cooling requirements for one building alone. Buildings without access to chilled water from this source either do not have air conditioning capability, or, in some cases, utilize less efficient localized air conditioning units.

Many of the chillers at the St. George Campus were installed in the 1960's, with a life expectancy of 25 to 35 years. Many are now 10 or 20 years beyond their expected lifetime and contain CFC refrigerants; a substance legislated out of production in 1996, because of damages this group of substances cause to the ozone layer. Failure of the equipment has in some cases led to major disruptions of normal University functions.

Lighting

During the 1990's, a major lighting retrofit was undertaken for nearly the entire St. George campus. This retrofit converted the older, less efficient T-12 lamps and ballasts, many containing the hazardous material polychloride biphenyl (PCB), to more efficient T-8 lighting. Three major buildings, including the Ontario Institute for Studies in Education (OISE), Robarts Library and the Medical Sciences Building (MSB) were not included in this retrofit because those buildings distribute a different voltage to lighting fixtures, and the appropriate technology was not available in the mid-nineties to perform the upgrade.

Fluorescent ballasts have a life expectancy of approximately 25 years. Many of those still in use at Robarts Library, MSB and OISE are original equipment and may contain PCB's, while others have failed over the years, leaking oil and posing a fire hazard.

3.2. Project Justification

This section outlines the justifications for the cooling infrastructure renewal project, the lighting retrofit project and their combination, with respect to four areas: reliability and maintenance costs; environmental liability, health and safety; energy and financial viability. It is recommended that while each of these projects can be justified in its own right, the projects should be combined into one package in order to take advantage of available funding opportunities.

3.2.1. Reliability and Maintenance Costs

The deferred renewal needs of the St. George campus now stand at a projected \$264 million over the next 5 years. Increased reliability is essential for the University to continue functioning effectively, without disruption.

Cooling Infrastructure

An ongoing audit of buildings and infrastructure by external consultants on the St. George Campus will be completed in 2006. The consultants have already determined that the renewal of the cooling infrastructure should be considered one of the highest priorities for the University.

As the cooling infrastructure equipment has aged, there have been frequent failures. Sudden breakdowns have occurred at Sidney Smith Hall and the Ramsay Wright Zoological Laboratories. The 36 year old chiller located in OISE has failed several times over the past three years, at times resulting in the evacuation of the building. This situation is becoming more common, and these malfunctions and breakdowns require expensive and time-consuming repairs.

Lighting Retrofit

While there are many other reasons to replace the lighting fixtures of Robarts Library, MSB and OISE, there are also valid reliability concerns for replacing the existing T-12 ballasts and lamps with the more efficient T-8 model. First, the T-8 has a significantly higher lifetime than their T-12 counterparts, which reduces the replacement costs, especially due to the difficult to reach locations that exist in buildings such as Robarts. Currently, up to \$80,000 is spent annually in that building alone to replace the existing T-12 lamps and ballasts on an ad hoc basis, often requiring a hydraulic boom or scaffolding to gain access. Second, utilizing the T-8 ballasts and lights will standardize the lighting in all of the major buildings on the St. George campus, increasing the efficiency and effectiveness of the maintenance staff and purchasing.

3.2.2. Environmental Liability, Health and Safety

This section deals with the benefits and justifications for removing and retrofitting infrastructure that contains and uses hazardous materials on the St. George campus.

Cooling Infrastructure

There are several concerns regarding the cooling infrastructure with respect to the environment, health and safety of the students, staff and faculty at the University. First, hazardous materials in the form of ozone-depleting chlorofluorocarbons (CFC'S), a regulated substance under the Canadian Environmental Protection Act (Ozone Depleting Substance Regulations (ODSR) 1998), are still being used in the existing chillers. The St. George campus has 18 remaining chillers in this category, some of which are over 40 years old. This proposal would remove all of the CFC containing chillers from the St. George campus.

Lighting Retrofit

Under the Canadian Environmental Protection Act (CEPA), all equipment containing polycarbonate biphenyls (PCB's) in concentrations greater than 500 ppm must be removed by the end of 2007, and the storage of PCB-containing equipment is prohibited after the end of 2009. Combined, Robarts Library, MSB and OISE have approximately 34,000 fluorescent lighting ballasts which may contain PCB's. The new T-8 lighting ballasts do not include PCB's or other highly regulated materials, and will not present any foreseeable environmental, health and safety concerns.

3.2.3. Energy

There are three main issues relevant to energy use on campus: electricity price volatility, international agreements and the capacity of the electrical grid. Effective electricity rates have increased by more than 30% since deregulation in 2002. Projections of shortfalls in supply due to the decommissioning of coal-fired generation plants in Ontario and protracted periods for refurbishing existing or building new nuclear facilities threaten to push rates even higher. Market consultants have forecast a possible increase of 20% in effective rates in 2006 alone. Meanwhile, in the same period, the floor space at the St. George campus has increased by more than 20% and normal electrical load growth is estimated at 1.3% per year. As a result, the electricity budget for the St. George Campus is expected to increase to \$23.0 million in 2006.

The Kyoto Protocol has recently been ratified, requiring Canada to reduce its overall level of emissions of greenhouse gases to 6% below levels recorded in 1990. There is a direct correlation between the amounts of electricity we use and the levels of carbon dioxide released in the electrical generation process. As with the price of electricity, reductions of these levels to those prescribed is doubly difficult for the U of T: not only has electricity use actually increased on a unit of floor area basis as equipment has aged, but the total building area has increased as well.

Due to the rapid expansion of the campus over the past decade with new buildings and increased research energy requirements, the capacity of the electrical grid operated by Facilities and Services is approaching its maximum limit. This project will reduce peak electrical demand on the electrical grid of the University by 4.2 MW, or approximately 10% of the maximum grid capacity, and will allow the University to continue to grow into the near future without any complications arising due to limited grid capacity. While every effort will be made to monitor the effect of these retrofits on energy consumption, it is expected that due to a variety of factors including campus expansion and measurement limitations, exact data will be difficult to obtain.

Cooling Infrastructure

While it is imperative at this point to replace and refurbish the cooling infrastructure at the St. George campus, there are also benefits of this renewal in terms of reduced overall electrical energy use. In 2005, the University of Toronto St. George campus consumed electricity worth \$17.4 million. Of this, the electrical consumption of the cooling infrastructure in the buildings affected by this proposal costs approximately \$1.0 million per year.

The electricity consumption of the cooling infrastructure will be improved through the increased efficiency of the installed chillers. The proposed replacement chillers are approximately 30% more efficient than their predecessors. This efficiency has three positive effects. First, annual electricity consumption and costs to the University will decrease by over 3 GWh and \$0.33 million respectively upon completion of the project. Second, reduced electricity consumption will offset greenhouse gas emissions by approximately 800 tonnes CO_{2E} /year. Finally, the reduced energy consumption of the

cooling infrastructure provides significant opportunities to pursue funding avenues as discussed in the next section.

Lighting Retrofit

Through the retrofit of over 72,000 bulbs and 34,000 ballasts, the University will reduce its energy consumption by almost 9 GWh per year, with annual cost savings upon project completion of approximately \$0.97 million. Furthermore, greenhouse gas emissions from the University will be reduced by approximately 2,300 tonnes of CO_{2E} per year.

3.2.4. Financial Viability

The return on investment of each project is extremely different. In combination, these two projects can prove to be complimentary. The current annual operating costs and the expected annual savings are shown in Table 3. A more detailed summary of the energy and cost savings is included in Appendix A.

	Annual Operating Cost of Infrastructure (millions)	Annual Savings from Project (millions)
Cooling Infrastructure	\$ 1.03	\$0.33
Lighting Retrofit	\$ 2.47	\$ 0.97
Total	\$ 3.50	\$ 1.30

Table 3.	Context and	benefits of	energy	efficiency	aspe	ct of 1	oro	posed	proi	ect.
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Cooling Infrastructure

Due to the nature and the necessity of the cooling infrastructure renewal, the University will need to spend significant capital (see Table 5) in order to ensure the continued operation of programs and facilities. Regardless, there are two factors that work to the University's advantage with respect to financing, both owing to the fact that the new cooling infrastructure will be significantly more energy efficient. First, reduced electricity costs to the University will result in a modest payback for the equipment of 42 years. Second, and more significantly, this reduction in energy use allows the University to gain access to significant low-interest loan and granting financing opportunities from external agencies that are designed to encourage energy conservation and demand-side management projects.

Lighting Retrofit

The payback period for the lighting retrofit is excellent at approximately 4.3 years. Each T-8 lamp uses approximately 30% less electricity than its T-12 counterpart. In addition, the proposed T-8 lighting has a much longer lifespan than the existing T-12 lighting. The overall capital costs for this project are shown in Table 6.

3.2.5. Motivation for Combined Project

The present popular wisdom, promoted by many government funding agencies at every level, is to bundle the good and the poor return on investment (ROI) projects together into a package of work that can provide an acceptable overall return. At present, there are a number of opportunities to reduce energy consumption at the St. George campus while at the same time reducing the backlog of renewal needs for outdated equipment and systems. Some of these projects have extremely attractive paybacks, such as the lighting project, while others cannot be justified simply for their ROI, such as the cooling infrastructure upgrade. A project of this scope has not been attempted previously by the Facilities and Services Department of the University. However, very similar bundling methods have precedent at Universities such as McMaster, York, Western and British Columbia, to name a few.

In summary:

- The chiller project is extremely critical if the air conditioning systems of several of the older buildings are to remain in operation in the coming years. On its own, the capital cost would be \$13.9 million but would be eligible for a total of \$0.5 million in grants from THESL and NRCan. The balance would have to be financed from the utilities budget at \$1.48 million of debt service each year assuming a maximum of \$1.8 million zero-interest loan from the City of Toronto Better Buildings Partnership. This would represent a 2.4% increase to the net utilities budget after completion of the project.
- The lighting project has a capital cost of \$4.4 million and would be eligible for a total of \$0.46 million in grants from THESL and NRCan. The balance would be financed from the utilities budget at \$0.45 million of debt service each year assuming a maximum \$0.65 million zero-interest loan from the City of Toronto Better Buildings Partnership. This would represent a 1.1% reduction to the net utilities budget after completion of the project.
- If the two projects are financed together as in the Base Case, the effect on the utilities budget would begin at a maximum of \$0.175 million annually or a 0.36% increase to the net utilities budget after completion of the project, decreasing with time.

IV. Environmental Impact

The proposed project is beneficial to the environment in two main ways: reduction of greenhouse gas emissions and the proper disposal of regulated materials. Reductions in the emission of greenhouse gases from the University are outlined in Table 4 below.

	Annual Energy Savings from Project (MWh)	Reduction in GHG Emissions (tonnes CO _{2F} /year)		
Cooling Infrastructure	3,054	794		
Lighting Retrofit	8,922	2,318		
Total	11,976	3,112		

Table 4. Reduction of electricity use and greenhouse gas emissions.

V. Resource Implications

This section outlines in more detail the various projects for each of the cooling infrastructure and lighting retrofit, and presents a cost estimate for each individual project. The construction costs are summarized in Tables 5 and 6, with the Total Project Costs sheets included in Appendix B.

5.1. Construction Costs

Total project cost sheets are attached in Appendix B.

Cooling Infrastructure

	Sub-project	Age	Description	Cost (millions)		
Ι	<i>Replace the 35 year old chiller in OISE</i>	36	This replacement is extremely challenging because of access issues to the building.	\$ 1.72		
Π	Replace two remaining 35 year old CFC chillers in Northwest Chiller Plant	34	Serving the Robarts / Bissell / Fisher complex, Innis College and Residence, Rotman Centre and Graduate House.	1.91		
III	Connect the Lash Miller and McLennan buildings to the Bahen Chiller Plant	38-42	Decommissioning of four 40-year old CFC chillers and installation of a new 2,000 Rton chiller in the space in the Bahen Centre left for that purpose.	2.41		
IV	Interconnect the Ramsay Wright and Sidney Smith buildings	40-44	Instead of replacing the CFC chillers in each building separately, it is more efficient to interconnect the two buildings and use the same system.	3.60		
V	Replace CFC chillers in the Warrens Stevens Building	25	Installation of two chillers to replace the two CFC chillers being used currently.	1.24		
VI	Replace CFC chillers in the Earth Sciences Centre	16	Although younger, these chillers utilize CFC refrigerant and must be removed.	1.47		
VII	Replace CFC chiller in the Bora Laskin Library	15	Replacement of existing 300 Rton R-11 chiller	0.57		
VIII	Replace CFC chillers in the Faculty of Dentistry Building	22	Replacement of two existing 387 Rton R- 11 chillers	1.00		
	Sub-total \$13.92					
Operational Shortfall						
			Finance Cost	\$ 0.57		
			Total Cost	\$ 14.90		

Table 5. Sub-project descriptions of the cooling infrastructure renewal, in priority order.

It is important to note that the normal life expectancy of a chiller is 23 years, and that it is essential that each project be undertaken in the very near future, due to the age of the equipment and the presence of CFC's, which were legislated out of production in 1996.

Lighting Retrofit

The lighting retrofit concerns three main buildings on the St. George campus, and features a capital cost significantly less than that of the cooling infrastructure renewal.

Sub-project		Description	Cost (millions)
Ι	Replace fixtures and lamps in Robarts Library/Bissell Building/Fisher Complex	Replacement of 18,500 fixtures and 42,000 lamps from T-12 to T-8 model.	\$ 2.31
II	Replacement of fixtures and lamps in Medical Sciences Building	Replacement of 10,500 fixtures and 25,000 lamps from T-12 to T-8 model.	1.23
III	Replacement of fixtures and lamps in OISE Building	Replacement of 5,500 fixtures and 19,000 lamps from T-12 to T-8 model.	0.83
		Sub-total	\$ 4.37
		Operational Shortfall	\$ 0.25
		Finance Cost	\$ 0.35
		Total Cost	\$ 4.97

Table 6. Description of each lighting retrofit sub-project, in order of priority.

VI. Funding Sources and Cash Flow Analysis

Table 7. Proposed sources of financing for the project.

Funding Sources	(millions)
Natural Resources Canada (confirmed)	\$ 0.25
Toronto Hydro Energy Services Limited (confirmed)	0.68
Ministry of Training, Colleges and Universities Facilities Renewal Program	2.00
Energy Savings During Construction	3.05
Total Required Funding	13.89
Total	\$ 19.87

6.1. External Funding Sources

This section outlines in greater detail the amounts of funding available from external agencies that have an interest in funding the project.

6.1.1. City of Toronto Better Buildings Partnership

This fund provides financial assistance for conservation projects in the form of an interest free loan up to a maximum of 15% of the total project cost. A loan of approximately \$2.74 million would be expected from the Better Buildings Partnership, to

be paid back over a period of 10 years. This would result in total interest savings of \$1.25 million at 8% over a ten year period.

6.1.2. Toronto Hydro Energy Services Limited

Through the Conservation and Demand Management Initiative, Toronto Hydro is required by the Ontario Energy Board to invest a total of \$40 million to reduce demand in the City of Toronto by 250 MW. A grant of \$0.68 million has been approved, at an incentive rate of \$160 per kW saved.

6.1.3. Natural Resources Canada

A grant of \$0.25 million from NRCan through the Energy Retrofit Assistance Program has recently been approved at an incentive rate set of \$7.50 per GJ (\$2.08 per MWh) saved.

6.2. Internal Funding Sources

This section outlines sources of funding internal to the University.

6.2.1. Ministry of Training, Colleges and Universities Facilities Renewal Program

Due to the fact that this proposal contains a substantial renewal component, a portion of this funding can be used to offset the capital costs of the project. Part of the annual allocation in the amount of \$2.0 million from the 2005/06 and 2006/07 Facilities Renewal Program has been directed to this project.

6.2.2. Avoided Energy Costs

During the three year construction period, it is estimated that energy savings of \$3.05 million will accrue. It is estimated that after construction is complete the energy expenses to the campus will be reduced by approximately \$1.3 million annually.

6.2.3. University of Toronto

It is proposed that approximately \$13.89 million be borrowed from the University and paid back from the realized energy savings over a period of 15 years, with an IRR of 7.52%.

6.3. Cash Flow Analysis

A financial projection for the base scenario is attached in Appendix C. Key assumptions include securing applicable external grants and interest free loans and their associated cash flow streams, an annual interest rate of 8% and an escalating electricity inflation rate of 2% after an initial increase of 20% in 2006. Based on the annual projected cash flow analysis, a 15 year internal loan repayment is most financially manageable.

6.4. Financial Risk Assessment

Financial risk to the success of the program is from three possible sources:

- *The actual project costs could vary from the estimate.* The project costs have been estimated conservatively, using the best advice from consultants experienced in this field. In any event, this program would be subject to the same rules for additional or re-approvals as any other capital project.
- *The external funding sources may not materialize.* Again, the amounts used in the calculations representing expected financial contributions from outside the University are conservative. Both NRCan and THESL have committed to providing grants in the amounts of \$0.25 million and \$0.68 million respectively.
- *Electricity rates may change from those in the base case.* The base case assumes a modest annual electricity rate increase of 2% after an initial 20% increase in 2006. An analysis of the sensitivity of the rate of return to the annual electricity rate of escalation shows:

	Base Case	Case #1	Case #2
Financing	Secured	Not secured	Secured
Rate increase	2%*	2%*	2%
Total Funding (incl. energy savings)	\$ 5.98 M	\$ 5.05 M**	\$ 5.98 M
Financing required ***	\$ 16.94 M	\$ 17.86 M	\$ 16.94 M
Simple Payback (in years)	14	14	16.5
IRR	7.52%	7.03%	6.02%
NPV	(\$0.7) M	(\$1.4) M	(\$2.7) M

Table 8. Comparison of financial models for the project.

* The rate increase expected for 2006 is 20.2%, per external consultant experts

** Assumes no energy incentive grants from government bodies

*** Interest free loan of \$2.74 million included as part of financing

Each of the cases present a variety of costs, benefits and energy outcomes. While there are anticipated to be positive cash flows after the projects are completed and achieve their energy saving, the negative net present value (NPV) in each of the three cases is the result of negative cash flows in the initial years during project implementation. In terms of the 'base case', there is no financial viability to proceed with the overall project given the negative slightly NPV, unless rates rise faster than are anticipated by the base case. Financial figures aside, this proposal addresses the important demands being placed on the University to provide efficient, cost effective and environmentally friendly infrastructure as outlined by legislation. The following is a recap of the cases highlighted above, which are shown in more detail in Appendix C

- Base Case Funding in the amount of \$2.93 million from various agencies has already been confirmed for this project. A further zero-interest loan in the amount of \$2.74 million is also expected. These funds are timely in that they have been made available to reduce the consumption demand by large entities such as the University. Any dramatic increase in rates (as noted by the expected rate spike of 20% in 2006) would strengthen this case. The long-term benefit of this project is a total cash flow savings of \$22.6 million between years 10 to 28, as shown in Appendix C.
- Case #1 Assuming the government agencies do not provide funding, there still remains a reasonably sound basis to proceed as both the IRR and NPV show a marginally lower return. Again, this assumes a rate increase of 20% in 2006.
- Case #2 Assuming the energy rate increase follows a standard inflationary pattern of 2%, with all funding sources in place, the overall project becomes financially difficult to support as evidenced by the NPV of negative \$2.4 million.

The Base Case can be summarized as follows: During the construction phase of the project (between years 1 to 3), \$13.70 million in debt capacity will be required. Upon completion of the project, the annual cash flow will result in mildly lower cash outflows totaling \$0.5 million (between years 4 to 9). This takes into account the repayment of the interest free loan, included in Table 2 under short-term financing. Ultimately, the University will need to draw on \$16.75 million of its borrowing capacity to achieve the objectives of the overall project. On a positive note, the long-term benefit of this project is a total cash flow savings of \$22.6 million between years 10 to 28, as shown in Appendix C.

The utilities budget is not expected to be reduced from the above savings, but rather will result in tempering the rise in demand in future years for increased financial resources with respect to both maintenance and energy related costs.

VII. Schedule

The following schedule is proposed for the approval, implementation and completion of this project:

Planning and Budget Project Committee Established:	December 6, 2005
Governing Council Approval:	March 23, 2006
Commencement of Cooling Infrastructure Renewal:	April 1, 2006
Commencement of Lighting Retrofit:	June 23, 2006
Completion of Cooling Infrastructure Renewal:	August 1, 2007
Completion of Lighting Retrofit:	August 1, 2007

Due to the urgency to replace the OISE chiller prior to the 2006 cooling season, this project has been approved through the Accommodations and Facilities Directorate (AFD), funded totally as part of the Facilities Renewal Program for 2005/06.

VIII. Next Steps

Directed by the Environmental Protection Advisory Committee and funded through a three year grant from the Toronto Atmospheric Fund, the goal of the Sustainability Office is to reduce energy consumption and greenhouse gas emissions from the St. George campus. The projects proposed here will have significant financial, environmental and social benefits for the St. George campus. However, they should be viewed as the first phase in a broader energy plan to be developed for the entire University.

The development of a comprehensive energy plan for the University is strategically desirable for several reasons. First, energy prices are likely to increase and become more volatile in the near future, which could have a significant financial impact on the University. Second, environmental issues such as climate change have become increasingly pressing over the past decade, and it is important for the University to show leadership with respect to energy conservation, and sustainability more generally. Finally, the strategy of offsetting expensive deferred maintenance projects against energy efficient retrofits with short payback periods can be reproduced in the future, and can continue to attract external funding for these projects, achieving financially attractive packages for long overdue and urgently required infrastructure renewal.

An energy plan would provide the framework within which the University can continue to expand and deliver high quality education and research. The plan should address the following: an energy and greenhouse gas inventory; energy consumption and potential savings from retrofits and new buildings; building/occupant relationships; energy supply; alternative methods to finance energy reduction initiatives; and related University policies and guidelines. The energy plan will provide the framework within which the University can continue to expand and deliver high quality education and research well into the future. In order to develop the plan, the capacity of the Sustainability Office will need to be secured into the future, an issue which is addressed in their Annual Report, currently moving through the governance structure.

IX. Recommendations

- 1. It is recommended that the proposed project encompassing a renewal of the cooling infrastructure and a major retrofit of lighting on the St. George campus with a total project cost estimate of \$19.87 million, and an allocation of borrowing capacity of \$16.94 million be approved.
- 2. It is recommended that the Sustainability Office and staff of Facilities and Services continue to work to harmonize and expand existing initiatives addressing energy consumption, supply and energy reduction to create a comprehensive energy plan for all three campuses that will address the long range requirements of the University, resulting in an Energy Infrastructure Renewal Plan.

X. Glossary

AFD: Accommodations and Facilities Directorate

Ballasts: This is a part is a component of the fluorescent lighting fixture. The purpose of the ballast is to regulate the charge to the lamp. This is the component of the lighting fixtures which contains PCB's. New ballasts are electronic, and do not contain PCB's. **CEPA:** Canadian Environmental Protection Act.

CFC: Chlorofluorocarbons, which are known to cause degradation of the ozone layer.

Chillers: Device that uses input electricity to generate cooled water for air conditioning purposes.

Chilled water: Generated by the chillers, this is the medium though which airconditioning is distributed in many of the St. George campus buildings.

CO_{2E}: Carbon-dioxide equivalent. A standard benchmark for the measurement of greenhouse gas emissions.

GWh; MWh; kWh: Gigawatt, Megawatt and Kilowatt hours. A measure of the amount of energy consumed over a given period of time.

IRR: Internal rate of return.

Lamp: The name for a fluorescent light bulb.

MSB: Medical Sciences Building.

MTCU: Ontario Ministry of Training, Colleges and Universities.

MW: Megawatt. A measure of the rate of energy being used at any given point in time. **NPV:** Net present value.

NRCan: Natural Resources Canada.

OISE: Ontario Institute for Studies in Education

PCB: Polycarbonate biphenyl. Potentially present in lighting ballasts.

ppm: Parts per million. A measure of the concentration of a particular component of a mixture.

ROI: Return on investment.

R-11; R-122: Types of fluid containing CFC's commonly used in the chillers on the St. George campus.

Sustainability Office: Launched through the Environmental Protection Advisory Committee in February 2005, the role of the Office is to facilitate energy and resource conservation and greenhouse gas reduction on the St. George Campus, under the direction of Dr. Beth Savan.

T-12: Current type of lighting in use at Robarts, OISE and MSB. Inefficient compared with T-8.

T-8: Type of light bulb proposed to replace the older, and less efficient T-12. **THESL:** Toronto Hydro Energy Services Limited.

Appendix A: Summary of financial and environmental benefits of project

UNIVERSITY OF TORONTO St. George Campus

PROPOSED ENERGY EFFICIENCY RETROFIT PROGRAM (2005 - 2007)

		Savings [\$]	Payback		Energ	gy & Environr	nental Benet	fits	
Energy Efficiency Retrofit Projects	Capital Cost [\$]	Energy Savings	Simple Individual Payback [Years]	Lighting or Chiller Existing Energy Usage [kWh]	Avoided Energy Usage [kWh]	Avoided Energy Usage [GJ]	Reduction of Lighting or Chiller Energy Usage [%]	Avoided Demand [kW]	Equivalent Avoided CO2 [kg]
Lighting Retrofit									
Robarts Library	2,307,951	510,781	4.3	13,971,540	4,698,844	16,916	33.6	536	1,221,230
Medical Sciences Building	1,230,903	233,889	5.0	4,828,772	2,151,622	7,746	44.6	431	559,207
OISE	825,536	225,211	3.5	3,930,321	2,071,795	7,458	52.7	415	538,460
SUB-TOTAL #1 = Lighting Retrofit Projects	4,364,390	969,881	4.3	22,730,633	8,922,261	32,120	39.3	1,382	2,318,896
Chilled Water System Upgrade									
Replace OISE Chiller	1,716,517	39,133	43.9	1,123,200	360,000	1,296	32.1	360	93,564
Replace NWCP Chillers	1,909,263	78,267	24.4	2,160,000	720,000	2,592	33.3	480	187,128
Interconnect L.Miller/McLennan Physics to BCIT Chiller	2,412,668			1,860,768	597,000	2,149	32.1	660	155,160
Combine R. Wright Zoo./S. Smith Chiller Systems	3,601,649	40,112	89.8	1,204,200	369,000	1,328	30.6	890	95,903
Replace Warren Stevens Chillers	1,236,912		54.2	,	210,000	756	33.0	135	54,579
Replace Earth Sciences Chillers	1,474,109		28.3	1,272,960	480,000	1,728		180	124,752
Replace Bora Laskin Chiller	570,362	18,262	31.2	528,000	168,000	605		84	43,663
Replace Dentistry Chillers	1,000,000	16,306	61.3	700,000	150,000	540		100	38,985
SUB-TOTAL #2 = Chiller Upgrade Projects	13,921,480	331,981	41.9	9,486,220	3,054,000	10,994	32.2	2,889	793,735
	40.005.070	4 204 902	14.0	22 240 052	44.076.064	40 445	27.0	4 074	2 442 620
TOTAL ESTIMATED (LIGHTING AND CHILLER PROJECTS)	10,205,870	1,301,862	14.0	32,216,853	11,976,261	43,115	37.2	4,271	3,112,630

Revised January 05, 2006

Appendix B: Total project cost sheets

	<u>COST ESTIMATE</u>	PROJECT: Lighting Retrofit Robarts Librar	ry		
PROJECT NO	I MGR: ITEM	U OF T PROJECT NO: REMARKS	BASE COST	GST(2.31%)	COST
		KEMARKS	BASE COST	GST(2.31%)	COST
			¢1 011 070	¢44.000	¢1 050 014
835730	Main contract		\$1,811,078	\$41,836	\$1,852,914
835752	Other contract		\$0	\$0	\$0
835754	Secondary effects		\$0	\$0	\$0
835757	Construction Contingency		\$0	\$0	\$0
835762	Hazardous materials removal	PCB ballast removal	\$100,000	\$2,310	\$102,310
835765	Demolition		\$0	\$0	\$0
835768	Site preparation		\$0	\$0	\$0
	Total Construction				\$1,955,224
LANDSC	APING				
835755	Landscaping		\$0	\$0	\$0
000100	Total Landscaping		φυ	φυ	\$0
DEDMITE	, INSURANCE				ψυ
			\$ 0	^	A 0
835400	Permits		\$0	\$0	\$0
836700	Insurance		\$0	\$0	\$0
	Total Permits, Insurance				\$0
PROFESS	SIONAL FEES				
835200	Consultants: -Architects, Enginee	rs	\$71,925	\$1,661	\$73,586
835201	Consultants - disbursements		\$0	\$0	\$0
835204	Construction management fees		\$0 \$0	\$0 \$0	\$0 \$0
	5				
835206	Other consultants		\$0	\$0	\$0
835210	Legal fees		\$0	\$0	\$0
835720	Design fees-In House		\$0	\$0	\$0
835721	External Project Manager		\$0	\$0	\$0
835725	Management fees-Capital Project	3.5% Project Management fee	\$63,388	\$0	\$63,388
	Total Professional fees		+,		\$136,974
SERVICE	S TO SITE				<i>\\</i> 100,011
835700			¢o	¢o	¢o
835700	Site services & infrastructure		\$0	\$0	\$0
	Total Site Services				\$0
COMPUT	ER WIRING AND TELEPHONES				
821110	Computer infrastructure		\$0	\$0	\$0
835010	Telephone		\$0	\$0	\$0
	Total Computer Wiring & Telep	hones			\$0
MOVING	AND STAGING				ψũ
837100	Moving		\$0	\$0	\$0
837101	Staging		\$0	\$0	\$0
	Total Moving and Staging				\$0
	INGS AND EQUIPMENT				
820010	Furnishings		\$0	\$0	\$0
821010	Equipment		\$0	\$0	\$0
821510	AV for classrooms		\$0	\$0	\$0
821610	Scientific Equipment	GST is not applicable	\$0	\$0	\$0
02.0.0	Total Furnishings and Equipme		ψu	ΨŪ	\$0
OTHER	i star i urnisinnys anu Equipine				φU
	Circus as Interview		A -	A -	* -
820011	Signage-Interior		\$ 0	\$0	\$0 \$0
821325	Security & Access systems		\$0	\$0	\$0
835070	Courier, misc.		\$0	\$0	\$0
835756	Signage-Exterior		\$0	\$0	\$0
835764	Client Construction expenses	Not-in-contract expenses	\$20,000	\$462	\$20,462
835766	Ceremonies	Ground breaking, Top off, Grand opening	\$0	\$0	\$0
835900	Advertising	creating programming, rop on, crand openning	\$0 \$0	\$0 \$0	\$0 \$0
836430	Donor recognition		\$0	\$0	\$0
890670	U of T Trades	\$10,000 per lighting project	\$10,000	\$0	\$10,000
	Total Other				\$30,462
		SUB TOTAL			\$2,122,660
PROJECT	CONTINGENCY				
835758	Project Contingency	10%	\$181,108	\$4,184	\$185,291
	Total Project Contingency		,,. .	÷ ,, , , , , ,	\$185,291
FINANCE					ψ100,201
			\$ 0	\$ 0	\$
835300	Finance Costs		\$0	\$0	\$0
íl	Total Finance Costs				\$0
,					
		TOTAL PROJECT COST:			\$2,307,951

PROJECT	<u>T COST ESTIMATE</u>	PROJECT: Lighting Retrofit OISE U OF T PROJECT NO:			
NO	ITEM	REMARKS	BASE COST	GST(2.31%)	COST
		REMARKS	BASE COST	GST(2.31%)	0051
835730	Main contract		\$560 746	¢12.000	¢575 745
			\$562,746	\$12,999	\$575,745
835752	Other contract		\$0	\$0	\$C
835754	Secondary effects		\$0	\$0	\$C
835757	Construction Contingency		\$0	\$0	\$0
835762	Hazardous materials removal	Asbestos in OISE Ceiling/PCB ballast removal	\$100,000	\$2,310	\$102,310
835765	Demolition		\$0	\$0	\$C
835768	Site preparation		\$0	\$0	\$C
	Total Construction				\$678,055
LANDSC	APING				
835755	Landscaping		\$0	\$0	\$C
	Total Landscaping		ΨŬ	* *	\$C
	, INSURANCE				ψο
835400	Permits		\$0	\$0	¢0
					\$0
836700	Insurance		\$0	\$0	\$0
	Total Permits, Insurance				\$0
	SIONAL FEES				
835200	Consultants: -Architects, Enginee	rs	\$38,850	\$897	\$39,747
835201	Consultants - disbursements		\$0	\$0	\$0
835204	Construction management fees		\$0	\$0	\$0
835206	Other consultants		\$0	\$0	\$0
835210	Legal fees		\$0	\$0	\$0
835720	Design fees-In House		\$0	\$0	\$0
835721	External Project Manager		\$0	\$0	\$0 \$0
835725	Management fees-Capital Project	2.5% Project Management fee	\$19,696	\$0 \$0	\$19,696
033723	Total Professional fees	3.5 % Project Management lee	\$19,090	φυ	
					\$59,444
	S TO SITE				
835700	Site services & infrastructure		\$0	\$0	\$0
	Total Site Services				\$0
COMPUT	ER WIRING AND TELEPHONES				
821110	Computer infrastructure		\$0	\$0	\$0
835010	Telephone		\$0	\$0	\$0
	Total Computer Wiring & Telep	hones			\$0
MOVING	AND STAGING				
837100	Moving		\$0	\$0	\$0
837101	Staging		\$0	\$0	\$0
001101	Total Moving and Staging		ΨŬ	ΨŬ	\$0
					ψυ
			¢o	¢o	¢0
820010	Furnishings		\$0 \$0	\$0	\$0 \$0
821010	Equipment		\$0	\$0 \$0	\$0
821510	AV for classrooms		\$0	\$0	\$0
821610	Scientific Equipment	GST is not applicable	\$0	\$0	\$0
	Total Furnishings and Equipme	ent			\$0
OTHER				T	
820011	Signage-Interior		\$0	\$0	\$0
821325	Security & Access systems		\$0	\$0	\$0
835070	Courier, misc.		\$0	\$0	\$0
835756	Signage-Exterior		\$0 \$0	\$0	\$0 \$0
835764	Client Construction expenses	Not-in-contract expenses	\$20,000	\$462	\$20,462
835766	Ceremonies	Ground breaking, Top off, Grand opening	\$20,000 \$0		\$20,402 \$0
		Ground breaking, Top on, Grand opening		\$0 \$0	
835900	Advertising		\$0 \$0	\$0	\$0 \$0
836430	Donor recognition		\$0	\$0	\$0
890670	U of T Trades	\$10,000 per lighting project	\$10,000	\$0	\$10,000
	Total Other				\$30,462
		SUB TOTAL			\$767,961
PROJEC	T CONTINGENCY				
835758	Project Contingency	10%	\$56,275	\$1,300	\$57,575
	Total Project Contingency				\$57,575
FINANCE					<i>40.,010</i>
835300	Finance Costs		\$0	\$0	\$0
300000	Total Finance Costs		ψΟ	ψυ	\$0 \$0
					Ф О
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		TOTAL PROJECT COST:			\$825,536

NO TEM REMARKS BASE COST GST(2) 11% S35730 Main contract \$911.306 \$21.051 S35742 Other contract \$00 \$00 S35757 Starburder contract \$00 \$00 S35757 Construction Contingency \$00 \$00 S35763 Environmentation \$00 \$00 S35763 Stip preparation \$00 \$00 Total Construction \$00 \$00 \$00 S35763 Landscaping \$0 \$0 Total Construction \$0 \$0 \$0 S35700 Insurance \$0 \$0 PROFESSIONAL FEES \$0 \$0 \$0 S35700 Consultants: -Architects, Engineers \$0 \$0 S35701 Consultants: -Architects, Engineers \$0 \$0 S35700 Consultants: -Architects, Engineers \$0 \$0 S35701 Consultants: -Architects, Engineers \$0 \$0 S35700 Stottuctoin manag				PROJECT: Lighting Retrofit MSB U OF T PROJECT NO:	CT COST ESTIMATE	-
CONSTRUCTION \$911,306 \$21,051 835730 Main contract \$911,306 \$21,051 835725 Construction contingency \$0 \$0 835757 Construction Contingency \$0 \$0 835757 Construction Contingency \$0 \$0 835765 Demolition \$0 \$0 835765 Demolition \$0 \$0 835766 Hazardous materials removal \$0 \$0 835765 Landscaping \$0 \$0 Total Landscaping \$0 \$0 \$0 PREMITS, INSURANCE \$0 \$0 \$0 835700 Construction management fees \$0 \$0 835720 Consultants - disbursements \$0 \$0 835720 Consultants - disbursements \$0 \$0 835720 Legal fees \$0 \$0 835720 Signa fees-In House \$0 \$0 835725 Signa fees-In House \$0 \$0	COST	ST(2 31%)	BASE COST			
825730 Main contract \$911.300 \$21.051 825754 Secondary effects \$0 \$0 825757 Construction Contingency \$0 \$0 825756 Demolition \$0 \$0 825757 Demolition \$0 \$0 825758 Eleropearation \$0 \$0 Total Construction \$0 \$0 \$0 RADSCAPING \$0 \$0 \$0 836750 Landscaping \$0 \$0 Total Construction \$0 \$0 \$0 RADSCAPING \$0 \$0 \$0 836700 Insurance \$0 \$0 PROFESSIONAL FEES \$0 \$0 \$0 835201 Consultants: -Architects, Engineers \$0 \$0 \$0 835201 Consultants: Architects, Engineers \$0 \$0 \$0 835201 Consultants: Architects, Engineers \$0 \$0 \$0 \$0 835201 Consultants: Architects, Eng	0001	51(2.5176)	DAGE COST	ILEMANKS		
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82574 Secondary effects \$0 \$0 825752 Hazardous materials removal Atestos in MS8 CellingPC8 balast removal \$100,000 \$2,310 825762 Hazardous materials removal \$100,000 \$2,310 \$0 825755 Demolition \$0 \$0 \$0 825755 Landscaping \$0 \$0 \$0 7 total Construction \$0 \$0 \$0 \$0 825755 Landscaping \$0 \$0 \$0 \$0 825760 Consultants: -Architects, Engineers \$39,725 \$918 \$0 \$0 82500 Consultants: -Architects, Engineers \$30 \$0 \$0 \$0 825204 Consultants: -Architects, Engineers \$30 \$0 \$0 \$0 825720 Consultants: -Architects, Engineers \$0 \$0 \$0 \$0 825720 Consultants: Architects, Engineers \$0 \$0 \$0 \$0 825720 Consultants: Architects, Engineers \$0 \$0 <	\$002,007 \$0					
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835768 Site preparation \$0 \$0 LANDSCAPING \$0 \$0 835755 Landscaping \$0 \$0 Total Construction \$0 \$0 \$0 B35755 Landscaping \$0 \$0 PERMITS, INSURANCE \$0 \$0 \$0 835700 Insurance \$0 \$0 ProfessionAL FEES \$35200 Consultants - disbursements \$0 \$0 835200 Consultants - disbursements \$0 \$0 \$0 835201 Consultants - disbursements \$0 \$0 \$0 835204 Construction management fees \$0 \$0 \$0 835710 Legal fees \$0 \$0 \$0 835725 Management fees \$0 \$0 \$0 835711 External Project Management fee \$31,896 \$0 835705 Site services & infrastructure \$0 \$0 835710 Site services & infrastructure \$0 \$0 83710 Moving \$0 \$0 83710 Staging \$0 \$0 7041 Professional fees \$0 \$0 837100 Korigang and taging \$0 </td <td>\$102,310</td> <td></td> <td></td> <td>Asbestos in MSB Ceiling/PCB ballast removal</td> <td></td> <td></td>	\$102,310			Asbestos in MSB Ceiling/PCB ballast removal		
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821325Security & Access systems\$0\$0835070Courier, misc.\$0\$0835756Signage-Exterior\$0\$0835764Client Construction expensesNot-in-contract expenses\$20,000835766CeremoniesGround breaking, Top off, Grand opening\$0835900Advertising\$0\$0836430Donor recognition\$0\$0890670U of T Trades\$10,000 per lighting project\$10,000\$0SUB TOTAL	\$0	\$0	\$0		Signage-Interior	820011
835070Courier, misc.\$0\$0835756Signage-Exterior\$0\$0\$0835764Client Construction expensesNot-in-contract expenses\$20,000\$462835766CeremoniesGround breaking, Top off, Grand opening\$0\$0835900Advertising\$0\$0\$0836430Donor recognition\$0\$0\$0890670U of T Trades\$10,000 per lighting project\$10,000\$0SUB TOTAL	\$0	\$0	\$0			
835756 Signage-Exterior \$0 \$0 835764 Client Construction expenses Not-in-contract expenses \$20,000 \$462 835766 Ceremonies Ground breaking, Top off, Grand opening \$0 \$0 835900 Advertising \$0 \$0 \$0 836430 Donor recognition \$0 \$0 \$0 890670 U of T Trades \$10,000 per lighting project \$10,000 \$0 SUB TOTAL Volume	\$0					
835764 Client Construction expenses Not-in-contract expenses \$20,000 \$462 835766 Ceremonies Ground breaking, Top off, Grand opening \$0 \$0 835900 Advertising \$0 \$0 \$0 836430 Donor recognition \$0 \$0 \$0 890670 U of T Trades \$10,000 per lighting project \$10,000 \$0 SUB TOTAL	\$0					
835766 Ceremonies Ground breaking, Top off, Grand opening \$0 \$0 835900 Advertising \$0 \$0 \$0 836430 Donor recognition \$0 \$0 \$0 890670 U of T Trades \$10,000 per lighting project \$10,000 \$0 SUB TOTAL	\$20,462			Not-in-contract expenses		
835900 Advertising \$0 \$0 836430 Donor recognition \$0 \$0 890670 U of T Trades \$10,000 per lighting project \$10,000 Total Other SUB TOTAL	\$20,402 \$0					
836430 Donor recognition \$0 \$0 890670 U of T Trades \$10,000 per lighting project \$10,000 \$0 Total Other SUB TOTAL	\$0 \$0			Ground breaking, rop on, Grand opening		
890670 U of T Trades \$10,000 per lighting project \$10,000 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0						
Total Other SUB TOTAL	\$0		-		-	
SUB TOTAL	\$10,000	\$0	\$10,000	\$10,000 per lighting project		890670
	\$30,462				Total Other	
	\$1,137,668			SUB TOTAL		
PROJECT CONTINGENCY						
835758 Project Contingency 10% \$91,131 \$2,105	\$93,236	\$2,105	\$91,131	10%	Project Contingency	835758
Total Project Contingency	\$93,236	Γ				
FINANCE COSTS		ľ				FINANCE
835300 Finance Costs \$0 \$0	\$0	\$0	\$0			
Total Finance Costs	\$0	+	÷°			
TOTAL PROJECT COST:	\$1,230,903			TOTAL PROJECT COST		
	ψ1,200,300					

	Capital Projects Department	PROJECT NUMBER:	PROJECT MANA	-	
- Anno and a second	TOTAL PROJECT COST (TPC) "Preliminary"	PROJECT NAME: OISE Chiller Replacement	CAMPUS: St. Ge	eorge	
Number	Item	Remarks	Base Coat	GST (2.31%)	Cost
CONSTRUC		Kemarka	Base ooat	001 (2.3170)	0031
835730	Construction: Main Contract	LKM estimate	1,200,000	27,720	1,227,720
835752	Construction: Other Contract		-	-	-
835754	Secondary Effects		-	-	-
835757	Construction Contingency	10%	120,000	2,772	122,772
835762	Hazardous Waste Removal	Asbestos allowance	35,000	809	35,809
835765 835768	Demolition Services	Allowance	20,000 50,000	462	20,462 51,155
835768	Site Preparation	Allowance		Total Construction	\$1,457,918
LANDSCAP	NING	1	T.	10111 Construction	<i>\$1,437,310</i>
835755	Landscaping Services		-	-	
000700			1	Total Landscaping	\$0
PERMITS, IN	NSURANCE		[7.5
835400	Licences / Permits		-	-	-
836700	Insurance	Calculated at 0.30% of Main Contract	3,765	87	3,852
			Total	Permits, Insurance	\$3,852
PROFESSIC	DNAL FEES				
835200	Consulting	LKM as Main Consultant	50,500	1,167	51,667
835201	Consultants: Disbursements		-	-	-
835204	Construction Management Fees	Allowonoo Structural echapted instantian and the bar	-	-	-
835206 835210	Other Consultants Legal Services	Allowance Structural, asbestos inspection and tender	18,000	416	18,416
835210	External Project Manager		-	-	
895720	Design Fees: In House		-	-	
895721	Design: Disbursements	Meals, parking, mileage, printing	-	-	-
835723	Project Disbursements	Meals, parking, mileage, printing	-	-	-
895725	Project Management: Fees	3.50%	50,645	-	50,645
			Tota	l Professional Fees	\$120,727
SERVICES					
835700	Site Services and Infrastructure	City charges	-	-	-
				Total Site Services	\$0
COMPUTER 821110	R WIRING AND TELEPHONES	Computing & Notucet Convince	0.000	40	0.040
821110 835010	Equipment: Computing: Purchase Telephone Line Service	Computing & Network Services	2,000	46	2,046
835010		Tat	al Computer W	iring & Telephones	\$2,046
	ND STAGING	100	ui Computer W	aring & Telephones	φ2,040
837100	Moving		-	-	
837101	Staging		-	-	-
			Total N	Ioving and Staging	\$0
FURNISHIN	GS AND EQUIPMENT				
820010	Furniture: Purchase		-	-	-
821010	Equipment: Purchase		-	-	-
821510	Equipment: Audio / Visual: Purchase		-	-	-
821610	Equipment: Research: Purchase	PST is not applicable	- Total Eumistic	- ngs and Equipment	- \$0
OTHERO			1 otat F urnishli	ngs and Equipment	\$U
OTHERS 820011	Interior Signage: Purchase / Design	Included in Main Contract	_	_	
821325	Security and Access Systems	Included in Main Contract	-	-	
835070	Courier		500	12	512
835756	Exterior Signage: Purchase / Design	Included in Main Contract	-	-	-
835764	Client Construction Expenses		20,000	462	20,462
835766	Ceremonies	Ground breaking, top off, grand opening	-	-	-
835900	Advertising / Marketing	Diaguag	-	-	-
836430 890670	Donor Recognition Facilities Repair/ Renovation: Internal	Plaques trades	- 15,000	-	- 15,000
090070			15,000	Total Others	\$35,974
PROJECT	CONTINGENCY			SUB TOTAL:	\$1,620,517
835758	Project Contingency	allow 8%	96,000	-	96,000
				roject Contingency	\$96,000
FINANCE C	OSTS			,	
835305	Interest Charges	FRP funded	-	-	-
			7	Total Finance Costs	\$0
			-		
				L PROJECT COST	\$1.716.517
				L PROJECT COST:	\$1,716,517
			ΤΟΤΑ	L PROJECT COST:	\$1,716,517
Project Mar	nagement Fees	Recommended by: Seng Kho		L PROJECT COST:	\$1,716,517
Project Mar \$50,645	nagement Fees	Recommended by: Seng Kho 1/9/2006 16:55	ΤΟΤΑ	L PROJECT COST:	\$1,716,517

NO ITEM REMARKS BASE COST GST(2,31%) COST 835730 Main contract \$3,030,000 \$60,933 \$3,099 835734 Secondary effects \$0 \$0 \$0 836754 Secondary effects \$0 \$0 \$0 836764 Secondary effects \$0 \$0 \$0 836765 Demotion \$0 \$0 \$0 836766 Demotion \$0 \$0 \$0 836767 Construction \$0 \$0 \$0 835765 Landscaping \$0 \$0 \$0 Construction \$0 \$0 \$0 \$0 835700 Construction management fees \$0 \$0 \$0 835204 Construction management fees \$0 \$0 \$0 835700 Construction management fees \$0 \$0 \$0 835700 Construction management fees \$0 \$0 \$0 835701 Construction management		COST ESTIMATE	PROJECT: Ramsay Wright/Sidney Smith C	Combined Chilled	Water System U	pgrade
CONSTRUCTION \$3.030,000 \$60:993 \$3.090 835720 Other contract \$0 \$0 \$0 835720 Man contract \$0 \$0 \$0 835720 Man contract \$0 \$0 \$0 835727 Construction Contingency \$0 \$0 \$0 835726 Man contract \$0 \$0 \$0 835726 Man contract \$0 \$0 \$0 835726 Man contract \$0 \$0 \$0 835726 Step reparation \$0 \$0 \$0 701al Landscaping \$0 \$0 \$0 \$0 836700 Insurance \$0 \$0 \$0 \$0 836700 Consultants - schilects, Engineers \$53,900 \$1,245 \$55 83500 Consultants - schilects, Engineers \$0 \$0 \$0 835720 Man premits \$0 \$0 \$0 \$0 835720 Logal frees-Inflouse <td< th=""><th></th><th></th><th>U OF T PROJECT NO:</th><th>5405 000T</th><th>007/0 040/</th><th></th></td<>			U OF T PROJECT NO:	5405 000T	007/0 040/	
Sts72 Main contract \$3,090 \$68,973 S60,90 \$50,990 \$51,245 \$50,990 \$51,245 \$50,990 \$51,245 \$50,990 \$51,245 \$55,900 \$51,245 \$55 R35700 Consultants: -distancements \$50 </th <th>-</th> <th></th> <th>REMARKS</th> <th>BASE COST</th> <th>GST(2.31%)</th> <th>COST</th>	-		REMARKS	BASE COST	GST(2.31%)	COST
85772 Other contract \$0 \$0 85774 Scondary effects \$0 \$0 85774 Scondary effects \$0 \$0 85774 Scondary effects \$0 \$0 85775 Total Construction \$0 \$0 ASS765 Demolition \$0 \$0 85775 Scondary effects \$0 \$0 85775 Storgerparation \$0 \$0 7total Construction \$0 \$0 \$0 85755 Landscaping \$0 \$0 \$0 98706 Permits \$0 \$0 \$0 83767 Consultants - Activates, Injunearia \$0 \$0 \$0 83760 Consultants - Activates, Injunearia \$0 \$0				A A AAA AAA	* ~~ ~~~	* ~ ~~~ ~~~
82574 Secondary effects \$0 \$0 83576 Construction Contingency \$0 \$0 83576 Demonstration Contingency \$0 \$0 83576 Demonstration Construction \$0 \$0 Total Construction \$0 \$0 \$0 83576 Demonstration \$0 \$0 83576 Landscaping \$0 \$0 7014 Landscaping \$0 \$0 835700 Insurance \$0 \$0 7014 Permits \$0 \$0 83500 Construction management fees \$0 \$0 83500 Construction management fees \$0 \$0 83500 Construction management fees \$0 \$0 835717 Logal fees \$0 \$0 83572 Management fees \$0 \$0 83572 Stote Services \$0 \$0 83572 Stote Stree \$0 \$0 835710 Marce A						\$3,099,993
B35772 Construction Contingency \$0 \$0 B35766 Demolition \$0 \$0 B35766 Demolition \$0 \$0 B35766 Demolition \$0 \$0 B35766 Demolition \$0 \$0 B35765 Landscaping \$0 \$0 Total Construction \$0 \$0 \$0 B35756 Landscaping \$0 \$0 PERMITS, INSURANCE \$0 \$0 \$0 B35700 Insurance \$0 \$0 PROFESSIONAL FEES \$0 \$0 \$0 B35200 Consultants - Architects, Engineers \$12,45 \$55 B35201 Consultants - Architects, Engineers \$0 \$0 B35720 Standament fees \$0 \$0 B35720 Standament fees \$0 \$0 B35720 Standament fees \$0 \$0 B35725 Management fees \$0 \$0 B35726 Standament						\$0
825762 Hazardous materials removal \$0 \$0 835768 Site preparation \$0 \$0 Total Construction \$0 \$0 \$0 1ANDSCAPING \$0 \$0 \$0 835765 Landscaping \$0 \$0 \$0 70tal Landscaping \$0 \$0 \$0 \$0 70tal Permits \$0 \$0 \$0 \$0 83500 Consultants: Architects, Engineers \$53,090 \$1,245 \$55 83500 Consultants: Architects, Engineers \$0 \$0 \$0 83500 Consultants: Architects, Engineers \$0 \$0 \$0 83500 Construction management foce \$0 \$0 \$0 83572 External Project Manager \$0 \$0 \$0 835761 Consultants: Architects, Engineers \$0 \$0 \$106 83572 Management foce: Capital Project: Ass% Project Management foce: Capital Project Manager \$0 \$0 835761 Computer Intrastructure <td></td> <td></td> <td></td> <td></td> <td></td> <td>\$0</td>						\$0
825765 Demolition \$0 \$0 \$0 35768 Site preparation \$0 \$0 \$3,099 AUNDSCAPING \$0<		Construction Contingency			\$0	\$0
Site preparation So So So Total Construction S0	835762	Hazardous materials removal		\$0	\$0	\$0
Total Construction S3.099 LANDSCA.PING S0.09 S3755 Landscaping S0 Total Landscaping S0 S0 PERMITS, INSURANCE S0 S0 S3500 Insurance S0 S0 PROFESSIONAL FEES S0 S0 S0 S35200 Consultants: -Architects, Engineers S0 S0 S35204 Construction management fees S0 S0 S35204 Construction management fees S0 S0 S35204 Construction management fees S0 S0 S35205 Other consultants S0 S0 S35274 Laggin fees-In House S0 S0 S35725 Management fees S106,050 S0 S35726 S118 Services S0 S0 COMPUTER WIRING AND TELEPHONES S0 S0 S0 S37100 Koring a Staging S0 S0 S0 Total Professional fees S0 S0 S0	835765	Demolition		\$0	\$0	\$0
LANDSCAPING So So S35755 Landscaping So So Total Landscaping So So So PROFESSIONAL FEES So So So S35755 Landscaping So So So PROFESSIONAL FEES So So So So S3200 Consultants: -Architects, Engineers So So So S3200 Consultants: -Architects, Engineers So So So S3201 Consultants So So So So S32020 Consultants Architects So	835768	Site preparation		\$0	\$0	\$0
LANDSCAPING So So S35755 Landscaping So So Total Landscaping So So So PROFESSIONAL FEES So So So S35755 Landscaping So So So PROFESSIONAL FEES So So So So S3200 Consultants: -Architects, Engineers So So So S3200 Consultants: -Architects, Engineers So So So S3201 Consultants So So So So S32020 Consultants Architects So		Total Construction				\$3,099,993
Total Landscaping Total Landscaping RPRMTFS, INSURANCE S0 834700 Permits 836700 Insurance Total Permits, Insurance S0 PROFESSIONAL FEES \$53,900 83200 Consultants: -Architects, Engineers \$53,900 83200 Consultants: -Architects, Engineers \$50 83200 Consultants 30 83200 Stating frees-Information 30 83727 Management fees- Capital Project Management fee \$106,059 \$2000 Furinsatructure \$0 \$0 \$20010 Furinsatructure \$0 \$0 \$37100 Moring and Staging \$0 \$0 \$37100 Moring and Staging \$0 \$0	LANDSC					+ - , ,
Total Landscaping Total Landscaping RPRMTFS, INSURANCE S0 834700 Permits 836700 Insurance Total Permits, Insurance S0 PROFESSIONAL FEES \$53,900 83200 Consultants: -Architects, Engineers \$53,900 83200 Consultants: -Architects, Engineers \$50 83200 Consultants 30 83200 Stating frees-Information 30 83727 Management fees- Capital Project Management fee \$106,059 \$2000 Furinsatructure \$0 \$0 \$20010 Furinsatructure \$0 \$0 \$37100 Moring and Staging \$0 \$0 \$37100 Moring and Staging \$0 \$0				\$0	\$0	\$0
PERMITS, INSURANCE \$0 \$0 836400 Permits \$0 \$0 Total Permits, Insurance \$0 \$0 \$0 PROFESSIONAL FEES \$0 \$0 \$0 835200 Consultants - disbursements \$0 \$0 835201 Construction management fees \$0 \$0 835202 Construction management fees \$0 \$0 835201 Legal fees \$0 \$0 835725 Management fees \$0 \$0 835720 Design fees-Induced capital Project Management fees \$0 \$0 835720 Site services & a infrastructure \$0 \$0 70tal Professional fees \$0 \$0 \$0 S0100 Total Professional fees \$0 \$0 \$0 S0101 Total Professional fees \$0 \$0 \$0 S0101 Total Professional fees \$0 \$0 \$0 S0101 Total Professional fees \$0 \$0 \$0	000100			ψũ	ΨŬ	\$0
825400 Permits \$0 \$0 38700 Insurance \$0 \$0 PROFESSIONAL FEES \$0 \$0 \$0 83500 Consultants: -Architects, Engineers \$0 \$0 83500 Consultants: -Architects, Engineers \$0 \$0 83500 Consultants: -Architects, Engineers \$0 \$0 835200 Design fees-In House \$0 \$0 835721 Extemal Project Manager \$0 \$0 835725 Management fees-Capital Project 3.5% Project Management fee \$0 \$0 83700 Norting 16 Set Set Vices \$0 \$0 837100 Moving \$0 \$0 \$0 837100 Noring \$0 \$0	DEDMITS					ψυ
836700 Insurance \$0 \$0 PROFESSIONAL FEES \$53,900 \$1,245 \$55 835201 Consultants - disbursements \$0 \$0 835204 Consultants - disbursements \$0 \$0 835204 Consultants - disbursements \$0 \$0 835204 Consultants - disbursements \$0 \$0 835205 Other consultants \$0 \$0 835721 External Project Manager \$0 \$0 835725 Management fees \$0 \$0 835725 Site services & Infrastructure \$0 \$0 7013 Site services & Infrastructure \$0 \$0 \$0 7013 Site services & Infrastructure \$0 \$0 \$0 7014 Site Services \$0 \$0 \$0 7014 Site Services \$0 \$0 \$0 7014 Site Services \$0 \$0 \$0 7011 Computer Mindstructure \$0 \$0 \$0 820110 Computer Mindstructure				¢0	0.9	\$0
Total Permits, insurance Total Permits, insurance PROFESSIONAL FEES \$53,900 \$1,245 \$55 835200 Consultants: -Architects, Engineers \$0 \$0 835201 Consultants: -Architects, Engineers \$0 \$0 835202 Consultants: -Architects, Engineers \$0 \$0 835204 Consultants: -Architects, Engineers \$0 \$0 835205 Ocnsultants: -Architects, Engineers \$0 \$0 835204 Consultants: -Architects, Engineers \$0 \$0 835205 Design fees-In House \$0 \$0 \$0 835721 External Project Manager \$0 \$0 \$106 Total Professional fees \$0 \$0 \$0 \$0 S100 Ste services \$0 \$0 \$0 \$0 COMPUTER WIRING AND TELEPHONES \$0 \$0 \$0 \$0 \$0 S1110 Computer Wiring & Telephone \$0 \$0 \$0 \$0 S1110 Staging \$0 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td></td<>						
PROFESSIONAL FEES \$53,900 \$1,245 835200 Consultants - Architects, Engineers \$50 \$0 835204 Consultants - disbursements \$0 \$0 835204 Consultants - disbursements \$0 \$0 835204 Construction management fees \$0 \$0 835204 Construction management fees \$0 \$0 835720 Design fees-In House \$0 \$0 835721 External Project Manager \$0 \$0 83722 Management fees-Capital Project 3.5% Project Management fee \$106,050 \$0 83710 Total Site Services & Infrastructure \$0 \$0 821110 Computer Wiring & Telephones \$0 \$0 MOVING AND TELEPHONES \$0 \$0 \$0 82110 Vor classrooms \$0 \$0 82110 AV for classrooms \$0 \$0 82110 AV for classrooms \$0 \$0 82110 AV for classrooms \$0 \$0 821250 <td>836700</td> <td></td> <td></td> <td>\$0</td> <td>\$U</td> <td>\$0</td>	836700			\$0	\$U	\$0
B32500 Consultants: -Architects. Engineers \$53,900 \$1,245 \$55 B35201 Consultants: -disbursements \$0 \$0 \$0 B35204 Construction management fees \$0 \$0 \$0 B35205 Other consultants \$0 \$0 \$0 B35204 Construction management fees \$0 \$0 \$0 B35720 Design fees-In House \$0 \$0 \$106<						\$0
835201 Consultants - disbursements \$0 \$0 835204 Consultants \$0 \$0 835204 Consultants \$0 \$0 835204 Other consultants \$0 \$0 835210 Legal fees \$0 \$0 835720 Design fees-In House \$0 \$0 835721 External Project Manager \$0 \$0 837272 Management fees-Capital Project 3.5% Project Management fee \$106,050 \$106 \$57700 Site services & infrastructure \$0 \$0 \$0 \$25711 Computer Wiring AND TELEPHONES \$0 \$0 \$0 \$20101 Funishings \$0 \$0 \$0 \$0 \$37100 Moving and Staging \$0 \$0 \$0 \$0 \$0 \$21100 AV for classrooms \$0 \$0 \$0 \$0 \$0 \$21100 AV for classrooms \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td></td<>						
835204 Construction management fees \$0 \$0 835206 Other consultants \$0 \$0 835206 Other consultants \$0 \$0 835720 Design fees-In House \$0 \$0 835727 External Project Manager \$0 \$0 835725 Management fees Capital Project 3.5% Project Management fee \$106,050 \$106 6000 Total Site Services \$0 \$0 \$106 70141 Site Services \$0 \$0 \$0 70141 Site Services \$0 \$0 \$0 \$0 70141 Site Services \$0 \$0 \$0 \$0 \$0 70141 Site Services \$0			rs			\$55,145
B35206 Other consultants \$0 \$0 B35210 Legal fees \$0 \$0 B35720 Design fees-In House \$0 \$0 B35721 External Project Manager \$0 \$0 B35721 External Project Manager \$0 \$0 S3722 Management fees \$0 \$0 S106.050 Ste services \$0 \$0 COMPUTER WIRNO AND FLEPHONES \$0 \$0 \$0 S21101 Computer Wiring & Telephones \$0 \$0 MOVING AND STAGING \$0 \$0 \$0 S3100 Telephone \$0 \$0 Total Moving and Staging \$0 \$0 \$0 S1010 Furnishings \$0 \$0 \$0 \$0 S21101 Cupiment \$0 \$0 \$0 \$0 S1010 Furnishings and Equipment \$0 \$0 \$0 \$0 S1010 Furnishings and Equipment \$0 \$0 \$0 \$0 S1010 Furnishings and Equipment<						\$0
835206 Other consultants S0 S0 835210 Legal fees S0 S0 835721 External Project Manager S0 S0 835722 External Project Manager S0 S0 835721 External Project Manager S0 S0 835721 External Project Manager S0 S0 835700 Site services & infrastructure S0 S0 Total Site Services S0 S0 S0 COMPUTER WIRNO AND FLEPHONES S0 S0 S0 83100 Telephone S0 S0 S0 Total Computer Wiring & Telephones S0 S0 S0 MOVING AND STAGING S0 S0 S0 83100 Telephone S0 S0 S0 Total Moving and Staging S0 S0 S0 S0 821010 Equipment S0 S0 S0 S0 821101 Signage-Interior S0 S0 S0 S0	835204	Construction management fees		\$0	\$0	\$0
835720 Design fees-In House \$0 \$0 835721 External Project Manager \$0 \$0 835725 Management fees-Capital Project J.5% Project Management fee \$106,050 \$0 52725 Management fees \$10 \$106 635700 Site services & infrastructure \$0 \$0 70tal Professional fees \$0 \$0 835700 Site services & infrastructure \$0 \$0 70tal Site Services \$0 \$0 \$0 821110 Computer Wiring & Telephones \$0 \$0 MOVING AND STAGING \$0 \$0 \$0 837100 Moving \$0 \$0 837100 Moving and Staging \$0 \$0 70tal Equipment \$0 \$0 \$0 70tal Equipment \$0 \$0 \$0 820101 Equipment \$0 \$0 821100 Furnishings and Equipment \$0 \$0 70tal Equipment GST is not applicable \$0 \$0 835766 Signage-Interior \$0 \$0 830702 Curier, misc. \$0 \$0 835766 Signage-Exterior \$0 \$0 836766 </td <td>835206</td> <td>-</td> <td></td> <td>\$0</td> <td>\$0</td> <td>\$0</td>	835206	-		\$0	\$0	\$0
835720 Design fees-In House \$0 \$0 835721 External Project Manager \$0 \$0 835725 Management fees-Capital Project J.5% Project Management fee \$106,050 \$0 52725 Management fees \$10 \$106 635700 Site services & infrastructure \$0 \$0 70tal Professional fees \$0 \$0 835700 Site services & infrastructure \$0 \$0 70tal Site Services \$0 \$0 \$0 821110 Computer Wiring & Telephones \$0 \$0 MOVING AND STAGING \$0 \$0 \$0 837100 Moving \$0 \$0 837100 Moving and Staging \$0 \$0 70tal Equipment \$0 \$0 \$0 70tal Equipment \$0 \$0 \$0 820101 Equipment \$0 \$0 821100 Furnishings and Equipment \$0 \$0 70tal Equipment GST is not applicable \$0 \$0 835766 Signage-Interior \$0 \$0 830702 Curier, misc. \$0 \$0 835766 Signage-Exterior \$0 \$0 836766 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td>\$0</td>						\$0
835721 External Project Manager \$0 \$0 835725 Management fees-Capital Project 3.5% Project Management fee \$106,050 \$0 STOM Site Services \$0 \$106 COMPUTER WIRING AND TELEPHONES \$0 \$0 S21110 Computer infrastructure \$0 \$0 Total Site Services \$0 \$0 \$0 Total Computer Wiring & Telephones \$0 \$0 \$0 MOVING AND STAGING \$0 \$0 \$0 837100 Moving \$0 \$0 \$0 S1011 Elephone \$0 \$0 \$0 S1011 Staging \$0 \$0 \$0 S1011 Staging \$0 \$0 \$0 S1010 Furishings \$0 \$0 \$0 S20100 Furnishings and Equipment \$0 \$0 \$0 S21510 X/ tor classrooms \$0 \$0 \$0 S21425 Security & Access systems \$0 \$0						\$0
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835754 S 835757 C 835762 H 835765 D 835768 S T LANDSCAP 835755 L 835755 L 835755 L 835755 L 835700 Ir PROFESSIO 835200 C 835201 C 835201 C 835204 C 835204 C 835206 C 835210 L 835720 D 835721 E 835725 M	econdary effects construction Contingency lazardous materials removal emolition ite preparation otal Construction ING andscaping otal Landscaping ISURANCE ermits issurance otal Permits, Insurance INAL FEES consultants - Architects, Engineer consultants - disbursements construction management fees other consultants egal fees lesign fees-In House xternal Project Manager lanagement fees-Capital Project		\$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$	\$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$1,155 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0	\$0 \$0 \$0 \$0 \$1,611,383 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0
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835762 H 835765 D 835768 S T LANDSCAP 835755 L 835755 L 835755 T PERMITS, IN 835400 P 836700 Ir T PROFESSIO 835200 C 835200 C 835200 C 835201 C 835204 C 835206 C 835210 L 835720 D 835721 E 835725 M	azardous materials removal emolition ite preparation otal Construction ING andscaping otal Landscaping ISURANCE ermits asurance otal Permits, Insurance INAL FEES consultants - Architects, Engineer consultants - disbursements construction management fees other consultants egal fees lesign fees-In House xternal Project Manager lanagement fees-Capital Project		\$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$	\$0 \$0 \$0 \$0 \$0 \$0 \$0 \$1,155 \$0 \$0 \$0 \$0 \$0 \$0 \$0	\$0 \$0 \$1,611,383 \$0 \$0 \$0 \$0 \$0 \$51,155 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0
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T LANDSCAPI 835755 Li PERMITS, IN 835400 836700 Ir PROFESSIO 835200 835201 835204 835205 835206 835206 835210 835210 835720 835720 835721 835725	otal Construction ING andscaping otal Landscaping ISURANCE ermits isurance otal Permits, Insurance INAL FEES consultants - Architects, Engineer consultants - disbursements construction management fees other consultants egal fees lesign fees-In House xternal Project Manager lanagement fees-Capital Project		\$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$	\$0 \$0 \$0 \$0 \$1,155 \$0 \$0 \$0 \$0 \$0 \$0	\$1,611,383 \$0 \$0 \$0 \$0 \$0 \$51,155 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0
LANDSCAP 835755 Li PERMITS, IN 835400 P 836700 Ir T PROFESSIO 835200 C 835200 C 835201 C 835204 C 835204 C 835206 C 835210 Li 835720 D 835721 E 835725 M	ING andscaping otal Landscaping ISURANCE ermits isurance otal Permits, Insurance INAL FEES consultants - Architects, Engineer consultants - disbursements construction management fees other consultants egal fees lesign fees-In House xternal Project Manager lanagement fees-Capital Project		\$0 \$0 \$50,000 \$0 \$0 \$0 \$0 \$0 \$0 \$0	\$0 \$0 \$1,155 \$0 \$0 \$0 \$0 \$0 \$0	\$0 \$0 \$0 \$0 \$0 \$51,155 \$0 \$0 \$0 \$0 \$0 \$0 \$0
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T PERMITS, IN 835400 P 836700 Ir T T PROFESSIO 835200 835201 C 835204 C 835205 C 835206 C 835210 Li 835720 D 835720 D 835721 E 835725 M	otal Landscaping ISURANCE ermits isurance otal Permits, Insurance NAL FEES consultants - Architects, Engineer consultants - disbursements construction management fees other consultants egal fees lesign fees-In House xternal Project Manager lanagement fees-Capital Project		\$0 \$0 \$50,000 \$0 \$0 \$0 \$0 \$0 \$0 \$0	\$0 \$0 \$1,155 \$0 \$0 \$0 \$0 \$0 \$0	\$0 \$0 \$0 \$51,155 \$0 \$0 \$0 \$0 \$0
T PERMITS, IN 835400 P 836700 Ir T T PROFESSIO C 835200 C 835201 C 835204 C 835205 C 835206 C 835210 L 835720 D 835721 E 835725 M	otal Landscaping ISURANCE ermits isurance otal Permits, Insurance NAL FEES consultants - Architects, Engineer consultants - disbursements construction management fees other consultants egal fees lesign fees-In House xternal Project Manager lanagement fees-Capital Project		\$0 \$50,000 \$0 \$0 \$0 \$0 \$0 \$0	\$0 \$1,155 \$0 \$0 \$0 \$0 \$0	\$0 \$0 \$0 \$51,155 \$0 \$0 \$0 \$0 \$0
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835400 P 836700 Ir T PROFESSIO 835200 C 835201 C 835204 C 835206 C 835210 L 835720 D 835720 D 835721 E 835725 M	ermits asurance otal Permits, Insurance NAL FEES consultants: -Architects, Engineer consultants - disbursements construction management fees other consultants egal fees lesign fees-In House xternal Project Manager lanagement fees-Capital Project		\$0 \$50,000 \$0 \$0 \$0 \$0 \$0 \$0	\$0 \$1,155 \$0 \$0 \$0 \$0 \$0	\$0 \$0 \$51,155 \$0 \$0 \$0 \$0
836700 Ir PROFESSIO 835200 C 835201 C 835204 C 835206 C 835210 L 835720 D 835721 E 835725 M	Asurance otal Permits, Insurance NAL FEES consultants: -Architects, Engineer consultants - disbursements construction management fees other consultants egal fees lesign fees-In House xternal Project Manager lanagement fees-Capital Project		\$0 \$50,000 \$0 \$0 \$0 \$0 \$0 \$0	\$0 \$1,155 \$0 \$0 \$0 \$0 \$0	\$0 \$0 \$51,155 \$0 \$0 \$0 \$0
T PROFESSIO 835200 C 835201 C 835204 C 835206 C 835210 L 835720 D 835720 D 835721 E 835725 M	otal Permits, Insurance NAL FEES consultants: -Architects, Engineer consultants - disbursements construction management fees other consultants egal fees lesign fees-In House xternal Project Manager lanagement fees-Capital Project		\$50,000 \$0 \$0 \$0 \$0 \$0	\$1,155 \$0 \$0 \$0 \$0 \$0	\$0 \$51,155 \$0 \$0 \$0 \$0
PROFESSIO 835200 C 835201 C 835204 C 835206 C 835210 L 835210 L 835720 D 835721 E 835725 M	NAL FEES consultants: -Architects, Engineer consultants - disbursements construction management fees other consultants egal fees lesign fees-In House xternal Project Manager lanagement fees-Capital Project		\$0 \$0 \$0 \$0	\$0 \$0 \$0 \$0	\$51,155 \$0 \$0 \$0
835200 C 835201 C 835204 C 835206 C 835210 L 835720 D 835721 E 835725 M	consultants: -Architects, Engineer consultants - disbursements construction management fees ther consultants egal fees lesign fees-In House xternal Project Manager lanagement fees-Capital Project		\$0 \$0 \$0 \$0	\$0 \$0 \$0 \$0	\$0 \$0 \$0
835201 C 835204 C 835206 C 835210 L 835720 D 835721 E 835725 M	onsultants - disbursements onstruction management fees ther consultants egal fees lesign fees-In House xternal Project Manager lanagement fees-Capital Project		\$0 \$0 \$0 \$0	\$0 \$0 \$0 \$0	\$0 \$0 \$0
835204 C 835206 C 835210 L 835720 D 835721 E 835725 M	construction management fees other consultants egal fees lesign fees-In House xternal Project Manager lanagement fees-Capital Project		\$0 \$0 \$0	\$0 \$0 \$0	\$0 \$0
835206 C 835210 L 835720 D 835721 E 835725 M	other consultants egal fees lesign fees-In House xternal Project Manager lanagement fees-Capital Project		\$0 \$0	\$0 \$0	\$0
835206 C 835210 L 835720 D 835721 E 835725 M	other consultants egal fees lesign fees-In House xternal Project Manager lanagement fees-Capital Project		\$0	\$0	\$0
835720 D 835721 E 835725 N	esign fees-In House xternal Project Manager lanagement fees-Capital Project				
835720 D 835721 E 835725 N	esign fees-In House xternal Project Manager lanagement fees-Capital Project				\$ 0
835721 E 835725 N	xternal Project Manager lanagement fees-Capital Project		ψυ	\$0	\$0
835725 N	lanagement fees-Capital Project		\$0	\$0 \$0	\$0 \$0
		2 EV/ Droject Monogement fee	\$55,125	\$0 \$0	\$55,125
	stal Dustansianal face	3.5% Project Management lee	\$00,120	Ф О	
	otal Professional fees				\$106,280
SERVICES 1					
	ite services & infrastructure		\$0	\$0	\$0
	otal Site Services				\$0
COMPUTER	WIRING AND TELEPHONES				
821110 C	computer infrastructure		\$0	\$0	\$0
835010 T	elephone		\$0	\$0	\$0
	otal Computer Wiring & Teleph	nones			\$0
					ψũ
	loving		\$0	\$0	\$0
	taging		\$0 \$0	\$0 \$0	\$0 \$0
	otal Moving and Staging		φυ	φυ	
					م 0
	GS AND EQUIPMENT		^	\$ 0	^
	urnishings		\$0	\$0	\$0
821010 E	quipment		\$0	\$0	\$0
	V for classrooms		\$0	\$0	\$0
821610 S	cientific Equipment	GST is not applicable	\$0	\$0	\$0
Т	otal Furnishings and Equipme	nt			\$0
OTHER			ľ		·
	ignage-Interior		\$0	\$0	\$0
	ecurity & Access systems		\$0	\$0 \$0	\$0 \$0
	courier, misc.		\$0 \$0	\$0 \$0	\$0 \$0
	ignage-Exterior		\$0 \$0	\$0 \$0	\$0 \$0
		Not in contract expanses			
		Not-in-contract expenses	\$20,000	\$462	\$20,462
		Ground breaking, Top off, Grand opening	\$0	\$0	\$0
	dvertising		\$0	\$0	\$0
836430 D	onor recognition		\$0	\$0	\$0
890670 U	of T Trades	\$10,000 per chiller project	\$10,000	\$0	\$10,000
Т	otal Other			Ē	\$30,462
		SUB TOTAL			\$1,748,125
PROJECT C	ONTINGENCY				. , -, -•
	roject Contingency	10%	\$157,500	\$3,638	\$161,138
	, , ,	1078	ψ 107,000	ψ0,000	
	otal Project Contingency				\$161,138
			A -1	* -	*-
	inance Costs		\$0	\$0	\$0
т	otal Finance Costs				\$0
	· · · · · · · · · · · · · · · · · · ·	TOTAL PROJECT COST:			\$1,909,263

Approved by: Date:

NO ITEM REMARKS BASE COST GST221%) COST 85730 Main contract \$2,000,000 \$20,0		T COST ESTIMATE	PROJECT: Lash Miller/McLennan/Bahen Centre Chill	ed Water System Upg	grade (2000 ton Bahe	n Chiller Option)
CONSTRUCTION S2.800.000 S60.060 S2.660.0 83752 Other contract S0 S0 S0 83754 Secondary effects S0 S0 S0 83757 Construction Contingency S0 S0 S0 83757 Total Construction S0 S0 S0 7578 Site preparation S0 S0 S0 7514 Construction S0 S0 S0 S0 7514 Construction S0 S0 </th <th></th> <th></th> <th>U OF T PROJECT NO:</th> <th>PASE COST</th> <th>CCT(2 210/)</th> <th>COST</th>			U OF T PROJECT NO:	PASE COST	CCT(2 210/)	COST
353720 Main contract \$2,000.000 \$20,000	-		REIMARKS	BASE COST	GST(2.31%)	0051
82572 Other contract 50 50 50 835745 Secondary effects 50 50 835765 Demolition 50 50 85765 Stepreparation 50 50 7total Construction 50 50 50 85760 Permits 50 50 85760 Permits 50 50 85760 Permits 50 50 85760 Secondor 51,386 \$61,3 85760 Consultants - disbursements 50 50 85200 Consultants - disbursements 50 50 85201 Consultants - disbursements 50 50 85725 Management fees - Capture function 50 50 85725 Steprine Project Manager 50 50 857210				¢2 600 000	¢60.060	¢2 660 060
828754 Secondary effects \$0 \$0 828757 Construction Contingency \$0 \$0 828766 Demolision \$0 \$0 828768 Stepreparation \$0 \$0 828760 Insurance \$0 \$0 PRIMITS, INSURANCE \$0 \$0 \$0 828700 Consultants: Architects, Engineers \$0 \$0 \$0 828700 Consultants: Architects, Engineers \$0 \$0 \$0 \$0 828201 Consultants: Architects, Engineers \$0 \$0 \$0 \$0 828720 Legal fees \$0 \$0 \$0 \$0 \$0 828720 Legal fees \$0 \$0 \$0 \$0 \$0 828770 Nore costutant						
853757 Construction Contingency \$0 \$0 853768 Demolition \$0 \$0 853768 Demolition \$0 \$0 853768 Stepreparation \$0 \$0 853755 Landscaping \$0 \$0 7total Construction \$0 \$0 \$0 853755 Landscaping \$0 \$0 \$0 9FRMTPS/SINBURANCE \$0 \$0 \$0 \$0 85200 Construction management fees \$0 \$0 \$0 \$1.386 \$81.386 85200 Construction management fees \$0 \$0 \$0 \$0 85201 Construction management fees \$0 \$0 \$0 \$15.23 85202 Struction management fees \$0 \$0 \$0 \$15.23 85720 Management fees \$0 \$0 \$0 \$15.23 85720 Steprices kindstructure \$0 \$0 \$0 \$0 \$0 \$0 \$0 <						\$0
825762 Hazardous materials removal \$0 \$0 825765 Demolition \$0 \$0 825765 Demolition \$0 \$22.680.0 825765 Landscaping \$0 \$22.680.0 825765 Landscaping \$0 \$0 PERMITS, INSURANCE \$0 \$0 \$0 825700 Insurance \$0 \$0 \$0 7041 Permits \$0 \$0 \$0 \$0 825000 Consultants - Architects, Engineers \$0 \$0 \$0 \$0 82500 Construction management tess \$0 <td< td=""><td></td><td></td><td></td><td></td><td></td><td>\$0</td></td<>						\$0
83756 Demointion \$0 \$0 Total Construction \$0 \$0 \$2,660.0 ANDSCA-PINO \$0 \$0 \$2,660.0 83755 Landscaping \$0 \$0 \$2,660.0 7total Landscaping \$0 \$0 \$0 \$2,660.0 83750 Steparation \$0 \$0 \$0 7total Construction Steparation \$0 \$0 \$0 83700 Insurance \$0 \$0 \$0 \$0 83500 Consultants: Architects, Engineers \$0 \$0 \$0 \$0 83501 Consultants: Architects, Engineers \$0 \$0 \$0 \$0 835020 Consultants \$0						\$0
SISS Site preparation \$0 \$0 \$0 \$0 Catal Construction \$0 \$0 \$2,660,0 \$2,660,0 LANDSCAPING \$0 \$0 \$0 \$0 \$0 S3755<					\$0	\$0
Total Construction S2.660.0 SATS55 Landscaping S0 Statistics S0 S0 Total Landscaping S0 S0 PERMITS, INSURANCE S0 S0 Statistics S0 S0 PROFESSIONAL FEES S0 S0 Statistics S0 S0 PROFESSIONAL FEES S0 S0 Statistics S0 S0	835765	Demolition		\$0	\$0	\$0
LANDSCAPING \$0 \$0 35755 Landscaping \$0 \$0 7C13 Landscaping \$0 \$0 835400 Permits \$0 \$0 835700 Insurance \$0 \$0 7C13 Permits \$0 \$0 83500 Consultants - disbursements \$0 \$0 83501 Construction management fees \$0 \$0 83502 Construction management fees \$0 \$0 83572 Head ProfessionAl Fees \$0 \$0 83572 Formal ProfessionAl fees \$0 \$0 83572 Management fees - Capital Project 3.5% Project Management fee \$91.00 \$0 83570 Design fees-in House \$0 \$0 \$0 83570 Ste services & infrastructure \$0 \$0 \$0 701110 Construction frastructure \$0 \$0 \$0 701110 Ste services & infrastructure \$0 \$0 \$0 701110	835768	Site preparation		\$0	\$0	\$0
83755 Landscaping \$0 \$0 Total Landscaping \$0 \$0 PERMITS; INSURANCE \$0 \$0 836700 Permits; \$0 \$0 836700 Insurance \$0 \$0 PROFESSIONAL FEES \$0 \$0 \$0 835200 Consultants: -Architects, Engineers \$0 \$0 835204 Construction management fees \$0 \$0 835204 Construction management fees \$0 \$0 835204 Construction management fees \$0 \$0 835720 Legig fees- \$0 \$0 835721 External Project Manage \$0 \$0 835720 Sing frees-In House \$0 \$0 835725 Management fees \$0 \$0 835700 Site services \$0 \$0 COMPUTER WIRING AND TELEPHONES \$0 \$0 \$0 835710 Moving and Staging \$0 \$0 Totatal Profescional fees		Total Construction				\$2,660,060
Total Landscaping Total Primits BS4400 Permits BS4500 Permits S0700 Insurance PROFESSIONAL FEES S0 S0200 Consultants: -Architects, Engineers S00 S0201 Consultants: -Architects, Engineers S00 S0202 Consultants: -Architects, Engineers S00 S02032 Consultants: -Architects, Engineers S00 S0204 Consultants: -Architects, Engineers S00 S02020 Consultants: -Architects, Engineers S00 S02020 Consultants: -Architects, Engineers S00 S02020 Consultants S00 S02020 Design fees-In House S00 S02700 Stite Anaagement fees S01 S1223 Management fees-Capital Project 3.5% Project Management fee S01 S2710 Stes Project Management fees S01 S2710 Stes Project S1 S0 S2710 Stes Project Management fees S0 S2710 Stes Project S1 S0 <td< td=""><td>LANDSC</td><td>APING</td><td></td><td></td><td></td><td></td></td<>	LANDSC	APING				
Total Landscaping Total Primits BS4400 Permits BS4500 Permits S0700 Insurance PROFESSIONAL FEES S0 S0200 Consultants: -Architects, Engineers S00 S0201 Consultants: -Architects, Engineers S00 S0202 Consultants: -Architects, Engineers S00 S02032 Consultants: -Architects, Engineers S00 S0204 Consultants: -Architects, Engineers S00 S02020 Consultants: -Architects, Engineers S00 S02020 Consultants: -Architects, Engineers S00 S02020 Consultants S00 S02020 Design fees-In House S00 S02700 Stite Anaagement fees S01 S1223 Management fees-Capital Project 3.5% Project Management fee S01 S2710 Stes Project Management fees S01 S2710 Stes Project S1 S0 S2710 Stes Project Management fees S0 S2710 Stes Project S1 S0 <td< td=""><td>835755</td><td>Landscaping</td><td></td><td>\$0</td><td>\$0</td><td>\$0</td></td<>	835755	Landscaping		\$0	\$0	\$0
PERMITS, INSURANCE S0 \$0 836400 Permits \$0 \$0 836700 Insurance \$0 \$0 PROFESSIONAL FEES \$80,000 \$1,386 \$61,3 835201 Consultants - dibursements \$0 \$0 835204 Construction management fees \$0 \$0 835204 Construction management fees \$0 \$0 835201 Legal fees \$0 \$0 835725 Management fees-Capital Project Management fee \$91,000 \$1512,3 835700 Site services & infrastructure \$0 \$0 70tal Professional fees \$0 \$0 \$0 835700 Site services & infrastructure \$0 \$0 835710 Computer infrastructure \$0 \$0 837100 Total Professional Staging \$0 \$0 701al Moving and Staging \$0 \$0 \$0 82110 Computer infrastructure \$0 \$0 \$0 82010 Fulphone <td></td> <td></td> <td></td> <td>• -</td> <td></td> <td>\$0</td>				• -		\$0
828400 Permits \$0 \$0 836700 Insurance \$0 \$0 70tal Permits, Insurance \$0 \$0 \$0 835200 Consultants - Architects, Engineers \$00 \$1,386 \$61,380 835201 Consultants - Architects, Engineers \$0 \$0 \$0 835201 Construction management fees \$0 \$0 \$0 835201 Design fees in House \$0 \$0 \$0 \$0 835721 External Project Manager \$0 \$0 \$91,000 \$0 \$	PERMITS					ψu
836700 Insurance \$0 \$0 PROFESSIONAL FEES \$60,000 \$1,386 \$61,385 835200 Consultants: -Architects, Engineers \$0 \$0 835204 Consultants: -Architects, Engineers \$0 \$0 835204 Construction management fees \$0 \$0 835204 Construction management fees \$0 \$0 835720 Legal fees \$0 \$0 835721 External Project Manager \$0 \$0 835725 Management fees \$0 \$0 835705 Site services & Infrastructure \$0 \$0 7018 Ster Services Stort Strees \$0 \$0 \$0 7018 Stre Services Stort Strees \$0 \$0 \$0 7018 Strees \$0 \$0 \$0 \$0 7019 Ter WRING AND TELEPHONES \$0 \$0 \$0 \$0 82110 Computer Minds Ataging \$0 \$0 \$0 \$0 7010 Explorine \$1 \$0 \$0				¢0	\$0	\$0
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835756 Signage-Exterior \$0 \$0 835764 Client Construction expenses Not-in-contract expenses \$20,000 \$462 \$20,4 835766 Ceremonies Ground breaking, Top off, Grand opening \$0 \$0 \$0 835766 Ceremonies Ground breaking, Top off, Grand opening \$0 \$0 \$0 835900 Advertising \$0 \$0 \$0 \$0 \$0 836430 Donor recognition \$10,000 per chiller project \$10,000 \$0 \$10,00 890670 U of T Trades \$10,000 per chiller project \$10,000 \$0 \$10,00 Total Other SUB TOTAL \$2,842,9 \$30,4 \$30,4 \$2,842,9 PROJECT CONTINGENCY SUB TOTAL \$2,842,9 \$2,842,9 \$2,842,9 \$2,842,9 835758 Project Contingency 10% \$260,000 \$6,006 \$2,260,00 \$2,66,00 \$2,260,00 \$2,66,00 \$2,260,00 \$2,260,00 \$2,260,00 \$2,260,00 \$2,260,00 \$2,260,00 \$2,260,00 \$2,260,00 \$2,260,00 \$2,260,00 \$2,260,00 \$2,260,00						\$0 \$0
835764 Client Construction expenses Not-in-contract expenses \$20,000 \$462 \$20,4 835766 Ceremonies Ground breaking, Top off, Grand opening \$0 \$0 \$0 835766 Ceremonies Ground breaking, Top off, Grand opening \$0 \$0 \$0 836430 Donor recognition \$10,000 per chiller project \$10,000 \$0 \$10,000 890670 U of T Trades \$10,000 per chiller project \$10,000 \$0 \$10,000 Total Other SUB TOTAL \$2,842,9 \$2,842,9 PROJECT CONTINGENCY SUB TOTAL \$2,842,9 \$2,842,9 835758 Project Contingency 10% \$260,000 \$6,006 \$266,00 FINANCE COSTS \$35300 Finance Costs \$0 \$0 \$0 \$0 \$266,00 Sub Total Finance Costs \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 Total Finance Costs \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0						
835766 Ceremonies Ground breaking, Top off, Grand opening \$0 \$0 835900 Advertising \$0 \$0 \$0 836430 Donor recognition \$10,000 per chiller project \$10,000 \$0 890670 U of T Trades \$10,000 per chiller project \$10,000 \$0 \$10,000 Total Other SUB TOTAL \$2,842,9 \$2,842,9 \$2,842,9 PROJECT CONTINGENCY \$200,000 \$6,006 \$2,66,0 \$35758 Project Contingency 10% \$260,000 \$6,006 \$266,0 FINANCE COSTS \$35300 Finance Costs \$0 \$0 \$0 \$0 Total Finance Costs \$0 \$0 \$0 \$0 \$0 \$0			Not in contract our second			\$0
835900 Advertising \$0 \$0 836430 Donor recognition \$10,000 per chiller project \$10,000 890670 U of T Trades \$10,000 per chiller project \$10,000 Total Other SUB TOTAL \$2,842,9 PROJECT CONTINGENCY \$260,000 \$6,006 \$35758 Project Contingency 10% Total Project Contingency \$266,00 FINANCE COSTS \$0 \$35300 Finance Costs Total Finance Costs \$0						\$20,462
836430 Donor recognition \$0 \$0 890670 U of T Trades \$10,000 per chiller project \$10,000 \$0 \$10,000 Total Other SUB TOTAL \$2,842,9 \$2,842,9 PROJECT CONTINGENCY \$35758 Project Contingency \$0 \$260,000 \$6,006 \$2266,00 Total Project Contingency 10% \$260,000 \$6,006 \$2266,00 FINANCE COSTS \$35300 Finance Costs \$0 \$0 \$0			Ground breaking, Top off, Grand opening			\$0
890670 U of T Trades \$10,000 per chiller project \$10,000 \$0 \$10,00 \$0 \$10,00 \$0 \$10,00 \$0 \$10,00 \$0 \$10,00 \$0 \$10,00 \$0 \$10,00 \$0 \$10,00 \$0 \$10,00 \$0 \$10,00 \$0 \$10,00 \$0 \$30,4		Advertising				\$0
Total Other\$30.4SUB TOTAL\$30.4PROJECT CONTINGENCY 835758 Project Contingency Total Project Contingency10%\$260,000\$6,006\$266,00FINANCE COSTS 835300 Finance Costs\$0Total Finance Costs\$0Total Finance Costs\$0	836430	Donor recognition		\$0	\$0	\$0
Total Other\$30.4SUB TOTAL\$30.4PROJECT CONTINGENCY 835758 Project Contingency Total Project Contingency10%\$260,000\$6,006\$266,00FINANCE COSTS 835300 Finance Costs\$0Total Finance Costs\$0Total Finance Costs\$0	890670	U of T Trades	\$10,000 per chiller project	\$10,000	\$0	\$10,000
SUB TOTAL\$2,842,9PROJECT CONTINGENCY 835758Project Contingency Total Project Contingency10%\$260,000\$6,006\$266,0FINANCE COSTS 835300\$1000\$1000\$1000\$1000\$1000\$1000\$1000Substrain Total Finance Costs\$1000\$1000\$1000\$1000\$1000\$1000\$1000Substrain Total Finance Costs\$1000\$1000\$1000\$1000\$1000\$1000\$1000Substrain Total Finance Costs\$1000\$1000\$1000\$1000\$1000\$1000\$1000Substrain Total Finance Costs\$1000\$1000\$1000\$1000\$1000\$1000\$1000Substrain Total Finance Costs\$1000\$1000\$1000\$1000\$1000\$1000Substrain Substrain Total Finance Costs\$1000\$1000\$1000\$1000\$1000Substrain Sub						\$30,462
PROJECT CONTINGENCY 835758Project Contingency10%\$260,000\$6,006\$266,0Total Project Contingency\$0\$266,0\$266,0\$266,0FINANCE COSTS 835300Finance Costs\$0\$0\$0Total Finance Costs\$0\$0\$0			SUB TOTAL			\$2,842,908
835758 Project Contingency 10% \$260,000 \$6,006 \$266,0 Total Project Contingency \$260,000 <td>PRO.IFCT</td> <td></td> <td></td> <td></td> <td></td> <td>÷=,0 .2,000</td>	PRO.IFCT					÷=,0 .2,000
Total Project Contingency \$266,0 FINANCE COSTS \$0 835300 Finance Costs Total Finance Costs \$0			100/	¢260.000	¢6 006	¢266 006
FINANCE COSTS 835300 Finance Costs \$0 \$0 Total Finance Costs \$0 \$0 \$0	000100		10%	φ∠00,000	φ0,000	
835300 Finance Costs \$0 \$0						\$266,006
Total Finance Costs						
	835300			\$0	\$0	\$0
TOTAL PROJECT COST:		Total Finance Costs				\$0
TOTAL PROJECT COST: \$3 108 9						
			TOTAL PROJECT COST:			\$3,108,914

PROJECT NO CONSTRU 835730 835752 835754	ITEM	U OF T PROJECT NO: REMARKS	BASE COST	GST(2.31%)	
CONSTRU 835730 835752 835754		REMARKS	BASE COST		
835730 835752 835754	JCTION			GST(2.31%)	COST
835752 835754	Main contract		¢4,000,000	¢00.400	¢4,000,400
835754	Main contract		\$1,000,000	\$23,100	\$1,023,100
	Other contract		\$0	\$0 \$0	\$0
	Secondary effects		\$0	\$0	\$0
835757	Construction Contingency		\$0	\$0	\$0
835762	Hazardous materials removal		\$0	\$0	\$0
835765	Demolition		\$0	\$0	\$0
835768	Site preparation		\$0	\$0	\$0
ł	Total Construction				\$1,023,100
LANDSCA	APING				
835755	Landscaping		\$0	\$0	\$0
	Total Landscaping		+-		\$0
PERMITS	, INSURANCE				\
835400	Permits		\$0	\$0	\$0
836700	Insurance		\$0	\$0	\$0
	Total Permits, Insurance				\$0
	BIONAL FEES				
835200	Consultants: -Architects, Enginee	rs	\$45,000	\$1,040	\$46,040
835201	Consultants - disbursements		\$0	\$0	\$0
835204	Construction management fees		\$0	\$0	\$0
835206	Other consultants		\$0	\$0	\$0
835210	Legal fees		\$0	\$0	\$0
835720	Design fees-In House		\$0	\$0	\$0
835721	External Project Manager		\$0 \$0	\$0	\$0
835725	Management fees-Capital Project	2.5% Project Management fee	\$35,000	\$0 \$0	\$35,000
035725		5.5% Project Management lee	φ35,000	φU	
	Total Professional fees				\$81,040
SERVICES					
835700	Site services & infrastructure		\$0	\$0	\$0
	Total Site Services				\$0
COMPUTE	ER WIRING AND TELEPHONES				
821110	Computer infrastructure		\$0	\$0	\$0
835010	Telephone		\$0	\$0	\$0
	Total Computer Wiring & Telep	hones		· _	\$0
MOVING /	AND STAGING				
837100	Moving		\$0	\$0	\$0
837101	Staging		\$0 \$0	\$0 \$0	\$0 \$0
037101			φυ	φU	\$0 \$0
FURNIOU	Total Moving and Staging				Ф О
	INGS AND EQUIPMENT		\$ 0	\$ 0	^
820010	Furnishings		\$0	\$0	\$0
821010	Equipment		\$0	\$0	\$0
821510	AV for classrooms		\$0	\$0	\$0
821610	Scientific Equipment	GST is not applicable	\$0	\$0	\$0
ł	Total Furnishings and Equipme	ent			\$0
OTHER					
820011	Signage-Interior		\$0	\$0	\$0
821325	Security & Access systems		\$0 \$0	\$0	\$0
835070	Courier, misc.		\$0 \$0	\$0	\$0
835756	Signage-Exterior		\$0 \$0	\$0 \$0	\$0 \$0
		Not in contract expenses			
835764	Client Construction expenses	Not-in-contract expenses	\$20,000	\$462	\$20,462
835766	Ceremonies	Ground breaking, Top off, Grand opening	\$0	\$0 \$0	\$0
835900	Advertising		\$0	\$0	\$0
836430	Donor recognition		\$0	\$0	\$0
890670	U of T Trades	\$10,000 per chiller project	\$10,000	\$0	\$10,000
	Total Other			Γ	\$30,462
		SUB TOTAL		İ	\$1,134,602
PROJECT	CONTINGENCY				i
835758	Project Contingency	10%	\$100,000	\$2,310	\$102,310
	Total Project Contingency	1070	<i><i><i>q</i></i> 100,000</i>	φ2,010	\$102,310
FINANCE					ψ102,010
835300	Finance Costs		¢0	¢.0	
000000			\$0	\$0	\$0
	Total Finance Costs				\$0
					A ·
		TOTAL PROJECT COST:			\$1,236,912

Approved by: Date:

NO ITEM REMARKS BASE COST GST(2 31%) COS 835730 Main contract \$1,200,000 \$27,720 \$1,22 835730 Other contract \$0 \$0 \$0 835742 Other contract \$0 \$0 \$0 835744 Secondary effects \$0 \$0 \$0 835762 Other contract \$0 \$0 \$0 835762 Demolition \$0 \$0 \$0 835762 Demolition \$0 \$0 \$0 835765 Landscaping \$0 \$0 \$0 835760 Insurance \$0 \$0 \$0 835700 Insurance \$0 \$0 \$0 835700 Construction management fees \$0 \$0 \$0 835700 Consultants: -disbursements \$0 \$0 \$0 835700 Construction management fees \$0 \$0 \$0 835720 Legal fees \$0		COST ESTIMATE	PROJECT: Earth Sciences Centre Chilled	Water System Up	grade (XXXXXXX	Option)
CONSTRUCTION S1,200,000 \$27,720 \$1,22 835730 Min contract \$0 \$0 \$0 835740 Manodaday effects \$0 \$0 \$0 835740 Sacondary effects \$0 \$0 \$0 835747 Sacondary effects \$0 \$0 \$0 835740 Hacondous materials removal \$0 \$0 \$0 835755 Demolition \$0 \$0 \$0 \$0 835755 Landscaping \$0 \$0 \$0 \$0 7014 Landscaping \$0 \$0 \$0 \$0 7014 Perktifts, Insurance \$0 \$0 \$0 \$0 7014 Perktifts, Insurance \$0			U OF T PROJECT NO:		0.07/0.0/00	
836730 Main contract \$1,200,000 \$27,720 \$1,22 836742 Other contract \$0 \$0 \$0 836745 Secondary effects \$0 \$0 \$0 836745 Chernotition \$0 \$0 \$0 835745 Demotion \$0 \$0 \$0 835745 Demotion \$0 \$0 \$0 835765 Demotion \$0 \$0 \$0 835765 Landscaping \$0 \$0 \$0 \$0 835700 Insurance \$0 \$0 \$0 \$0 \$0 83500 Constructor management fees \$0	-		REMARKS	BASE COST	GST(2.31%)	COST
82572 Other contract 50 50 825764 Secondary effects 50 50 825767 Construction Contingency 50 50 835767 Construction Contingency 50 50 835766 Demolition 50 50 835765 Landscaping 50 50 Total Construction 50 50 50 835755 Landscaping 50 50 Total Construction 50 50 50 835760 Permits 50 50 50 835760 Insurance 50 50 50 835200 Consultants - Architests, Engineers 50 50 50 835201 Consultants - Architests, Engineers 50 50 50 835201 Consultants - Architests, Engineers 50 50 50 835202 Consultants - Architests, Engineers 50 50 50 835725 Management fees-Capital Project 3.5% Project Management fee				A 4 000 000	* • 7 7 ••	* 4 007 700
58:5776 Secondary effects \$0 \$0 58:5767 Construction Contingency \$0 \$0 58:5765 Demoision \$0 \$0 58:5700 Insurance \$0 \$0 58:5720 Consultants: -stopsements \$0 \$0 58:5720 Legal fees \$0 \$0 58:5720 Sing fees/ Anage \$0 \$0 58:5720 Sing fees/ Anage \$0 \$0 58:5721 External Project Manager \$0 \$0 58:5721 External Project Manager						\$1,227,720
825777 Construction Contingency \$0 \$0 835762 Personations materials removal \$0 \$0 835763 Depreparation \$0 \$0 835764 Personation \$0 \$0 835768 Stepreparation \$0 \$0 835765 Landscaping \$0 \$0 70121 Landscaping \$0 \$0 835705 Issuance, Insurance \$0 \$0 PROFESSIONALFEES \$0 \$0 \$0 835201 Construction management test \$0 \$0 835202 Construction management test \$0 \$0 835204 Construction management test \$0 \$0 835720 Legal test \$0 \$0 835724 Legal test \$0 \$0 835725 Management test \$0 \$0 835724 Legal test \$0 \$0 835725 Management test \$0 \$0 835726						\$0
835762 Hazardous materials removal \$0 \$0 835765 Demolition \$0 \$0 835766 Site preparation \$0 \$0 50761 Demolition \$0 \$0 835768 Site preparation \$0 \$0 535755 Landscaping \$0 \$0 7041 Landscaping \$0 \$0 835700 Insurance \$0 \$0 835000 Construction management fees \$50,000 \$1,155 \$2 835200 Construction management fees \$0 \$0 \$0 \$0 835725 Menagement fees-Capital Project 3.5% Project Management fee \$0 \$0 \$0 835725 Site services 4 infrastructure \$0 \$0 \$0 \$0 835772 Tetal Professional fees \$0 \$0 \$0 \$0 \$0 835725 Infrastructure \$0 \$0 \$0 \$0 \$0 835725 Site services \$0		,				\$0
835765 Demolition \$0 \$0 357768 Site preparation \$0 \$1.22 ANDSCAPING \$0 \$1.22 835755 Landscaping \$0 \$0 7041 Landscaping \$0 \$0 \$0 70574 Site program \$0 \$0 70574 Site program \$0 \$0 70574 File promits, insurance \$0 \$0 7057 Total Pormits, insurance \$0 \$0 7057 Site provide insurance \$0 \$0 7057 Management fees \$0 \$0 835201 Consultants - disbustements \$0 \$0 835202 Consultants - disbustements \$0 \$0 835203 Consultants - disbustements \$0 \$0 835204 Consultants - disbustements \$0 \$0 83572 Management fees \$0 \$0 83572 Stagement fees \$0 \$0 835710 Moving<	835757	Construction Contingency			\$0	\$0
SISS780 Sile preparation S0 S0 Total Construction \$0 \$1.22 LANDSCAPING \$0 \$0 S35755 Landscaping \$0 \$0 Total Landscaping \$0 \$0 \$0 PERMITS, INSURANCE \$0 \$0 \$0 S35700 Insurance \$0 \$0 PROFESSIONAL FEES \$0 \$0 \$0 S35200 Consultants: -Architects, Engineers \$0 \$0 S35201 Consultants: -Architects, Engineers \$0 \$0 S35201 Consultants: -Architects, Engineers \$0 \$0 S35201 Consultants: Architects, Engineers \$0 \$0 S35202 Consultants: Architects, Engineers \$0 \$0 S35203 Consultants: Architects, Engineers \$0 \$0 S35204 Construction management fees \$0 \$0 S35720 Stesservices & infrastructure \$0 \$0 S35710 Management fees-Capital Projectd .5% Project Management fe	835762	Hazardous materials removal		\$0	\$0	\$0
Total Construction S122 LANDSCAPING \$0 \$122 S37575 Landscaping \$0 \$0 S3740 Insurance \$0 \$0 PERMITS, INSURANCE \$0 \$0 \$0 S36700 Insurance \$0 \$0 \$0 Total Permits \$0 \$0 \$0 \$0 S35200 Consultants - disbursements \$0 \$0 \$0 S35200 Consultants - disbursements \$0 \$0 \$0 S35204 Construction management fees \$0 \$0 \$0 S35204 Construction management fees \$0 \$0 \$0 S35720 External Professional fees \$0 \$0 \$0 S35720 Solid Total Professional fees \$0 \$0 \$0 S2720 Solign fees-In House \$0 \$0 \$0 \$0 S35720 Solid Total Professional fees \$0 \$0 \$0 \$0 \$0 \$0 <td< td=""><td>835765</td><td>Demolition</td><td></td><td>\$0</td><td>\$0</td><td>\$0</td></td<>	835765	Demolition		\$0	\$0	\$0
Total Construction \$1,22 LANDSCAPING \$0 \$1,22 B35755 Landscaping \$0 \$0 Total Landscaping \$0 \$0 \$0 PERMITS, INSURANCE \$0 \$0 \$0 835400 Permits \$0 \$0 \$0 836700 Insurance \$0 \$0 \$0 70tal Permits, insurance \$0 \$0 \$0 \$0 835200 Consultants - distruction management fees \$0 \$0 \$0 835204 Construction management fees \$0 \$0 \$0 835720 Legial fees \$0 \$0 \$0 835720 Legial fees \$0 \$0 \$0 835720 Legial fees \$0 \$0 \$0 835720 So filte services & infrastructure \$0 \$0 \$0 837720 Site services & cinfrastructure \$0 \$0 \$0 \$0 827110 Computer Viring & Telephones \$0	835768	Site preparation		\$0	\$0	\$0
LANDSCAPING \$0 \$0 387755 Landscaping \$0 \$0 70tal Landscaping \$0 \$0 \$0 835400 Permits \$0 \$0 836700 Insurance \$0 \$0 PROFESSIONAL FEES \$0 \$0 \$1,155 \$2 835200 Consultants -Architects, Engineers \$0 \$0 \$0 835201 Consultants -Architects, Engineers \$0 \$0 \$0 835201 Consultants - disbursements \$0 \$0 \$0 835720 Design fees- In House \$0 \$0 \$0 835721 External Project Manager \$0 \$0 \$0 835725 Management fees \$0 \$0 \$0 \$0 83775 Management fees \$0 \$0 \$0 \$0 83755 Management fees \$0 \$0 \$0 \$0 \$0 83750 Ste services & infrastructure \$0 \$0 \$0		Total Construction				\$1,227,720
83755 Landscaping \$0 \$0 Total Landscaping \$0 \$0 PERMITS, INSURANCE \$0 \$0 835400 Permits \$0 \$0 S05700 Insurance \$0 \$0 POFESSIONAL FEES \$0 \$1,155 \$2 835200 Consultants - disbursements \$0 \$0 835201 Consultants - disbursements \$0 \$0 835204 Construction management fees \$0 \$0 835204 Construction management fees \$0 \$0 835210 Legal fees \$0 \$0 835720 Design fees-In House \$0 \$0 835721 External Project Management fees \$0 \$0 835721 External Project Management fees \$0 \$0 835720 Design fees-In House \$0 \$0 835720 Stell services & Capital Project 3.5% Project Management fee \$42,000 \$0 COMPUTER WIRING AND TELEPHONES \$0 \$0 \$0 S0101 Telephone \$0 \$0 \$0 Total Computer Wiring & Telephones \$0 \$0 \$0 Total Moving and Staging \$0 \$0 \$0 <td>LANDSC/</td> <td></td> <td></td> <td></td> <td></td> <td>÷ , , -</td>	LANDSC/					÷ , , -
Total Landscaping Total Landscaping PERMITS, INSURANCE \$0 835400 Permits 835400 Insurance PROFESSIONAL FEES \$0 835200 Consultants: Architects, Engineers \$50,000 835201 Consultants: Architects, Engineers \$50,000 835202 Consultants: Architects, Engineers \$50,000 835204 Consultants: Architects, Engineers \$50,000 835205 Other consultants \$50,000 835205 Design fees-In House \$50,000 835725 Management fees-Capital Project 3.5% Project Management fee \$42,000 ST210 Leagl reads \$50 835705 Site services \$50 COMPUTER WIRING AND TELEPHONES \$50 837100 Stelephone \$50 Total Moving and Staging \$50 Total Moving and Staging \$50 Total Moving and Staging \$50 S0710 Felephonet \$50 S0710 Felephonet \$50 S0 <t< td=""><td></td><td></td><td></td><td>\$0</td><td>\$0</td><td>\$0</td></t<>				\$0	\$0	\$0
PERMITS, INSURANCE S0 S0 836400 Permits S0 S0 836700 Insurance S0 S0 PROFESSIONAL FEES S0,000 \$11,155 S2 835200 Consultants - idsbursements S0 S0 835204 Construction management fees S0 S0 835204 Construction management fees S0 S0 835700 Design fees-In House S0 S0 835721 External Project Manager S0 S0 835725 Management fees-Capital Project 3.5% Project Management fee \$42,000 S0 835702 Stesprices S0 S0 S0 835703 Stesprices S0 S0 S0 S2700 Stesprices S0 S0 S0 S3710 Moring Infrastructure S0 S0 S0 S37100 Noring S0 S0 S0 S0 S37100 Moving and Staging S0 S0 S0	000100	1 5		ψũ	ΨŬ	\$0
835400 Permits \$0 \$0 PROFESSIONAL FEES \$0 \$0 \$0 836700 Insurance \$0 \$0 \$0 PROFESSIONAL FEES \$0 \$0 \$0 \$0 835200 Consultants: -Architects, Engineers \$0 \$0 \$0 835201 Consultants: -Architects, Engineers \$0 \$0 \$0 835202 Design fees-In House \$0 \$0 \$0 \$0 835720 Design fees-In House \$0 \$0 \$0 \$0 \$0 835720 Design fees-In House \$0 \$0 \$0 \$0 \$0 835721 External Project Management fees \$0	DEDMITE					ψυ
S83F00 Insurance \$0 \$0 PROFESSIONAL FEES \$50,000 \$1,155 \$52 835200 Consultants - dichitexts, Engineers \$0 \$0 835204 Construction management fees \$0 \$0 835204 Construction management fees \$0 \$0 835204 Construction management fees \$0 \$0 835204 Cense on thouse \$0 \$0 835710 Legal fees \$0 \$0 835720 Design fees-In House \$0 \$0 835705 Ste services & Infrastructure \$0 \$0 835700 Ste services & Infrastructure \$0 \$0 837100 Noring \$0 \$0 837100 Noring and Staging \$0 \$0 837101 Staging \$0 \$0 821101 Call Moving and Staging \$0 \$0 821101 Staging \$0 \$0 821101 Staging \$0 \$0 <		,		¢o	¢o	¢o
Total Permits, Insurance Total Permits, Insurance B35200 Consultants: Architects, Engineers \$50,000 \$1,155 \$52 835201 Consultants: Architects, Engineers \$0 \$0 \$0 835201 Consultants: Architects, Engineers \$0 \$0 \$0 835202 Consultants: Architects, Engineers \$0 \$0 \$0 835204 Consultants: Architects, Engineers \$0 \$0 \$0 835205 Legal fees \$0 \$0 \$0 835720 Design fees-In House \$0 \$0 \$0 835700 Site services & Infrastructure \$0 \$0 \$0 Total Professional fees \$0 \$0 \$0 \$0 Soloto Ste services \$0 \$0 \$0 \$0 Total Portessional fees \$0 \$0 \$0 \$0 \$0 Soloto Ste services \$0 \$0 \$0 \$0 Soloto Tetal Portestinal Project Nanagement fee \$0 \$0 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td>\$0</td>						\$0
PROFESSIONAL FEES \$50,000 \$11,155 335200 Consultants - Architects, Engineers \$50,000 \$11,155 335204 Construction management fees \$0 \$0 335204 Construction management fees \$0 \$0 335204 Construction management fees \$0 \$0 335201 Legal fees \$0 \$0 335720 Design fees-In House \$0 \$0 335721 External Project Manager \$0 \$0 33725 Management fees-Capital Project 3.5% Project Management fee \$42,000 \$0 35700 Site services & Infrastructure \$0 \$0 35710 Site services & Infrastructure \$0 \$0 35010 Telephone \$0 \$0 Total Computer Wiring & Telephones \$0 \$0 Total Moving \$0 \$0 \$0 37100 Moving \$0 \$0 \$0 321500 Yor calastrooms \$0 \$0 21501 AY for clas	836700			\$0	\$0	\$0
B35200 Consultants: -Architeds, Engineers \$50,000 \$1,155 \$2 B35201 Consultants: -disbursements \$30 \$0 \$0 B35204 Construction management fees \$0 \$0 \$0 B35205 Other consultants \$0 \$0 \$0 B35204 Construction management fees \$0 \$0 \$0 B35205 Legal fees \$0 \$0 \$0 \$0 B35720 Design fees-In House \$0 \$0 \$0 \$0 B35705 Management fees-Capital Project 3.5% Project Management fee \$42,000 \$0 \$2 Total Professional fees \$0 \$0 \$0 \$0 \$0 STO Site services & infrastructure \$0 \$0 \$0 \$0 \$0 Total Computer infrastructure \$0 <td< td=""><td></td><td></td><td></td><td></td><td></td><td>\$0</td></td<>						\$0
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835300 Finance Costs \$0 \$0						\$122,772
				A -	* -	. -
Total Finance Costs	835300			\$0	\$0	\$0
		Total Finance Costs				\$0
TOTAL PROJECT COST: \$1,47			TOTAL PROJECT COST:			\$1,474,109

835752 (835754 (835757 (835762) 835765 [835768 (335768 (1 835768 (1 835755) PERMITS, I 835400] 836700]	ITEM CTION Main contract Other contract Secondary effects Construction Contingency Hazardous materials removal Demolition Site preparation Total Construction	U OF T PROJECT NO: REMARKS	BASE COST \$430,000 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0	GST(2.31%) \$9,933 \$0 \$0 \$0 \$0 \$0 \$0 \$0	COST \$439,933 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$0 \$439,933
CONSTRUC 835730 I 835752 G 835752 G 835752 G 835754 S 835755 I 835768 S 835768 S 835768 S 835768 S PERMISS I 835755 I 835700 I 836700 I PROFESSIO I	CTION Main contract Other contract Secondary effects Construction Contingency Hazardous materials removal Demolition Site preparation Total Construction PING Landscaping Total Landscaping INSURANCE Permits		\$430,000 \$0 \$0 \$0 \$0 \$0 \$0	\$9,933 \$0 \$0 \$0 \$0 \$0 \$0	\$439,933 \$0 \$0 \$0 \$0 \$0 \$0 \$0
835730 1 835752 0 835754 5 835757 0 835762 1 835765 1 835768 5 LANDSCAF 835755 1 835755 1 835755 1 835400 1 836700 1 9 PROFESSI	Main contract Other contract Secondary effects Construction Contingency Hazardous materials removal Demolition Site preparation Total Construction PING Landscaping Total Landscaping INSURANCE Permits		\$0 \$0 \$0 \$0 \$0 \$0	\$0 \$0 \$0 \$0 \$0 \$0	\$0 \$0 \$0 \$0 \$0 \$0 \$0
835752 (835754 (835757 (835762) 835765 [835768 (335768 (1 835768 (1 835755) PERMITS, I 835400] 836700]	Other contract Secondary effects Construction Contingency Hazardous materials removal Demolition Site preparation Total Construction PING Landscaping Total Landscaping INSURANCE Permits		\$0 \$0 \$0 \$0 \$0 \$0	\$0 \$0 \$0 \$0 \$0 \$0	\$0 \$0 \$0 \$0 \$0 \$0 \$0
835754 \$ 835757 0 835762 835765 835768 \$ 	Secondary effects Construction Contingency Hazardous materials removal Demolition Site preparation Total Construction PING Landscaping Total Landscaping INSURANCE Permits		\$0 \$0 \$0 \$0 \$0	\$0 \$0 \$0 \$0 \$0	\$0 \$0 \$0 \$0 \$0 \$0
835757 (835762 835765 835768 (1 835768 (1 835755 9 PERMITS, I 835400 836700 9 PROFESSI	Construction Contingency Hazardous materials removal Demolition Site preparation Total Construction PING Landscaping Total Landscaping INSURANCE Permits		\$0 \$0 \$0 \$0	\$0 \$0 \$0 \$0	\$0 \$0 \$0 \$0
835762 835765 835768 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Hazardous materials removal Demolition Site preparation Total Construction PING Landscaping Total Landscaping INSURANCE Permits		\$0 \$0 \$0	\$0 \$0 \$0	\$0 \$0 \$0
835765 835768 	Demolition Site preparation Total Construction PING Landscaping Total Landscaping INSURANCE Permits		\$0 \$0	\$0 \$0	\$0 \$0
835768 - LANDSCAF 835755 PERMITS, I 835400 836700 PROFESSI	Site preparation Total Construction PING Landscaping Total Landscaping INSURANCE Permits		\$0	\$0	\$0
LANDSCAF 835755 PERMITS, I 835400 836700 PROFESSI	Total Construction PING Landscaping Total Landscaping INSURANCE Permits				
LANDSCAF 835755 PERMITS, I 835400 836700 PROFESSI	PING Landscaping Total Landscaping INSURANCE Permits		\$0	¢0	\$439,933
LANDSCAF 835755 PERMITS, I 835400 836700 PROFESSI	PING Landscaping Total Landscaping INSURANCE Permits		\$0	¢n	
PERMITS, I 835400 I 836700 I PROFESSI	Total Landscaping INSURANCE Permits		\$0	¢0	
PERMITS, I 835400 I 836700 I PROFESSI	Total Landscaping INSURANCE Permits		ψũ		\$0
PERMITS, I 835400 F 836700 F PROFESSI	INSURANCE Permits			+-	\$0
835400 F 836700 F PROFESSI	Permits				φ0
836700 - PROFESSI			\$0	\$0	\$0
- PROFESSI	Insurance				
PROFESSI			\$0	\$0	\$0
	Total Permits, Insurance				\$0
835200 4					
	Consultants: -Architects, Enginee	rs	\$40,000	\$924	\$40,924
835201 (Consultants - disbursements		\$0	\$0	\$0
835204 0	Construction management fees		\$0	\$0	\$0
835206 (Other consultants		\$0	\$0	\$0
	Legal fees		\$0	\$0	\$0
	Design fees-In House		\$0	\$0	\$0
	External Project Manager		\$0 \$0	\$0	\$0 \$0
	Management fees-Capital Project	2 E% Project Management fee	\$15,050	\$0 \$0	
		5.5% Project Management lee	φ15,050	φU	\$15,050
	Total Professional fees				\$55,974
SERVICES					
	Site services & infrastructure		\$0	\$0	\$0
	Total Site Services				\$0
COMPUTER	R WIRING AND TELEPHONES				
821110 (Computer infrastructure		\$0	\$0	\$0
835010	Telephone		\$0	\$0	\$0
	Total Computer Wiring & Telepl	hones			\$0
	ND STAGING				
	Moving		\$0	\$0	\$0
	Staging		\$0 \$0	\$0 \$0	\$0 \$0
	Total Moving and Staging		φU	φυ	\$0 \$0
					Φ 0
			\$ 0	\$ 0	^
	Furnishings		\$0	\$0	\$0
821010 E	Equipment		\$0	\$0	\$0
	AV for classrooms		\$0	\$0	\$0
821610	Scientific Equipment	GST is not applicable	\$0	\$0	\$0
-	Total Furnishings and Equipme	ent			\$0
OTHER					
	Signage-Interior		\$0	\$0	\$0
	Security & Access systems		\$0	\$0	\$0
	Courier, misc.		\$0 \$0	\$0	\$0
	Signage-Exterior		\$0 \$0	\$0 \$0	\$0 \$0
		Not in contract expenses			
		Not-in-contract expenses	\$20,000	\$462	\$20,462
	Ceremonies	Ground breaking, Top off, Grand opening	\$0	\$0	\$0
	Advertising		\$0	\$0	\$0
	Donor recognition		\$0	\$0	\$0
890670 l	U of T Trades	\$10,000 per chiller project	\$10,000	\$0	\$10,000
1 -	Total Other				\$30,462
[SUB TOTAL			\$526,369
PROJECT (CONTINGENCY				
	Project Contingency	10%	\$43,000	\$993	\$43,993
	Total Project Contingency	1070	φ 10,000	φ000	\$43,993
FINANCE C					φ 4 0,993
			* ~	\$ \$	* ~
	Finance Costs		\$0	\$0	\$0
ļ	Total Finance Costs				\$0
ĺ					
L		TOTAL PROJECT COST:			\$570,362

835752 835754 835757 835762 835765 835768 LANDSCA 835755 PERMITS,	ITEM	U OF T PROJECT NO: REMARKS	BASE COST \$795,838 \$0	GST(2.31%) \$18,384	COST \$814,222
CONSTRU 835730 835752 835754 835757 835762 835765 835768 LANDSCA 835755 PERMITS,	CTION Main contract Other contract Secondary effects Construction Contingency Hazardous materials removal Demolition Site preparation	REMARKS	\$795,838		
835730 835752 835754 835757 835762 835765 835768 LANDSCA 835755 PERMITS,	Main contract Other contract Secondary effects Construction Contingency Hazardous materials removal Demolition Site preparation			\$18,384	\$814 222
835752 835754 835757 835762 835765 835768 LANDSCA 835755 PERMITS,	Other contract Secondary effects Construction Contingency Hazardous materials removal Demolition Site preparation			\$18,384	\$814 222
835754 835757 835762 835765 835768 LANDSCA 835755 PERMITS,	Secondary effects Construction Contingency Hazardous materials removal Demolition Site preparation		\$0	* -	
835757 835762 835765 835768 LANDSCA 835755 PERMITS,	Construction Contingency Hazardous materials removal Demolition Site preparation			\$0	\$0
835762 835765 835768 LANDSCA 835755 PERMITS,	Hazardous materials removal Demolition Site preparation		\$0	\$0	\$0
835765 835768 LANDSCA 835755 PERMITS,	Demolition Site preparation		\$0	\$0	\$0
835768 LANDSCA 835755 PERMITS,	Site preparation		\$0	\$0	\$0
LANDSCA 835755 PERMITS,			\$0	\$0	\$0
LANDSCA 835755 PERMITS,			\$0	\$0	\$0
LANDSCA 835755 PERMITS,					\$814,222
835755 PERMITS,					+- 1
PERMITS,	Landscaping		\$0	\$0	\$0
PERMITS,	Total Landscaping		ψũ	\$°	\$0
					φυ
	Permits		\$0	\$0	\$0
	Insurance		\$0	\$0	\$0
	Total Permits, Insurance				\$0
	ONAL FEES				
	Consultants: -Architects, Engineer	rs	\$45,000	\$1,040	\$46,040
	Consultants - disbursements		\$0	\$0	\$0
835204	Construction management fees		\$0	\$0	\$0
	Other consultants		\$0	\$0	\$0
835210	Legal fees		\$0	\$0	\$0
	Design fees-In House		\$0	\$0	\$0
	External Project Manager		\$0	\$0	\$0
	Management fees-Capital Project	3.5% Project Management fee	\$27,854	\$0 \$0	\$27,854
	Total Professional fees	5.5 % Troject Management lee	ψ27,004	ψυ	\$73,894
SERVICES					\$13,094
			\$ 0	\$ 0	\$ 2
	Site services & infrastructure		\$0	\$0	\$0
	Total Site Services				\$0
	R WIRING AND TELEPHONES				
	Computer infrastructure		\$0	\$0	\$0
835010	Telephone		\$0	\$0	\$0
	Total Computer Wiring & Telepl	nones			\$0
MOVING A	ND STAGING				
837100	Moving		\$0	\$0	\$0
837101	Staging		\$0	\$0	\$0
	Total Moving and Staging		• -		\$0
	NGS AND EQUIPMENT				
	Furnishings		\$0	\$0	\$0
	0		\$0 \$0	\$0 \$0	\$0 \$0
	Equipment				
	AV for classrooms		\$0	\$0	\$0
		GST is not applicable	\$0	\$0	\$0
	Total Furnishings and Equipme	nt			\$0
OTHER					
	Signage-Interior		\$0	\$0	\$0
	Security & Access systems		\$0	\$0	\$0
835070	Courier, misc.		\$0	\$0	\$0
835756	Signage-Exterior		\$0	\$0	\$0
		Not-in-contract expenses	\$20,000	\$462	\$20,462
	Ceremonies	Ground breaking, Top off, Grand opening	\$0	\$0	\$0
	Advertising		\$0 \$0	\$0 \$0	\$0
	Donor recognition		\$0 \$0	\$0 \$0	\$0 \$0
	-	\$10,000 per chiller project		\$0 \$0	
		\$10,000 per chiller project	\$10,000	\$U	\$10,000
	Total Other				\$30,462
		SUB TOTAL			\$918,578
	CONTINGENCY				
	Project Contingency	10%	\$79,584	\$1,838	\$81,422
'	Total Project Contingency				\$81,422
FINANCE (COSTS				
	Finance Costs		\$0	\$0	\$0
	Total Finance Costs		÷ -	* ²	\$0
	*				
		TOTAL PROJECT COST:			\$1,000,000
					ψ1,000,000

Approved by: Date: Appendix C: Financial forecasts for three cases

January 5, 2005 T-8 Lighting Retrofit and Chiller Replacement Financial Projection - BASE CASE

Loan Amount Annual Interest Rate Loan Period in Years Number of Payments Monthly Payment Annual Payment Total Interest Total Cost of Loan	10,484,387 8.0% 15 180 100,194 1,202,331 7,550,580 18,034,967	-	923,844 (3,049,086) (5,676,241) 10,484,387	Total Capital Cc Total T-Bill Fina Energy Savings Total Funding a Total Loan Am	ncing Charges Years 1 - 3 nd Grants																							
	1 2006	2 2007	3 2008	4 2009	5 2010	6 2011	7 2012	8 2013	9 2014	10 2015	11 2016	12 2017	13 2018	14 2019	15 2020	16 2021	17 2022	18 2023	19 2024	20 2025	21 2026	22 2027	23 2028	24 2029	25 2030	26 2031	27 2032	28 2033
Electricity Rate Inflation	-	20.2%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
SOURCES and ENERGY SAVINGS <u>Funding and Grants</u> FRP Contribution 3 City of Toronto BBP Loan Contribution 3 Toronto Hydro Funding Grant 1 NRCan Funding Incentive 1 Total Funding and Grants	2,000,000 2,742,881 341,680 125,000 5,209,561	- - - -	- 341,680 125,000 466,680	- - - -	- - - -	- - - -	- - - - -	- - - -	- - - - -	- - - -	- - - - -																	
Energy Cost Savings Annual T-8 Lighting Retrofit Energy Savings kWh Annual Chilled Water Upgrade Energy Savings kWh Total Energy Savings kWh 2		- -	-	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,261 3,054,000 11,976,261	8,922,262 3,054,000 11,976,262	3,054,000	8,922,262 3,054,000 11,976,262	8,922,262 3,054,000 11,976,262
Forecasted Average CED Rate \$/kWh	0.087	0.104	0.107	0.109 969,881	0.111 989,279	0.113 1,009,064	0.115 1,029,246	0.118 1,049,830	0.120 1,070,827	0.122 1,092,244	0.125 1,114,088	0.127 1,136,370	0.130 1,159,098	0.133 1,182,280	0.135 1,205,925	0.138 1,230,044	0.141 1,254,645	0.143 1,279,737	0.146 1,305,332	0.149 1,331,439	0.152 1,358,068	0.155 1,385,229	0.158 1,412,934	0.162 1,441,192	0.165 1,470,016	0.168 1,499,417	0.171 1,529,405	0.175 1,559,993
Annual T-8 Lighting Retrofit Energy Cost Savings Annual Chilled Water Upgrade Energy Cost Savings		-	-	331,981	338,620	345,393	352,300	359,346	366,533	373,864	381,341	388,968	396,747	404,682	412,776	421,032	429,452	438,041	446,802	455,738	464,853	474,150	483,633	493,306	503,172	513,235	523,500	533,970
Total Energy Cost Savings	-	-	-	1,301,862	1,327,899	1,354,457	1,381,546	1,409,177	1,437,360	1,466,108	1,495,430	1,525,338	1,555,845	1,586,962	1,618,701	1,651,075	1,684,097	1,717,779	1,752,134	1,787,177	1,822,920	1,859,379	1,896,566	1,934,498	1,973,188	2,012,652	2,052,905	2,093,963
TOTAL SOURCES AND ENERGY SAVINGS	5,209,561	-	466,680	1,301,862	1,327,899	1,354,457	1,381,546	1,409,177	1,437,360	1,466,108	1,495,430	1,525,338	1,555,845	1,586,962	1,618,701	1,651,075	1,684,097	1,717,779	1,752,134	1,787,177	1,822,920	1,859,379	1,896,566	1,934,498	1,973,188	2,012,652	2,052,905	2,093,963
EXPENSES																												
Annual Loan Payments Annual Principal	_		-	377,212	408,521	442,428	479,149	518,918	561,988	608,633	659,149	713,858	773,108	837,275	906,769	982,030	1,063,538	1,151,811						_	-	-	-	_
Annual Interest	-	-	-	825,119	793,811	759,903	723,182	683,413	640,343	593,698	543,182	488,473	429,223	365,056	295,562	220,301	138,793	50,520	-	-	-	-	-		-	-	-	
Total Annual Internal Loan Payment Annual City of Toronto BBP Loan Payment 3	- 274,288	- 274,288	- 274,288	1,202,331 274,288	1,202,331 274,288	1,202,331 274,288	1, 202,331 274,288	1,202,331 274,288	1, 202,331 274,288	1,202,331 274,288	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	-	-	-	-	-	-	-	-	-	-
TOTAL ANNUAL LOAN PAYMENT	274,288	274,288	274,288	1,476,619	1,476,619	1,476,619		1,476,619	1,476,619	1,476,619	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	-	-	-	-	-	<u> </u>	-	-	-	
T-8 Lighting Retrofit Capital Costs																												
Robarts T-8 Medical Sciences T-8	2,307,951 1,230,903	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OISE T-8 Subtotal T-8 Capital Costs	3,538,854	825,536 825,536	-	-		-		-		-				-	-							-			-	-	-	
Chilled Water Systems Capital Costs OISE Chiller Replacement RWright / Ssmith Interconnect NWCP Chiller Replacements Lmiller / Physics to BCIT New Chiller/Interconnect	1,716,517 - - -	- 3,601,649 1,909,263 2,412,668	- - -	-	- - -	- - -	- - -			- - -	- - -	- - -	- - -		- - -	-		- - -	- - -	- - -								
W. Stevens Chiller Replacement ESC Chiller Replacement Bora Laskin Chiller Replacement Dentistry	-	- - -	1,236,912 1,474,109 570,362 1,000,000	-	-	-	-	-	:	-	-	-	-	-	-	-	-	-	-	-	-	-	-	:	-	-	-	-
Subtotal Chilled Water Capital Costs	1,716,517	7,923,580	4,281,383	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	5,255,371	8,749,116		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-
TOTAL EXPENSES	5,529,659	9,023,404	4,555,671	1,476,619	1,476,619	1,476,619	1,476,619	1,476,619	1,476,619	1,476,619	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	-	-	-	-	-	-	-	-	-	
				(174,758)				(67,442)	(**)=**/	(10,512)		323,007	353,514	384,631	416,370	448,744			.,	1,787,177	.,	1,859,379	.,	1,934,498	.,,	_,,	_,,	_,,
Cumulative Cashflow	(320,099)	(9,343,503)	(13,432,494)	(174,758)	(323,478)	(445,641)	(540,714)	(608,156)	(647,415)	(657,927)	(364,828)	(41,821)	311,693	696,324	1,112,694	1,561,438	2,043,203	2,558,651	4,310,785	6,097,962	7,920,883	9,780,261	11,676,828	13,611,326	15,584,513	17,597,165	19,650,070	21,744,033
T-Bill Financing Charges @ 4.0%	12,804	373,740	537,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL PROJECTS IRR TOTAL PROJECTS NPV	7.52% -675,124	Note 4			NOTE 1: Toronto H NOTE 2:	lydro Funding (Grant and NRCa	n Incentive Fur	iding based on	50% funded at	project comple	tion and 50% a	fter verified res	ults.														
CHILLER PROJECTS IRR	24.19% 6,997,770 -1.27% -7,672,894	Note 4 Note 4			Annual er NOTE 3: BBP Loar NOTE 4:	n Repayment b	based on revised	total project co	st repaid over 10	0 years with no				D and														
							tions based on f In the case for th																					

 Annual T-8 Lighting Retrofit Energy Savings kWh
 6,850,466
 8,922,261
 8,922,261

 Annual Chilled Water Upgrade Energy Savings kWh
 360,000
 2,046,000
 3,054,000

 Total Energy Savings kWh
 2
 7,210,466
 10,968,261
 11,976,261

 Forecasted Average CED Rate \$/kWh
 0.087
 0.104
 0.107
 Annual T-8 Lighting Retrofit Energy Cost Savings Annual Chilled Water Upgrade Energy Cost Savings Total Energy Cost Savings Cumulative Energy Cost Savings 595,469 31,293 **626,761 626,761** 932,219950,864213,771325,4711,145,9901,276,3351,772,7523,049,086 electrical cost savings. In the case for the T-8 and Chiller Projects, the non-return funding for each project is prorated by capital cost.

. . .

January 5, 2005 T-8 Lighting Retrofit and Chiller Replacement Financial Projection - CASE #1

Loan Amount Annual Interest Rate Loan Period in Years Number of Payments Monthly Payment Annual Payment Total Interest Total Cost of Loan	14,564,442 8.0% 15 180 100,194 1,202,331 7,550,580 18,034,967	· ·	1,327,658 (3,049,086) (2,000,000)	Total Capital C Total T-Bill Fina Energy Savings Total Funding a Total Loan An	ancing Charges s Years 1 - 3 and Grants																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Electricity Rate Inflation	2006	2007 20.2%	2008 2.0%	2009	2010 2.0%	2011 2.0%	2012 2.0%	2013 2.0%	2014	2015 2.0%	2016 2.0%	2017 2.0%	2018	2019 2.0%	2020 2.0%	2021 2.0%	2022	2023 2.0%	2024 2.0%	2025 2.0%	2026 2.0%	2027 2.0%	2028	2029 2.0%	2030 2.0%	2031 2.0%	2032 2.0%	2033 2.0%
SOURCES and ENERGY SAVINGS																												
Funding and Grants FRP Contribution	2,000,000	-	-	-	-	-		-	-		-	-			-	-	-	-	-	-	-	-		-			-	-
City of Toronto BBP Loan Contribution 3 Toronto Hydro Funding Grant 1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NRCan Funding Incentive 1 Total Funding and Grants	2,000,000		-		-	-	-	-			-		-		-						-	-	-		-			
Energy Cost Savings																												
Annual T-8 Lighting Retrofit Energy Savings kWh Annual Chilled Water Upgrade Energy Savings kWh	-	-	-	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,261 3,054,000	8,922,262 3,054,000	8,922,262 3,054,000	8,922,262 3,054,000	8,922,262 3,054,000
Total Energy Savings kWh	2 -	-	-	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,262		11,976,262	11,976,262
Forecasted Average CED Rate \$/kWh	0.087	0.104	0.107	0.109	0.111	0.113	0.115	0.118	0.120	0.122	0.125	0.127	0.130	0.133	0.135	0.138	0.141	0.143	0.146	0.149	0.152	0.155	0.158	0.162	0.165	0.168	0.171	0.175
Annual T-8 Lighting Retrofit Energy Cost Savings Annual Chilled Water Upgrade Energy Cost Savings Total Energy Cost Savings			-	969,881 331,981 1,301,862	989,279 338,620 1,327,899	1,009,064 345,393 1,354,457	1,029,246 352,300 1,381,546	1,049,830 359,346 1,409,177	1,070,827 366,533 1,437,360	1,092,244 373,864 1,466,108	1,114,088 <u>381,341</u> 1,495,430	1,136,370 388,968 1,525,338	1,159,098 396,747 1,555,845	1,182,280 404,682 1,586,962	1,205,925 412,776 1,618,701	1,230,044 421,032 1,651,075	1,254,645 429,452 1,684,097	1,279,737 438,041 1,717,779	1,305,332 446,802 1,752,134	1,331,439 455,738 1,787,177	1,358,068 464,853 1,822,920	1,385,229 474,150 1,859,379	1,412,934 483,633 1,896,566	1,441,192 493,306 1,934,498	1,470,016 503,172 1,973,188	1,499,417 513,235 2,012,652	1,529,405 523,500 2,052,905	1,559,993 533,970 2,093,963
TOTAL SOURCES AND ENERGY SAVINGS	2,000,000		-	1,301,862		1,354,457	1,381,546	1,409,177	1,437,360	1,466,108		1,525,338		1,586,962		1,651,075	1,684,097	1,717,779			1,822,920	1,859,379	1,896,566	1,934,498		2.012.652		
	2,000,000		_	1,301,002	1,327,033	1,334,437	1,301,340	1,403,177	1,457,500	1,400,100	1,433,430	1,020,000	1,555,045	1,500,302	1,010,701	1,031,073	1,004,037	1,711,713	1,752,154	1,707,177	1,022,920	1,000,010	1,030,000	1,334,430	1,373,100	2,012,032	2,032,903	2,033,303
EXPENSES Annual Loan Payments																												
Annual Principal	-	-	-	377,212		442,428	479,149	518,918	561,988	608,633	659,149	713,858	773,108	837,275	906,769	982,030	1,063,538	1,151,811	-	-	-	-		-	-	-	-	-
Annual Interest Total Annual Internal Loan Payment		-	-	825,119 1,202,331	793,811 1,202,331	759,903 1,202,331	723,182 1,202,331	683,413 1,202,331	640,343 1,202,331	593,698 1,202,331	543,182 1,202,331	488,473 1,202,331	429,223 1,202,331	365,056 1,202,331	295,562 1,202,331	220,301 1,202,331	138,793 1,202,331	50,520 1,202,331	-	-	-	-		-	-	-	-	<u> </u>
Annual City of Toronto BBP Loan Payment 3	3 274,288	274,288	274,288	274,288	274,288	274,288	274,288	274,288	274,288	274,288	-		-	-	-	-	-	-	-	-	-	-						
TOTAL ANNUAL LOAN PAYMENT	274,288	274,288	274,288	1,476,619	1,476,619	1,476,619	1,476,619	1,476,619	1,476,619	1,476,619	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	-	-	-	-	-	-	-	-	-	
T-8 Lighting Retrofit Capital Costs Robarts T-8	2,307,951	-							_	_																		_
Medical Sciences T-8	1,230,903	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OISE T-8 Subtotal T-8 Capital Costs	3,538,854	825,536 825,536	-	-	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chilled Water Systems Capital Costs																												
OISE Chiller Replacement RWright / Ssmith Interconnect	1,716,517	- 3,601,649	-			-		-		-				-	-	-	-	-	-	-	-	-		-		-		
NWCP Chiller Replacements Lmiller / Physics to BCIT New Chiller/Interconnect	-	1,909,263 2,412,668	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W. Stevens Chiller Replacement	-	-	1,236,912	-		-	-	-		-	-		-	-	-	-	-	-	-	-	-	-		-	-	-	-	-
ESC Chiller Replacement Bora Laskin Chiller Replacement	-	-	1,474,109 570,362	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dentistry	-	-	1,000,000																									
Subtotal Chilled Water Capital Costs	1,716,517			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CAPITAL COSTS	5,255,371	8,749,116	4,281,383	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL EXPENSES	5,529,659	9,023,404	4,555,671	1,476,619	1,476,619	1,476,619	1,476,619	1,476,619	1,476,619	1,476,619	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	-	-	-	-	-	-	-	-	-	<u> </u>
CASHFLOW	(3,529,659)) (9,023,404)	(4,555,671)	(174,758)	(148,720)	(122,162)	(95,073)	(67,442)	(39,259)	(10,512)	293,099	323,007	353,514	384,631	416,370	448,744	481,766	515,448	1,752,134	1,787,177	1,822,920	1,859,379	1,896,566	1,934,498	1,973,188	2,012,652	2,052,905	2,093,963
Cumulative Cashflow	(3,529,659)) (12,553,063)	(17,108,734)	(174,758)	(323,478)	(445,641)	(540,714)	(608,156)	(647,415)	(657,927)	(364,828)	(41,821)	311,693	696,324	1,112,694	1,561,438	2,043,203	2,558,651	4,310,785	6,097,962	7,920,883	9,780,261	11,676,828	13,611,326	15,584,513	17,597,165	19,650,070	21,744,033
T-Bill Financing Charges @ 4.0% TOTAL PROJECTS IRR	141,186 7.03%	-	684,349	-	- NOTE 1:	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL PROJECTS NPV	-1,418,251	-			Toronto H NOTE 2:	, ,	Grant and NRCa	an Incentive Fur	nding based on	50% funded a	t project comple	ation and 50% a	after verified res	ults.														
T-8 PROJECTS IRR T-8 PROJECTS NPV	23.39% 6,820,404						ased on revised	l October imple	mentation proje	ect schedule.																		
CHILLER PROJECTS IRR CHILLER PROJECTS NPV	-1.66% -8,238,654						ased on 15% of	total project co			o interest.	non roture for	ding grapts	Pond														

All IRR and NPV calculations based on first year 2006 going forward for 25 years. Cashflow includes non-return funding grants, FRP and electrical cost savings. In the case for the T-8 and Chiller Projects, the non-return funding for each project is prorated by capital cost.

Annual T-8 Lighting Retrofit Energy Savings kWh	6,850,466	8,922,261	8,922,261
Annual Chilled Water Upgrade Energy Savings kWh	360,000	2,046,000	3,054,000
Total Energy Savings kWh 2	7,210,466	10,968,261	11,976,261
Forecasted Average CED Rate \$/kWh	0.087	0.104	0.107
Annual T-8 Lighting Retrofit Energy Cost Savings	595,469	932,219	950,864
Annual Chilled Water Upgrade Energy Cost Savings	31,293	213,771	325,471
Total Energy Cost Savings	626,761	1,145,990	1,276,335
Cumulative Energy Cost Savings	626,761	1,772,752	3,049,086

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January 5, 2005 T-8 Lighting Retrofit and Chiller Replacement Financial Projection - CASE #2

Loan Amount Annual Interest Rate Loan Period in Years Number of Payments Monthly Payment Annual Payment Total Interest Total Cost of Loan	10,851,162 8.0% 15 180 100,194 1,202,331 7,550,580 18,034,967	-	923,844 (2,682,312) (5,676,241)	Total Capital Co Total T-Bill Fina Energy Savings Total Funding a Total Loan Am	ncing Charges Years 1 - 3 nd Grants																							
	1 2006	2 2007	3 2008	4 2009	5 2010	6 2011	7 2012	8 2013	9 2014	10 2015	11 2016	12 2017	13 2018	14 2019	15 2020	16 2021	17 2022	18 2023	19 2024	20 2025	21 2026	22 2027	23 2028	24 2029	25 2030	26 2031	27 2032	28 2033
Electricity Rate Inflation	-	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
SOURCES and ENERGY SAVINGS																												
Funding and Grants																												
FRP Contribution City of Toronto BBP Loan Contribution 3	2,000,000 2,742,881	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toronto Hydro Funding Grant 1 NRCan Funding Incentive 1	341,680 125,000	-	341,680 125,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Funding and Grants	5,209,561	-	466,680	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Energy Cost Savings																												
Annual T-8 Lighting Retrofit Energy Savings kWh Annual Chilled Water Upgrade Energy Savings kWh	-	-	-	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,261 3.054.000	8,922,262 3.054.000	8,922,262 3.054.000	8,922,262 3.054.000	8,922,262 3.054.000
Total Energy Savings kWh 2	-	-	-	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,261	11,976,262		11,976,262	11,976,262
Forecasted Average CED Rate \$/kWh	0.087	0.089	0.090	0.092	0.094	0.096	0.098	0.100	0.102	0.104	0.106	0.108	0.110	0.112	0.115	0.117	0.119	0.122	0.124	0.127	0.129	0.132	0.134	0.137	0.140	0.143	0.145	0.148
Annual T-8 Lighting Retrofit Energy Cost Savings Annual Chilled Water Upgrade Energy Cost Savings		-	-	823,027 281,714	839,488 287,348	856,277 293,095	873,403 298,957	890,871 304,936	908,689 311,035	926,862 317,256	945,400 323,601	964,308 330,073	983,594 336,674	1,003,266 343,408	1,023,331 350,276	1,043,797 357,281	1,064,673 364,427	1,085,967 371,716	1,107,686 379,150	1,129,840 386,733	1,152,437 394,467	1,175,485 402,357	1,198,995 410,404	1,222,975 418,612	1,247,435 426,984	1,272,383 435,524	1,297,831 444,234	1,323,788 453,119
Total Energy Cost Savings	-	-	-	1,104,741	1,126,836	1,149,373	1,172,360	1,195,807	1,219,723	1,244,118	1,269,000	1,294,380	1,320,268	1,346,673	1,373,607	1,401,079	1,429,100	1,457,682	1,486,836	1,516,573	1,546,904	1,577,842	1,609,399	1,641,587	1,674,419	1,707,907	1,742,066	1,776,907
TOTAL SOURCES AND ENERGY SAVINGS	5,209,561	-	466,680	1,104,741	1,126,836	1,149,373	1,172,360	1,195,807	1,219,723	1,244,118	1,269,000	1,294,380	1,320,268	1,346,673	1,373,607	1,401,079	1,429,100	1,457,682	1,486,836	1,516,573	1,546,904	1,577,842	1,609,399	1,641,587	1,674,419	1,707,907	1,742,066	1,776,907
EXPENSES																												
Annual Loan Payments																												
Annual Principal Annual Interest	-	-	-	377,212 825,119	408,521 793,811	442,428 759,903	479,149 723,182	518,918 683,413	561,988 640,343	608,633 593,698	659,149 543,182	713,858 488,473	773,108 429,223	837,275 365,056	906,769 295,562	982,030 220,301	1,063,538 138,793	1,151,811 50,520				-	-	-		-	-	-
Total Annual Internal Loan Payment	-	-	-	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	-	-	-	-	-	-	-	-	-	-
Annual City of Toronto BBP Loan Payment 3 TOTAL ANNUAL LOAN PAYMENT	274,288 274,288	274,288 274,288	274,288 274,288	274,288 1,476,619	274,288 1,476,619	274,288 1,476,619	274,288 1,476,619	274,288 1,476,619	274,288 1,476,619	274,288 1,476,619	- 1,202,331	- 1,202,331	- 1,202,331	- 1,202,331	- 1,202,331	- 1,202,331	- 1,202,331	- 1,202,331		-	-	-	-					
	214,200	274,200	214,200	1,470,013	1,470,013	1,470,013	1,470,013	1,470,013	1,470,013	1,470,013	1,202,551	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,551	-	-	-	-	-	-	-	-	-	-
T-8 Lighting Retrofit Capital Costs Robarts T-8	2,307,951	-	-	-		-							-														-	
Medical Sciences T-8 OISE T-8	1,230,903	- 825,536	-	-		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal T-8 Capital Costs	3,538,854	825,536	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chilled Water Systems Capital Costs	4 740 547																											
OISE Chiller Replacement RWright / Ssmith Interconnect	1,716,517 -	- 3,601,649	-	-		-	-		-	-	-	-	-	-		-	-	-		-	-	-	-	-	-	-	-	
NWCP Chiller Replacements Lmiller / Physics to BCIT New Chiller/Interconnect	-	1,909,263 2,412,668	-	-		-	-	-		-		-	-	-		-	-		-			-	-	-		-	-	-
W. Stevens Chiller Replacement ESC Chiller Replacement	-	-	1,236,912 1,474,109	-		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-
Bora Laskin Chiller Replacement	-	-	570,362	-																								
Dentistry	-	-	1,000,000																									
Subtotal Chilled Water Capital Costs TOTAL CAPITAL COSTS	1,716,517			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL CAPITAL COSTS	5,255,371	8,749,116	4,281,383	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL EXPENSES	5,529,659	9,023,404	4,555,671	1,476,619	1,476,619	1,476,619	1,476,619	1,476,619	1,476,619	1,476,619	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	1,202,331	-	-	-	-	-	-	-	-	-	-
CASHFLOW	(320,099)	(9,023,404)	(4,088,991)	(371,878)	(349,783)	(327,247)	(304,259)	(280,812)	(256,896)	(232,501)	66,669	92,049	117,937	144,342	171,276	198,748	226,769	255,351	1,486,836	1,516,573	1,546,904	1,577,842	1,609,399	1,641,587	1,674,419	1,707,907	1,742,066	1,776,907
Cumulative Cashflow	(320,099)	(9,343,503)	(13,432,494)	(371,878)	(721,661)	(1,048,908)	(1,353,167)	(1,633,979)	(1,890,875)	(2,123,376)	(2,056,707)	(1,964,658)	(1,846,721)	(1,702,379)	(1,531,104)	(1,332,356)	(1,105,587)	(850,235)	636,601	2,153,173	3,700,078	5,277,920	6,887,319	8,528,906	10,203,325	11,911,232	13,653,298	15,430,205
T-Bill Financing Charges @ 4.0%	12,804	373,740	537,300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL PROJECTS IRR TOTAL PROJECTS NPV	6.02% r			,	NOTE 1: Toronto H	lydro Funding (Grant and NRC	an Incentive Fu	nding based on	50% funded a	t project comple	etion and 50% a	fter verified res	ults.														
T-8 PROJECTS IRR T-8 PROJECTS NPV	21.30% 5,492,449					nergy savings b	based on revise	d October imple	mentation proje	ct schedule.																		
CHILLER PROJECTS IRR CHILLER PROJECTS NPV	-2.30% -8,175,491				NOTE 4: All IRR ar	n Repayment band	tions based on		joing forward fo	r 25 years. Ca	ashflow includes	s non-return fun roject is prorate																

	6,850,466	8,922,261	8,922,261
	360,000	2,046,000	3,054,000
2	7,210,466	10,968,261	11,976,261
	0.087	0.089	0.090
5	595,469	791,068	806,889
	31,293	181,403	276,190
	626,761	972,471	1,083,079
	626,761	1,599,232	2,682,312
	2	360,000 2 7,210,466 0.087 595,469 31,293 626,761	2 7,210,466 2,046,000 2 7,210,466 10,968,261 0.087 0.089 5 555,469 791,068 31,293 181,403 626,761 972,471

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Appendix D: Project work plan

10	Task Nama	Duration	Ctort	
1	Task Name CHILLER PROJECT IMPLEMENTATION	361 days?	Start Fri 10/21/05	Juli '05 Sep' '05 Nov '05 Jan '06 Mar '06 Juli '06 Sep' '06 Nov '06 Jan '07 1
2				
	OISE	131 days		
	Engineering Design & Tender Documentation Review & Preparation of Chiller Equipment Tender	36 days		
	Chiller Equipment Tender		Mon 10/24/05 Mon 10/31/05	
	Chiller Tender Evaluation		Mon 11/14/05	
	Chiller Equipment Order	0 days		
	Construction Tender	20 days		
10	Construction Tender Evaluation	5 days	Mon 1/9/06	
11	Award Construction Contract	0 days	Fri 1/13/06	
	Equipment & Material Delivery	95 days		
	Onsite Construction (Areawell by Mid-March 06)	60 days		
	Substantial Completion	0 days		
	Commissioning & Closeout Project Completion	10 days 0 days		
17	r lojeti completion	0 uays	1114/21/00	
18	University Governing Council Approval	0 days	Thu 3/23/06	3/23
19				
20	Ramsay Wright/Sidney Smith	160 days?	Mon 5/1/06	
	Engineering Design & Tender Documentation	40 days	Mon 5/1/06	
	Review & Preparation of Chiller Equipment Tender	5 days		
	Chiller Equipment Tender	10 days		
	Chiller Tender Evaluation	5 days		
	Chiller Equipment Order Construction Tender	0 days		
	Construction Tender Construction Tender Evaluation	20 days 5 days		
	Award Construction Contract	0 days		
	Equipment & Material Delivery	90 days		
	Onsite Construction	90 days		
	Substantial Completion	0 days		
	Commissioning & Closeout	10 days		
	Project Completion	0 days	Fri 12/8/06	
34 35	Lash Miller/McLennan/Bahen	160 days?		
	Engineering Design & Tender Documentation	40 days		
	Review & Preparation of Chiller Equipment Tender	5 days		
	Chiller Equipment Tender	10 days		
	Chiller Tender Evaluation	5 days		
	Chiller Equipment Order Construction Tender	0 days 20 days		
	Construction Tender Evaluation	5 days		
	Award Construction Contract	0 days		
	Equipment & Material Delivery	90 days		
	Onsite Construction	90 days		
	Substantial Completion	0 days		
	Commissioning & Closeout	10 days		
48	Project Completion	0 days	Fri 12/8/06	
	Northwest Chiller Plant	160 days?	Mon 7/31/06	
	Engineering Design & Tender Documentation	40 days		
	Review & Preparation of Chiller Equipment Tender	5 days		
53	Chiller Equipment Tender	10 days		
	Chiller Tender Evaluation	5 days	Mon 10/16/06	
	Chiller Equipment Order	0 days		
	Construction Tender		Mon 9/25/06	
	Construction Tender Evaluation	-	Mon 10/23/06	
	Award Construction Contract Equipment & Material Delivery	0 days 90 days		
	Onsite Construction	90 days 90 days		
	Substantial Completion	0 days		
	Commissioning & Closeout	10 days		
	Project Completion	0 days		
64				
65				
66				
67	Warren Stevens	160 days?	Mon 7/31/06	
Project	Business Board Chiller Projec Task		0-15	
Date: W	Business Board Chiller Projec Task ed 12/21/05		Split	Progress Milestone Internal Milestone Summary Project Summary External Tasks External Milestone Deadline
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ID	Task Name	Duration	Start Jul '05	Sep '05	Nov '05	Jan '06	Mar '06	May '06	Jul '06	Sep '06	Nov '06	Jan '07	Mar '07
	Task Name Engineering Design & Tender Documentation	40 days	Mon 7/31/06									Joan of	
	Review & Preparation of Chiller Equipment Tender	5 days	Mon 9/25/06										
	Chiller Equipment Tender	10 days	Mon 10/2/06										
	Chiller Tender Evaluation	5 days											
	Chiller Equipment Order Construction Tender	0 days 20 days	Fri 10/20/06 Mon 9/25/06								10/20		
	Construction Tender Evaluation	5 days											
	Award Construction Contract	0 days	Fri 10/27/06								10/27		
	Equipment & Material Delivery	90 days	Mon 10/23/06										
77	Onsite Construction	90 days	Mon 10/30/06								-		
78	Substantial Completion	0 days	Fri 2/23/07										↓ _2/23
	Commissioning & Closeout	10 days	Mon 2/26/07										
	Project Completion	0 days	Fri 3/9/07										3/9
81													
	Earth Sciences Centre	160 days?	Mon 7/31/06										
	Engineering Design & Tender Documentation Review & Preparation of Chiller Equipment Tender	40 days	Mon 7/31/06 Mon 9/25/06										
	Chiller Equipment Tender	5 days 10 days											
	Chiller Tender Evaluation	5 days											
	Chiller Equipment Order	0 days	Fri 10/20/06								10/20		
	Construction Tender	20 days	Mon 9/25/06							†			
	Construction Tender Evaluation	5 days	Mon 10/23/06										
	Award Construction Contract	0 days	Fri 10/27/06								10/27		
	Equipment & Material Delivery	90 days											
	Onsite Construction	90 days											
	Substantial Completion	0 days	Fri 2/23/07										¢_2/23
	Commissioning & Closeout	10 days	Mon 2/26/07										
	Project Completion	0 days	Fri 3/9/07										3 /9
96 97	Dentistas Dellation	400 days 20	Mag. 7/04/00						_				
	Dentistry Building Engineering Design & Tender Documentation	160 days? 40 days	Mon 7/31/06 Mon 7/31/06							-			
	Review & Preparation of Chiller Equipment Tender	5 days	Mon 9/25/06										
	Chiller Equipment Tender	10 days	Mon 10/2/06										
	Chiller Tender Evaluation	5 days											
	Chiller Equipment Order	0 days	Fri 10/20/06								10/20		
103	Construction Tender	20 days	Mon 9/25/06							1			
104	Construction Tender Evaluation	5 days	Mon 10/23/06										
	Award Construction Contract	0 days	Fri 10/27/06								10/27		
	Equipment & Material Delivery	90 days											
	Onsite Construction	90 days											
	Substantial Completion Commissioning & Closeout	0 days 10 days	Fri 2/23/07 Mon 2/26/07										↓ ^{2/23}
	Project Completion	0 days	Fri 3/9/07										2/0
111	r loject completion	0 days	1113/3/07										5/9
	Bora Laskin Library	160 days?	Mon 7/31/06										
	Engineering Design & Tender Documentation	40 days	Mon 7/31/06										
	Review & Preparation of Chiller Equipment Tender	5 days	Mon 9/25/06										
	Chiller Equipment Tender	10 days	Mon 10/2/06								L		
	Chiller Tender Evaluation	5 days											
	Chiller Equipment Order	0 days	Fri 10/20/06							\downarrow	10/20		
	Construction Tender	20 days	Mon 9/25/06										
	Construction Tender Evaluation		Mon 10/23/06										
120	Award Construction Contract Equipment & Material Delivery		Fri 10/27/06 Mon 10/23/06								10/27		
121	Onsite Construction		Mon 10/30/06										
	Substantial Completion	0 days	Fri 2/23/07										<u>▲_2/23</u>
	Commissioning & Closeout	10 days											
125	Project Completion	0 days											◆ ² /23 ● 3/9
Project: I Date: We	Business Board Chiller Projec Task d 12/21/05		Split	Progress	Milestone	♦ Su	Page 2	Project Summary	External	Tasks Ex	ternal Milestone	Deadline	

ID Task Name 1 LIGHTING RETROFIT IMPLEMENTATION	Duration Start Aug '05 Sep 425 days? Mon 11/14/05	05 Oct '05 Nov '05 Dec '05 Jan '06 Feb '06 Mar '06 Apr '06 May '06 Jun '06 Jul '06 Aug '06 Sep '06 Oct '06 Nov '06 Dec '06 Jan '07 Feb '07 Mar '07 Apr '07 May '0	07 Jun '07
2			
3 University Governing Council Approval	0 days Thu 3/23/06	(→) 3/23	
4			
5 ROBARTS LIBRARY	150 days Mon 3/27/06		
6 Feasibility Study Received	0 days Mon 11/7/05		
7 University Review	5 days Mon 11/7/05		
8 Engineering Design & Tender Documentation	35 days Mon 3/27/06		
9 University Review	5 days Mon 5/15/06		
10 Tender (Lighting Equipment & Implementation)	20 days Mon 5/22/06		
11 Tender Evaluation	5 days Mon 6/19/06		
12 Award Implementation Contract	0 days Fri 6/23/06	R/73	
13 Equipment & Material Delivery	60 days Mon 6/26/06		
14 Onsite Construction	80 days Mon 6/26/06		
15 Substantial Completion	0 days Fri 10/6/06		
16 Commissioning & Closeout	10 days Mon 10/9/06		
17 Project Completion	0 days Fri 10/20/06		
18			
19 MEDICAL SCIENCES BUILDING	140 days Mon 6/5/06		
20 Feasibility Study Received	0 days Fri 11/25/05		
20 Peasibility Study Received 21 University Review	5 days Mon 11/28/05		
22 Engineering Design & Tender Documentation	35 days Mon 6/5/06		
23 University Review	5 days Mon 7/24/06		
24 Tender (Lighting Equipment & Implementation)	20 days Mon 7/31/06		
25 Tender Evaluation	5 days Mon 8/28/06 0 days Fri 9/1/06		
26 Award Implementation Contract			
27 Equipment & Material Delivery	50 days Mon 9/4/06		
28 Onsite Construction	70 days Mon 9/4/06		
29 Substantial Completion	0 days Fri 12/1/06		
30 Commissioning & Closeout	10 days Mon 12/4/06		
31 Project Completion	0 days Fri 12/15/06		
32	400 days		
33 OISE	130 days Mon 1/1/07		
34 Feasibility Study Received	0 days Fri 12/16/05	12/16	
35 University Review	5 days Fri 12/16/05		
36 Engineering Design & Tender Documentation	35 days Mon 1/1/07		
37 University Review	5 days Mon 2/19/07		
38 Tender (Lighting Equipment & Implementation)	20 days Mon 2/26/07		
39 Tender Evaluation	5 days Mon 3/26/07		
40 Award Implementation Contract	0 days Fri 3/30/07		
41 Equipment & Material Delivery	40 days Mon 4/2/07		
42 Onsite Construction	60 days Mon 4/2/07		
43 Substantial Completion	0 days Fri 6/15/07		
44 Commissioning & Closeout	10 days Mon 6/18/07		
45 Project Completion	0 days Fri 6/29/07		
I			
Project: Lighting Project Timeline Task	Progress	Summary External Tasks Deadline	
Date: Wed 12/21/05 Split	Milestone	Project Summary External Milestone	
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Appendix E: Listing of buildings affected by cooling infrastructure upgrade

North West Chiller Plant:

- Robarts/Bissell/Fisher
- Rotman School
- Innis Residence
- Innis College
- Massey College
- Graduate House

Bahen Centre for Information Technology:

- Bahen Centre
- Koffler Student Services
- Hughes Pharmacy Building
- 215 Huron Street

Stand Alone Systems:

- Lash Miller Chemical Labs
- McLennan Physical Labs
- Ramsay Wright Zoological Labs
- Sidney Smith Hall
- Warren Stevens Building
- Earth Sciences Centre
- Bora Laskin Law Library
- Dental Building
- OISE