Building Condition Assessment and Preventative Maintenance Plan

Victoria Road Community Complex
Guelph, Ontario
July 2005

D R A F T

THE STONEWELL GROUP INC.

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August 12, 2005

Mr. Murray McCrae P. Eng
Corporate Property Manager
Community Services
Corporate Property Division
1 Carden Street
Guelph, Ontario
N1H 3A1

RE: Draft Copy of Building Condition Assessment and Preventative Maintenance Plan for VRCC
Contract No. 05-049

Dear Mr. McCrae:

Attached is a draft copy of the Condition Assessment Survey for VRCC.

Please review the draft. I will call you on August 16 to ensure you have received the draft and to discuss with you a process and the time lines for you to deliver the comments on the draft report back to me.

Should you require any additional information, please contact me at:
(905) 720-0564 or rfoster@stonewell.ca

Yours truly,

Robert Foster P. Eng, Principal
The Stonewell Group Inc.
Enclosed

1. Executive Summary

The Victoria Road Recreation Complex has a swimming pool, ice hockey rink, change rooms for each community activity room. The building was constructed in 1975 however there have been structural modifications to the pool and the roof over the ice rink that is significantly modified from the original design. The building is concrete block with steel roofing over the pool. The roof over the ice rink originally was steel, but additional insulation was added to this roof and 2-ply modified bitumen was added over the new insulation. The pool deck and pool change rooms were originally concrete and they have been retrofitted with ceramic tile. Most of the remainder of the building is the original finish materials however there has been a regular program to re-paint. The parking lots were originally left as gravel however they have since been asphalt paved.

Most of the costs are associated with building elements reaching the end of their life expectancy and requiring replacement. The total capital funding requirement over the 25-year study period is $1,361,555 in present value dollars. The peak year is 2017. The primary cost in 2017 is for parking lot re-paving.

The following table is a summary of the Capital Expenses recommended in the next 5 years.

Roofing requires some immediate attention along with caulking of the flashings. There is deteriorated concrete block along the south wall which is also in poor condition. The deterioration of the concrete block is due to the continuous wetting of the block caused by water running off the roof. Eaves troughing should be installed to re-direct the water. The other large expenditure in the next 5 years is for air make-up systems and ice making equipment. This equipment is nearing the end of its life expectancy and will soon need replacement.

5 year Summary of Capital Expenses

	2005	2006	2007	2008	2009
Retaining Walls	$1,200				
Roofing Systems	$27,000				$26,000
Eaves Troughs	$4,000				
Caulking	$7,500				
Exterior Walls	$9,000				
Distribution Panel - Main/intermediate					$6,000
Fire Alarm System - heat detectors		$440		$440	
Fire Alarm System - smoke detectors		$450		$450	
Fire Alarm System - Pull stations		$200		$200	
Fire Alarm System - Bell	$275		$275		$275
Emergency Generator					
Emergency Lighting					$22,800
Heating System - common and service areas					$14,500
Air Make-up Systems				$131,000	

Exhaust Systems					$19,800
Ice Making System				$63,600	
Domestic Water Shut-off Valves and Mains			$3,000		
Storm Water including Roof Drains			$1,000		
GRAND TOTAL	$48,975	$1,090	$4,275	$195,690	$89,375

During the research for the preventative maintenance routines we contacted and received information from the following municipalities—City of Hamilton, Town of Markham, Town of Richmond Hill and the City of Cambridge. The input from these organizations was used to determine or modify the preventative maintenance routines and the hours required to complete the task. Appendix B contains a series of excel spreadsheets with maintenance routines for the building elements inventoried at the Victoria Road Recreation Complex during the site investigation. The excel spreadsheets list the building element, the location, where the equipment may be found, the preventative maintenance routine and the schedule.

Infra red scans were done on the electrical components at the Victoria Road Recreation Complex. The reports from the scanning company Schneider Electric are included in their entirety in Appendix C.

2. The Consultants

The Stonewell Group Inc.

Stonewell Group Inc. has 25 years of professional experience in government at both the municipal and provincial level. With their office located in Ajax, the firm specializes in asset management strategies, capital and reserve fund planning, and the co-ordination of facility evaluations and building condition audits. The firm has extensive experience coordinating major facility evaluations for government departments and agencies.

We offer a broad range of services including:
Management Services - Organizational reviews and development, Change management, Corporate Team building, Policy development, Project Management. Strategic Planning, Tactical Planning, Human Resource planning & support, Outsourcing (reviews and implementation), Business Planning, Master Accommodation Planning, Property Management, Non Profit Board Governance, PID Resolution, Operational Reviews, Staff Management

Technical Services - Maintenance (planning) preventative maintenance programs, Building Condition Assessment and Reserve Fund Studies, Capital Planning, Energy Management

Training / Education - Curriculum and Manuals Development, Training materials, Facilitation and Training, Links with specialized training organizations, Skills Assessment (RGI Training, Conflict Resolution)

Financial Experience - Financial Planning, Cost Benefit Analysis, Reserve Fund Studies

RWG Building Engineering and Inspections Inc.

RWG Building Engineering and Inspections Inc. will subcontract with Stonewell for mechanical and electrical inspections. RWG-BEI formerly CCRS specializes in:

- Electrical and mechanical Capital Reserve Studies for multi-storey buildings.
- Performance Audits and reports for multi-storey buildings.
- Energy audits and analyses for all types of buildings.
- Analyzing and trouble shooting building related problems.
- Project Management of building modifications or upgrades.

RWG-BEI professional engineers have over 25 years of experience in:

- Design and construction of buildings up to $30,000,000
- Facility management via performance contracts of large building portfolios.
- Building inspection and analysis of over 5,000 buildings in both Canada and the Middle East.

RWG-BEI has experience in all aspects of building operation, maintenance and construction. This knowledge and experience insures that building inspections are thorough, detailed and refined to the building owner's needs and requirements.

3. Methodology

3.1. Building Condition Assessment

- Quantity estimates were based on our review of site conditions.
- There were interviews with the staff responsible for operating and maintaining the building.
- A visual inspection of building elements was conducted. All the common rooms were inspected and all spaces in the building were reviewed, this included the service areas, mechanical electrical areas, office areas, and public areas.
- Lighting levels were measured in public corridors and common areas.
- There was a visual inspection of the exterior of the building from the ground level, which included the roof, the walls, the exterior parking lots, and the sidewalks.
- Photographs were taken to document and illustrate the condition of the building elements encountered during the investigation. These photographs have been included in this report and referenced throughout the text.
- The dollar amounts used in the building condition report and spreadsheet are in 2005 dollars.
- Technical assessments were based on non-invasive techniques.

3.2. Definitions

Building Condition Assessment

A Building Condition Assessment (BCA) is a snap shot in time of the condition of various building elements and should not be considered an exhaustive survey and analysis on a "bolt-by-bolt" basis. The BCA provides an estimated cost in present value dollars to repair or replace a building element and the year that the repair or replacement is likely to occur. The Building Condition Assessments in this study project capital costs for the next twenty-five years.

Capital / Reserve Fund Study

A Reserve Fund Study (RFS) builds on the information provided in the Building Condition Assessment (BCA). The RFS converts the current cost picture from the BCA to future values based on an assumed inflation rate. The RFS then models the cash in and out of the Capital Replacement Reserve Fund using the opening balance and the owner's annual contribution rate to the fund and an assumed investment rate. The resulting cash flow analysis of the reserve fund highlights when the fund will be depleted.

Life Expectancy

The normal expected life span estimate of the building element in terms of years.

Estimated Remaining Life

The useful life of the building element remaining from the date of the visual condition assessment and assuming a normal level of maintenance.

Effective Age

Is the effective age estimate of the element, which is an observed condition assessment judgment in terms of years. Not necessarily the actual age of the element.

Cost Estimates

The total current replacement cost estimate of the reserve element. In the case of finishes, the cost may be an allowance for total replacement.

Capital Work

Capital work is an improvement that extends the useful life of the building element. Repairs that maintain the functionality of the building element but do not extend the life of the building element are not capital work. Partial replacements can be capital work if they are substantial enough that they would be left in place when the rest of the building element is replaced some time in the future.

Life Cycle

The estimated time from the installation of the system or component until the replacement of that component is a life cycle. Life cycles expressed in building condition assessments represent average conditions, historical information from the industry, and the experience of the professionals involved. The actual date that a component or system will fail, even partially, cannot be predicted.

Good Condition
Reasonable condition, not expected to require capital expenditure within the scope of this report.

Fair Condition
Deteriorating condition, likely to become "poor" within a few years if not addressed.

Poor Condition
Observable deterioration requiring immediate capital repair.

Replacement Prioritization System

Priority A - Life Safety:
Hazardous conditions which cannot be deferred and which could lead to loss of life or critical or extremely severe injury must be corrected or removed as a first priority.

Priority B - Structural Integrity:
Conditions which lead to the deterioration of structural elements of a building must be investigated and corrected if necessary; structural integrity must be maintained at all times. Failure to do so will lead to unsafe, life threatening conditions and will eventually render the building structurally unsound and physically obsolescent, incapable of performing the task it was designed to do.

Priority C - Legislative Requirements:
All buildings and building systems must be upgraded so that they comply with revisions to existing legislation or to the requirements of newly adopted legislation.

Priority D - Building Functionality:
Included within this priority is the repair or replacement of building elements, which have reached the end of their useful life. This work is necessary in order to maintain tenants' quality of life and to prevent the building from becoming physically or functionally obsolescent. Priority D includes all building systems which are scheduled for replacement at the end of their useful life in a planned and systematic fashion including; roofing systems, electrical systems, fire alarm systems, fire suppression systems, elevators, heating systems, domestic water supply systems and sanitary and/or storm water removal systems.

Priority E - Cost-Effective Initiatives:
Included in this priority is the repair or replacement of building elements principally to obtain a savings in the future operating of the building. Generally the payback period should be 5 years or less.

3.3. Sources for Replacement Costs

The replacement costs for the various components detailed in this report are based on the unit rates detailed in the 2005 edition of R.S. Means, combined with the experience of the consultants gained in the repair and renovation of buildings.

The estimated replacement and maintenance costs contained in this report are based in part on information and quantities obtained by a visual inspection of the property and in part from a review of the available documentation.

The life expectancy of the building components is based on the life expectancy information from the Ministry of Housing, the service life of buildings reports from Canada Mortgage and Housing Corporation and the experience of the consultant.

The estimates of the remaining life are based on an assessment of the current condition as made by the consultants during a visual examination of the property carried out July of 2005.

The effective age is based on the observed condition of the building element. It is not necessarily the actual age (chronological age) of the building component. This is especially true where there has been a severe environment and the building component is prematurely aged.

The replacement costs include a 15% mark up for design and contract management costs and the 7% Goods and Services Tax (GST) where appropriate.

3.4. Assumptions

The estimates provided are the installed cost of completing the repair or replacement indicated in the report. These costs are in 2005 dollars and include the contractor's overhead and profits and additional design or contract management fees, which may be required on some work.

The replacement cost of each component implies:

- Standard building materials or systems will be used;
- Current construction techniques will be used in replacement or repair of building components; and
- Construction will be in accordance with the edition of the Ontario Building Code, which is current at the time of preparation of the BCA's.

It is essential that a program of maintenance work be carried out on an annual basis to maintain the property elements in a condition such that they will achieve the life expectancies detailed in this report. The building condition assessment results assume that the owner will adopt and implement proper maintenance practices for the property.

3.5. Limitations

The analysis recognizes a number of factors that can influence the findings in this report. Historically, building costs have been rising at various rates from year to year, depending on business cycles, economic conditions, interest rates, etc. In boom periods, cost increases were fairly pronounced, whereas in times of recession, cost increases were only nominal or costs even declined. As many of the building elements covered by the building condition assessment (BCA) report involve aesthetic qualities, there is an element of judgment in identifying costs and life cycles for certain elements, particularly finishes.

The costing and budgeting programme developed/recommended in this report should be considered no better than a Class 'D' costing estimate and limited to conditions which were apparent at the time of the site visit and based on the access to different parts of the buildings as outlined in the scope of our contract. A Class 'D' estimate is strictly an indication (rough order of magnitude) of the total project cost; the expected degree of accuracy is +/-25%.

Code Compliance is based on the requirement to meet code at the time of building construction and as such, does not necessarily ensure that all elements meet current codes. Only elements that represent potential life safety hazards, are raised as non-compliance issues for the current analysis.

The building condition assessment results assume that the owner will adopt and implement proper maintenance practices for their projects.

4. Capital Reserve Fund Study and Analysis

Reserve funds are commonly established to fund the repair and replacement of major components of buildings.

The requirement for capital dollars in a building tends to follow cycles and to fluctuate from year to year. For the first 15 to 20 years after a building is constructed there should be a minimal requirement for capital dollars as all of the building components are new and should have a life expectancy greater than 15 years. As the building ages, individual building components reach the end of their useful life and require major repair or replacement. The requirement for capital work can fluctuate greatly from year to year depending on the type of work required.

Ideally reserve funds are established from the first day the building is occupied and annual contributions are made for future repairs. The fund should enjoy a holiday from expenses in the first 15 to 20 years. This allows it to grow to a substantial amount, before it is necessary to draw on the fund.

The reserve fund spreadsheet builds on the data in the Building Condition Assessment spreadsheet. The present value dollar amounts are escalated for inflation. The spreadsheets were set with an inflation amount of 2%. The reserve fund spreadsheet also has the ability to set an interest rate for the investment of funds and to include an opening balance and an annual contribution rate.

Key to the success of a reserve fund is:

- Clearly defined types of expenditures, which can draw from the fund. The fund should not be used for operational expenses or budget short falls as this would prematurely deplete the fund.
- Interest earned on the principal must be directed back to the fund and not diverted for other use.
- The annual replacement reserve fund contribution must be appropriate from the very beginning of the fund.
- The Building Condition Assessment and the Reserve Fund Study should be reviewed on an annual basis. At a very minimum, work which is completed in a given year should be removed from the spread sheet and work which should have been done, but needed to be deferred should be moved on the spreadsheet from the current year to a future year and the affect on the reserve fund balances noted. This will keep the spreadsheet current. It may be necessary to repeat the field inspections every 3 to 5 years to insure that the estimated life expectancies continue to be accurate.

There is no existing reserve fund for this building, however a scenario was created which is a combination of the annual contributions and specific top up contributions in specific years which will give an indication of the level of capital funding required to address the level of capital expenditures identified in the report.

4.1. Financial Factors

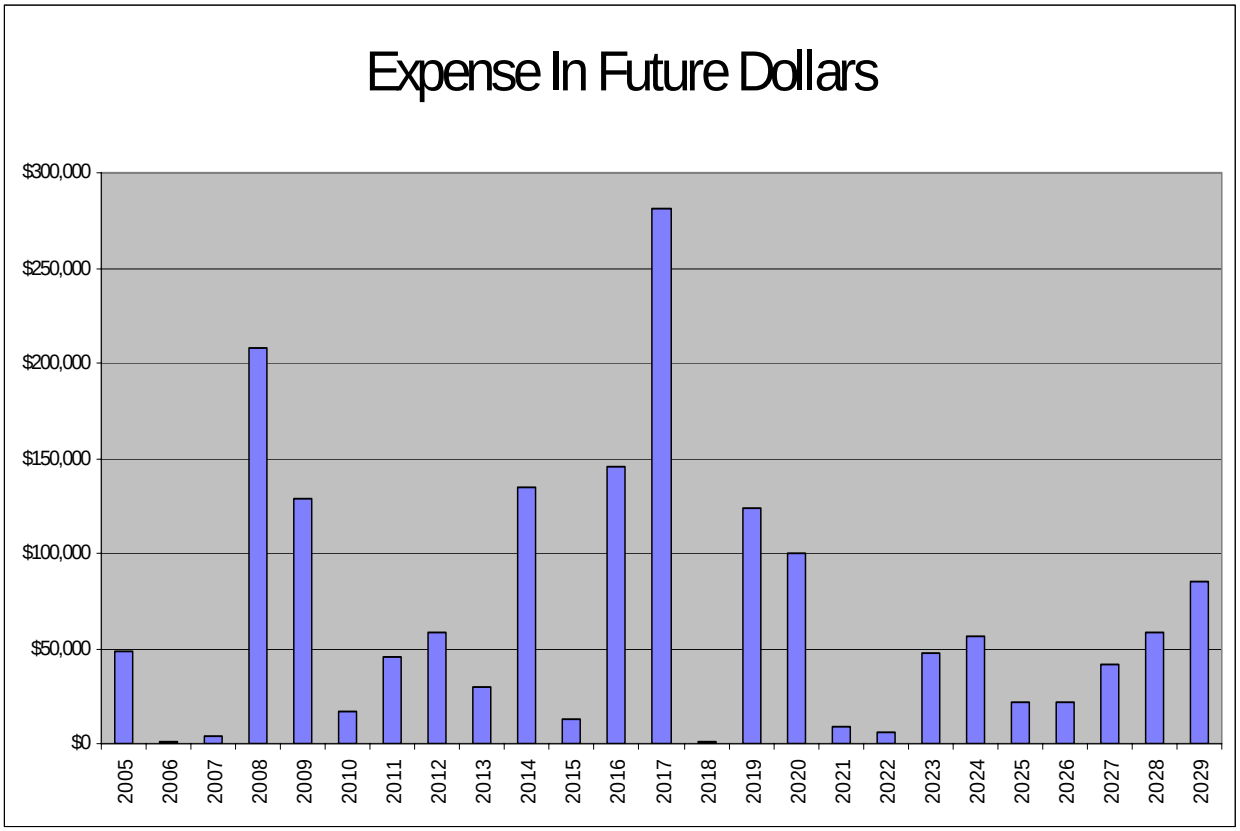
In projecting replacement cost estimates and capital reserve fund requirements, the following factors have been used:

Inflation Rate	2.00%
Interest Rate	5.00%
Opening Reserve Fund Balance:	$ 0

(Note: The annual replacement reserve contribution is assumed to increase 1% each year.)

4.2. Expenditures

Most of the costs are associated with building elements reaching the end of their life expectancy and requiring replacement. The total capital funding requirement over the 25-year study period is $1,361,555 in present value dollars. The peak year is 2017. The primary cost in 2017 is for parking lot re-paving.



4.3. Reserve Cash Flow Scenario

The following table shows a possible cash flow scenario capable of supporting the annual capital expenses. Annual capital contributions of approximately $50,000 with a 1% annual increase (slightly less than inflation) would carry the capital expenditures provided specific increases were made for the years 2008, 2009, 2016 and 2020. These specific increases are necessary to cover large expenditures such as paving or roofing. It appears the reserve fund continues to grow to the relatively large balance of $275,000 by the end of the 25 year period, however it should be remembered that many building elements have a 30 year life expectancy and there will be another cycle of expenditures. Building the reserve fund in the years 2021 to 2029 will likely reduce or eliminate the need for specific top ups in the future cycle of expenditures.

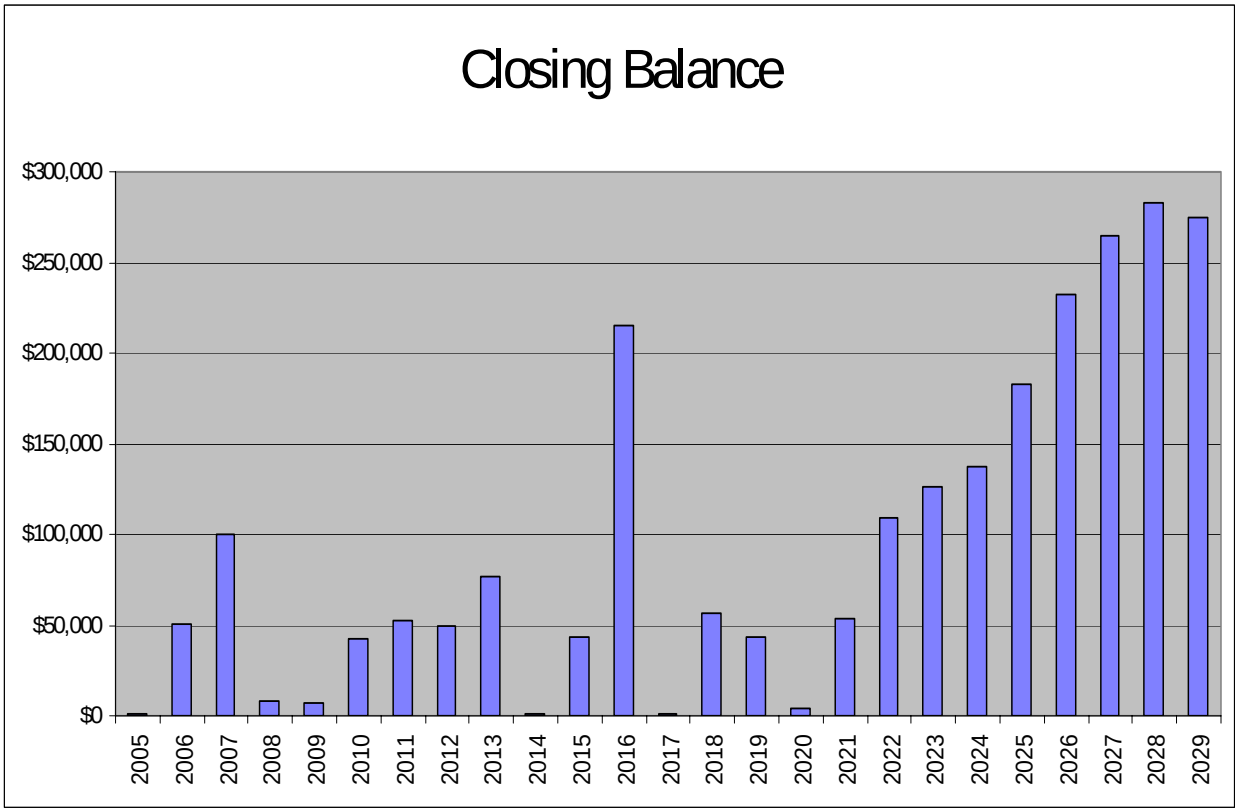
Project # :	1	Project Name:		Victoria Road Recreation Complex
Building Type :	Recreation Complex		Building #'s:	1
Date Prepared :	June 2005		Prepared By:	Stonewell

Assumed Inflation	2.00%
Interest earned on investment	5.00%
Interest paid on loan	5.00%
Opening Balance	$0
Cost Factor	1%
Annual Contribution	$50,000

	Opening Balance	Interest on Balance	Existing Annual Contribution	Reserve Contribution Increase	Total Contribution	Total Balance	Expense In Future Dollars	Closing Balance
2005	$0	$0	$50,000		$50,000	$50,000	$48,975	$1,025
2006	$1,025	$51	$50,500		$50,500	$51,576	$1,112	$50,464
2007	$50,464	$2,523	$51,005		$51,005	$103,993	$4,448	$99,545

2008	$99,545	$4,977	$51,515	$60,000	$111,515	$216,037	$207,668	$8,369
2009	$8,369	$418	$52,030	$75,000	$127,030	$135,818	$129,026	$6,792
2010	$6,792	$340	$52,551		$52,551	$59,682	$17,213	$42,470
2011	$42,470	$2,123	$53,076		$53,076	$97,669	$45,244	$52,426
2012	$52,426	$2,621	$53,607		$53,607	$108,654	$58,686	$49,967
2013	$49,967	$2,498	$54,143		$54,143	$106,609	$29,614	$76,995
2014	$76,995	$3,850	$54,684		$54,684	$135,529	$134,555	$973
2015	$973	$49	$55,231		$55,231	$56,253	$13,135	$43,118
2016	$43,118	$2,156	$55,783	$260,000	$315,783	$361,058	$145,587	$215,471
2017	$215,471	$10,774	$56,341		$56,341	$282,586	$281,264	$1,322
2018	$1,322	$66	$56,905		$56,905	$58,292	$1,410	$56,882
2019	$56,882	$2,844	$57,474	$50,000	$107,474	$167,200	$124,130	$43,070
2020	$43,070	$2,154	$58,048		$58,048	$103,272	$99,715	$3,557
2021	$3,557	$178	$58,629		$58,629	$62,364	$8,614	$53,749
2022	$53,749	$2,687	$59,215		$59,215	$115,652	$6,427	$109,225
2023	$109,225	$5,461	$59,807		$59,807	$174,494	$47,953	$126,540
2024	$126,540	$6,327	$60,405		$60,405	$193,273	$56,182	$137,091
2025	$137,091	$6,855	$61,010		$61,010	$204,955	$21,955	$183,000
2026	$183,000	$9,150	$61,620		$61,620	$253,769	$21,356	$232,414
2027	$232,414	$11,621	$62,236		$62,236	$306,270	$41,239	$265,031
2028	$265,031	$13,252	$62,858		$62,858	$341,141	$58,487	$282,654
2029	$282,654	$14,133	$63,487		$63,487	$360,273	$85,368	$274,905

The reserve fund closing balance for the above scenario:



5. SITEWORK

5.1. Driveways and Culverts

Description, Assessment and Recommendations:
See Parking Lots

5.2. Parking Lots

Description, Assessment and Recommendations:
There are asphalt driveways and parking lots. The large lower parking lots between the building and Victoria Road were gravel parking lots at the time of construction in 1975. The sloped road way from the lower parking lot and the entrance out to Hadati Road was paved from the time of original construction. At some time all of the driveways and parking lots were resurfaced with asphalt. Maintenance records that the asphalt was most recently resurfaced in 1998. The asphalt is in good condition, there are a few cracks but no potholes or broken asphalt. There are concrete curbs at the sloped driveway up from the lower parking lots, the exit out to Hadati Road and at several islands in the lower parking lot. The asphalt should last for a normal life expectancy of 20 years. The concrete curbs appear to be original to the 1975 construction. The concrete does not appear to have settled or broken. The surface scarring on the concrete is likely due to snowploughing. Recommend planning for repairs to 20% of the curbs the next time the asphalt needs to be resurfaced.


Parking lot and Driveway in good condition

<u>Replace asphalt</u>
Quantity Estimate: **8,000 m2**
Unit Cost Estimate: **$25 /m2**
Cost Estimate: **$200,000**

Life Span Analysis:	Expected Life Span:	20 years
	Effective Age:	7 years
	Remaining Life:	13 years

5.3. Sidewalks/Walkways

Description, Assessment and Recommendations:
There is a small amount of interlocking brick sidewalk at the front entrance to the building, most of which is under the front canopy and along the east wall. This brick is in good condition and should last the duration of this study period. Most of the sidewalks on site are


Sidewalk on east side
in good condition

concrete. There is an 8' wide concrete sidewalk from the front entrance down the slope to the lower parking lots. There is a 4' wide sidewalk at the east side of the building a 4 ' wide sidewalk from the front entrance to Hadati road following the exit driveway and there is a 4' wide concrete sidewalk around the end of the chain link fence rising up a concrete stair towards Hadati Road. These sidewalks appear to be original to the construction of the building in 1975. The concrete is generally in good condition, there is no surface spalling. A few sections of the sidewalk appear to have heaved near the front entrance however the concrete edges have been ground down to eliminate a potential tripping hazard. The sidewalks should last the duration of the study period, recommend planning for some minor repairs and replacement when the curbs and asphalt are done.

Replace concrete sidewalks

Quantity Estimate:	**100 m2 (20%)**	
Unit Cost Estimate:	**$35 /m2**	
Cost Estimate:	**$3,500**	
Life Span Analysis:	Expected Life Span:	20 years
	Effective Age:	7 years
	Remaining Life:	13 years

5.4. Fencing and Handrails

Description, Assessment and Recommendations: There is a chain link fence protecting the chiller tower and the garbage area at the northwest corner of the arena. The south side of this enclosure has pressure treated privacy boards. This fencing is in good condition and should last the duration of the study period.


Fencing is in good condition

5.5. Retaining Walls

Description, Assessment and Recommendations: There is a small wood retaining wall at the northwest corner of the arena and at the exit stairs on the east side of the arena. The retaining wall at the northwest corner is constructed of creosote timbers; it needs to be replaced soon. The retaining wall supporting the stairs at the east arena exit is of pressure treated wood and it is in good condition and should last another ten years.


Small retaining wall northwest corner in poor condition

Replace Creosote retaining wall northwest corner

Quantity Estimate:	**4 m2**
Unit Cost Estimate:	**$300 /m2**
Cost Estimate:	**$1,200**

Life Span Analysis:	Expected Life Span:	25 years
	Effective Age:	24 years
	Remaining Life:	1 year

Replace Pressure Treated retaining wall east exit

Quantity Estimate:	**5 m2**
Unit Cost Estimate:	**$300/m2**
Cost Estimate:	**$1,500**

Life Span Analysis:	Expected Life Span:	25 years
	Effective Age:	15 years
	Remaining Life:	10 years

5.6. Garbage Area and Structure

Description, Assessment and Recommendations:
Not applicable.

5.7. Storage and Maintenance Buildings

Description, Assessment and Recommendations:
Not applicable.

5.8. Drainage Away From Building

Description, Assessment and Recommendations:
The site has good slope from north to south. There are two catch basins at the north side of the building to catch water trapped against the wall and one catch basin on each of the south and east sides for the same purpose. There are eight other catch basins in the asphalt areas to drain the hard surfaces.

5.9. General Landscaping

Description, Assessment and Recommendations:
There are many mature trees and shrubs as well as grass areas.

6. STRUCTURE

6.1. Columns

Description, Assessment and Recommendations:
Not applicable.

6.2. Parapets

Description, Assessment and Recommendations:
Not applicable.

6.3. Foundation Walls

Description, Assessment and Recommendations:
For the most part the foundation walls are not visible. The north wall of the arena is a reinforced concrete wall below grade. Staff provided a Simon-Carver Fenco report from 1998, which reference two, cracks in this wall and indicated they should be monitored. The cracks are still visible however based on the photographs in the Simon-Carver Fenco Report there does not appear to be any change in the cracks. They are not any wider; the wall does not appear to have shifted in any direction. It is possible that these are shrinkage cracks as the wall is about 60 meters long.

6.4. Shear Walls

Description, Assessment and Recommendations:
Not applicable. Note that there were a number of studies completed on this building in the 1980 and significant structural repairs were completed in 1988.

6.5. Floor Slabs

Description, Assessment and Recommendations:
In service areas where the floor slabs were visible there were no unusual cracks or settlements. The floors are expected to last the duration of the study period.

7. BUILDING EXTERIOR

7.1. Roofing Systems

Description, Assessment and Recommendations:

Water ponding and deterioration of 4 ply roof

The roof system for this building has had problems from shortly after construction. The original building had a 4 ply built-up roof over the small section east and west of the mechanical rooftop penthouse. The roof over the pool and the ice rink were originally prefinished steel. There were problems with leaks at many of the roof penetrations. There were leaks at the mitered cut edges where the steel panel on the roof met the steel panel on the side wall. There were problems with the bolts securing the panels backing out of the purlins below. There were condensation problems on the underside of the arena roof. In 1987 a second roof was constructed over the original steel roof above the arena. On the arena side rigid insulation was laid on top of the original steel roof, a plywood deck was installed over the insulation and a 2 ply modified bitumen was place on the deck. The modified bitumen is roll roofing which is heated and adhered to the deck. In 1990 the smaller section at the northwest corner of the building also had 2 ply modified bitumen installed. The 2 ply modified bitumen should have a life expectancy of about 30 years. It is currently in good condition, there is no indication of problems and the granular topping is in good condition. This lower edge of this roof has a prefinished fascia which is level or slightly above the level of the 2 ply. This joint is caulked. This is a poor detail and it is likely that the wood forming the edge of the roof behind the fascia is now rotten and will need to be replaced when the roof is next replaced. This edge could be re-caulked when the building is next re-caulked but it is likely the damage has been done. Recommend planning for the replacement of the 2 ply roof in about 12 years when it reaches a normal life expectancy. The pool side of the building has the original steel roof. The paint on this roof is wearing thin and in many places the red primer is beginning to show through. Staff has indicated that they intend to repaint the roof soon. The joints and roof penetrations have been slathered with caulking many layers thick to stop leaks. This old caulking should be completely removed as part of the roof rehabilitation. These roof panels were originally factory coated. Once they are field painted they will require re-painting on a regular basis.

The 4 ply roof at the east and west sides of the mechanical penthouse is in fair to poor condition. There are spots where the asphalt has bubbled up through the gravel and there are areas behind the roof top units where it appears that water is trapped on a regular basis and can not freely drain to the roof drains. Recommend planning on the replacement of this portion of roof in about 5 years.

2 ply Membrane

Quantity Estimate:	**2,200 m2**	
Unit Cost Estimate:	**$50 /m2**	
Cost Estimate:	**$110,000**	
Life Span Analysis:	Expected Life Span:	30 years
	Effective Age:	18 years
	Remaining Life:	**12 years**

Repaint steel roof

Quantity Estimate:	**1,800 m2**	
Unit Cost Estimate:	**$15 /m2**	
Cost Estimate:	**$27,000**	
Life Span Analysis:	Expected Life Span:	15 years
	Effective Age:	14 years
	Remaining Life:	**1,16 years**

4 ply Membrane

Quantity Estimate:	**260 m2**	
Unit Cost Estimate:	**$100 /m2**	
Cost Estimate:	**$26,000**	
Life Span Analysis:	Expected Life Span:	30 years
	Effective Age:	25 years
	Remaining Life:	**5 years**

7.2. Eaves Troughs and Downspouts

Description, Assessment and Recommendations:

Water stains on wall
need eaves through

The only spots where eaves troughing currently exist are at the front entrance and at the northwest corner of the arena. Several of the previous reports provided by staff indicate that eaves troughing is required to prevent the deterioration of the concrete block. There are several areas on the building where there is severe damage to the concrete block and it is attributable to water draining from the roof. Eave troughing should be installed but consideration should be given to the attachment of the eaves trough and the gauge of the metal used and the size of the trough. This is a large roof and in a heavy down pour large volume of water will run off the roof in a short period. The water will likely reach high velocity given the long expanse and steep slope. This over shooting is evident at the inside corners where the adjacent wall is water marked in an arc several feet out from the edge of the roof. Also a snow or ice slide on this metal roof would easily wipe conventional eaves troughing off the edge of the roof. Snow guards should be installed along the lower edge of the steel roof to prevent large snow and ice slides and they should be installed to slow the velocity of the roof water at the edge of the roof. The

down spouts on the two existing eaves troughs should be repaired to direct water away from the building.

Install eaves troughing on south edge of steel roofs

Quantity Estimate:	**80 m2**	
Unit Cost Estimate:	**$50 /m2**	
Cost Estimate:	**$4,000**	
Life Span Analysis:	Expected Life Span:	30 years
	Effective Age:	29 years
	Remaining Life:	**1 year**

7.3. Soffit & Fascia

Description, Assessment and Recommendations:
There is a small amount of prefinished metal soffit under the front entrance which is in good condition and should last the duration of the study period.

7.4. Caulking & Weather Stripping

Description, Assessment and Recommendations:
All of the mastic or caulking materials on the steel roof should be re-caulked as part of the steel roof rehabilitation. The caulking around the exterior doors to the pool would have been replaced as part of the door replacement in 1996 and this caulking is in good condition. There is a flashing where the 2 ply roof over the northwest corner of the building meets the higher arena wall. This flashing dates from the 1990 installation of the 2 ply roof and the caulking is cracked and needs replacement. All joints where the roofing meets the concrete block will require the caulking replaced such as above the canopy at the front entrance and the canopy at the east arena exit. The caulking includes at all wall and roof penetrations including the louvers for the vents in the arena and the mechanical penthouse. The caulking at the windows on the ramp by the pool should be replaced and any of the original doors should have the caulking replaced.


Cracked caulking at roof/flashing joint


Cracked caulking at northwest Corner over 2 ply roof

Re-caulk building

Quantity Estimate:	**500 m**	
Unit Cost Estimate:	**$15 /m**	
Cost Estimate:	**$7,500**	
Life Span Analysis:	Expected Life Span:	10 years
	Effective Age:	9 years
	Remaining Life:	**1, 11, 21 years**

7.5. Exterior Walls

Description, Assessment and Recommendations:

The exterior walls are fluted concrete block. The block is generally in good condition with the exception of places where water damage from the roof has caused the block to be repeatedly wetted. The worst section of the wall is the lowest three courses of block along the south side of the teaching pool and the pool mechanical rooms. There is the largest amount of the water run off at this point and there is no eave trough so the water runs off the roof and hits the paved ground and the back splash thoroughly wets the lowest courses of block. Other areas of damage include inside corners where water over shooting the roof wets the adjacent sidewall such as the inside corner by the chlorination room and the edged of the roof by the canopy at the east stairwell. There is also damage at selected spots along the south wall. This usually occurs where there is a minor flaw in the flashing at the bottom edge of the steel siding. This flaw tends to concentrate the water draining down the siding at specific points. There are two sections of eaves trough on the building; at the front entrance and at the northwest corner of the building however in both cases the downspouts do not effectively carry the water away from the building and damage has occurred to the block. The block along the edge of the teaching pool and some of the other locations must be replaced; most of the other damage could be halted if eaves troughs and downspouts were installed. As indicated above in the roofing section some care should be given to the design and installation of the eaves trough to ensure it is sized properly and well attached.

Block damage by pool door

Lowest course of block at teaching pool

Repair concrete block at selected damaged areas

Quantity Estimate:	**60 m2**	
Unit Cost Estimate:	**$150 /m2**	
Cost Estimate:	**$9,000**	
Life Span Analysis:	Expected Life Span:	one time
	Effective Age:	one time
	Remaining Life:	**1 year**

7.6. Windows

Description, Assessment and Recommendations:
There are very few windows in this building. The office at the west side of the building has a small double glazed window and the south end of the ramp has large double pane windows. The windows at the ramp have steel sashes and the windows are double pane however they are not sealed glazing units they are two single panes of glass with a spacer. These are not very energy efficient windows but given the small area of windows in this building there would be very little reason to upgrade these window and they continue to function as windows.

7.7. Doors

Description, Assessment and Recommendations:
The front doors are glass and steel. Most of the utility doors are insulated hollow steel doors. Ten of the doors, which open on to the pool, were replaced in 1996. The doors in the pool area may have been subject to corrosion from the chlorine environment. Recommend planning for the replacement of the remainder of the exterior doors in ten years including the overhead roll-up door at the Zamboni entrance.

Entrance Doors		
Quantity Estimate:	**4**	
Unit Cost Estimate:	**$1,000 ea**	
Cost Estimate:	**$4,000**	
Life Span Analysis:	Expected Life Span:	30 years
	Effective Age:	20 years
	Remaining Life:	**10 years**
Service Doors		
Quantity Estimate:	**9**	
Unit Cost Estimate:	**$1,000 ea**	
Cost Estimate:	**$9,000**	
Life Span Analysis:	Expected Life Span:	40 years
	Effective Age:	30 years
	Remaining Life:	**10 years**
Over head Door (10' x 12')		
Quantity Estimate:	**1**	
Unit Cost Estimate:	**$2,000 ea**	
Cost Estimate:	**$2,000**	
Life Span Analysis:	Expected Life Span:	30 years
	Effective Age:	20 years
	Remaining Life:	**10 years**

8. BUILDING INTERIOR

8.1. Ceilings - Common and service areas

Description, Assessment and Recommendations:
Most of the ceilings in the service areas are un-painted exposed structure. Most of the common areas have painted exposed structure for the ceiling. Recommend painting as-required to maintain the appearance. The offices off the front vestibule have acoustic tile ceilings and the pool offices on the lowest level also have acoustic tile ceilings. These ceilings were added as renovations as the original drawings for the complex indicate that these rooms have painted exposed structure for the ceilings. This acoustic tile ceiling should last the duration of the study period. The third floor lounge meeting rooms, concession, and public washrooms have acoustic tile ceilings. The original drawings show this ceiling a one-hour rated ceiling. The fire rating would be to separate the interior space from the mechanical penthouse above. This acoustic tile is in good condition however a few of the tile are out of place and one tile is missing near the concession area. These tiles should be replaced with one-hour rated tiles as soon as possible to maintain the fire rating of the ceiling. The arena ceiling has insulated panels, which are darkly stained. The dark staining likely dates from before the roof retrofit which added additional insulation to the roof deck. In some places the interior insulation has been removed exposing the underside of the original metal roof panels. There would never be a reason to replace these original insulation panels as they are redundant now that rigid insulation has been added above the old roof. Recommend planning to remove the old panels and leaving the interior metal deck exposed. The dehumidifiers and the fans should be able to prevent condensation on the ceiling. The pool ceiling has soft batt insulation on every second panel and exposed aluminium panel in the alternative space. This acoustic insulation is supposed to dampen the echoes from bouncing around in the pool. This batt appears to be in good condition.

Paint Ceilings

Quantity Estimate:	**800 m2**	
Unit Cost Estimate:	**$8 /m2**	
Cost Estimate:	**$1,600**	
Life Span Analysis:	Expected Life Span:	10 years
	Effective Age:	5 years
	Remaining Life:	**5, 15, 25 years**

8.2. Walls – Common and service areas

Description, Assessment and Recommendations:
The walls in some of the service areas are painted and some are unpainted. Almost all public spaces are paint on concrete. The walls in the pool change rooms and the showers in all of the change rooms have ceramic tile on concrete block. The ceramic tile should last the duration of the study period. The paint on the walls was generally in good condition. Recommend planning for an allowance to re-paint was as required.


Wall crack appears unchanged from 1998 report

Note: The Simon-Carver-Fenco report from 1998 make reference to some wall cracks in the concrete block in dressing room 4. Based on the photos in that report it does not appear that there has been any further movement of these cracks.

Paint Hallway Walls

Quantity Estimate:	**2,500m2**	
Unit Cost Estimate:	**$8 /m2**	
Cost Estimate:	**$20,000**	
Life Span Analysis:	Expected Life Span:	10 years
	Effective Age:	5 years
	Remaining Life:	**5, 15, 25 years**

8.3. Floors - Common and service areas

Description, Assessment and Recommendations:
Most of the service areas have painted or unpainted concrete floors. The meeting rooms on the third floor, the concession room on the third floor have vinyl tile, which appears to be original to the 1975 construction. Some of the tiles near the concession area have already been replaced. Thirty years is a normal life expectancy for vinyl tile and this tile is reaching the end of its life expectancy. Recommend planning for the replacement of this original tile in about 7 years. The third floor corridor along the gallery to the ice arena has a vinyl tile floor however this tile is a different colour than the tile in the meeting rooms. The tile in the corridor is in good condition and may have been replaced since the 1975 construction. The tile in the third floor corridor will likely last the duration of the study period. The flooring in most of the public traffic areas is a mastic material call ceramite and is original to the construction of the building. This material appears to be in good condition, and should continue to where well in the future. The original construction indicated the ceramite was installed in the wet areas of the pool change rooms and the showers. In 1983 about $57,000 was spent to add ceramic tile to the pool deck which had been coloured concrete and to replace the ceramite in the pool change rooms and the showers. The ceramic tile should have a long life expectancy and should last the duration of the study period. Originally the only room with a carpet was the third floor lounge; however renovations to the pool offices, the male/female exercise rooms and the offices off the main floor lobby have added carpets to these spaces. The carpets were generally in good condition, the lounge carpet had several stains. Recommend planning on the replacement of the carpets in about 5 years and thereafter on a 15 year cycle. The ice rink change rooms, the player's benches and the corridor between these change rooms and the ice rink has rubber mats. These mats are in good condition.


Vinyl tile and interior finishes generally in good condition

Replace Carpet

Quantity Estimate:	**235 m2**	
Unit Cost Estimate:	**$35 /m2**	
Cost Estimate:	**$8,225**	
Life Span Analysis:	Expected Life Span:	15 years
	Effective Age:	5 years
	Remaining Life:	**5, 20 years**

Replace Vinyl Flooring

Quantity Estimate:	**180 m2**	
Unit Cost Estimate:	**$65/m2**	
Cost Estimate:	**$11,700**	
Life Span Analysis:	Expected Life Span:	30 years
	Effective Age:	23 years
	Remaining Life:	**7 years**

Replace Rubber Flooring

Quantity Estimate:	**450 m2**	
Unit Cost Estimate:	**$65/m2**	
Cost Estimate:	**$29,250**	
Life Span Analysis:	Expected Life Span:	30 years
	Effective Age:	10 years
	Remaining Life:	**20 years**

8.4. Stairs

Description, Assessment and Recommendations:
The stairs are metal pan and concrete as the ramp. Aside from painting they should last the duration of the study period.

8.5. Stairway and Corridor Handrails

Description, Assessment and Recommendations:
The hand rails are painted steel and should last the duration of the study period.

8.6. Interior Doors – Common and service areas

Description, Assessment and Recommendations:
The interior service doors are steel and expected to last the duration of the study period.

8.7. Lighting Fixtures - common and service areas

Description, Assessment and Recommendations:
Typically energy efficient T8 fluorescent fixtures illuminate the common and service areas of the complex. Ceiling mounted metal halide fixtures illuminate the ice rink and pool areas. Management reports the metal halide fixtures were installed in 2003 and the T8 fixtures were installed in 1999. All fixtures visually appeared in good condition.

Metal Halide Fixture

Quantity Estimate:	**198 T8 fixtures**	
Unit Cost Estimate:	**$120**	
Cost Estimate:	**$23,800**	
Life Span Analysis:	Expected Life Span:	25 years
	Effective Age:	6 years
	Remaining Life:	19 years

Quantity Estimate:	**72 Metal Halide fixtures**	
Unit Cost Estimate:	**$325**	
Cost Estimate:	**$23,400**	
Life Span Analysis:	Expected Life Span:	25 years
	Effective Age:	2 years
	Remaining Life:	23 years

8.8. Plumbing Fixtures – common and service areas

Description, Assessment and Recommendations:
There are various washrooms, shower rooms, change rooms and service room sinks for the janitor and poolroom equipment. All of these fixtures visually appeared in adequate condition for their age.


Shower Fixture

Quantity Estimate:	**111**	
Unit Cost Estimate:	**$410 (average)**	
Cost Estimate:	**$45,400**	
Life Span Analysis:	Expected Life Span:	25 years
	Effective Age:	10 years
	Remaining Life:	15 years

8.9. Appliances – Other

Description, Assessment and Recommendations:
Not applicable.

8.10. Cabinetry

Description, Assessment and Recommendations:
There are built in cabinets in concession stands on the main floor and the third floor which are original to the 1975 construction. There are also cabinets at the pool control, the pool storage room and at the exit door by the main floor office. The normal life expectancy of cabinets is about 30 years however these cabinets still have some use left in them. Recommend planning for the replacement of the cabinets in about 10 years.

Replace cabinets

Quantity Estimate:	**35 linear meters**	
Unit Cost Estimate:	**$400 /m**	
Cost Estimate:	**$14,000**	
Life Span Analysis:	Expected Life Span:	30 years
	Effective Age:	20 years
	Remaining Life:	**10 years**

8.11. Countertops

Description, Assessment and Recommendations:
Countertops would be replaced with the cabinet replacements above.

8.12. Storage Lockers

Description, Assessment and Recommendations:
The storage lockers in the change rooms are stainless and should last the duration of the study period.

9. ELECTRICAL SYSTEMS

9.1. Distribution System Main/intermediate


Main Panel

Description, Assessment and Recommendations:
The main distribution panel for the complex is a Federal Pioneer 800 amp 347/600-volt three-phase four-wire panel, which is located in the main ground floor electrical room. Visually the panel appears in good condition. Thermographic scans should be implemented on this equipment at a minimum of once every two years to ensure all connections are tightly secured to the panel bus. A thermogrphic infrared scan was taken of this equipment at the time of the inspection. This report is attached to this report as a detailed reference. Refer to Appendix C.
Management reports copper conductor is used through out the building. The estimated cost of the entire electrical system is identified below. Although the electrical system is expected to last the life of the building we recommend that an allowance of 5% of the total cost of the electrical system be budgeted every 4 years after 35 years.

Quantity Estimate: **1 system**
Unit Cost Estimate: **$120,000**
Cost Estimate: **$6,000 allowance every four years after 35 years**
Life Span Analysis: Expected Life Span: 35 years
Effective Age: 30 years
Remaining Life: 5, 9, 13, 17, 21, 25 years

9.2. Distribution Panel – sub

Description, Assessment and Recommendations:
The following Federal Pioneer sub electrical distribution panels were observed in the complex at the time of the inspection:

- 100 amp 3 phase 347/600 volt in rooftop mechanical room.
- Four Allen Bradley switches in rooftop mechanical room.
- 400 amp 3 phase 120/208 volt in main electrical room.
- 225 amp 120/208 volt in corridor.

The cost of these panels is included in the distribution cost identified above. These panels visually appeared in good shape during the inspection.

9.3. Transformers

Description, Assessment and Recommendations:
The following three phase 600-volt primary step-down transformers were observed in the complex at the time of the inspection. All transformers were operating without excessive vibration or temperature build-up:

- Hammond 25 kVA single phase in rooftop mechanical room.
- Federal Pioneer 112.5 kVA 3 phase in main electrical room.
- Federal Pioneer 7.5 kVA 3 phase in pool mechanical room.

Transformer

It is important to ensure transformers are properly ventilated. Transformer over heating can dramatically shorten their service lives.

Quantity Estimate:	**3 transformers**
Unit Cost Estimate:	**$4,500**
Cost Estimate:	**$13,500**

Life Span Analysis:	Expected Life Span:	30 years
	Effective Age:	24 years
	Remaining Life:	6 years

9.4. Fire Alarm – Panel

Description, Assessment and Recommendations:
A small combination fire alarm detection and annunciator panel is installed in the ground floor main entrance vestibule. Smoke, heat, flow and duct smoke sensors are connected to the fire panel. When a fire condition occurs the annunciator lights the zone where the sensor has been triggered so that Fire fighters can quickly access the part of the building where the problem occurred.
This system is maintained and tested as required by a specialist contractor for this type of equipment. All deficiencies are immediately repaired.

Quantity Estimate:	**1 system**
Unit Cost Estimate:	**$6,000**
Cost Estimate:	**$6,000**

Life Span Analysis:	Expected Life Span:	25 years
	Effective Age:	9 years
	Remaining Life:	16 years

9.5. Fire Alarm System - Heat Detectors

Description, Assessment and Recommendations:
Heat detectors are installed in selected electrical and equipment rooms as well as some service rooms, common areas, and elevator shaft.
The heat detectors are wired back to the fire panel. When the heat detector detects heat above the set point it triggers a response in the zone of the fire panel to which it is wired.
It is estimated that 1 to 2 units will need to be replaced every second year.

Quantity Estimate: **2 (every second year)**
Unit Cost Estimate: **$220**
Cost Estimate **$440**

Life Span Analysis: Expected Life Span: 12 years
Effective Age: various
Remaining Life: various

9.6. Fire Alarm System - Smoke Detectors

Description, Assessment and Recommendations:
Smoke detectors are located where required in rooms, stairwells, and corridors through out the building. Smoke detectors are installed in the air handler ductwork. The smoke detectors are wired back to the fire panel.
It is estimated that 1 to 2 units will need to be replaced every second year.

Quantity Estimate: **2**
Unit Cost Estimate: **$225 (average)**
Cost Estimate: **$450**

Life Span Analysis: Expected Life Span: 12 years
Effective Age: various
Remaining Life: various

9.7. Fire Alarm System - Pull Stations

Description, Assessment and Recommendations:
Pull stations are installed adjacent fire exit pathways throughout the complex. It is estimated that 1 of these stations will need to be replaced every second year.

Quantity Estimate: **1 (every second year)**
Unit Cost Estimate: **$200**
Cost Estimate: **$200**

Life Span Analysis: Expected Life Span: 12 years
Effective Age: various years
Remaining Life: various years

9.8. Fire Alarm System - Bell

Description, Assessment and Recommendations:
Fire alarm bells are located where required through out the building.
This equipment is inspected and tested yearly and any deficiencies are corrected.
It is estimated that 1 of these stations will need to be replaced every second year.

Quantity Estimate: 1
Unit Cost Estimate: $275
Cost Estimate: $275

Life Span Analysis: Expected Life Span: 15 years
Effective Age: various years
Remaining Life: various years

9.9. Emergency Generator

Description, Assessment and Recommendations:
There is no emergency generator installed at this facility.

9.10. Emergency Lighting

Description, Assessment and Recommendations:
There are emergency light fixtures and exit signs located at all exit corridor doors as well as other areas and rooms in the building. The exit lights are normally powered by the buildings electrical distribution system. When a power failure occurs the exit lights as well as the emergency lights are energized and are powered by rechargeable battery packs. The battery packs are charged via the buildings electrical distribution system.

Lighting fixtures are located throughout the facility and are positioned to provide a minimum of 10 Lux of lighting along passageways, corridors, and stairwells in order to provide safe exit from the facility in the event of an electrical power failure. The bulbs are replaced as required from the operating budget. These fixtures are very expensive and should be tested monthly to insure the batteries are properly charged. Typically the fire inspection company tests this equipment.

Quantity Estimate: 19
Unit Cost Estimate: $1,200
Cost Estimate: $22,800

Life Span Analysis: Expected Life Span: 10 years
Effective Age: 5 years
Remaining Life: 5, 15, 25 years

9.11. Voice Communication

Description, Assessment and Recommendations:
Not applicable at this building.

9.12. Exterior Lighting System

Description, Assessment and Recommendations:
The following fixtures provide exterior illumination: 3 pole mounted high-pressure sodium fixtures, 8 wall mounted and 4 canopy mounted high-pressure sodium fixtures. These fixtures were not illuminated at the time of the inspection.

Quantity Estimate:	**15**	
Unit Cost Estimate:	**$800** (average)	
Cost Estimate:	**$12,000** (includes pole)	
Life Span Analysis:	Expected Life Span:	25 years
	Effective Age:	17 years including pole
	Remaining Life:	8 years

9.13. Door Systems/ Entry System

Description, Assessment and Recommendations:
There are two automatic door openers installed to open the buildings main entrance doors. During the inspection the door openers functioned adequately.

Quantity Estimate:	**2 door openers**	
Unit Cost Estimate:	**$2,500**	
Cost Estimate:	**$5,000**	
Life Span Analysis:	Expected Life Span:	20 years
	Effective Age:	8 years
	Remaining Life:	**12 years**

9.14. Security/ Surveillance Systems

Description, Assessment and Recommendations:
No CCTV security cameras were observed at the complex at the time of the inspection.

9.15. Other (Specify)

Description, Assessment and Recommendations:
Not applicable.

10. MECHANICAL SYSTEMS

10.1. Heating Systems – common & service areas

Description, Assessment and Recommendations:
The following types of equipment heats the complex:

- Carrier natural gas fired (model #: 48HJE006-14HQ, serial #: 3304G10446) at 115,000 BTUH and 575 volts on front low roof. This unit provides heating and cooling for the Lounge. Management reports this unit was installed in the fall of 2004.
- Two, Carrier natural gas fired (model #: 48JE004-132DA, serial #: 1100G20255 and 1100G20256) at 72,000 BTUH heating and cooling powered by 575 volts on back roof near roof stairs. Management reports this these units were installed in 1998.
- Natural gas fired radiant heaters heat ice rink bleachers.
- Wall mounted electric forced flow and unit heaters are installed in corridors, entrance vestibules, and selected equipment rooms.
- Trane natural gas fired unit heater (model #: GF01200A) with input capacity of 125,000 BTUH.

New Rooftop Unit
Quantity Estimate: 1
Unit Cost Estimate: $6,500
Cost Estimate: $6,500
Life Span Analysis:

Expected Life Span:	20 years
Effective Age:	1 year
Remaining Life:	19 years

Unit Heater

Old Rooftop Units
Quantity Estimate: 1
Unit Cost Estimate: $5,000
Cost Estimate: $10,000
Life Span Analysis:

Expected Life Span:	20 years
Effective Age:	7 years
Remaining Life:	13 years

Radiant Heaters
Quantity Estimate: 6
Unit Cost Estimate: $1,500
Cost Estimate: $9,000
Life Span Analysis:

Expected Life Span:	30 years
Effective Age:	25 years
Remaining Life:	5 years

Electric Unit Heaters
Quantity Estimate: 11
Unit Cost Estimate: $500 (average)
Cost Estimate: $5,500
Life Span Analysis:

Expected Life Span:	25 years
Effective Age:	20 years
Remaining Life:	5 years

Natural Gas Unit Heater
Quantity Estimate: 1
Unit Cost Estimate: $2,500
Cost Estimate: $2,500
Life Span Analysis:

Expected Life Span:	25 years
Effective Age:	7 years
Remaining Life:	18 years

10.2. Air Make-up Systems

Description, Assessment and Recommendations:
The following equipment installed in the rooftop mechanical room both heats and provides make-up air for selected areas of the complex:

- Temprite natural gas fired air handler (model #: GTDM-65-C, serial # 128/3) at 813,000 BTUH with 5 HP 575 volt blower section. Labelled Lobby Rink Change room supply. Filters were clean at time of inspection.
- Temprite natural gas fired air handler (model #: GTDM-85-C, serial # 128/2) at 1,063,000 BTUH with 5 HP 575 volt blower section. Labelled Natatorium Change room supply. Filters were clean at time inspection.


Empty Filter Rack

- Temprite natural gas fired air handler (model #: GTDM-175-C, serial # 128/1) at 1,563,000 BTUH with 15 HP 575 volt blower section @ 18,000 CFM. Labelled Natatorium supply. Filter rack was empty at the time of the inspection.
- Trane natural gas fired unit heater (model #: GF01200A) with input capacity of 125,000 BTUH.

The above equipment is controlled by a DDC building automation system, which actuates a building vintage pneumatic control system. The system with the exception of the DDC control system is the vintage of the building and may be approaching the end of its life cycle.

Quantity Estimate: 1 system
Unit Cost Estimate: $131,000
Cost Estimate: $131,000
Life Span Analysis:

Expected Life Span:	25 years
Effective Age:	21 years
Remaining Life:	4 years

10.3. Exhaust Systems

Description, Assessment and Recommendations:
The following major exhaust fans and blowers were observed during the inspection:


Broken Belts

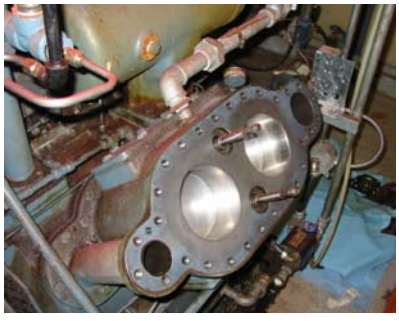
- Sheldons 1 HP 3 phase propeller belt drive fan labelled #16 in rooftop mechanical room.
- Sheldons 1/3 HP (type 100-1) labelled Lounge exhaust in rooftop mechanical room.
- Sheldons 3 HP 24" axial fan (model #: AF-24-7B/33) in rooftop mechanical room. The fan was running, but the drive belts were broken at the time of the inspection.
- Sheldons 3 HP 21" axial fan (model #: AF-21-7B/33) in rooftop mechanical room.
- Sheldons F10 3 HP 21" axial fan (model #: AF-21-7B/33) in rooftop mechanical room. Service personnel walking on the ductwork have crushed the ductwork for this fan. The duct airflow cross section has been dramatically reduced and should be repaired.
- Sheldons labelled F8 3 HP 21" axial fan (model #: AF-21-7B/33) in rooftop mechanical room for washroom exhaust.
- Sheldons 36" axial fan (model #: AF-36-7B/33) in rooftop mechanical room labelled Natatorium return.
- 72" diameter belt drive propeller fan installed in wall of rink.
- Sheldons 16" ¼ HP (model #: PROPEKLD) in chiller room.

Quantity Estimate: **8 fans**
Unit Cost Estimate: **$2,475** (average)
Cost Estimate: **$19,800**
Life Span Analysis:

Expected Life Span:	30 years
Effective Age:	25 years
Remaining Life:	5 years

10.4. Ice Making System

Description, Assessment and Recommendations:
The ground floor chiller room contains the following equipment for making ice for the 1 ice rink:


Compressor

- Two Chil-con Products Ltd. (model #: RA16168-509 C870449A-1 and RA16168-509 C870449A-2) heat exchangers.
- Two 75 HP Lincoln reciprocating compressors with 575 volt motors and 1986 manufacture date tag.
- Peerless 3HP (type 825) circulating pump
- 1 HP pump with Century motor

- Armstrong 25 HP 3 phase 575-volt brine circulating pump.
- BAC (model #: C1843K, serial #: 87800484) ammonia cooling tower.

The compressors were dismantled at the time of the inspection and as a result none of this equipment was running. The compressors are currently being rebuilt and we have adjusted their expected life span accordingly.

Quantity Estimate: **2 Heat Exchangers**
Unit Cost Estimate: **$20,700**
Cost Estimate: **$41,400**
Life Span Analysis:

Expected Life Span:	30 years
Effective Age:	26 years
Remaining Life:	4 years

Quantity Estimate: **2 Compressors**
Unit Cost Estimate: **$25,000**
Cost Estimate: **$50,000**
Life Span Analysis:

Expected Life Span:	20 years
Effective Age:	10 years
Remaining Life:	10 years

Quantity Estimate: **3 Circulating Pumps**
Unit Cost Estimate: **$7,400**
Cost Estimate: **$22,200**
Life Span Analysis:

Expected Life Span:	20 years
Effective Age:	16 years
Remaining Life:	4 years

Quantity Estimate: **1 Cooling Tower**
Unit Cost Estimate: **$40,000**
Cost Estimate: **$40,000**
Life Span Analysis:

Expected Life Span:	25 years
Effective Age:	9 years
Remaining Life:	16 years

10.5. Ice Rink De-humidification

Description, Assessment and Recommendations:
The air in the ice rink is de-humidified by two combination KeepRite (model #: P011WED, serial #: KZ70556) 6 kW squirrel cage blowers mated to two Dunham Bush (model #: EH75DHF) compressors and cooling coils utilizing R22 refrigerant. The air filters were very clean however; the equipment surfaces were covered in dirt and dust. This area has not been cleaned in some years.


Compressor & Filter Media

Quantity Estimate: **2 Dehumidifiers**
Unit Cost Estimate: **$9,000**
Cost Estimate: **$18,000**
Life Span Analysis:

Expected Life Span:	25 years
Effective Age:	16 years
Remaining Life:	9 years

10.6. Domestic Water Supply and Distribution

Description, Assessment and Recommendations:
The City of Guelph supplies domestic cold water to this building.

10.7. Domestic Water Shut-off Valves and Mains

Description, Assessment and Recommendations:
This equipment is in good condition and should last the life of the building if exercised routinely; however a small allowance is included. Typically valves seize if not exercised a couple of times per year.

Quantity Estimate: **Allowance**
Unit Cost Estimate: **$3,000 (every 4 years) after 30 years**
Cost Estimate: **$3,000 (every 4 years)**

Life Span Analysis:

Expected Life Span:	30 years
Effective Age:	27 years
Remaining Life:	3, 7, 11, 15, 19, 23, 27 years

10.8. Domestic Water – Risers and Laterals

Description, Assessment and Recommendations:
Type “M” copper piping was observed in the building. All repairs should be made with type “L” copper because it has a much longer expected service life before pinhole leaks develop. Both hot and cold water is distributed to the washroom and shower rooms by

laterals. Hot water is continually re-circulated to these areas via a small recirculation pump.

Quantity Estimate: **1 system**
Unit Cost Estimate: **$31,000**
Cost Estimate: **$31,000**
Life Span Analysis: Expected Life Span: 40 years
Effective Age: 30 years
Remaining Life: 10 years

10.9. Domestic Water - Hot water Boilers & Storage Tanks

Description, Assessment and Recommendations:
The rooftop mechanical room houses the following domestic hot water equipment:

- A.O. Smith 1,000 US gallon concrete lined hot water storage tank installed in 2004.
- A.O. Smith (model #: DW1350S110EZ14, serial #: 103343) natural gas fired boiler with an input capacity of 1,350,000 BTUH.
- New Bell & Gossett 1 HP (estimated) re-circulation pump.

DHW Boiler

The combination of the large boiler and massive storage has the capacity to supply much more hot water than is required for the number of faucets and shower. This system may be over substantially sized. The Zamboni room closet contains the following equipment:

- A.O. Smith Master Fit (model #: BTRC500A) 500,000 BTUH natural gas water heater with 110 US gallons of storage and 485 US gallons per hour recovery.
- One 200 US gallon (estimated) glass lined storage tank.
- ¼ HP re-circulation pump.

Quantity Estimate: **1 boiler**
Unit Cost Estimate: **$35,000**
Cost Estimate: **$35,000**
Life Span Analysis:
Expected Life Span: 25 years
Effective Age: 1 year
Remaining Life: 24 years

Quantity Estimate: **1** (re-line tank)
Unit Cost Estimate: **$9,000**
Cost Estimate: **$9,000**
Life Span Analysis:
Expected Life Span: 30 years
Effective Age: 1 year

Remaining Life: 29 years

Quantity Estimate: **1 Boiler** (Zamboni room)
Unit Cost Estimate: **$13,000**
Cost Estimate: **$13,000**
Life Span Analysis:

Expected Life Span: 15 years
Effective Age: 8 years
Remaining Life: 7, 22 years

10.10. Swimming Pool Equipment

Description, Assessment and Recommendations:
The two level ground floor swimming pool equipment houses the following equipment:

Upper Floor

- Two Dulcomarin chlorination controls.
- Two HydroTherm (model #: M-300, serial #: L8812367 and L8812350) natural gas fired power vented condensing boilers with 249,000 BTUH input.
- Two Bell & Gossett ½ HP circulating pumps.
- 2 HP water circulation pump.

Lower Floor

- 25 HP ITT (type: 8100, serial #: 203523-01-01) rated at 1,400 GPM installed in 1996.
- Tagelus (model #: TA-1000) sand filter.
- Magnuum 2 HP (estimated) 575-volt pool water circulating pump.
- Jacuzzi (type: 5MAG-61A) 1/2 HP (estimated). The piping connected to this pump was leaking substantially at the time of the inspection.
- 7.5 HP Ebarra pump (not running). This pump may be retired in place and its replacement cost has not been included in the report.


Boiler

Quantity Estimate: **2 boilers**
Unit Cost Estimate: **$19,000**
Cost Estimate: **$38,000**
Life Span Analysis:

Expected Life Span: 25 years
Effective Age: 17 years
Remaining Life: 8 years


Leaking Pump

Quantity Estimate: **7** (pumps & filter)
Unit Cost Estimate: **$1,750**
Cost Estimate: **$12,200**
Life Span Analysis:

Expected Life Span:	20 years
Effective Age:	13 years
Remaining Life:	7 years

10.11. Domestic Water Circulation System

Description, Assessment and Recommendations:
As described previously in the Domestic Hot Water Boiler section two, small 120-volt domestic hot water circulating pumps circulate hot water throughout the facility.

Quantity Estimate: **2**
Unit Cost Estimate: **$1000** (average)
Cost Estimate: **$2,000**
Life Span Analysis:

Expected Life Span:	15 years
Effective Age:	2 years
Remaining Life:	13 years

10.12. Domestic Water Treatment System

Description, Assessment and Recommendations:
This type of equipment has not been installed at this building.

10.13. Fire Hydrants

Description, Assessment and Recommendations:
The City of Guelph maintains the fire hydrants installed near the property of this building.

10.14. Fire Alarm- Sprinkler System

Description, Assessment and Recommendations:
Selected rooms are sprinklered.
This equipment should last the life of the building if properly maintained.

10.15. Fire Department- Connections and Standpipes

Description, Assessment and Recommendations:
There are no Fire Department Siamese connections installed at this complex.

10.16. Fire Extinguishers

Description, Assessment and Recommendations:
ABC type fire extinguishers are installed in all fire extinguisher cabinets and selected equipment rooms through out the building. The occasional replacement of fire extinguishers is from the operating budget.

10.17. Fire Hoses

Description, Assessment and Recommendations:
This facility is too small to have fire hoses.

10.18. Sanitary Waste Removal System

Description, Assessment and Recommendations:
Sanitary waste removal is provided by the City of Guelph sanitary sewer system.

10.19. Storm Water including Roof Drains

Description, Assessment and Recommendations:
Storm water is drained to the City of Guelph system from a 100 mm diameter drain connection. These drains should last the life of the building if they are adequately maintained by power flushing every three years. An allowance is provided to power flush the drains when appropriate.

Quantity Estimate: **allowance**
Unit Cost Estimate: **$1,000 (every three years)**
Cost Estimate: **$1,000 (every three years)**

10.20. Garbage Collection and Compactor

Description, Assessment and Recommendations:
There is no hydraulic centralized garbage compaction equipment at this facility.

10.21. Other (Specify)

Description, Assessment and Recommendations:
Not applicable.

11. Preventative Maintenance

11.1. Definition

Preventative maintenance is regularly scheduled repair and maintenance needed to keep building components, such as heating-ventilation-air-conditioning (HVAC) systems, roofs, plumbing, and electrical systems, operating efficiently and to extend their useful life. Preventative maintenance includes periodic inspections (weekly, monthly, bi-annually), lubrication, calibrations, and equipment replacement. Replacing filters in an air-handling unit on a regular basis is an example of preventative maintenance.

A successful preventative maintenance program requires an inventory of building components and an inspection of their condition. Building managers should:

- Set priorities among maintenance projects and evaluate projects' lifetime costs. Building managers should also plan and budget strategically for preventive maintenance in the long- and short-term,
- Structure a framework for operating a preventive maintenance program, including checklists of preventive maintenance tasks,
- Use tools, such as work-order systems, to optimize their preventive maintenance program and;
- Ensure that maintenance employees have appropriate training to competently complete their tasks.

Well-planned preventative maintenance extends the useful life of building components such as roofs or heating and ventilation systems, thereby preserving investments. A preventative maintenance program is less costly and disruptive than replacing or repairing of major systems when they breakdown.

Best practices for Preventative Maintenance planning should include:

- Involve maintenance personnel in the program planning
- Enhanced training for maintenance personnel
- Tools to optimize the process which may include a computerized maintenance management system and work order system which documents a sign-off when the work is complete and;
- A priority system to rank the importance of the work.

If preventative maintenance is not implemented correctly the warning signs of equipment failure are often missed, leading to a catastrophic failure rather than an orderly replacement. A catastrophic failure can cause additional damage to interrelated equipment. Catastrophic failure can result in additional equipment down time because there is insufficient lead time to buy parts or schedule the service technician for the repair. Over time costs are often incurred for a catastrophic failure. A lack of preventative maintenance can result in increased energy consumption as the equipment may be incorrectly adjusted for long periods of time. Ultimately a lack of preventative maintenance can shorten the life expectancy of the equipment.

A preventative maintenance plan will keep the property and equipment in working condition leading to improved safety of operation and a reduced incidence of emergency or breakdown repairs. The preventative maintenance plan should identify problems before they escalate into high cost repairs and offer the greatest potential for extending equipment life. This should result in more effective use of resources and achieve the lowest overall cost of equipment maintenance.

Obstacles to preventative maintenance are often systemically built into an organization. For instance there may be insufficient staff hours available to complete the required tasks. Budget restrictions may force a break down maintenance strategy where funds are directed away from preventative maintenance to address immediate problems. Staff may not have sufficient training or staff may not have the equipment specific training to complete the maintenance tasks.

11.2. Best Maintenance Practice

The following are Benchmarks for *Best Maintenance Practice* developed with in the property management sector.

- 100% of maintenance person's time is covered by a work order. This allows all maintenance activity to be captured and recorded. Trends and total repairs on equipment will assist with decisions to replace equipment at the end of life. It is equally important that all work orders are completed and signed off as complete.

- 90% of Work Orders are generated by preventative maintenance inspections. Catastrophic failure and breakdown maintenance should be avoided. A comprehensive and practical preventative maintenance program should ensure that staff are visiting and inspecting equipment on a regular basis and should spot and anticipate repairs and replacements before catastrophic failure.

- 30% of all work is Preventative Maintenance. Sufficient staff time must be dedicated to preventive maintenance such as inspections, filter changes, lubricant changes etc. Otherwise the opportunity to spot and plan for repairs and replacements is lost. Preventative maintenance is a significant portion of maintenance staff time.

- Overtime is less than 2% of total maintenance time. This is only possible if the above benchmarks are achieved and maintenance is planned rather than reactive.

- Maintenance budget is within +/- 2%. Similar to overtime, this is only possible if the benchmarks are achieved and maintenance is planned rather than reactive.

11.3. Maintenance Terms

Additional terms commonly used and associated with maintenance:

Routine Maintenance – housekeeping and cleaning, mechanical systems, maintenance, residence changes

Predictive Maintenance – is a pro-active planned approach to avoid equipment breakdowns and prevent minor problems from escalating into major ones.

Emergency and Corrective Maintenance – occur when equipment fails, typically requiring more time and resources to correct problems.

Preventative Maintenance – carrying out routines to extend the operating life

Demand Maintenance - "one time" non-scheduled maintenance tasks

11.4. Deferred Maintenance

Generally the condition of the building elements was good. A summary of deferred maintenance observed during our site review:

The damage to the concrete blocks at downspouts near the front entrance at the northwest corner of the building and along the south wall of the building should have been attended to before 2005. The repair of this wall is now beyond deferred maintenance and requires a capital repair and replacement of many of the blocks. Previous reports mention the need to install eaves trough along the south roof line to direct water away from the wall. This report also recommends eaves troughing (see section 7.2).

The retaining wall at the north east corner of the building is also deteriorated and should have bee replaced prior to 2005. This has also become a capital repair (see section 5.5).

The Temprite natural gas fired air handler in the mechanical penthouse is missing the filters (see section 10.2).

The Sheldons 3 HP 24” axial fan in rooftop mechanical room was running, but the drive belts were broken at the time of the inspection and duct work for the Sheldons F10 3 HP 21” axial fan in the roof top mechanical room has been crushed dramatically reducing the cross sectional area and should be repaired (see section 10.3).

The piping connected to the Jacuzzi (type: 5MAG-61A) 1/2 HP pump in the pump room was leaking substantially at the time of the inspection (see section 10.10).

These are relatively minor items and may have been repaired since the site visit.

11.5. Methodology

Following the site visit a list of the building components requiring preventative maintenance was complied. The general condition of the component was noted and forms the basis to the capital replacement portion of this report as well as the starting point for the preventative maintenance plan for the City of Guelph.

During the research for the preventative maintenance routines we contacted and received information from the following municipalities—City of Hamilton, Town of Markham, Town of Richmond Hill and the City of Cambridge. The input from these organizations was used to determine or modify the Preventative Maintenance routines and the hours required to complete the task.

A preventative maintenance report was prepared in Microsoft excel spreadsheet format. Refer to Appendix B.

An explanation of the excel spreadsheet report is provided below.
The spread sheet has the building components listed on the left side of the sheet (column A). These building element components refer to the equipment and building elements in the Victoria Road Recreation Complex. Column B refers to the location where the building element will be found, for example the ***roof top boiler room*** or the ***chiller room***.

Column C breaks the building element into appropriate component parts such as the ***belts, bearings, motor***, etc. and column D is the maintenance procedure required on the component part.

Column E is the anticipated hours required to complete the procedure. The sources for the hours were R.S. Means, Facilities Maintenance and Repair Cost Data, 2005 and from BOMA (Building Owners and Managers Association), Preventative Maintenance and Building Operation Efficiency, 2003. The hours were adjusted to fit the quantity and type of the equipment at the Victoria Road Recreation complex.

Column F is the frequency of the preventative maintenance which has been transcribed into an actual 52 week schedule in columns G to BF.

The auto filter function for the electronic spread sheet has been turned on for the entire spread sheet which allows the sheet to be sorted. Sorting on column A will allow for easy locating of a specific building element. Sorting on any of the weekly columns will quickly identify all of the Preventative maintenance tasked require in that week.

11.6. Infra Red Scans

Infra red scans were done on the electrical components. The reports from the scanning company Schneider Electric are included in their entirety in Appendix C. On the day of the site visit it was not possible to establish full electrical loads on the system as the chiller was apart for repairs. Schneider has offered to return to the site to re-do the circuit with the chiller after repairs are completed however it will be after the deadlines to

submit this report. There were no problems identified with the electrical systems on the day of the site visit.

12. Appendix A – Capital Planning Spreadsheets

13. Appendix B – Preventative Maintenance Spreadsheets

14. Appendix C – Infra Red Scans

Thermographic Inspection
of
Electrical Distribution Equipment

At Victoria Road Community Centre,
151 Victoria Road North,
Guelph, Ontario

Inspection completed on behalf of
The Stonewall Group Inc.

Completed by: Ian Thomson
Reference: FS20874109
Date: July 05 2005

THERMOGRAPHIC INSPECTION REPORT

ELECTRICAL DISTRIBUTION EQUIPMENT

Every body emits infrared radiation relative to its temperature and emissivity. The Thermographic camera detects this invisible energy and converts it to a visible image on a TV screen. The different colours represent different temperatures within the set range of the camera. The system allows the operator to measure any spot on the screen, in degrees Celsius.

The image displayed by the Thermographic imager is a colour representation of this infrared radiation intensity. This image allows for meaningful interpretation of the thermal properties of the various objects. This makes it possible to pinpoint potential problem areas before damage results from overheating.

For electrical inspections, the actual temperature of objects is given in the thermogram. By subtracting the ambient temperature, the temperature rise of the object in question is obtained. Most electrical equipment has a specific temperature rise rating. The thermogram, therefore, provides a measurement of the rise above ambient and information required to decide a priority of repairs.

There are no set rules for the assessment of excess temperatures as measured. The over heating could be caused by hidden faults such as poor connections. Several factors must be considered before prioritizing of repairs.

* Temperature rise
* Load during test
* Type and design of equipment
* Environmental conditions
* Temperature rating of components and insulation.

Power must be "ON" during the inspection, with at least 40% capacity load or higher if possible. Evaluations in the report are based on load conditions in effect at the time of the inspection.

A second inspection should be conducted after the repairs have been completed, so as to be sure that no problems exist.

THE EQUIPMENT USED FOR THE INSPECTION WAS THE FLIR P40, thermal imager.

Priority 1 = Repair Immediately

Priority 2 = As Soon As Possible

Priority 3 = Repair at time of next Maintenance

Summary of Inspection

Device	Rating	Designation	Status
Main electrical Room			
Moulded case breaker	800	Main	Ir-107, Ir-108
Metering compartment	-	PUC	OK
Distribution section			
Moulded case breaker	20 Amp	Exit Lights	OK
Moulded case breaker	20 Amp	Exterior lights	OK
Moulded case breaker	20 Amp	Night lights	OK
Moulded case breaker	15 Amp	Exhaust fan	OK
Moulded case breaker	100 Amp	Rink frost Prevention	OK
Moulded case breaker	100 Amp	PPN	OK
Moulded case breaker	300 Amp	Refrigeration Splitter	no load
Moulded case breaker	20 Amp	PPR	OK
Moulded case breaker			
Moulded case breaker	30 Amp	Parking lot lights	no load
Moulded case breaker	50 Amp	Electric heat	no load
Moulded case breaker	70 Amp	Pool equipment	OK
Moulded case breaker	100 Amp	PPM	OK
Moulded case breaker		Transformer: T1	OK
Rooftop mechanical room			
motor controller	-	F7	OK
motor controller	-	Compressor	OK
motor controller	-	F17	OK
motor controller	-	F8	OK
power panel	100	PPM	OK

Insert Schneider PDF document (two pages)