ASSOCIATION OF MANITOBA MUNICIPALITIES
MANITOBA MUNICIPAL ENERGY AND WATER EFFICIENCY PROJECT
R.M. OF GRAHAMDALE
FINAL REPORT
MARCH 2006

KGS GROUP

KONTZAMANIS ▪ GRAUMANN ▪ SMITH ▪ MACMILLAN INC.
CONSULTING ENGINEERS & PROJECT MANAGERS

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March 28, 2006

File No. 05-1285-01-1000.4

Association of Manitoba Municipalities
1910 Saskatchewan Avenue West
Portage la Prairie, Manitoba
R1N 0P1

RE: Municipal Energy and Water
Efficiency Study for Grahamdale – Final Report

Dear Mr. Tyler MacAfee:

Enclosed is the Final Report of the Manitoba Municipal Energy and Water Efficiency Study for the R.M. of Grahamdale with all comments incorporated.

Included with this submission are 10 hard copies (3 in colour, 7 in black and white) of the report and 10 copies on compact disk in PDF format with searchable text functionality, as requested in the "Request for Proposal". The PDF file consists of the entire report, including the Executive Summary, Sections 1 to 20, and Appendix A to G.

We thank you for giving us the opportunity to work on this project and look forward to continuing this work with the other Municipalities.

Yours Truly,

R. B. Bodnar, P.Eng.
Senior Mechanical Engineer/ Department Head

RBB/MG/af

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EXECUTIVE SUMMARY

The objective of this study was to determine energy and water efficiency opportunities that could enable the rural municipality of Grahamdale to reduce operating costs, conserve resources, and reduce greenhouse gas emissions.

An energy and water efficiency audit was conducted on eighteen buildings in the rural municipality of Grahamdale. Throughout the course of this audit, water and energy efficiency opportunities were analyzed to determine each building's potential for energy and water savings. The saving opportunities were separated into the following categories:

- Lighting – Replacing the interior and/or exterior lighting with more energy efficient lights and fixtures.
- Envelope – This involves measures that would reduce the heat loss through the building's windows, doors, walls, and roof.
- Motors- Replacing low efficiency motors with higher efficiency motors.
- HVAC- Improving current heating, ventilating and air conditioning systems.
- Process Equipment: Potential upgrades to ice plants.
- Water – Replacing high flow water fixtures with water efficient fixtures.

Table E1 shows the energy and water consumption for each of the buildings for the period from August 2004 to August 2005. This year was chosen as it represents a typical year for energy and water consumption. In addition, the most recent year was selected since the conditions of the buildings throughout this time most closely resemble the buildings' current conditions. Aside from an oil furnace used in the boarding house of the Steep Rock Community Hall, the buildings included in this audit use electricity exclusively. The "Energy Density" column in this table is the total energy consumed in the building divided by the area of the building. This is useful in comparing the energy consumption among the different buildings in Grahamdale. The pie chart displays the percentage of total energy density for each of the buildings. It ranges from a high of 14% for the Moosehorn Fire Hall to a low of 1% for the Moosehorn Heritage Museum and the Steep Rock Community Hall.

Tables E2 (a) and (b) show overall energy and water saving opportunities for all eighteen buildings in the Rural Municipality of Grahamdale. These tables include approximate product and installation prices for each measure both with and without incentives (refer to Appendix D for a list of Manitoba Hydro incentives) and simple payback years. The "Simple Payback Years" column is the overall payback period and may vary for individual buildings.

From the energy saving opportunities table (Table E2(a)) it can be seen that the total potential for energy savings in all eighteen buildings is 393,527 kWh, or 46% of the current total energy consumption.

There were three main issues that were noted during the course of this study that limited the potential for additional energy savings.

- Some of the buildings have little or no ventilation (ex: Moosehorn Seniors Centre and both fire halls).
- Some of the buildings are unheated in the winter (ex: Moosehorn Heritage Museum).

- Some of the buildings are infrequently used (ex: fire halls, community halls, and seniors' centres).

The water saving opportunities table (Table E2(b)) only shows percentages of savings. The reason for this is that none of the buildings audited have water meters and actual water consumption is unknown. In addition, water is supplied by individual wells at each building. A central water supply system is not present. Actual water savings in litres/year would therefore be based on rough estimates and would not be accurate. The percentages shown in this table indicate the percent water savings that would result from replacing the current water fixtures in all of the buildings with water efficient fixtures.

In addition to energy, water, and cost savings, other benefits would result from implementing the saving opportunities recommended throughout this report:

- Reduction in CO_2 emissions resulting in reduced contribution to climate change– the percent reduction is shown at the bottom of each of the energy saving opportunity tables.
- Lowered maintenance costs – (e.g. replacing the current lights with longer lasting bulbs).
- Improved physical comfort – (e.g. reducing infiltration into buildings).

Table E1: Energy Consumption for the Period from August 2004 – August 2005

Site	Energy Density (kWh/m^2)	% of Total Energy Density	Area (m^2)	Electricity	
				kWh	Cost
St. Martin Recreation Centre (Including Bowling Alley, Curling Rink, and Seniors Centre)	55	2.8%	1427	77,940	$5,166
Camper Community Hall	93	4.7%	567	52,920	$3,761
Moosehorn Community Hall	152	7.7%	592	90,168	$6,127
Grahamdale Community Centre	140	7.1%	603	84,172	$6,275
Faulkner Community Hall	97	5.0%	708	69,024	$5,445
Steep Rock Community Hall	25	1.3%	353	8,940	$817
St. Martin Community Hall	177	9.0%	557	98,784	$6,814
Gypsumville Memorial Hall	177	9.0%	400	70,845	$5,099
Moosehorn Curling Rink	158	8.0%	836	132,060	$7,930
Moosehorn Fire Hall	263	13.4%	191	50,320	$3,595
Gypsumville Fire Hall	169	8.6%	288	48,720	$3,476
Moosehorn Administration Building	163	8.3%	150	24,478	$1,942
Moosehorn Heritage Museum (Including Masonic Hall, CN Moosehorn, & CFB Gypsumville)	18	0.9%	327	5,930	$616
Camper New Horizons Seniors Centre	80	4.1%	126	10,090	$892
Moosehorn Senior Citizens Handicraft Centre	99	5.0%	265	26,320	$1,981
Faulkner Seniors Centre	100	5.1%	102	10,180	$899
Total				**860,891**	**$60,835**

Table E2 (a): Summary of Energy Saving Opportunities for all 18 Buildings in Grahamdale

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years****		Related Buildings
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*	
LIGHTING											
Replace EXIT incandescent lamps with LED modules.	41	$50	$5	$80	$6,076	$3,973	9,697	$582	10.4	6.8	Rec Centre, Camper Hall, Moosehorn Hall, Grahamdale Centre, Steep Rock Hall, St. Martin Hall, Gypsumville Hall, Moosehorn Curling Rink, & Faulkner Seniors Centre.
Replace exterior lights with high-pressure sodium lights.	29	$125	$100	$125	$8,265	$7,439	6,557	$394	21.0	18.9	Camper Hall, Moosehorn Hall, Faulkner Hall, St. Martin Hall, Admin Building, Museum, Camper Seniors Centre, & Faulkner Seniors Centre.
Replace exterior incandescent lamps with high-pressure sodium lights with photocells.	12	$155	$118	$195	$4,788	$4,282	6,373	$383	12.5	11.2	Grahamdale Centre, St. Martin Hall, & Gypsumville Hall.
Retrofit 4' x 4 T12 fluorescents with T8 ballast and tubes.	37	$60	$40	$65	$5,273	$4,429	1,843	$111	47.6	40.0	Rec Centre & St. Martin Hall.
Retrofit 4' x2 T12 fluorescents with T8 ballast and tubes.	104	$55	$35	$65	$14,227	$11,856	4,524	$272	52.4	43.7	Rec Centre, Moosehorn Curling Rink, & Admin Building.
Retrofit 8' x2 T12 fluorescents with T8 ballast and tubes.	93	$75	$40	$75	$15,903	$12,192	5,081	$305	52.1	40.0	Rec Centre, Moosehorn Hall, Grahamdale Centre, St. Martin Hall, & Moosehorn Seniors Centre.
Replace interior incandescents with compact fluorescents.	5	$15	$10	$13	$157	$128	526	$32	5.0	4.1	Admin Building.
When replacing interior incandescents, replace them with compact fluorescents.	300	$13	$8	$0	$4,446	$2,736	8,090	$486	9.2	5.6	Rec Centre, Camper Hall, Moosehorn Hall, Grahamdale Centre, Faulkner Hall, Steep Rock Hall, St. Martin Hall, Gypsumville Hall, Moosehorn Curling Rink, Moosehorn Fire Hall, Museum, Moosehorn Seniors Centre, & Faulkner Seniors Centre.
Lighting Subtotal					**$59,990**	**$47,804**	**43,122**	**$2,589**			

Table E2 (a): Summary of Energy Saving Opportunities for all 18 Buildings in Grahamdale **Page 2 of 4**

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years****		Related Buildings
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*	
ENVELOPE											
Replace and weatherstrip doors.	19	350	350	100	$9,747	$9,747	39,638	$2,380	4.1	4.1	Moosehorn Hall, Grahamdale Centre, Gypsumville Hall, Moosehorn Curling Rink, Moosehorn Fire Hall, Admin Building, & Moosehorn Seniors Centre.
Weatherstrip pedestrian doors.	31	$15	$15	$50	$2,297	$2,297	39,772	$2,388	1.0	1.0	Rec Centre, Camper Hall, Moosehorn Hall, Grahamdale Centre, Faulkner Hall, Gypsumville Hall, Gypsumville Fire Hall, & Faulkner Seniors Centre.
Weatherstrip double/vehicle doors.	5	$30	$30	$100	$741	$741	16,739	$1,005	0.7	0.7	St. Martin Hall, Moosehorn Fire Hall, & Gypsumville Fire Hall.
Replace damaged weather-stripping on vehicle door.	1	$30	$30	$200	$262	$262	7,617	$457	0.6	0.6	Moosehorn Fire Hall.
Replace and seal windows.	14	$10,100	$8,287	$2,500	$14,364	$12,297	17,628	$1,058	13.6	11.6	Rec Centre, Gypsumville Hall, Moosehorn Fire Hall, & Moosehorn Seniors Centre.
Seal windows/doors.	9	$5	$5	$25	$34	$34	2,432	$146	0.2	0.2	Gypsumville Hall, Admin Building, & Camper Seniors Centre.
Upgrade wall insulation.	1	$4,038	$4,038	$4,038	$9,207	$9,207	4,230	$254	36.3	36.3	Admin Building.
Upgrade roof insulation.	1	$1,615	$1,615	$1,615	$3,682	$3,682	3,172	$190	19.3	19.3	Admin Building.
Upgrade floor insulation.	2	$19,100	$19,100	$19,100	$9,207	$9,207	82,808	$4,972	36.3	36.3	Grahamdale Centre & Gypsumville Hall.
Envelope Subtotal					**$49,541**	**$47,474**	**214,037**	**$12,851**			
HVAC											
Install programmable thermostats; Setback temp to 15°C (59°F).	15	$300	$300	$300	$10,260	$10,260	49,062	$2,946	3.5	3.5	Rec Centre, Moosehorn Hall, St. Martin Hall, Gypsumville Hall, Moosehorn Curling Rink, Moosehorn Fire Hall, & Admin Building.
Install motorized dampers.	11	$300	$300	$300	$7,524	$7,524	21,871	$1,313	5.7	5.7	Rec Centre, Moosehorn Hall, Grahamdale Centre, St. Martin Hall, & Gypsumville Hall, Faulkner Hall.

Table E2 (a): Summary of Energy Saving Opportunities for all 18 Buildings in Grahamdale **Page 3 of 4**

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years****		Related Buildings
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*	
Insulate heat return ducts in crawlspace.	1	$100	$100	$100	$228	$228	3,385	$203	1.1	1.1	Gypsumville Hall.
Install geothermal heating system.	1	$36,214	$36,214	$20,400	$64,540	$64,540	47,529	$2,854	22.6	22.6	Moosehorn Curling Rink.
HVAC Subtototal					**$82,552**	**$82,552**	**121,848**	**$7,316**			
MOTORS											
When replacing 20HP compressor motor, replace it with a premium efficiency motor.	1	$200	$200	$0	$228	$228	787	$47	4.8	4.8	Moosehorn Curling Rink.
When replacing pump and condenser fan motors, replace them with high efficiency motors.	2	$100	$100	$0	$228	$228	583	$35	6.5	6.5	Moosehorn Curling Rink.
Motors Subtotal					**$456**	**$456**	**1,371**	**$82**			
HOT WATER											
Insulate hot water piping.	14	$625	$625	$625	$1,425	$1,425	5,816	$349	4.1	4.1	Camper Hall, Moosehorn Hall, Grahamdale Centre, Faulkner Hall, Steep Rock Hall, St. Martin Hall, Gypsumville Hall, Moosehorn Curling Rink, Moosehorn Fire Hall, Gypsumville Fire Hall, Admin Building, Camper Seniors Centre, Moosehorn Seniors Centre, & Faulkner Seniors Centre.
Replace hot water heater with an instantaneous water heater.	3	$300	$300	$900	$4,104	$4,104	2,822	$169	24.2	24.2	Gypsumville Fire Hall, Admin Building, & Camper Seniors Centre.
Hot Water Subtotal					**$5,529**	**$5,529**	**8,638**	**$519**			

Table E2 (a): Summary of Energy Saving Opportunities for all 18 Buildings in Grahamdale

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	860,891	$60,968	25.66
Estimated Annual Savings	389,016	$23,357	11.59
Percent Savings	45%	38%	45%

* NI = Cost does not include incentives, WI = Cost includes incentives.
** The total cost column includes 14% taxes.
*** The cost of electricity was taken as 0.06004 $/kWh.
**** This is the overall payback period and may vary for individual buildings (refer to tables throughout report for payback years for specific buildings).

Table E2 (b) Summary of Water Saving Opportunities for Grahamdale

Description	Qty	Installed Cost/Unit ($)		Total Cost* ($)	Annual Water Savings (%)	Related Buildings
		Material	Labour			
Install water efficient metering faucets.	56	$309	$150	$29,303	80%	Rec Centre, Camper Hall, Moosehorn Hall, Grahamdale Centre, Faulkner Hall, Steep Rock Hall, St. Martin Hall, Moosehorn Curling Rink, Moosehorn Fire Hall, Gypsumville Fire Hall, Administration Building, Camper Seniors Centre, Moosehorn Seniors Centre, & Faulkner Seniors Centre.
Install water efficient toilets.	65	$284	$150	$32,159	55%	Rec Centre, Camper Hall, Moosehorn Hall, Grahamdale Centre, Faulkner Hall, Steep Rock Hall, St. Martin Hall, Gypsumville Hall, Moosehorn Curling Rink, Moosehorn Fire Hall, Gypsumville Fire Hall, Administration Building, Camper Seniors Centre, Moosehorn Seniors Centre, & Faulkner Seniors Centre.
Install water efficient urinals	18	$344	$200	$11,163	60%	Rec Centre, Moosehorn Hall, Grahamdale Centre, Faulkner Hall, Steep Rock Hall, St. Martin Hall, Gypsumville Hall, Moosehorn Fire Hall, Administration Building, & Faulkner Seniors Centre.

* The total cost column includes 14% taxes.

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Association of Manitoba Municipalities
Manitoba Hydro
Manitoba Conservation
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Manitoba Culture, Heritage, and Tourism

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- Bev Yaworski, Chief Administrative Officer
- Dave Shabaga (St. Martin Recreation Centre)
- Richard Shannon (Moosehorn Community Hall and Fire Hall)
- Judy Clark (Grahamdale Community Hall)
- Kathy Rawluk (Gypsumville Memorial Hall)
- Bev Yaworski (Administration Building)
- Edmund Russell (Camper New Horizons Seniors Centre)
- John Sveinson (Faulkner New Horizons Seniors Centre)
- Gordon Garing (Faulkner New Horizons Seniors Centre)

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1.0 INTRODUCTION

1.1 BACKGROUND

Energy and water conservation is becoming more important as environmental concerns grow and energy costs increase. For this reason it is important to perform energy and water efficiency audits to identify practical efficiency improvement opportunities and determine the capital costs and payback periods associated with these implementations.

An energy and water efficiency audit was conducted on eighteen buildings in the Rural Municipality of Grahamdale to determine how to reduce both energy and water consumption in each of the buildings.

1.2 OBJECTIVE

The objective of this study was to determine energy and water efficiency opportunities that could enable the rural municipalities of Grahamdale to reduce operating costs, conserve resources, and reduce greenhouse gas emissions. Most of the buildings in Grahamdale were analyzed separately and the results are presented in separate sections throughout this report. The three buildings that make up the Moosehorn Heritage Museum, however, share the same energy bills and are therefore presented together in one section.

1.3 METHODOLOGY

The buildings were toured from October 19 to 21, 2005 by Mr. Ray Bodnar, P.Eng. and Mr. Joel Lambert, both of KGS Group Engineering Consultants. These tours involved a walkthrough of each of the buildings to determine the current condition of the building's envelope (walls, roof, windows, and doors), lighting, water fixtures, heating, ventilation and air conditioning (HVAC) systems, and motors.

During the building tours, the auditors met with the Grahamdale's Chief Administrative Officer Bev Yaworski to discuss the study objectives for identifying energy and water saving opportunities, and to provide information on existing incentive programs. At this time, it was

determined that there are currently no new building or retrofit projects underway for the municipality or surrounding area. While auditing the buildings, whenever possible, on-site training was done to inform the staff on energy and/or water saving opportunities in specific buildings and to point out maintenance issues where applicable.

Using the information collected during the audit, available drawings of the buildings, historical weather data, and the hydro bills from the past 12 months, calculations were performed to determine how each of the buildings are consuming energy and water. Several assumptions were made throughout these calculations including occupancies, room temperatures, and envelope conditions (see Inventory Sheets in Appendix A). When no drawings were available, wall/roof R-values were assumed based on discussions with site personnel or based on knowledge of other buildings of similar type/age to the building surveyed.

Energy Saving Opportunities (ESOs) were developed for each building and are presented in tables throughout this report showing energy savings, cost savings, installation costs, and simple payback periods. Simple Payback periods are calculated as the total installation cost divided by the annual cost savings. The installation costs include the material costs, both with and without incentives (see Appendix D for a list of Manitoba Hydro incentives), and the labour costs for the installation using standard contractor rates. The total energy savings, the percent energy savings, and the associated costs are presented at the end of each ESO table. It should be noted that the energy savings and capital cost estimates are preliminary. For complex measures such as geothermal heating/cooling, a more detailed investigation would be required to confirm capital and installation costs for this system.

An environmental benefit that results from reducing energy consumption is a reduction in CO_2 emissions. CO_2 is a greenhouse gas and thus contributes to global warming. Although over 95% of Manitoba's electricity is produced by hydropower and thus emits very little CO_2, some of the electrical generating stations in Canada and the United States burn fossil fuels and emit large quantities of CO_2 into the atmosphere. By reducing the electrical energy consumption here in Manitoba, more of Manitoba Hydro's clean hydropower is available for offsetting the fossil-fuelled electrical generating stations. At the bottom of each ESO table, the total CO_2 reduction resulting from the energy savings is shown. This was calculated using a CO_2 emissions calculator produced by Natural Resources Canada.

Many of the ESOs have low installed costs and payback periods of less than two years. Once the implementation phase begins, these ESOs are the most attractive measures. However, in order to maximize long-term savings and efficiencies for the buildings, implementation of the more capital-intensive measures with the longer payback periods is necessary. These items will become more attractive as energy costs increase in the future. It is recommended that the savings associated with the short payback ESOs be reinvested annually as a means to help finance the more expensive options.

Water Saving Opportunities (WSOs) are also presented in this report. The WSOs include installing water efficient sink faucets, toilets, urinals, and showerheads. Since none of the buildings have water meters, the savings are shown as percentages of the current fixtures' water consumption. Individual water wells supply water to these buildings and therefore, reducing water consumption will not save in water costs but will reduce pumping costs. Another cost saving is in treating the water. Although the current water supply may not be treated, it is possible that future regulations will require that all water supplies be treated. Once this occurs, reduced water consumption will result in significant savings on water treatment.

2.0 NORTH INTERLAKE RECREATION CENTRE

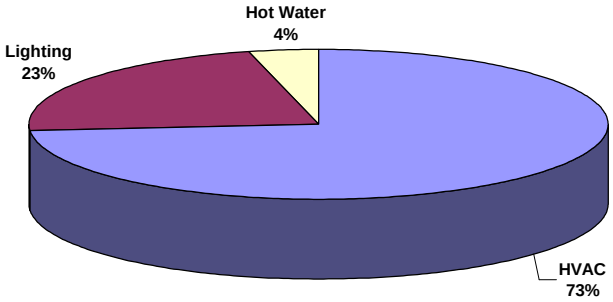
2.1 BACKGROUND

The North Interlake Recreation Centre, located in St. Martin, is a 15,360 square foot metal frame structure with metal cladding on the outside walls. The Recreation Centre was constructed in 1991 and houses a curling rink, a bowling alley, and a senior's centre.

Photo 1 – North Interlake Recreation Centre

The Recreation Centre uses only electricity with a total consumption for the previous year of 78,000 kWh at a cost of $5,300. The largest portion of electricity is used for heating as can be seen in the pie chart below.

Energy Breakdown (% of Total kWh) for the North Interlake Recreation Centre



The washrooms in the Recreation Centre contain a total of 9 toilets, 10 sinks, and 3 urinals. A 270-litre electric hot water heater heats the water for this facility. The energy used for hot water heating was calculated based on estimates of the current hot water consumption and includes the energy required to offset heat losses from the storage tank.

2.2 ENERGY AND WATER SAVING OPPORTUNITIES

Tables 1 and 2 show a summary of both the energy and water saving opportunities for the North Interlake Recreation Centre. The following assumptions were made in determining the annual savings:

- The Bowling Alley is occupied from September to May for 16 hours per week.
- The Curling Rink and lounge are occupied from October to April for three evenings per week for 8 hours each evening plus 3 weekend bonspiels per year.
- The Seniors Centre is occupied for 4 hours per week.
- The exit lamps are on 24 hours per day year round and the outdoor lights are on 12 hours per day year round.
- The temperature of the Centre (excluding the Curling Rink) is maintained at 21°C (70°F).
- For the purpose of water consumption, the typical occupancy is assumed to be 20.

Table 1 Energy Saving Opportunities for the North Interlake Recreation Centre

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
LIGHTING										
Replace EXIT incandescent lamps with LED modules.	6	$50	$5	$80	$889	$581	1,419	$85	10.4	6.8
Retrofit 4' x 4 T12 fluorescents with T8 ballast and tubes.	26	$60	$40	$65	$3,705	$3,112	1,318	$79	46.8	39.3
Retrofit 4' x2 T12 fluorescents with T8 ballast and tubes.	46	$55	$35	$65	$6,293	$5,244	1,166	$70	89.9	74.9
Retrofit 8' x2 T12 fluorescents with T8 ballast and tubes.	36	$75	$40	$75	$6,156	$4,720	1,654	$99	62.0	47.5
When replacing interior incandescents, replace them with compact fluorescents.	25	$13	$8	$0	$371	$228	944	$57	6.5	4.0
Lighting Subtotal					**$17,414**	**$13,885**	**6,500**	**$390**		
ENVELOPE										
Weatherstrip doors.	7	$15	$15	$50	$519	$519	10,145	$609	0.9	0.9
Replace and seal windows (7).	7	$5,950	$4,718	$1,200	$8,151	$6,747	11,854	$712	11.5	9.5
Envelope Subtotal					**$8,670**	**$7,266**	**21,998**	**$1,321**		
HVAC										
Install programmable thermostat in lounge; setback temp to 15°C (59°F).	1	$300	$300	$300	$684	$684	2,362	$142	4.8	4.8
Install motorized dampers.	1	$400	$400	$400	$912	$912	6,364	$382	2.4	2.4
HVAC Subtototal					**$1,596**	**$1,596**	**8,727**	**$524**		

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	77,940	$5,301	2.32
Estimated Annual Savings	37,225	$2,235	1.11
Percent Savings	48%	42%	48%

* NI = Cost does not include incentives, WI = Cost includes incentives.
** The total cost column includes 14% taxes.
*** The cost of electricity was taken as 0.06004 $/kWh (Taken from Manitoba Hydro's website).

Table 2 Water Saving Opportunities for the North Interlake Recreation Centre

Description	Qty	Installed Cost/Unit ($)		Total Cost* ($)	Annual Water Savings (%)
		Material	Labour		
Install water efficient metering faucets.	10	$309	$150	$5,233	80%
Install water efficient toilets.	9	$284	$150	$4,453	55%
Install water efficient urinals	2	$344	$200	$1,240	60%

* The total cost column includes 14% taxes.

2.3 GENERAL RECOMMENDATIONS

Lighting

The lighting analysis summary for the North Interlake Recreation Centre is shown in Appendix B, Table B.1.3. Although the initial cost of replacing the T12s with T8s is high, large annual energy savings would result from this upgrade. The energy consumed by the exit signs would be reduced by 90% if the incandescent bulbs were replaced with LEDs. The most economical opportunity is to replace the interior incandescent bulbs with energy efficient compact fluorescent bulbs.

Envelope

The weather-stripping around the exterior doors of this building is in poor condition resulting in cold air leaking through the cracks around the doors throughout the winter. Replacing the weather-stripping would reduce the heat loss through the cracks with a short payback period. Weather-stripping should be inspected for damage annually, especially in high traffic areas, and repaired as required. Replacing the single and double pane windows with triple pane windows would also help to reduce heat losses throughout the winter. Table B.1.4 in Appendix B shows details on these calculations.

HVAC

Installing a programmable thermostat in the lounge area and setting back the temperature during unoccupied times could result in energy savings with a very short payback. The thermostat should be programmed such that the temperature is reduced to 15°C (59°F) when the building is unoccupied.

Replacing the back draft damper in the exhaust duct with a motorized damper would reduce the cold air leakage into the building by ensuring an air tight seal when the fan is turned off.

Water

Exact water savings in litres are not shown in Table 2 above; however, Table B.1.5 in Appendix B shows estimated water consumption results that were calculated based on typical water fixtures and estimations of the occupancy of the Recreation Centre. Replacing the high flow faucets, toilets, and urinals with water efficient fixtures would save from 55 to 80% of the current fixtures' water consumption.

3.0 CAMPER HALL

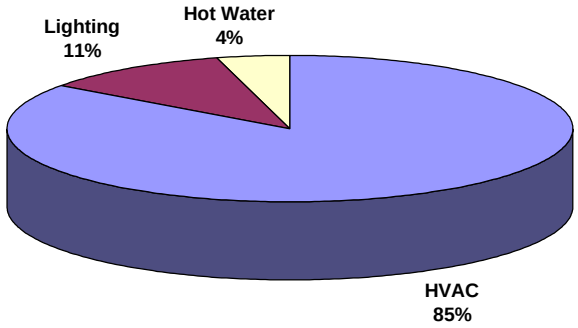
3.1 BACKGROUND

Camper Hall, built in 1984, is a 6,100 square foot building that is occupied for approximately 8 hours per week for bingo, weddings, funerals or other social events. The walls and roof of the hall are well insulated and are finished on the exterior with either stucco (3 of the 4 walls) or metal cladding (1 of the 4 walls and the roof).

Photo 2 – Camper Hall

The hall is heated using three electric, two-stage furnaces and an electric wall heater. Two condensing units provide cooling in the summer. The annual electricity consumption for the hall is 52,920 kWh with a total cost of $3,761 for the year. The pie chart below shows the portions of the total energy consumption used for lighting, water heating, and heating, ventilating, and air conditioning. Since the hall is only occupied 5% of the time, the energy consumption for hot water and lights is quite low.

Energy Breakdown (% of Total kWh) for Camper Hall



The washrooms in Camper Hall contain a total of 6 toilets, 6 sinks, and 3 urinals. A 175-litre electric hot water heater heats the water for this facility. The energy used for hot water heating was calculated based on estimates of the current hot water consumption and includes the energy required to offset the heat losses from the storage tank.

3.2 ENERGY AND WATER SAVING OPPORTUNITIES

Tables 3 and 4 show a summary of energy and water saving opportunities for the Camper Hall. The following assumptions were made in the analysis:

- Camper Hall is occupied for 8 hours per week.
- The temperature of the hall is maintained at 10°C (50°F) when unoccupied.
- For the purpose of water consumption, the typical occupancy of the hall during an event is assumed to be 50.
- The exit lamps are on 24 hours per day year round and the outdoor lights are on 12 hours per day year round.

Table 3 Energy Saving Opportunities for Camper Hall Energy Saving Opportunities for Camper Hall

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
LIGHTING										
Replace EXIT incandescent lamps with LED modules.	1	$50	$5	$80	$148	$97	237	$14	10.4	6.8
Replace exterior incandescent lamps with high-pressure sodium lights.	5	$130	$93	$130	$1,482	$1,268	1,095	$66	22.5	19.3
When replacing interior incandescents, replace them with compact fluorescents.	15	$13	$8	$0	$222	$137	281	$17	13.2	8.1
Lighting Subtotal					**$1,853**	**$1,502**	**1,612**	**$97**		
ENVELOPE										
Weatherstrip doors.	5	$15	$15	$50	$371	$371	6,232	$374	1.0	1.0
Envelope Subtotal					**$371**	**$371**	**6,232**	**$374**		
HOT WATER										
Insulate hot water piping.	1	$50	$50	$50	$114	$114	465	$28	4.1	4.1
Water Subtotal					**$114**	**$114**	**465**	**$28**		

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	52,920	$3,761	1.58
Estimated Annual Savings	8,309	$499	0.25
Percent Savings	16%	13%	16%

* NI = Cost does not include incentives, WI = Cost includes incentives.
** The total cost column includes 14% taxes.
*** The cost assigned to electricity is 0.06004 $/kWh (Taken from Manitoba Hydro's website).

Table 4 Water Saving Opportunities for Camper Hall

Description	Qty	Installed Cost/Unit ($)		Total Cost* ($)	Annual Water Savings (%)
		Material	Labour		
Install water efficient metering faucets.	6	$309	$150	$3,140	80%
Install water efficient toilets.	6	$284	$150	$2,969	55%

* The total cost column includes 14% taxes.

3.3 GENERAL RECOMMENDATIONS

Lighting

Since Camper Hall is occupied for so few hours every year, replacing the T12s with T8s would not result in sufficient savings to make replacing them worthwhile (this assumes that the lights

are turned off when the hall is not in use). Energy savings from replacing the T12 fluorescent lights are therefore not shown in Table 3 above but are included in Table B.2.3 in Appendix B. Since the incandescent exit sign runs 24 hours per day, replacing it with an LED module would result in energy savings with a reasonable payback period. Similarly, the exterior incandescent lamps run 12 hours per day year round and therefore, replacing these lamps with high pressure sodium lights would result in significant energy savings. The lighting analysis summary table is shown in Appendix B as Table B.2.3.

Envelope

There is only one window in Camper Hall and it was replaced with a triple pane window in 1988. The doors are also well insulated; however, new weather-stripping would help reduce heat losses through the gaps around these doors. The results from these calculations are shown in Appendix B, Table B.2.4.

Water

The water analysis summary is shown in Table B.2.5 in Appendix B. Although the water consumption is fairly low for the Community Hall, replacing the fixtures with water efficient fixtures would save between 55 and 80% of their current water consumption.

Other Issues

The hall currently has no ventilation in the wintertime. One recommendation is to install a heating recovery ventilator to pre-heat the outdoor air intake to the furnace under the stage. This would allow for ventilation in the winter without significant heat losses.

4.0 MOOSEHORN COMMUNITY HALL

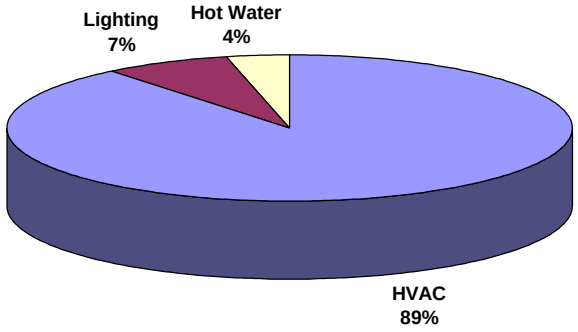
4.1 BACKGROUND

The Moosehorn Community Hall was originally built in 1970 and in approximately 1985, an addition was built on for a total area of 6,372 square feet. The hall consists of one large open room used for both Bingo and Socials.

Photo 3 - Moosehorn Community Hall

This building is heated with electric cabinet convectors in the hall, unit heaters in the kitchen, and baseboards in the washrooms. Cooling is provided in the summertime using 4 – 5 ton condensers. The total electricity consumption for the previous year was 90,168 kWh and was used for lighting, heating, and hot water as shown in the pie chart below.

Energy Breakdown (% of Total kWh) for the Moosehorn Community Hall



The washrooms in the Moosehorn Community Hall contain a total of 7 toilets, 6 sinks, and 2 urinals. A 270-litre electric hot water heater heats the water for this facility. The energy used for hot water heating was calculated based on estimates of the current hot water consumption and includes the energy required to offset the heat losses from the storage tank.

4.2 ENERGY AND WATER SAVING OPPORTUNITIES

Tables 5 and 6 show summaries of the energy and water efficiency improvement opportunities for the Moosehorn Community Hall. The following assumptions were made in the calculations:

- The hall is occupied for 4 hours/week for bingo and twice a month for socials.
- The temperature of the hall is maintained at 21°C (70°F).
- For the purpose of water consumption, the typical occupancy of the hall is assumed to be 50.
- The exit lamps are on for 24 hours per day year round and the exterior lights are on 12 hours per day year round.

Table 5 Energy Saving Opportunities for the Moosehorn Community Hall

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
LIGHTING										
Replace EXIT incandescent lamps with LED modules.	5	$50	$5	$80	$741	$485	1,183	$71	10.4	6.8
Replace exterior incandescent lamps with high-pressure sodium lights.	6	$130	$93	$130	$1,778	$1,525	1,314	$79	22.5	19.3
Retrofit 8' x 2 T12 fluorescents with T8 ballast and tubes.	3	$75	$40	$75	$513	$393	149	$9	57.4	44.0
When replacing interior incandescents, replace them with compact fluorescents.	11	$13	$8	$0	$163	$100	317	$19	8.6	5.3
Lighting Subtotal					**$3,195**	**$2,503**	**2,962**	**$178**		
ENVELOPE										
Weatherstrip and replace old wood pedestrian doors.	4	$350	$350	$100	$2,052	$2,052	8,991	$540	3.8	3.8
Weatherstrip metal doors.	3	$15	$15	$50	$222	$222	4,348	$261	0.9	0.9
Envelope Subtotal					**$2,274**	**$2,274**	**13,339**	**$801**		
HVAC										
Install programmable thermostats; Setback temp to 15°C (59°F).	4	$300	$300	$300	$2,736	$2,736	10,167	$610	4.5	4.5
Install motorized dampers in exhausts.	2	$300	$300	$300	$1,368	$1,368	3,394	$204	6.7	6.7
HVAC Subtototal					**$4,104**	**$4,104**	**13,560**	**$814**		
HOT WATER										
Insulate hot water piping.	1	$50	$50	$50	$114	$114	465	$28	4.1	4.1
Water Subtotal					**$114**	**$114**	**465**	**$28**		

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	90,168	$6,125	2.69
Estimated Annual Savings	30,326	$1,821	0.90
Percent Savings	34%	30%	33%

* NI = Cost does not include incentives, WI = Cost includes incentives.
** The total cost column includes 14% taxes.
*** The cost assigned to electricity is 0.06004 $/kWh (Taken from Manitoba Hydro's website).

Table 6 Water Saving Opportunities for the Moosehorn Community Hall

Description	Qty	Installed Cost/Unit ($)		Total Cost** ($)	Annual Water Savings (%)
		Material	Labour		
Install water efficient metering faucets.	6	$309	$150	$3,140	80%
Install water efficient toilets.	7	$284	$150	$3,463	55%
Install water efficient urinals.	2	$344	$200	$1,240	60%

* The total cost column includes 14% taxes.

4.3 GENERAL RECOMMENDATIONS

Lighting

The lighting analysis results for the Moosehorn Community Hall can be found in Appendix B, Table B.3.3. Due to the infrequent occupancy of the hall, minimal energy savings would result from replacing the interior lights. The largest energy savings in terms of lighting for the hall would result from replacing the incandescent exit signs with LEDs and replacing the exterior incandescent lights with high-pressure sodium lights.

Envelope

The old wood doors to the hall have very little insulation. Replacing these doors with insulated doors and replacing the weather-stripping would help to reduce heat losses. In addition, replacing the weather-stripping around the insulated metal doors would reduce heat losses with a very short payback period. The analysis on the envelope for the Moosehorn Community Hall is shown in Appendix B, Table B.3.4.

HVAC

Installing programmable thermostats in the hall and wiring them to the light switches would help to reduce the heating requirements throughout the winter. When the hall is unoccupied, the thermostats will maintain the temperature of the lounges at 15°C (59°F). When the lights are switched on, the thermostat will increase its setting back to 21°C (70°F).

Replacing the leaky back draft dampers on the exhaust vents with motorized dampers would reduce the cold air leaking into the hall when the fan is shut off.

Water

Insulating the hot water pipes would reduce the heat losses from these pipes with a short payback period. Water usage savings from 55% to 80% would result from installing new water efficient metering faucets, urinals, and toilets in the washrooms. This water analysis is shown in Appendix B, Table B.3.5.

5.0 GRAHAMDALE COMMUNITY CENTRE

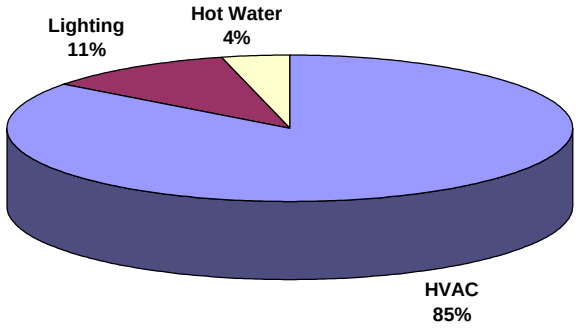
5.1 BACKGROUND

Grahamdale Community Centre is a 6,500 square foot wood frame structure with exterior aluminum siding. The building is approximately 30 years old and is currently used for bingo every Thursday and approximately one meeting every month.

Photo 4 – Grahamdale Community Centre

The electricity consumption for the previous year was 84,170 kWh with a total cost of $6,275. The pie chart below shows the breakdown of energy consumption for this building.

Energy Breakdown (% of Total kWh) for the Grahamdale Community Centre



The washrooms in the Grahamdale Community Hall contain a total of 6 toilets, 6 sinks, and 2 urinals. A 150-litre electric hot water heater heats the water for this facility. The energy used for hot water heating was calculated based on estimates of the current hot water consumption and includes the energy required to offset the heat losses from the storage tank.

5.2 ENERGY AND WATER SAVING OPPORTUNITIES

Tables 7 and 8 show summaries of the energy and water saving opportunities for the Grahamdale Community Centre. The following assumptions were made in the calculations:

- The Centre is occupied for 34 hours per month.
- The temperature of the Centre is maintained at 10°C (50°F) when unoccupied and 18°C (65 °F) when occupied.
- For the purpose of water consumption, typical occupancy of the hall is assumed to be 50.

Table 7 Energy Saving Opportunities for the Grahamdale Community Centre

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
LIGHTING										
Replace EXIT incandescent lamps with LED modules.	9	$50	$5	$80	$1,334	$872	2,129	$128	10.4	6.8
Replace exterior incandescent lamps with high-pressure sodium lights with photocells.	7	$155	$118	$155	$2,474	$2,179	2,759	$166	14.9	13.1
Retrofit 8' x 2 T12 fluorescents with T8 ballast and tubes.	27	$60	$40	$65	$3,848	$3,232	1,366	$82	46.9	39.4
When replacing interior incandescents, replace them with compact fluorescents.	6	$13	$8	$0	$89	$55	176	$11	8.4	5.2
Lighting Subtotal					**$7,744**	**$6,337**	**6,430**	**$386**		
ENVELOPE										
Weatherstrip and replace old wood doors.	3	$350	$350	$100	$1,539	$1,539	4,336	$260	5.9	5.9
Weatherstrip metal doors.	4	$15	$15	$50	$296	$296	3,728	$224	1.3	1.3
Insulate floor (roof of crawlspace).	1	$11,500	$11,500	$11,500	$26,220	$26,220	54,652	$3,281	8.0	8.0
Envelope Subtotal					**$28,055**	**$28,055**	**62,716**	**$3,765**		

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
HVAC										
Install motorized dampers.	2	$300	$300	$300	$1,368	$1,368	2,182	$131	10.4	10.4
HVAC Subtototal					**$1,368**	**$1,368**	**2,182**	**$131**		
HOT WATER										
Insulate hot water piping.	1	$50	$50	$50	$114	$114	465	$28	4.1	4.1
Water Subtotal					**$114**	**$114**	**465**	**$28**		

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	84,172	$6,275	2.51
Estimated Annual Savings	71,794	$4,310	2.14
Percent Savings	85%	69%	85%

* NI = Cost does not include incentives, WI = Cost includes incentives.
* *The total cost column includes 14% taxes.
*** The cost assigned to electricity is 0.06004 $/kWh (Taken from Manitoba Hydro's website).

Table 8 Water Saving Opportunities for the Grahamdale Community Centre

Description	Qty	Installed Cost/Unit ($)		Total Cost* ($)	Annual Water Savings (%)
		Material	Labour		
Install water efficient metering faucets.	6	$309	$150	$3,140	80%
Install water efficient toilets.	6	$284	$150	$2,969	55%
Install water efficient urinals.	2	$344	$200	$1,240	60%

* The total cost column includes 14% taxes

5.3 GENERAL RECOMMENDATIONS

Lighting

The inside lights in the Grahamdale Community Centre are used so infrequently that replacing the T12 lamps with T8s is not recommended. The exterior incandescent lights and exit signs, however, are on 24 hours a day; replacing these with energy efficient lighting would therefore result in large energy savings. In addition, photocells should be installed on the exterior lights such that they are automatically turned off throughout the day.

Envelope

Energy savings for replacing and weather-stripping the exterior doors are shown in Table 7 above. Consideration should be given to these opportunities since the payback period is so short. Another opportunity that would result in large energy savings is to upgrade the insulation in the ceiling of the crawlspace from R-4 to R-12. The crawlspace is unheated and therefore, upgrading the insulation would drastically reduce heat losses through the floors.

HVAC

Replacing the back draft dampers in the exhaust vents with motorized dampers would reduce the cold air leakage into the building. Details on the HVAC calculations can be found in Appendix B, Table B.3.6.

Water

The water savings that would result from replacing the current sink faucets, toilets, and urinals with water efficient fixtures are shown in Table 8. Table B.4.5 in Appendix B shows more detailed results from this analysis.

6.0 FAULKNER COMMUNITY HALL

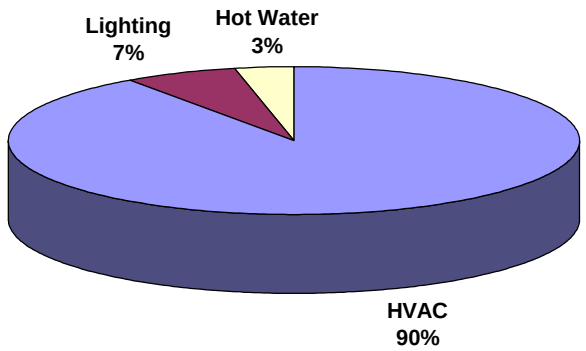
6.1 BACKGROUND

Faulkner Community Hall, constructed in 1990, is a 7,625 square foot building with metal clad exterior walls and drywall interior walls. The hall is only used approximately once per week for special functions.

Photo 5 – Faulkner Community Hall

The hall uses electricity exclusively for heating, lighting, and hot water. In the previous year, 69,024 kWh of electricity was consumed and the breakdown is shown in the pie chart below.

Energy Breakdown (% of Total kWh) for the Faulkner Community Hall



The washrooms in the Faulkner Community Hall contain a total of 7 toilets, 6 sinks, and 3 urinals. A 150-litre electric hot water heater heats the water for this facility. The energy used for hot water heating was calculated based on estimates of the current hot water consumption and includes the energy required to offset the heat losses from the storage tank.

6.2 ENERGY SAVING OPPORTUNITIES

Tables 9 and 10 below show summaries of the energy and water saving opportunities for the Faulkner Community Hall. The following assumptions were made in the calculations:

- The hall is occupied for 8 hours per week.
- The outdoor lights are on 12 hours per day year round.
- The temperature is maintained at 15°C (59°F).
- For the purpose of water consumption, the typical occupancy is assumed to be 50.

Table 9 Energy Saving Opportunities for the Faulkner Community Hall

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
LIGHTING										
Replace exterior halogens with high-pressure sodium lights.	4	$130	$93	$130	$1,186	$1,017	666	$40	29.7	25.4
When replacing interior incandescents, replace them with compact fluorescents.	95	$13	$8	$0	$1,408	$866	2,407	$145	9.7	6.0
Lighting Subtotal					**$2,594**	**$1,883**	**3,073**	**$185**		
ENVELOPE										
Weatherstrip doors.	6	$15	$15	$50	$445	$445	7,416	$445	1.0	1.0
Envelope Subtotal					**$445**	**$445**	**7,416**	**$445**		
HVAC										
Install motorized damper	1	$300	$300	$300	$684	$684	1,447	$87	7.9	7.9
HVAC Subtotal					**$684**	**$684**	**1,447**	**$87**		
HOT WATER										
Insulate hot water piping.	1	$50	$50	$50	$114	$114	465	$28	4.1	4.1
Water Subtotal					**$114**	**$114**	**465**	**$28**		

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	69,024	$5,445	2.06
Estimated Annual Savings	12,401	$745	0.37
Percent Savings	18%	14%	18%

* NI = Cost does not include incentives, WI = Cost includes incentives.
* *The total cost column includes 14% taxes.
*** The cost assigned to electricity is 0.06004 $/kWh (Taken from Manitoba Hydro's website).

Table 10 Water Saving Opportunities for the Faulkner Community Hall

Description	Qty	Installed Cost/Unit ($)		Total Cost* ($)	Annual Water Savings (%)
		Material	Labour		
Install water efficient metering faucets.	6	$309	$150	$3,140	80%
Install water efficient toilets.	7	$284	$150	$3,463	55%
Install water efficient urinals.	3	$344	$200	$1,860	60%

* The total cost column includes 14% taxes

6.3 GENERAL RECOMMENDATIONS

Lighting

The majority of the lights in the Faulkner Community Hall are incandescent bulbs. When these bulbs burn out, replacing them with compact fluorescents would save over 60% of the current lights energy consumption. Replacing the exterior halogens with high-pressure sodium lights would also save energy; however, this upgrade is costly since the entire fixtures require replacement. The lighting analysis summary for this station is shown in Appendix B, Table B.5.3.

Envelope

There are no windows in the hall and there is adequate insulation in the walls and roof of the building. From Table 9 it can be seen that the only energy saving opportunity suggested for the envelope is to weather-strip the pedestrian doors. This would reduce the amount of cold air infiltrating into the hall in the wintertime. Further details are shown in Appendix B, Table B.5.4.

HVAC

Installing a motorized damper in the exhaust duct to the attic would provide a better seal and would thus reduce cold air infiltration into the building.

Water

The hot water pipes in the hall have no insulation. Insulating these pipes would reduce the heat losses and thus save in annual energy consumption with a short payback period. Replacing the water fixtures in the washroom with water efficient fixtures would save from 55 to 80% of the current fixtures' water consumption.

7.0 STEEP ROCK COMMUNITY HALL

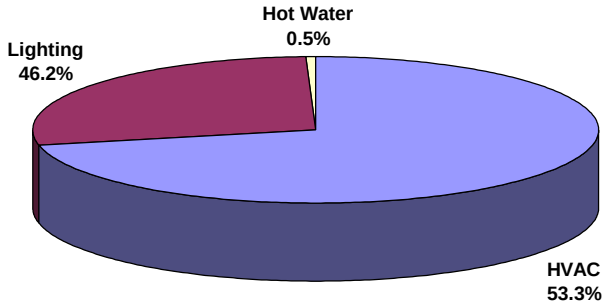
7.1 BACKGROUND

Steep Rock Community Hall is an old hall and boarding house constructed of concrete block walls and a stucco exterior. The hall is occupied approximately twice a month for special functions and the boarding house is rented throughout the summer.

Photo 6 – Steep Rock Community Hall

The hall portion of the building uses electricity exclusively for heating, hot water, and lighting while the boarding house is heated with an oil furnace which has failed and must be replaced. The total electrical energy consumed in the previous year was 8,940 kWh. The pie chart below shows how this electricity was split between lighting for both the hall and the boarding house, heat for the hall, and hot water heating. No records were available for oil consumption for the furnace in the boarding house and therefore the energy used to heat the house is not included in the pie chart below.

Energy Breakdown (% of Total kWh) for the Steep Rock Community Hall



The washrooms in the Steep Rock Community Hall contain a total of 4 toilets, 2 sinks, and 1 urinals and the washroom in the boarding house has 1 toilet and 1 sink. An electric hot water heater heats the water for both these facilities. The energy used for hot water heating was calculated based on estimates of the current hot water consumption and includes the energy required to offset the heat losses from the storage tank.

7.2 ENERGY AND WATER SAVING OPPORTUNITIES

Tables 11 and 12 show the energy and water saving opportunities for Steep Rock Community Hall. Since no records were available on the oil consumed by the furnace for heating and on the cost of oil, cost savings and payback periods for energy saving opportunities that reduce heating requirements in the house could not be calculated. Therefore, these opportunities are not included in the table but will be discussed in the following section.

The following assumptions were made in the analysis:

- The hall is occupied twice a month for 4 hours each time.
- The boarding house is rented from June to September and is maintained at 10°C (50°F) year round.
- The heat for the hall is shut off when it is unoccupied.
- For the purpose of water consumption, the typical occupancy of the hall is assumed to be 50.
- The exit lamps are on 24 hours per day year round and the exterior lights are on for 12 hours a day year round.

Table 11 Energy Saving Opportunities for Steep Rock Community Hall

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
LIGHTING										
Replace EXIT incandescent lamps with LED modules.	3	$50	$5	$80	$445	$291	710	$43	10.4	6.8
When replacing interior incandescents, replace them with compact fluorescents.	36	$13	$8	$0	$534	$328	1,147	$69	7.7	4.8
Lighting Subtotal					**$978**	**$619**	**1,857**	**$111**		
Hot Water										
Insulate hot water pipes.	1	$50	$50	$50	$114	$114	465	$28	4.1	4.1
Water Subtotal					**$114**	**$114**	**465**	**$28**		

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	8,940	$817	0.27
Estimated Annual Savings	2,322	$139	0.07
Percent Savings	26%	17%	26%

* NI = Cost does not include incentives, WI = Cost includes incentives.
**The total cost column includes 14% taxes.
*** The cost assigned to electricity is 0.06004 $/kWh (Taken from Manitoba Hydro's website).

Table 12 Water Saving Opportunities for Steep Rock Community Hall

Description	Qty	Installed Cost/Unit ($)		Total Cost* ($)	Annual Water Savings (%)
		Material	Labour		
Install water efficient metering faucets.	3	$309	$150	$1,570	80%
Install water efficient toilets.	5	$284	$150	$2,474	55%
Install water efficient urinals.	1	$344	$200	$620	60%

* The total cost column includes 14% taxes

7.3 GENERAL RECOMMENDATIONS

Lighting

When the incandescent bulbs in the hall and boarding house burn out, it is recommended that they be replaced with compact fluorescent bulbs. Compact fluorescents can last up to 10 times longer than incandescents and can save up to 75% in energy costs. Another recommendation is to replace the incandescent exit signs with LEDs. Since exit signs are never off, the payback

period for this upgrade is reasonable. The lighting analysis summary can be found in Table B.6.3.

Envelope

The hall portion of this building is only heated when it is occupied. Since it is only occupied for 8 hours a month (1% of the time), improving the efficiency of the building's envelope by replacing windows, doors or upgrading insulation is not recommended due to the long payback period. However, if there are plans to use the hall in the winter, the walls should be insulated to R20.

As previously mentioned, the boarding house is heated using an oil furnace. Energy saving opportunities for this portion of the building are shown in Appendix B, Table B.6.4. Energy savings of over 40,000 kWh would result from replacing and sealing the windows and doors and upgrading the wall and roof insulation.

HVAC

Since the hall is rarely heated, there are no recommendations for improving the heating or ventilation systems in this portion of the building. Consideration should be given to replacing the oil furnace in the boarding house with an electric furnace; this upgrade would save over 40% of the current heating bill. Another option is to replace the furnace with a high efficiency condensing oil furnace. Unfortunately, these are expensive and not commonly available.

Water

The hot water pipes are not insulated and are losing heat to the surroundings. Insulating these pipes would save energy with a short payback period. The percent water savings that would result from installing water efficient fixtures in the washrooms are shown in Table 12.

8.0 ST. MARTIN COMMUNITY HALL

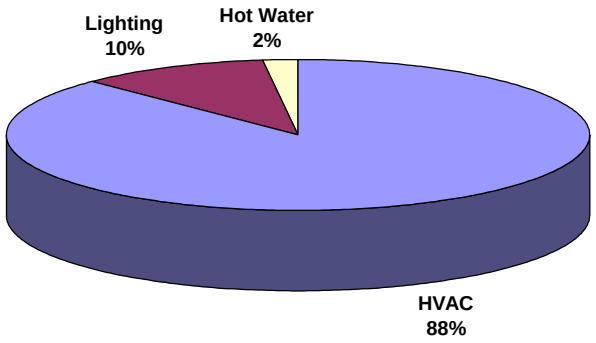
8.1 BACKGROUND

St. Martin Community Hall is a 6,000 square foot building that was constructed in 1985. The walls and roof are well insulated with exterior metal clad walls. The hall is used for bingo, court, meetings, and socials.

Photo 7 - St. Martin Community Hall

The electricity consumed over the past year totaled 98,784 kWh for a cost of $6,814. The majority of this energy is used to heat the hall, as can be seen in the pie chart below.

Energy Breakdown (% of Total kWh) for St. Martin Community Hall



The washrooms in the St. Martin Community Hall contain a total of 5 toilets, 4 sinks, and 2 urinals. A 270-litre electric hot water heater heats the water for this facility. The energy used for hot water heating was calculated based on estimates of the current hot water consumption and includes the energy required to offset the heat losses from the storage tank.

8.2 ENERGY AND WATER SAVING OPPORTUNITIES

Tables 13 and 14 show the energy and water saving opportunities for the St. Martin Community Hall. The following assumptions were made in the analysis:

- The hall is occupied for 612 hours per year.
- One of the outdoor lights is on 24 hours a day while the others are on 12 hours per day year round.
- For the purpose of water consumption, the typical occupancy is assumed to be 50.
- The temperature of the hall is maintained at 21°C (70°F).

Table 13 Energy Saving Opportunities for the St. Martin Community Hall

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
LIGHTING										
Replace EXIT incandescent lamps with LED modules.	3	$50	$5	$80	$445	$291	710	$43	10.4	6.8
Replace exterior incandescent lamps with high-pressure sodium lights.	5	$130	$93	$130	$1,482	$1,271	1,643	$99	15.0	12.9
Replace exterior incandescent lamps with high-pressure sodium lights with photocell.	1	$155	$118	$195	$399	$357	986	$59	6.7	6.0
Retrofit 4' x 4 T12 fluorescents with T8 ballast and tubes.	11	$60	$40	$65	$1,568	$1,317	525	$32	49.7	41.8
Retrofit 8' x2 T12 fluorescents with T8 ballast and tubes.	18	$75	$40	$75	$3,078	$2,360	1,366	$82	37.5	28.8
When replacing interior incandescents, replace them with compact fluorescents.	12	$13	$8	$0	$178	$109	347	$21	8.5	5.3
Lighting Subtotal					**$7,149**	**$5,705**	**5,576**	**$335**		
ENVELOPE										
Weather-strip double doors.	3	$30	$30	$100	$445	$445	11,304	$679	0.7	0.7
Envelope Subtotal					**$445**	**$445**	**11,304**	**$679**		
HVAC										
Install programmable thermostat; Setback temp to 15°C (59°F).	2	$300	$300	$300	$1,368	$1,368	11,828	$710	1.9	1.9
Install motorized dampers.	2	$300	$300	$300	$1,368	$1,368	3,394	$204	6.7	6.7
HVAC Subtototal					**$2,736**	**$2,736**	**15,221**	**$914**		
HOT WATER										
Insulate hot water piping.	1	$50	$50	$50	$114	$114	465	$28	4.1	4.1
Water Subtotal					**$114**	**$114**	**465**	**$28**		

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	98,784	$6,814	2.94
Estimated Annual Savings	32,566	$1,955	0.97
Percent Savings	33%	29%	33%

* NI = Cost does not include incentives, WI = Cost includes incentives.
** The total cost column includes 14% taxes.
*** The cost assigned to electricity is 0.06004 $/kWh (Taken from Manitoba Hydro's website).

Table 14 Water Saving Opportunities for the St. Martin Community Hall

Description	Qty	Installed Cost/Unit ($)		Total Cost* ($)	Annual Water Savings (%)
		Material	Labour		
Install water efficient metering faucets.	4	$309	$150	$2,093	80%
Install water efficient toilets.	5	$284	$150	$2,474	55%
Install water efficient urinals.	2	$344	$200	$1,240	96%

* The total cost column includes 14% taxes

8.3 GENERAL RECOMMENDATIONS

Lighting

The best opportunities for energy savings in terms of lighting are in replacing the outdoor lights and exit signs with energy efficient lighting. One of the exterior incandescent lights is on 24 hours a day. Installing a photocell in this fixture would ensure that the light is turned off throughout the day. The indoor T12 fluorescents are not used sufficiently to make replacing them worthwhile. A detailed table on the lighting analysis can be found in Appendix B, Table B.7.3.

Envelope

There are no windows in this building and the walls and roof have adequate insulation. The only suggestion for energy saving opportunities in terms of the building's envelope is to weather-strip the doors. There is currently a gap around all three sets of double doors resulting in cold air leaking into the building throughout the winter months. Significant energy savings would result from sealing these cracks with weather-stripping.

HVAC

Installing programmable thermostats and setting the temperature back to 15°C (59°F) when the hall is unoccupied would save in the annual heating requirements. Large energy savings would also result from replacing the back draft dampers in the exhaust vents with motorized dampers. This would eliminate the cold air leakage through the dampers.

Water

Consideration should also be given to insulating the hot water piping to help reduce heat losses from the hot water.

From Table 14 it can be seen that installing water efficient fixtures in the washroom would reduce the water consumption. The urinals are automatic flush urinals and therefore they are assumed to flush every 20 minutes year round. Since the hall is unoccupied for 93% of the year, large water savings would result from replacing these urinals with manual flush, water efficient urinals.

9.0 GYPSUMVILLE MEMORIAL HALL

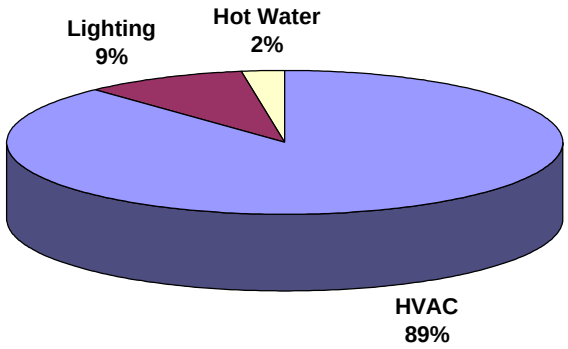
9.1 BACKGROUND

Gypsumville Memorial Hall, built in 1950, is a 4,300 square foot building with stucco exterior walls and wood paneling interior with 6" of insulation. This building consists of a small hall, a large hall, washrooms, and a kitchen that was added on in 1960.

Photo 8 - Gypsumville Memorial Hall

The total electricity consumption over the past year was 70,845 kWh with the majority of this energy used for heating as can be seen in the pie chart below.

Energy Breakdown (% of Total kWh) for the Gypsumville Memorial Hall



The washrooms in the Gypsumville Memorial Hall contain a total of 3 toilets, 4 sinks, and 2 urinals. A 175-litre electric hot water heater heats the water for this facility. The energy used for hot water heating was calculated based on estimates of the current hot water consumption and includes the energy required to offset the heat losses from the storage tank.

9.2 ENERGY AND WATER SAVING OPPORTUNITIES

Tables 15 and 16 show a summary of the energy and water savings opportunities for the Gypsumville Memorial Hall. The following assumptions were made in the analysis:

- The hall is occupied for 22 hours per month year round.
- The temperature is maintained at 21°C (70°F) in the winter.
- For the purpose of water consumption, the typical occupancy is assumed to be 50.
- The exit signs and exterior lights are on 24 hours per day.

Table 15 Energy Saving Opportunities for the Gypsumville Memorial Hall

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
LIGHTING										
Replace EXIT incandescent lamps with LED modules.	7	$50	$5	$80	$1,037	$678	1,656	$99	10.4	6.8
Replace exterior incandescent lamps with high-pressure sodium lights with photocells.	4	$155	$118	$195	$1,596	$1,427	2,628	$158	10.1	9.0
When replacing interior incandescents, replace them with compact fluorescents.	57	$13	$8	$0	$845	$520	948	$57	14.8	9.1
Lighting Subtotal					**$3,478**	**$2,625**	**5,232**	**$314**		
ENVELOPE										
Replace and weather-strip old pedestrian wood doors.	2	$350	$350	$100	$1,026	$1,026	4,495	$270	3.8	3.8
Weather-strip doors.	3	$15	$15	$50	$222	$222	4,348	$261	0.9	0.9
Seal doors.	2	$5	$5	$25	$68	$68	580	$35	2.0	2.0
Replace and seal double pane windows.	2	$800	$741	$600	$1,596	$1,528	2,996	$180	8.9	8.5
Upgrade floor insulation.	1	$7,600	$7,600	$7,600	$17,328	$17,328	28,156	$1,690	10.3	10.3
Envelope Subtotal					**$20,241**	**$20,173**	**40,575**	**$2,436**		

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
HVAC										
Install programmable thermostat; Setback temp to 15°C (59°F).	2	$300	$300	$300	$1,368	$1,368	8,916	$535	2.6	2.6
Insulate heat return ducts in crawlspace.	1	$100	$100	$100	$228	$228	3,385	$203	1.1	1.1
Install motorized dampers on exhausts.	3	$300	$300	$300	$2,052	$2,052	5,090	$306	6.7	6.7
HVAC Subtototal					**$3,648**	**$3,648**	**17,391**	**$1,044**		
HOT WATER										
Insulate hot water piping.	1	$50	$50	$50	$114	$114	465	$28	4.1	4.1
Water Subtotal					**$114**	**$114**	**465**	**$28**		

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	70,845	$5,099	2.11
Estimated Annual Savings	63,663	$3,822	1.90
Percent Savings	90%	75%	90%

* NI = Cost does not include incentives, WI = Cost includes incentives.
** The total cost column includes 14% taxes.
*** The cost assigned to electricity is 0.06004 $/kWh (Taken from Manitoba Hydro's website).

Table 16 – Water Saving Opportunities for the Gypsumville Memorial Hall

Description	Qty	Installed Cost/Unit ($)		Total Cost* ($)	Annual Water Savings (%)
		Material	Labour		
Install water efficient toilets.	3	$284	$150	$1,484	55%
Install water efficient urinals.	2	$344	$200	$1,240	60%

* The total cost column includes 14% taxes.

9.3 GENERAL RECOMMENDATIONS

Lighting

One recommendation for reducing energy consumption is to replace the exterior incandescent lights with high-pressure sodium fixtures and install photocell control to ensure that the lights are turned off throughout the day. The incandescent exit signs should also be replaced with LED exit signs; the LEDs consume 1/10th the electricity that the incandescent signs consume. Due to the large number of interior incandescent bulbs in this hall, it is recommended that when they burn out, they be replaced with compact fluorescents.

Envelope

Several of the doors to the hall require either caulking around the doorframes or weather-stripping to reduce the leakage through the cracks. In addition, two of the wood doors have poor insulation and should be replaced. Some of the windows were recently replaced with triple pane windows and are in good condition but there are still two double pane aluminum sliders with poor caulking that should be replaced and sealed tight.

The crawlspace is exposed to the outdoors and the floor of the hall has no insulation; a large amount of heat is therefore being lost through the floors. Insulating the ceiling of the crawlspace would drastically reduce the amount of heat lost to the crawlspace.

HVAC

Since the hall is rarely occupied, there is a large potential for energy savings in reducing the temperature setting when the hall is empty. Installing programmable thermostats and wiring them to the light switches such that the temperature is reduced to 15°C (59°F) when the lights are shut off would result in energy savings with a short payback period.

Other energy saving opportunities are to insulate the hot air return ducts in the crawlspace and to replace the leaky back draft dampers with motorized dampers.

Water

Insulating the hot water piping would save energy with a short payback period. As shown in Table 16, replacing the toilets and urinals in the washrooms with water efficient fixtures would save 55 and 60%, respectively, of the current fixtures' water consumption.

10.0 MOOSEHORN CURLING RINK

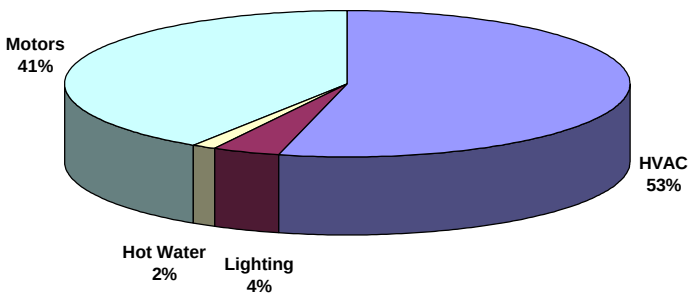
10.1 BACKGROUND

The Moosehorn Curling Rink is a 9,000 square foot metal clad building that was constructed in the late 1970s. The building consists of a curling rink and a lounge with large windows overlooking the rink.

Photo 9 – Moosehorn Curling Rink

The Curling Rink uses electricity exclusively for heating, lighting, hot water, and to run the motors for the ice plant. The following pie chart shows how the energy is consumed in a typical year.

Energy Breakdown (% of Total kWh) for the Moosehorn Curling Rink



The washrooms in the Moosehorn Curling Rink contain a total of 5 toilets, 3 sinks, and 1 urinal. An electric hot water heater heats the water for this facility. The energy used for hot water heating was calculated based on estimates of the current hot water consumption and includes the energy required to offset the heat losses from the storage tank.

10.2 ENERGY SAVING OPPORTUNITIES

Tables 17 and 18 show summaries of the energy and water saving opportunities for the Moosehorn Curling Rink. The following assumptions were made in the analysis:

- The Curling Rink is occupied from November to April for 3 nights per week plus 4 weekends per year.
- The temperature of the lounge is maintained at 21°C (70°F) in the winter and the temperature of the rink is maintained at 6°C (41°F).
- For the purpose of water consumption, the typical occupancy is assumed to be 50.

Table 17 Energy Saving Opportunities for the Moosehorn Curling Rink

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
LIGHTING										
Replace EXIT incandescent lamps with LED modules.	5	$50	$5	$80	$741	$485	1,183	$71	10.4	6.8
Retrofit 4' x2 T12 fluorescents with T8 ballast and tubes.	28	$55	$35	$60	$3,671	$3,032	1,361	$82	44.9	37.1
When replacing interior incandescents, replace them with compact fluorescents.	3	$13	$8	$0	$44	$27	85	$5	8.7	5.4
Lighting Subtotal					**$4,456**	**$3,544**	**2,628**	**$158**		
ENVELOPE										
Replace and weatherstrip exterior doors.	5	$350	$350	$100	$2,565	$2,565	11,239	$675	3.8	3.8
Envelope Subtotal					**$2,565**	**$2,565**	**11,239**	**$675**		
HVAC										
Install programmable thermostat; Setback temp to 15°C (59°F).	2	$300	$300	$300	$1,368	$1,368	7,515	$451	3.0	3.0
Install geothermal heat pump	1	$36,214	$36,214	$20,400	$64,540	$64,540	47,529	$2,854	22.6	22.6
HVAC Subtototal					**$65,908**	**$65,908**	**55,045**	**$3,305**		

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
MOTORS										
When replacing 20HP compressor motor, replace it with a premium efficiency motor.	1	$200	$200	$0	$228	$228	787	$47	4.8	4.8
When replacing pump and condenser fan motors, replace them with high efficiency motors.	2	$100	$100	$0	$228	$228	583	$35	6.5	6.5
Motors Subtotal					**$456**	**$456**	**1,371**	**$82**		
HOT WATER										
Insulate hot water piping.	1	$50	$50	$50	$114	$114	465	$28	4.1	4.1
Water Subtotal					**$114**	**$114**	**465**	**$28**		

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	132,060	$7,930	3.94
Estimated Annual Savings	70,748	$4,248	2.11
Percent Savings	54%	54%	54%

* NI = Cost does not include incentives, WI = Cost includes incentives.
** The total cost column includes 14% taxes.
*** The cost assigned to electricity is 0.06004 $/kWh (Taken from Manitoba Hydro's website).

Table 18 – Water Saving Opportunities for the Moosehorn Curling Rink

Description	Qty	Installed Cost/Unit ($)		Total Cost* ($)	Annual Water Savings (%)
		Material	Labour		
Install water efficient metering faucets.	3	$309	$150	$1,570	80%
Install water efficient toilets.	5	$284	$150	$2,474	55%

* The total cost column includes 14% taxes.

10.3 GENERAL RECOMMENDATIONS

Lighting

The lighting analysis summary is shown in Appendix B, Table B.9.3. Replacing the incandescent exit signs with LED exit signs would reduce the energy consumption from 30W per sign to 3W per sign. The other energy saving opportunities listed in Table 17 in terms of lighting are to replace the incandescent bulbs with compact fluorescents and to replace the T12

fluorescent lamps with T8s. The installation cost for replacing the T12 lamps and ballasts with energy efficient T8s is high and therefore the payback period for this opportunity is quite long.

Envelope

There are no exterior windows in this building and the walls and roof are well insulated. Therefore, the only energy saving opportunities suggested are to replace the five exterior doors with insulated doors and install weather-stripping.

HVAC

Installing programmable thermostats and setting the temperature down to 15°C (59°F) when the building is unoccupied would reduce annual heating requirements with a short payback period.

A geothermal heating system was investigated for this facility. The existing electric furnaces would be replaced with three water-to-air heat pumps connected to a closed loop ground water system. The ground loop is needed as a heat exchanger to pull and return heat from the ground. In addition to heating, this system could also be used for cooling in the summertime and could be expanded to include replacing the ice plant.

A geothermal heat pump is one of the most energy efficient and environmentally friendly electric heating and cooling systems available and would cut annual heating costs by 33%. Manitoba Hydro provides incentives for this installation.

Motors

A large portion of the annual energy consumption is used to run the ice plant motors. The energy savings shown in Table 17 represent the energy savings that would result from replacing the motors with premium efficiency versus standard efficiency motors when the current motors require replacement. The costs associated with this upgrade represents the additional cost of a premium over a standard efficiency motor.

Water

Insulating the hot water piping would reduce energy consumption with a short payback period. Table 18 shows the percent reduction in water consumption that results from replacing the current water fixtures in the washrooms with water efficient fixtures.

Other Opportunities

The following is a list of energy saving opportunities for the ice plant that would help reduce annual costs associated with ice production:

- Natural ventilation of the rink in the winter saves energy by reducing the run time of the refrigeration equipment.
- Ensure that the water used for flooding is pure – salts lower the freezing point of water and air in water acts like an insulation, making it harder for the brine in the slab to freeze the top layer of the ice.
- Keep the ice thin (1 inch thick) because excessive ice thickness increases the load on the compressor. Shaving ice helps to reduce the ice thickness and removes concentrations of impurities. When shaving ice, take the ice shavings outside to be melted as opposed to melting the shavings in a heated area of the building.
- Maintain your brine at a specific gravity of 1.2 to 1.22 for optimum energy use and maintain the brine temperature as high as possible.
- Significant amounts of energy can be saved by recovering heat from the refrigeration equipment and using it for flood water heating, space heating, domestic water heating, or ice melting.

For additional information, refer to the Manitoba Hydro “Guidelines for Operators of Manitoba’s Rinks and Arenas”, available for downloading from the following website:

http://www.hydro.mb.ca/sing_with_ps/recreation_manitoba_rinks.pdf

11.0 MOOSEHORN FIRE HALL

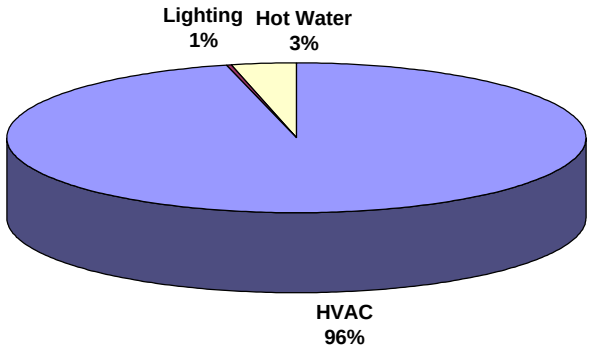
11.1 BACKGROUND

The Moosehorn Fire Hall is a 2,000 square foot building that was constructed in 1979 and contains a garage and a meeting room. The fire hall receives an average of one call every three weeks and aside from that, it is only occupied for approximately one hour every other day and for one meeting every month.

Photo 10 – Moosehorn Fire Hall

In the previous year, the Fire Hall consumed a total of 50,320 kWh of electrical energy for heating, lighting and hot water. The energy breakdown is shown in the pie chart below.

Energy Breakdown (% of Total kWh) for the Moosehorn Fire Hall



The washrooms in the Moosehorn Fire Hall contain a total of 3 toilets, 3 sinks, and 1 urinal. A 189-litre electric hot water heater heats the water for this facility. The energy used for hot water heating was calculated based on estimates of the current hot water consumption and includes the energy required to offset the heat losses from the storage tank.

11.2 ENERGY AND WATER SAVING OPPORTUNITIES

Tables 19 and 20 show the energy and water saving opportunities for Moosehorn Fire Hall. The following assumptions were made in the analysis:

- The fire hall is occupied for 1 hour every other day and for 1 meeting every month.
- The temperature of the hall is maintained at 21°C (70°F).
- For the purpose of water consumption, the typical occupancy is assumed to be 10.

Table 19 Energy Saving Opportunities for the Moosehorn Fire Hall

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
LIGHTING										
When replacing interior incandescents, replace them with compact fluorescents.	5	$13	$8	$0	$74	$46	121	$7	10.2	6.3
Lighting Subtotal					**$74**	**$46**	**121**	**$7**		
ENVELOPE										
Replace and weather-strip old wood pedestrian doors.	2	$350	$350	$100	$1,026	$1,026	4,495	$270	3.8	3.8
Replace damaged weather-stripping on vehicle door.	1	$30	$30	$200	$262	$262	7,617	$457	0.6	0.6
Weather-strip vehicle door.	1	$30	$30	$100	$148	$148	3,768	$226	0.7	0.7
Replace windows.	3	$2,450	$2,026	$100	$2,907	$2,424	1,523	$91	31.8	26.5
Envelope Subtotal					**$4,343**	**$3,860**	**17,403**	**$1,045**		
HVAC										
Install programmable thermostat; Setback temp to 15°C (59°F).	2	$300	$300	$300	$1,368	$1,368	6,847	$411	3.3	3.3
HVAC Subtototal					**$1,368**	**$1,368**	**6,847**	**$411**		
HOT WATER										
Insulate hot water piping.	1	$50	$50	$50	$114	$114	465	$28	4.1	4.1
Water Subtotal					**$114**	**$114**	**465**	**$28**		

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	50,320	$3,595	1.50
Estimated Annual Savings	24,837	$1,491	0.74
Percent Savings	49%	41%	49%

* NI = Cost does not include incentives, WI = Cost includes incentives
** The total cost column includes 14% taxes.
*** The cost assigned to electricity is 0.06004 $/kWh (Taken from Manitoba Hydro's website).

Table 20 Water Saving Opportunities for the Moosehorn Fire Hall

Description	Qty	Installed Cost/Unit ($)		Total Cost* ($)	Annual Water Savings (%)
		Material	Labour		
Install water efficient metering faucets.	3	$309	$150	$1,570	80%
Install water efficient toilets.	3	$284	$150	$1,484	55%
Install water efficient urinals.	1	$344	$200	$620	60%

* The total cost column includes 14% taxes.

11.3 GENERAL RECOMMENDATIONS

Lighting

The only energy saving opportunity listed in Table 19 for lighting is to replace the incandescent bulbs with compact fluorescent bulbs when they burn out.

Envelope

The old wood doors to the washroom have very little insulation and should be replaced with insulated doors with new weather-stripping. A considerable amount of heat is also being lost through the cracks around the vehicle doors; new weather-stripping would help reduce this heat loss. Another opportunity for energy savings is to replace the windows with triple pane windows; however, the payback for this upgrade is long.

HVAC

Since the fire hall is rarely occupied, installing programmable thermostats connected to the building's lighting and reducing the temperature setting to 15°C (59°F) during unoccupied times would save energy with a short payback period.

Water

The hot water piping should be insulated to reduce heat losses. Table 20 shows the percent reduction in water consumption that would result from replacing the current water fixtures in the washrooms with water efficient fixtures.

12.0 GYPSUMVILLE FIRE HALL

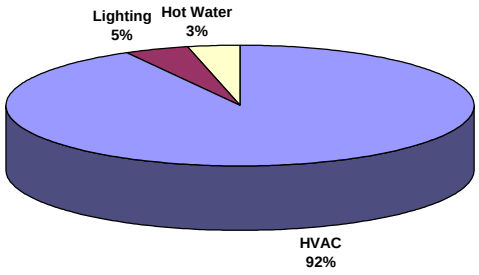
12.1 BACKGROUND

The Gypsumville Fire Hall is a 3,100 square foot well-insulated building with metal clad exterior walls. The west half of this building was constructed in 1984 and in the 1990s, the east half was added on. The Fire Hall consists of a large garage for the trucks, an office, and a washroom.

Photo 11 – Gypsumville Fire Hall

Due to the low occupancy of this building, the energy consumption in the previous year was only 48,720 kWh. The majority of this energy is used for heating and the remainder is used for lighting and for hot water heating as shown in the pie chart below.

Energy Breakdown (% of Total kWh) for the Gypsumville Fire Hall



The washroom in the Gypsumville Memorial Hall contains 1 toilet and 1 sink. A 150-litre electric hot water heater heats the water for this facility. The energy used for hot water heating was calculated based on estimates of the current hot water consumption and includes the energy required to offset the heat losses from the storage tank. The majority of the water consumption at the fire hall is used to fill the fire trucks. A submersible well pump fills a 4,000 gallon underground cistern which is used to fill the fire trucks.

12.2 ENERGY SAVING OPPORTUNITIES

Tables 21 and 22 show the energy and water saving opportunities for the Gypsumville Fire Hall. The following assumptions were made in the analysis:

- The Fire Hall is occupied for 2 hours per week.
- The temperature is maintained at 18°C (64°F) in the winter months.
- For the purpose of water consumption, the typical occupancy is assumed to be 10.

Table 21 Energy Saving Opportunities for the Gypsumville Fire Hall

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
ENVELOPE										
Weather-strip pedestrian door.	1	$15	$15	$50	$74	$74	1,390	$83	0.9	0.9
Weather-strip vehicle door.	1	$30	$30	$100	$148	$148	1,667	$100	1.5	1.5
Envelope Subtotal					**$222**	**$222**	**3,057**	**$184**		
HOT WATER										
Insulate hot water piping.	1	$50	$50	$50	$114	$114	465	$28	4.1	4.1
Replace hot water heater with instantaneous water heater.	1	$300	$300	$900	$1,368	$1,368	1,164	$70	19.6	19.6
Water Subtotal					**$1,482**	**$1,482**	**1,629**	**$98**		

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	48,720	$3,476	1.45
Estimated Annual Savings	4,686	$281	0.14
Percent Savings	10%	8%	10%

* NI = Cost does not include incentives, WI = Cost includes incentives
** The total cost column includes 14% taxes.
*** The cost assigned to electricity is 0.06004 $/kWh (Taken from Manitoba Hydro's website).

Table 22 Water Saving Opportunities for the Gypsumville Fire Hall

Description	Qty	Installed Cost/Unit ($)		Total Cost* ($)	Annual Water Savings (%)
		Material	Labour		
Install water efficient metering faucets.	1	$309	$150	$523	80%
Install water efficient toilets.	1	$284	$150	$495	55%

12.3 GENERAL RECOMMENDATIONS

Lighting

Since the indoor lighting in the Fire Hall is only on for approximately two hours every week, installing high efficiency lights would have a long payback period.

Envelope

The walls, roof, and doors of the Fire Hall are well insulated. However, some of the doors require new weather-stripping. Weather-stripping the pedestrian door and one of the vehicle doors on the east wall would reduce infiltration and thus reduce heat loss throughout the winter. The weather-stripping on the remaining vehicle doors is in good condition.

HVAC

The unit heaters in the Fire Hall have built in thermostats that are kept at 18°C (64°F) throughout the winter. This temperature setting is chosen such that the water in the fire trucks remains warm for fire calls in the winter. Reducing the temperature setting in this building is therefore not an option.

Water

Since the building is used so infrequently, the majority of the energy consumed by the hot water heater is used to maintain the water temperature in the tank at a certain degree (i.e. make up for heat losses from storage tank). Installing an instantaneous water heater would eliminate these heat losses. In addition, the hot water piping should be insulated for further energy savings.

Table 22 shows the percent water savings that would result from replacing the current water fixtures in the washroom with water efficient fixtures.

13.0 MOOSEHORN ADMINISTRATION BUILDING

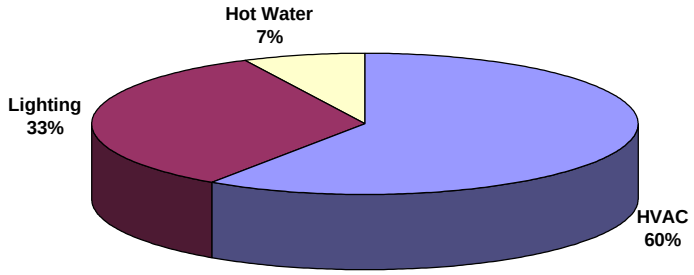
13.1 BACKGROUND

The Moosehorn Administration Building was built in the 1960s and houses the Rural Municipalities of Grahamdale's municipal offices and council chamber. The building is 1,600 square feet and has a stucco exterior, 4" thick walls, and drywall interior walls. The offices are occupied from Monday to Friday for 40 hours per week.

Photo 12 – Moosehorn Administration Building

The electrical energy consumption for the previous year was 24,478 kWh and was used for lighting, heating, and hot water as shown in the pie chart below.

Energy Breakdown (% of Total kWh) for the Moosehorn Administration Building



The washrooms in the Moosehorn Administration Building contain a total of 2 toilets, 2 sinks, and 1 urinal. A 130-litre electric hot water heater heats the water for this facility. The energy used for hot water heating was calculated based on estimates of the current hot water consumption and includes the energy required to offset the heat losses from the storage tank.

13.2 ENERGY SAVING OPPORTUNITIES

Tables 23 and 24 below show the energy and water saving opportunities for the Moosehorn Administration Building. The following assumptions were made in the analysis:

- The offices are occupied for 40 hours per week year round.
- The temperature is maintained at 21°C (70°F).
- For the purpose of water consumption, the typical occupancy is assumed to be 4.
- The exterior lights are on for 12 hours every night.

Table 23 Energy Saving Opportunities for the Moosehorn Administration Building

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
LIGHTING										
Replace exterior incandescent lamps with high-pressure sodium lights.	4	$130	$93	$130	$1,186	$1,017	526	$32	37.6	32.2
Retrofit 4' x2 T12 fluorescents with T8 ballast and tubes.	30	$55	$35	$65	$4,104	$3,420	1,997	$120	34.2	28.5
Replace interior incandescents with compact fluorescents.	5	$15	$10	$13	$157	$128	526	$32	5.0	4.1
Lighting Subtotal					**$5,446**	**$4,565**	**3,048**	**$183**		
ENVELOPE										
Replace and weather-strip old wood back door.	1	$350	$350	$100	$513	$513	2,248	$135	3.8	3.8
Seal double pane windows.	3	$5	$5	$25	$103	$103	855	$51	2.0	2.0
Upgrade roof insulation.	1	$1,615	$1,615	$1,615	$3,682	$3,682	3,172	$190	19.3	19.3
Upgrade wall insulation.	1	$4,038	$4,038	$4,038	$9,206	$9,206	6,345	$381	24.2	24.2
Envelope Subtotal					**$13,503**	**$13,503**	**10,505**	**$631**		
HVAC										
Install programmable thermostat; setback temp to 15°C (59°F).	2	$300	$300	$300	$1,368	$1,368	1,425	$86	16.0	16.0
HVAC Subtototal					**$1,368**	**$1,368**	**1,425**	**$86**		
HOT WATER										
Insulate hot water piping.	1	$50	$50	$50	$114	$114	465	$28	4.1	4.1
Replace water heater with instantaneous water heater.	1	$300	$300	$900	$1,368	$1,368	1,164	$70	19.6	19.6
Water Subtotal					**$1,482**	**$1,482**	**1,629**	**$98**		

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	24,478	$1,942	0.73
Estimated Annual Savings	16,506	$991	0.49
Percent Savings	67%	51%	67%

* NI = Cost does not include incentives, WI = Cost includes incentives
** The total cost column includes 14% taxes.
*** The cost assigned to electricity is 0.06004 $/kWh (Taken from Manitoba Hydro's website).

Table 24 Water Saving Opportunities for the Moosehorn Administration Building

Description	Qty	Installed Cost/Unit ($)		Total Cost* ($)	Annual Water Savings (%)
		Material	Labour		
Install water efficient metering faucets.	2	$309	$150	$1,047	80%
Install water efficient toilets.	2	$284	$150	$990	55%
Install water efficient urinals.	1	$344	$200	$620	60%

* The total cost column includes 14% taxes.

13.3 GENERAL RECOMMENDATIONS

Lighting

The lighting analysis summary for this building can be found in Appendix B, Table B.12.3. The only opportunity in terms of lighting with a less than 10-year payback period is to replace the interior incandescent light bulbs with compact fluorescents. Another energy saving opportunity that should be considered is to replace the T12 fluorescents with T8 ballasts and tubes. Although the payback period for this upgrade is long, T12 fluorescent lights are expected to become obsolete by the year 2010. The sooner these T12 lights are replaced with T8s, the more energy that will be saved in the long run.

Envelope

There are several opportunities for energy savings in terms of the building's envelope. The walls are only 4" thick with approximately R-12 insulation. Upgrading the insulation to R-20 would be costly but would reduce the building's heat load by over 15%. Another opportunity is to upgrade the roof insulation to R-40; the lower installation cost results in a shorter payback period when compared to the wall insulation.

Some of the windows are new triple pane windows while others are old double panes. The energy savings associated with replacing the double pane windows with triple panes are shown in Table B.12.4. This opportunity was not included in Table 23 due to the high payback period. However, these windows should be re-caulked to reduce cold air infiltrating into the building in the winter.

Another opportunity for energy savings with the building's envelope is to replace the weather-stripping around the back door. This would result in significant energy savings with a short payback period.

HVAC

The temperature in this building is currently maintained at 21°C (70°F) at all times. One option is to install programmable thermostats and set the temperature to 15°C (59°F) when the building is unoccupied. This will reduce the heating requirements and thus save in annual energy consumption.

Water

A large portion of the energy consumed by the hot water heater is to make up for heat losses from the tank. Installing an instantaneous water heater would eliminate these losses and the associated costs. In addition, the hot water piping is also losing heat to the surroundings and should be insulated.

Table 24 shows the percent water savings that would result from replacing the toilets, sink faucets, and urinals with water efficient fixtures.

Maintenance

During the building inspection, it was determined that the air conditioning fan coil filter has never been changed. This should be done annually to ensure peak efficiency of the air conditioning system. Similarly, the outdoor condenser should also be cleaned annually.

14.0 MOOSEHORN HERITAGE MUSEUM

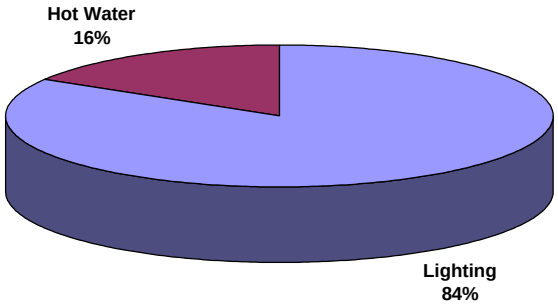
14.1 BACKGROUND

There are three separate buildings that make up the Moosehorn Heritage Museum. The building on the left in Picture 13 below is CN Moosehorn and the building on the right is Masonic Hall. The third building is only 360 square feet and is the old Canadian Forces Base for Gypsumville. This building (not shown in photo below) was closed for the past year. The rest of the Museum is occupied for 5 days a week throughout the summer.

Photo 13 – Moosehorn Heritage Museum

The Moosehorn Heritage Museum consumes very little energy. Throughout the winter, the buildings are unheated and all the water systems are drained. The electricity consumed in the previous year was therefore used exclusively for lighting and hot water. A total of 5,930 kWh was used in the previous year as shown in the pie chart below.

Energy Breakdown (% of Total kWh) for the Moosehorn Heritage Museum



The washrooms in CN Moosehorn and Masonic Hall contain a total of 2 toilets and 2 sinks. A small 45-litre electric hot water heater heats the water for CN Moosehorn and a 114 litre hot water heater is used to heat the water in the Masonic Hall. These water heaters are drained in the wintertime to prevent freezing. The energy used for hot water heating was calculated based on estimates of the current hot water consumption and includes the energy required to makeup for heat losses from the storage tanks throughout the summer.

14.2 ENERGY SAVING OPPORTUNITIES

Tables 25 and 26 show the energy and water saving opportunities for the Moosehorn Heritage Museum. The following assumptions were made in the analysis:

- The museum is occupied for 40 hours per week throughout the summer.
- There is no energy consumption for heating.
- For the purpose of water consumption, the typical occupancy is assumed to be 8.
- The exterior lights are on for 12 hours every night.
- There is no heat in any of the three buildings that make up the museum.

Table 25 Energy Saving Opportunities for the Moosehorn Heritage Museum

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$	NI*	WI*
LIGHTING										
Replace exterior incandescent lamps with high-pressure sodium lights.	1	$130	$93	$130	$296	$254	219	$13	22.5	19.3
When replacing interior incandescents, replace them with compact fluorescents.	14	$13	$8	$0	$207	$128	806	$48	4.3	2.6
Lighting Subtotal					**$504**	**$382**	**1,025**	**$62**		

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	5,930	$616	0.18
Estimated Annual Savings	1,025	$62	0.03
Percent Savings	17%	10%	17%

* NI = Cost does not include incentives, WI = Cost includes incentives
** The total cost column includes 14% taxes.
*** The cost assigned to electricity is 0.06004 $/kWh (Taken from Manitoba Hydro's website).

Table 26 Water Saving Opportunities for the Moosehorn Heritage Museum

Description	Qty	Installed Cost/Unit ($)		Total Cost* ($)	Annual Water Savings (%)
		Material	Labour		
Install water efficient metering faucets.	1	$309	$150	$523	80%
Install water efficient toilets.	2	$284	$150	$990	55%

* The total cost column includes 14% taxes.

14.2 GENERAL RECOMMENDATIONS

Lighting

The only energy saving opportunities for this building are to replace the interior incandescent bulbs with compact fluorescent bulbs and to replace the exterior incandescent lights with high-pressure sodium lights. The lighting analysis can be found in Appendix B, Table B.13.3.

Water

Table 26 shows the percent water savings that would result from replacing one of the high flow sink faucets (not the antique sink) and the toilets in the washrooms with water efficient fixtures.

15.0 CAMPER NEW HORIZONS SENIORS CENTRE

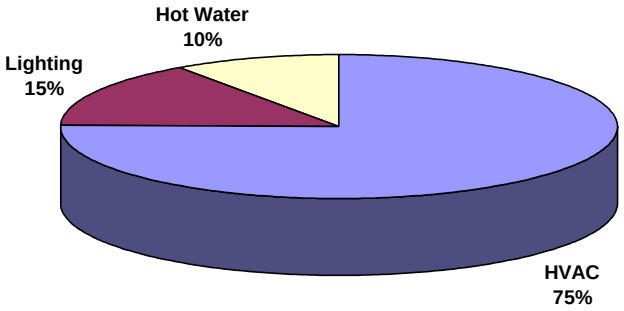
15.1 BACKGROUND

The Camper New Horizons Seniors Centre is a 1,356 square foot building that was constructed approximately 20 years ago. The walls and roof of this building are well insulated with vinyl siding on the exterior walls and a sloped shingled roof. The seniors centre is only occupied for approximately 3 hours every week.

Photo 14 – Camper New Horizons Seniors Centre

Electricity is used exclusively for heating, lighting, and hot water. A total of only 10,090 kWh of electrical energy was used in the previous year as shown in the pie chart below.

Energy Breakdown (% of Total kWh) for the Camper New Horizons Seniors Centre



The washrooms in the Camper New Horizons Seniors Centre contain a total of 2 toilets and 2 sinks. An 85-litre electric hot water heater heats the water for this facility. The energy used for hot water heating was calculated based on estimates of the current hot water consumption and includes the energy required to makeup for heat losses from the storage tank.

15.2 ENERGY SAVING OPPORTUNITIES

Tables 27 and 28 show the energy and water saving opportunities for the Camper New Horizons Seniors Centre. The following assumptions were made in the analysis:

- The centre is occupied for three hours every week.
- The temperature is maintained at 13°C (55°F).
- The exterior lights are on for 12 hours every night.
- For the purpose of water consumption, the typical occupancy is assumed to be 25.

Table 27 Energy Saving Opportunities at the Camper New Horizons Seniors Centre

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
LIGHTING										
Replace exterior incandescent lamps with high-pressure sodium lights.	2	$130	$93	$130	$593	$508	657	$39	15.0	12.9
Lighting Subtotal					**$593**	**$508**	**657**	**$39**		
ENVELOPE										
Seal steel doorframes.	2	$5	$5	$25	$68	$68	434	$26	2.6	2.6
Seal windows.	2	$5	$5	$25	$68	$68	564	$34	2.0	2.0
Envelope Subtotal					**$137**	**$137**	**997**	**$60**		
HOT WATER										
Replace water heater with instantaneous water heater.	1	$300	$300	$900	$1,368	$1,368	640	$38	35.6	35.6
Insulate hot water piping.	1	$25	$25	$25	$57	$57	233	$14	4.1	4.1
Water Subtotal					**$1,368**	**$1,368**	**640**	**$38**		

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	10,090	$892	0.30
Estimated Annual Savings	2,294	$138	0.07
Percent Savings	23%	15%	23%

* NI = Cost does not include incentives, WI = Cost includes incentives
** The total cost column includes 14% taxes.
*** The cost assigned to electricity is 0.06004 $/kWh (Taken from Manitoba Hydro's website).

Table 28 Water Saving Opportunities at the Camper New Horizons Seniors Centre

Description	Qty	Installed Cost/Unit ($)		Total Cost* ($)	Annual Water Savings (%)
		Material	Labour		
Install water efficient metering faucets.	2	$309	$150	$1,047	80%
Install water efficient toilets.	2	$284	$150	$990	55%

* The total cost column includes 14% taxes.

15.3 GENERAL RECOMMENDATIONS

Lighting

Since the interior lights in the Seniors Centre are rarely used, there is very little potential for energy savings with replacing them. The only recommended opportunity in terms of lighting is

to replace the exterior incandescent lights with high-pressure sodium lights. The lighting analysis is shown in Appendix B, Table B.14.3.

Envelope

The walls, roof, and metal doors of this building are well insulated. However, the caulking around the doorframes is in poor condition and should be re-done to reduce infiltration. Similarly, the windows should be re-caulked to seal the cracks around the frames.

Water

Consideration should be given to replacing the hot water heater with an instantaneous water heater. This will eliminate the heat losses from the storage tank. The hot water piping has no insulation and thus heat is being lost to the surroundings. Insulating these pipes would reduce heat losses with a short payback period.

Table 28 shows the percent water savings that would result from replacing the high flow toilets and sink faucets with water efficient fixtures.

Other Issues

Since this building is rarely used, it is worth considering relocating the activities performed in the winter to Camper Hall. This would eliminate the costs associated with heating this building throughout the winter.

16.0 MOOSEHORN SENIOR CITIZENS HANDICRAFT CENTRE

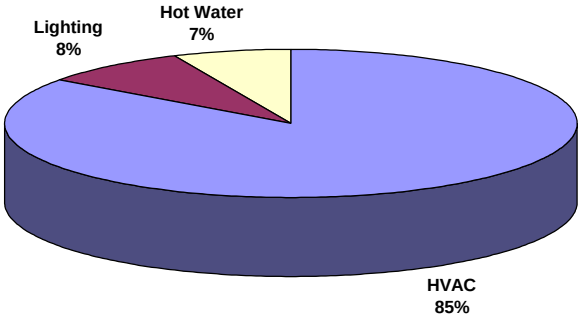
16.1 BACKGROUND

The Moosehorn Senior Citizens Handicraft Centre is a 2,852 square foot building that is occupied for approximately 8 ½ hours every week. The second floor of this building is unused and the entrance is blocked off. In addition, insulation batts have been laid down on the floor thus converting it into an attic.

Photo 15 – Moosehorn Senior Citizens Handicraft Centre

Electricity is used exclusively for heating, lighting, and hot water. A total of only 26,320 kWh of electrical energy was used in the previous year as shown in the pie chart below.

Energy Breakdown (% of Total kWh) for the Moosehorn Senior Citizens Handicraft Centre



The washrooms in the Moosehorn Senior Citizens Handicraft Centre contain a total of 2 toilets and 1 sink. A 150-litre electric hot water heater heats the water for this facility. The energy used for hot water heating was calculated based on estimates of the current hot water consumption and includes the energy required to offset the heat losses from the storage tank.

16.2 ENERGY SAVING OPPORTUNITIES

Tables 29 and 30 show the energy and water saving opportunities for the Moosehorn Senior Citizens Handicraft Centre. The following assumptions were made in the analysis:

- The centre is occupied for 8.5 hours every week plus 48 hours per year for special occasions.
- The temperature is maintained at 15°C (59°F).
- For the purpose of water consumption, the typical occupancy is assumed to be 25.

Table 29 Energy Saving Opportunities at the Moosehorn Senior Citizens Handicraft Centre

Description	Qty	Installed Cost/Unit ($)			Total Cost* ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
LIGHTING										
Retrofit 8' x 2 T12 fluorescents with T8 ballast and tubes.	9	$75	$40	$75	$1,539	$1,180	547	$33	46.9	35.9
When replacing interior incandescents, replace them with compact fluorescents.	3	$13	$8	$0	$44	$27	106	$6	7.0	4.3
Lighting Subtotal					**$1,583**	**$1,207**	**653**	**$39**		
ENVELOPE										
Replace and weather-strip east wood door.	1	$350	$350	$100	$513	$513	3,153	$189	2.7	2.7
Replace southwest wood door with insulated door.	1	$350	$350	$100	$513	$513	681	$41	12.5	12.5
Seal and replace single pane windows.	2	$900	$802	$600	$1,710	$1,598	1,255	$75	22.7	21.2
Envelope Subtotal					**$2,736**	**$2,624**	**5,089**	**$306**		
HOT WATER										
Insulate hot water piping.	1	$25	$25	$25	$57	$57	233	$14	4.1	4.1
Water Subtotal					**$57**	**$57**	**233**	**$14**		

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	26,320	$1,982	0.78
Estimated Annual Savings	5,975	$359	0.18
Percent Savings	23%	18%	23%

* NI = Cost does not include incentives, WI = Cost includes incentives
** The total cost column includes 14% taxes.
*** The cost assigned to electricity is 0.06004 $/kWh (Taken from Manitoba Hydro's website).

Table 30 Water Saving Opportunities at the Moosehorn Senior Citizens Handicraft Centre

Description	Qty	Installed Cost/Unit ($)		Total Cost* ($)	Annual Water Savings (%)
		Material	Labour		
Install water efficient metering faucets.	2	$309	$150	$1,047	80%
Install water efficient toilets.	2	$284	$150	$990	55%

* The total cost column includes 14% taxes.

16.3 GENERAL RECOMMENDATIONS

Lighting

The only practical energy saving opportunity in terms of lighting is to replace the incandescent bulbs with compact fluorescent bulbs. The lighting analysis is shown in Appendix B, Table B.15.3.

Envelope

The wood door on the east face of the building is not insulated and requires new weather-stripping. Replacing and weather-stripping this door would result in significant energy savings with a short payback period. The wood door on the southwest side of the building has good weather-stripping but should be replaced with an insulated wood door.

Several of the windows in this building have been recently replaced and are in good condition. However, there are still two single pane windows that could be replaced to reduce heat losses.

Water

The hot water piping has no insulation and thus heat is being lost to the surroundings. Insulating these pipes would reduce heat losses with a short payback period.

Table 30 shows the percent reduction in water consumption that would result from replacing the high flow sink faucets and toilets with water efficient fixtures. A more detailed analysis can be found in Appendix B, Table B.15.5.

17.0 FAULKNER SENIORS CENTRE

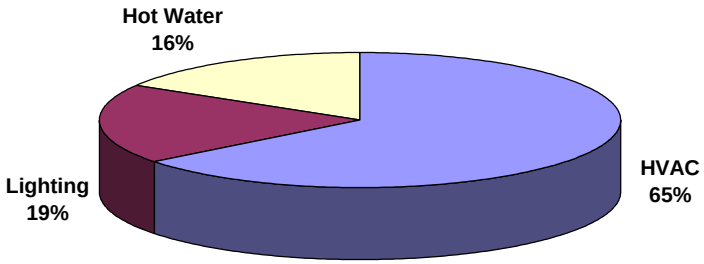
17.1 BACKGROUND

The Faulkner Seniors Centre is an 1,100 square foot building constructed in the mid 1990s. The walls and roof are well insulated with vinyl siding on the exterior walls and a sloped, shingled roof.

Photo 16 – Faulkner Seniors Centre

Electricity is used exclusively for heating, lighting, and hot water. A total of only 10,180 kWh of electrical energy was used in the previous year as shown in the pie chart below.

Energy Breakdown (% of Total kWh) for the Faulkner Seniors Centre



The washrooms in the Faulkner New Horizons Seniors Centre contain a total of 2 toilets, 2 sinks, and 2 urinals. A 145-litre electric hot water heater heats the water for this facility. The energy used for hot water heating was calculated based on estimates of the current hot water consumption and includes the energy required to offset the heat losses from the storage tank.

17.2 ENERGY SAVING OPPORTUNITIES

Tables 31 and 32 show the energy and water saving opportunities for the Faulkner Seniors Centre. The following assumptions were made in the analysis:

- The centre is occupied for 8 hours/week in the winter and 4 hours/week in the summer.
- When unoccupied, the temperature is maintained at 13°C (55°F).
- For the purpose of water consumption, the typical occupancy is assumed to be 30.
- The exit signs are on 24 hours per day and the exterior lights are on for 12 hours every night.

Table 31 Energy Saving Opportunities at the Faulkner Seniors Centre

Description	Qty	Installed Cost/Unit ($)			Total Cost** ($)		Estimated Annual Savings		Simple Payback Years	
		Material (NI*)	Material (WI*)	Labour	NI*	WI*	kWh	$***	NI*	WI*
LIGHTING										
Replace EXIT incandescent lamps with LED modules.	2	$50	$5	$80	$296	$194	473	$28	10.4	6.8
Replace exterior incandescent lamps with high-pressure sodium lights.	2	$130	$93	$130	$593	$508	438	$26	22.5	19.3
When replacing interior incandescents, replace them with compact fluorescents.	18	$13	$8	$0	$267	$164	404	$24	11.0	6.8
Lighting Subtotal					**$1,156**	**$866**	**1,315**	**$79**		
ENVELOPE										
Weather-strip doors	2	$15	$15	$50	$148	$148	2,168	$130	1.1	1.1
Envelope Subtotal					**$148**	**$148**	**2,168**	**$130**		
HOT WATER										
Insulate hot water piping	1	$25	$25	$25	$57	$57	233	$14	4.1	4.1
Water Subtotal					**$57**	**$57**	**233**	**$14**		

TOTALS	Energy (kWh)	Cost ($)	CO_2 (Tonnes)
Existing Annual Consumption/Cost/Emissions	10,180	$899	0.30
Estimated Annual Savings	3,716	$223	0.11
Percent Savings	37%	25%	37%

* NI = Cost does not include incentives, WI = Cost includes incentives
** The total cost column includes 14% taxes.
*** The cost assigned to electricity is 0.06004 $/kWh (Taken from Manitoba Hydro's website).

Table 32 Water Saving Opportunities at the Faulkner Seniors Centre

Description	Qty	Installed Cost/Unit ($)		Total Cost* ($)	Annual Water Savings (%)
		Material	Labour		
Install water efficient metering faucets.	2	$309	$150	$1,047	80%
Install water efficient toilets.	2	$284	$150	$990	55%
Install water efficient urinals.	2	$344	$200	$1,240	60%

* The total cost column includes 14% taxes.

17.3 GENERAL RECOMMENDATIONS

Lighting

The incandescent exit signs are on 24 hours a day and consume 30W each. Replacing these with 3W LEDs would result in a 90% energy saving. Another opportunity for lighting is to replace the interior incandescent lights with compact fluorescent bulbs. The exterior lighting cannot be replaced with compact fluorescent bulbs due to the cold outdoor temperatures. However, these lights could be replaced with high-pressure sodium light fixtures to reduce energy consumption. The lighting analysis is shown in Appendix B, Table B.16.3.

Envelope

The walls and roof of this building have adequate insulation and the windows have recently been replaced with triple pane windows. The only opportunity for energy savings in terms of the building's envelope is to replace the weather-stripping around the metal doors. This would reduce infiltration and thus save in annual heating requirements.

Water

The hot water piping has no insulation and thus heat is being lost to the surroundings. Insulating these pipes would reduce heat losses with a short payback period.

Table 32 shows the percent reduction in water consumption that would result from replacing the high flow sink faucets, urinals, and toilets with water efficient fixtures. A more detailed analysis can be found in Appendix B, Table B.16.5.

18.0 GENERAL UPGRADES AND MAINTENANCE RECOMMENDATIONS FOR REDUCING ENERGY AND WATER CONSUMPTION

The following energy and water saving opportunities exist in many buildings including those toured in this study. The saving opportunities are generic in nature and include both capital upgrades (Sections 18.1 to 18.4) and maintenance activities (Section 18.5) that will result in energy / water savings for all the buildings.

18.1 LIGHTING AND ELECTRICAL

Light Switches – Place signs or stickers adjacent to switches to remind occupants to shut off switches when leaving rooms unoccupied. Occupancy sensors can be provided to shut off lights automatically when not in use. Timers can also be used in a similar fashion.

Fluorescent Lighting Systems – T12 lights should be upgraded to premium T8 or T5 electronic ballasts and lamps. This may be done when current T12 ballasts need replacement or in a planned retrofit program. Use cold-weather rated ballasts for retrofits in areas where the temperature is below 15°C (59°F). When selecting T8 electronic ballasts, please refer to Manitoba Hydro's Power Smart Lighting program for current listings of eligible ballasts. Contact Manitoba Hydro for details.

EXIT Signs – Replace all incandescent exit signs with 3W LED signs.

Incandescent Bulbs – All incandescent bulbs should be converted to compact fluorescents. Compact fluorescent bulbs last approximately 10 times longer than incandescents and save up to 75% of the energy costs.

Exterior Lights – Compact fluorescent bulbs do not function at low temperatures, therefore, the exterior lights should be replaced with high-pressure sodium lighting. High-pressure sodium lights are the most energy efficient type of lighting available today. Savings of approximately 50% would result from replacing exterior incandescent fixtures with these high-pressure sodium lights. Photos cells should be considered for automatically shutting off outdoor lights during day light conditions.

Parking Lot Controllers – Parking lot controllers save energy by automatically adjusting the power at the car plugs depending on the outside temperature.

Other Recommendations - Dispose of all fluorescent lamps and ballasts through a recycling company to reduce toxins entering the landfills.

Refer to Appendix D for a list of Manitoba Hydro's Power Smart incentives and listings of other incentive programs.

18.2 BUILDING ENVELOPE

Window/Door Infiltration – Seal drafts on windows and doors. This can be done by installing or upgrading weather-stripping, or with removable silicone caulking such as “Draft Stop” or “Peel and Seal”. Doors with high usage should be inspected twice per year for damaged weather stripping.

Window/Door Replacement – Windows and doors with low R-values should be considered for replacement. Manitoba Hydro offers incentives for new windows.

Wall / Roof Insulation – The wall insulation in older buildings typically has a resistance of R-12 or less. Large energy savings would result from upgrading this insulation to R-20. Similarly, roof insulation should be upgraded to R40. In addition to the energy savings, upgrading insulation also extends the life of a building by avoiding the rotting of wood framing from the development of mould and mildew in the walls.

Electrical Outlets – Install draft-reducing foam pads in all electrical receptacles.

18.3 HEATING, VENTILATION, AND AIR CONDITIONING

Temperature Control – Use programmable electronic thermostats where appropriate. Use the recommended “set-back” and “set forward” temperatures during unoccupied periods. A 3°C “set-back” over a 12 hour period can reduce heating costs by 4%. Terminate ventilation during un-occupied periods.

Air Conditioning – Reduce the cooling load on the air conditioner by keeping the facility a few degrees warmer and using fans at workstations to augment cooling of personnel. Provide an economizer to supply “free cooling” when it is cool outside and air conditioning is required.

Remove or insulate wall or window-mounted air conditioners for the winter season.

HVAC Ductwork – Seal duct joints with duct tape to reduce losses of heated or cooled air where the ducts traverse cold or hot areas respectively. Insulate duct work passing through unconditioned spaces.

Thermostat Equipped Electric Baseboard Heaters – Mark the thermostat “normal” setting to provide a visual cue as to when they are on or set too high.

18.4 WATER CONSUMPTION

Excessive water usage wastes energy, increases water / sewage treatment costs and further risks damage to the environment.

Toilet Tanks – Install flush volume reduction devices in existing toilet tanks to reduce the quantity of water used per flush by about 25%. "Early closing flapper valves" are inexpensive and are easily installed**.**

Toilets – When replacing older toilets or installing new ones, use high efficiency, low-flush volume models that require only 6 L (1.3 Imp. gal.) per flush. Refer to the toilet and drainline reports on the Canadian Water and Wastewater Association (CWWA) website for advice in selecting a toilet that will perform well.

Hot Water – In facilities where large volumes of hot water are not required, set the hot water tank thermostat to 55°C (131°F). A reduction from 60°C to the recommended value of 55°C saves approximately 3% of the energy related to hot water generation. Insulate the first 2 meters (6 ft) of the cold water line and as much of the hot water distribution lines as practical, particularly where hot water lines traverse cold spaces.

Shower Controls – In facilities where large amounts of water are used, consider retrofitting single actuator, short cycle (adjustable), self-closing control valves, with pressure-balancing temperature controls to reduce water consumption. These controls limit flow and allow for a preset water temperature (recommended 40°C) for the showers in order to reduce water heating costs and wastage of water.

Auto-Shut Off Fixtures - Consider using spring loaded fixtures that automatically shut off water flow in public areas.

Tankless Water Heaters – Consider replacing the hot water storage tanks with instantaneous water heaters to avoid storage tank losses and save energy.

18.5 MAINTENANCE

Maintenance activities are important to ensure that the equipment in a building is operating efficiently and to reduce the potential for future equipment breakdown. One option is to hire a maintenance contractor to perform inspections four times annually to clean, lubricate, test, and adjust the building's HVAC.

The following is a list of HVAC maintenance procedures that should be performed two to four times annually:

Heating/Ventilation Systems

- Change filters
- Inspect belts
- Inspect and clean heating coils
- Inspect operation of blower

- Inspect and lubricate motor and fan bearings
- Inspect and lubricate fresh air, exhaust air, and return air dampers

Air Conditioning/Ice Plant Systems

- Clean outdoor condensers
- Clean filters
- Check refrigerant and oil levels
- Inspect ice plant and refrigerant piping for leaks
- Inspect and lubricate brine pumps
- Inspect and lubricate motorized and back draft dampers
- Inspect A/C operation and adjust as required

19.0 IMPLEMENTATION OF ENERGY AND WATER SAVING OPPORTUNITIES

19.1 IMPLEMENTATION

The energy and water saving opportunities suggested in this report range from simply changing a light bulb to installing a geothermal heating system. Some of the simpler recommended upgrades can be completed in-house while others would require hiring a contractor to complete the work. Major renovation projects will require a consulting engineer to design and help implement the upgrade. The various energy/water saving opportunities discussed throughout this report are separated into three levels of implementation: (1) in-house implementations, (2) contractor implementations, and (3) consulting engineer implementations. The following sections discuss which upgrades fall into each of these three categories.

In-House Implementations

Some of the energy saving opportunities can be completed in-house. Replacing the incandescent light bulbs with compact fluorescent bulbs involves simply replacing the bulb and could easily be done by one of the building's janitors. Installing weather-stripping around the doors and sealing the windows could also be done in-house. For the saving opportunities that involve replacing the doors, some could be done in-house while for others, such as the vehicle doors, it is best to hire a contractor.

Contractor Implementations

The majority of the energy saving opportunities will require a contractor. In terms of lighting, replacing the T12s with T8s requires replacing the ballast as well as the bulbs. An electrician should be hired to complete this function. Replacing the exterior incandescent lights with high-pressure sodium lights and replacing the exit incandescent lamps with LED modules involve replacing the fixture and will therefore require an electrician.

Upgrades on a building's envelope not mentioned in the "In-House Implementations" section should be done by a contractor. This includes replacing windows and vehicle doors, and upgrading the wall and/or roof insulation.

In terms of HVAC, a contractor should be hired to install programmable thermostats and motorized dampers.

Electricians should be hired to replace motors with high-efficiency motors.

For the water saving opportunities involving installing low-flow water fixtures, a contractor will likely be required. Insulating the hot water tank, and installing an instantaneous water heater will also require a contractor.

Consulting Engineer Implementations

The only energy saving opportunity for the R.M. of Grahamdale that requires a consultant to implement is the geothermal heating system in the Moosehorn Curling Rink. This will require a detailed site investigation, bore hole testing, and energy modeling of the building to properly size the geothermal system.

Consulting services should also be considered for any major upgrades to building and services.

19.2 FINANCING

There are several incentive programs listed in Appendix D of this report that will help finance the implementation of the energy and water saving opportunities. In the "Energy Saving Opportunity" tables throughout this report, the capital costs are listed both with and without incentives. The incentives in these tables are from Manitoba Hydro's Power Smart Incentives and apply to energy efficient lighting and windows, wall insulation upgrades, and geothermal heating systems. For more information on these incentives, contact your local Manitoba Hydro Energy Services Coordinator or the contact listed in Table D.1.

Table D.2 lists other incentive programs that are available for energy saving upgrades. These programs are:

- Energy Innovators Initiative: Energy Retrofit Assistance (ERA)
- Municipal Rural Infrastructure Fund (MRIF)
- Renewable Energy Development Initiative (REDI)

- Community Places Program
- Sustainable Development Innovations Fund (SDIF)

For further information on these programs refer to the website listed in the table.

Members of the Association of Municipalities also have the option of purchasing products and services in bulk at reduced prices through the Municipality Trading Company of Manitoba Limited. Details of this can be found in Appendix G of this report.

19.3 POLITICAL FRAMEWORK

General Municipal Environment in Manitoba

In Manitoba, municipal elections are set every 4 years. The next municipal election will be in October 2006, which may mean that some councils will see a change in members. However, we do not expect this to have a major impact on the plans to implement the recommendations of this report.

There are currently no Provincial or Federal targets or goals set that municipalities must achieve. 'Green Projects' have become common in Manitoba and often programs like the Municipal Rural Infrastructure Fund (MRIF) targets such projects. Details of this project are included in Appendix D of this report. Manitoba has been a leader in energy efficiency and many municipalities have partnered with other levels of government and companies like Manitoba Hydro on innovative projects. We believe the MMEP project is an excellent example of an innovative project and believe all of the participating communities are receptive to innovative ideas because they have agreed to participate.

A recent trend in municipal government has been toward longer-term planning. This is seen with the recent changes to the provincial Planning Act and the requirements for community sustainability plans in the New Deal agreement. The recommendations in this report certainly complement this direction.

Political Environment in the R.M. of Grahamdale

This study is the first energy and water efficiency study to take place in the R.M. of Grahamdale. Although there are currently no plans for new community buildings in Grahamdale, the knowledge gained from this study and from observing the energy and water savings that result from implementing the recommended upgrades will be valuable in the future when new buildings are developed. In addition, there is potential for this information to be shared with the surrounding regions.

A potential barrier that could affect the implementation of the energy and water saving opportunities discussed throughout this report is a change in council members. It is important that the information gained here be passed on as new members enter the council and current members leave.

20.0 PERFORMANCE VERIFICATION

Following the implementation of the recommended energy and water saving opportunities, it is important to continuously monitor the annual energy consumption to keep a record of the resulting energy savings.

Appendix F contains a spreadsheet and graph for each of the buildings audited. These spreadsheets should be used as a tool to monitor the energy consumption on a monthly basis. The first three columns in each spreadsheet are for year 2004-2005 and have already been completed.

Following the implementation of the measures discussed in this report, the energy consumption should be recorded. The year headings may need to be re-entered, depending on when the implementations are completed. The monthly energy consumption in kWh taken from the building's hydro bill should be recorded in the "Billed Energy Consumption" column. The monthly energy consumption for heating depends on the outdoor temperatures for that month. The "Billed Energy Consumption" is therefore normalized to the year 2004-2005 such that a fair comparison can be made.

The normalized energy consumption is determined as follows:

$$NEC = BEC \times (\%\ Energy\ Used\ \ for\ Heating) \times \left(\frac{HDD(present)}{HDD(2004-2005)} \right) + BEC \times (1 - \%\ Energy\ Used\ \ for\ Heating)$$

Where *NEC* is the Energy Normalized to year 2004-2005, *BEC* is the billed energy consumption and *HDD* is the heating degree-days.

The heating degree-days (HDD) for a given day are the number of Celsius degrees that the mean temperature is below 18°C. This data can be found for the town of Arborg on the following website:

http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=16.

Once the "Billed Energy Consumption" and "HDD" columns are filled in, the "Energy Normalized to 2004-2005" column is automatically calculated and the graph is updated. From this graph, the energy consumption can be monitored on a monthly basis to ensure that the upgrades are resulting in a reduction in energy consumption.

APPENDIX A

INVENTORY SHEETS

TABLE OF CONTENTS – APPENDIX A

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale		**Date:** Oct. 20, 2005
Toured By: Ray Bodnar, Dave Shabaga, Joel Lambert		**Construction Date:** 1991
Building: North Interlake Recreation Centre		**Renovations:** Added 6" of batt insulation in bowling alley and lounge between these areas and the rink inside.
Address: St. Martin		
L x W x H: 240 x 64 x 19	**Area:** 15,360 ft² footprint	
Building Capacity: Bowling: 12, Lounge: 20		
Building Floor Plan: Curling Rink, Bowling Alley, 2nd floor Lounge, 2nd floor storage Room, Senior Centre		**Occupied Times:** Bowling: Sept to May, 16 hrs/week; 2nd floor lounge used when curling is on. Curling 3-4 evenings/wk plus 2 or 3 weekend bonspiels/yr. Senior's Centre used 4 hrs/wk

ARCHITECHTURAL/STRUCTURAL
Wall type/R-value: Metal frame metal exterior with drywall in lounge and bowling alley. Assume R=20 (blanket insulation), In the lobby, fibreglass insulation was added in stud walls.
Roof Type/R-value: Sloped metal roof with exposed insulation in rink, drywall covered elsewhere. Assume R=20.
Door Type/weather stripping: Bowling and lounge: 2 metal insulated steel doors 5/10 stripping – redo stripping. 6 doors need w/s (5 to exterior and one to rink)
Window type/caulking: 2 – 23" x 48" 2 pane in lounge to outside – replace; 2 – 40" x 54" single pane from 2nd floor storage to rink – replace. Between Lobby and Curling Rink: Three 56" x 38" (3 panels each) single pane plate glass.
Other: ceiling fan in lounge.
MECHANICAL
Heating System: Bowling: electric unit heater and wall force flow. 2nd floor lounge: electric baseboards to a single standard wall stat. 2nd floor storage: baseboards with integral stat.. Lobby: electric furnace + baseboards + wall heater (all electric). Curling rink has 2 elec UH's but the are unused., pumps room has one elec baseboard, elec room has 1 x 100W incand
Cooling System: None
Ventilation System: Bowling: none. 2nd floor lounge: 1500 cfm wall exhaust fan with BDD – replace with motorized damper. Lobby has HRV
HVAC Controls: Integral stats in bowling and storage. Lounge: 1 standard stat. no setback. Lobby: regular stat set At 16°C.
HVAC Maintenance/Training:
Water Supply System: Well pump in other building.
Domestic Hot Water System: 1 – 72 gal, 4500 W electric water heater, with pipe insulation.
Water Fixtures: Lounge: 4 toilets , 4 lavs, 2 urinals all high flow. Lobby: 5 w.c. (13.25 LPF), 1 urinal (already seems low flow), 6 lavs (can't take aerator), 1 double sink in canteen

ELECTRICAL
Indoor Lighting: Bowling: 2 – 100 W incandescent; 22 x 4', 2 tube T12, 34W. 2nd floor lounge: 3– 100 W plus 17 – 60W incandescent; 28 – T12 – 4' x 2, 34W. 2 nd floor storage: 4 – T12 – 4' x 2, plus 6 – 8' x 2 ,60 W Curling rink: 36 x 8', 2 tube T12, Lobby: 26 x 4', 4 tube T12, 3 x 4', 1 tube T12, 18 x 4', 2tube T12, 1 incand, pump room has 1 200W incand. Plus one incand bulb in furnace room.
Outdoor Lighting: 2 – 100 W floodlights on photocell. + 7 wall packs
Exit Signs: Bowling: none; 2 nd floor lounge: 4 incandescent. Curling rink: 4 incand (burnt out) Lobby: 4 incand (2 are burnt out)
Motors: 1/3 HP sewage pump
Parking Lot Plugs: None
OTHER BUILDING SYSTEMS
PROCESS SYSTEMS
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
Hydro. (demand meter)
NOTES

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale		**Date: October 20, 2005**
Toured By: Joel Lambert		**Construction Date: 1984**
Building: Camper Hall		**Renovations:**
Address:		
L x W x H: 100 x 61 x 14	**Area: 6100 ft²**	
Building Capacity:		
Building Floor Plan:		**Occupied Times: approx. 8 hrs per week.**

ARCHITECHTURAL/STRUCTURAL
Wall type/R-value:
Roof Type/R-value:
Door Type/weather stripping: all doors are steel, 36" door in kitchen has beg gap at sill and needs w/s at sill, double door in front does not close tightly and needs w/s across bottom, 2 side exit doors (36") need w/s at sill
Window type/caulking: 36" x 36" triple pane 1988
Other:
MECHANICAL
Heating System: two-stage electric furnace under stage c/w OA duct (OA duct has manual wooden door operated from back of hall (OA duct only opened in the summer when occupied). Two 2-stage electric furnaces in ceiling space, ducted. Electric wall heater in vestibule . furnace under stage was added because floor was very cold.
Cooling System: 2 small condensing units connected to furnaces in ceiling. 4 ceiling fans
Ventilation System: see heating system
HVAC Controls: wall stats. Stat for furnace under stage has locking cover. Temperature manually turned down to 10 ℃ when unoccupied.
HVAC Maintenance/Training:
Water Supply System: well and septic field
Domestic Hot Water System: electric HWT, 3000 W, 175 L, no insulation on piping, water is very hot.
Water Fixtures: 1 triple sink in kitchen, 1 sink in bar, 6 lavs (hi flow, can't take aerators), 3 urinals (seem like low flow), 6 w.c. (13.25 LPF)

ELECTRICAL
Indoor Lighting: 19 x 4', 2 tube T12, 24 x 4', 4 tube T12, 15 incand, 4 x 4', 1 tube T12
Outdoor Lighting: 1 yard light on sentinel, 5 incand, 1 wall pack on sentinel
Exit Signs: 3 incand (2 have burnt out bulbs)
Motors:
Parking Lot Plugs: none
OTHER BUILDING SYSTEMS
PROCESS SYSTEMS
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
hydro
NOTES

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale	**Date:** Oct. 19, 2005
Toured By: Ray Bodnar, Richard Shannon	**Construction Date:** 1970
Building: Moosehorn Community Hall	**Renovations:** North east addition 20 years ago.
Address: Moosehorn	
L x W x H: 15m x 18m + 23m x 14 x 3.4 m h / **Area:** 592 sm	
Building Capacity: 230	
Building Floor Plan: Social and Bingo Hall – 2 parts joined together.	**Occupied Times:** Friday bingo 6 to 10 PM, plus 2/month for socials for 8 hrs each.

ARCHITECHTURAL/STRUCTURAL
Wall type/R-value: Stucco with wood paneling 6" batt R20.
Roof Type/R-value: Sloped metal roof , 14" blown in insulation plus 6" fiberglass, assume R40.
Door Type/weather stripping: 4- old wood doors with 6/10 stripping – replace doors. 3 metal insulated steel doors – 6/10 stripping but good caulking on all doors.
Window type/caulking: double pane aluminum sliders 2' x 1' – 5, good caulking – replace windows.
Other: ceiling fans.
MECHANICAL
Heating System: electric cabinet convectors in hall and unit heaters in kitchen. Baseboards in washrooms.
Cooling System: 4 – 5 ton standard condensers outside about 10 years old.
Ventilation System: 2 – 20" x 20" wall exhaust fans with leaky BDD's. washroom exhaust fans on light switch. (Broan)
HVAC Controls: 4 standard heat/cool thermostats, no setback.
HVAC Maintenance/Training:
Water Supply System: Well inside building.
Domestic Hot Water System: 1 - 270 L, 4500 W electric water heater.
Water Fixtures: 7 toilets , 6 sinks, 2 urinals all high flow.

ELECTRICAL
Indoor Lighting: T12's: 2 x 4' lamps = 44 (40 W); T12's: 2 x 8' lamps = 3; 11 – 100 W incandescent.
Outdoor Lighting: 6 incandescent.
Exit Signs: 5 incandescent.
Motors:
Parking Lot Plugs: None
OTHER BUILDING SYSTEMS
PROCESS SYSTEMS
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
Hydro.
NOTES

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale	**Date:** Oct. 19, 2005
Toured By: Ray Bodnar, Judy Clark (PH: 204-449-2328)	**Construction Date:** approx. 30 yrs old
Building: Grahamdale Community Centre	**Renovations:** None.
Address: Grahamdale	
L x W x H: 33.5m x 18m x 3.6m H — **Area:** 603 sm	
Building Capacity: approx 160	
Building Floor Plan: Open hall with bingo and kitchen	**Occupied Times:** Bingo every Thursday plus 1 meeting/month = 34 hrs/month

ARCHITECHTURAL/STRUCTURAL
Wall type/R-value: Aluminum siding with wood frame 6" walls with drywall and wood paneling. R20.
Roof Type/R-value: Sloped metal roof , old tile ceiling, assume R30.
Door Type/weather stripping: 3- old wood doors with no caulking, 5/10 stripping – replace doors. 4 metal insulated steel doors no caulking, 5/10 stripping, Caulk and strip.
Window type/caulking: Openings to crawlspace
Other: ceiling fans.
MECHANICAL
Heating System: 3 electric unit heaters with 1 wall stat and 1 integral stat. Building kept at 65 F all of the time.
Cooling System: 2 furnace blowers in the crawlspace (poor access) with 2 - 12 ton condensers outside.
Ventilation System: 2 wall exhaust fans with BDD, 2 Broan fans in washrooms.
HVAC Controls: 2 standard H/C stats. no setback.
HVAC Maintenance/Training:
Water Supply System: Well pump.
Domestic Hot Water System: 1 – 40 gal, 3000 W electric water heater, no pipe insulation.
Water Fixtures: 6 toilets , 6 sinks, 2 urinals all high flow.

ELECTRICAL
Indoor Lighting: T12's: 2 x 8' lamps = 27; 9 – T12 4' x 2; 6 – 100 W incandescent.
Outdoor Lighting: 7 - 60 W incandescent on all day.
Exit Signs: 9 incandescent.
Motors:
Parking Lot Plugs: None
OTHER BUILDING SYSTEMS
PROCESS SYSTEMS
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
Hydro.
NOTES

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale		**Date: October 19, 2005**
Toured By: Joel Lambert		**Construction Date: ≈1990**
Building: Faulkner Community Hall		**Renovations:** funaces new in 1999
Address:		
L x W x H: 125 x 61 x 13'	**Area: 7625 ft²**	
Building Capacity:		
Building Floor Plan:		**Occupied Times:** 1 function/week at approx. 4 hours/function plus 4 hours cleaning = 8 hours per week

ARCHITECHTURAL/STRUCTURAL
Wall type/R-value: metal clad exterior w/ R20 fibreglass
Roof Type/R-value: metal clad exterior with 14" - 16" of fibreglass (≈R50)
Door Type/weather stripping: 4 metal exit doors on sides of hall (36" wide) and 1 double door (72" wide) on front (front doors have small 5" x 18" windows) uninsulated metal frame, all doors need w/s.
Window type/caulking: No windows
Other: Concession: 1 ceiling fan, hall: 4 ceiling fans
MECHANICAL
Heating System: 15℃ unoccupied, 2 two stage furnaces, 5 electric wall convectors, 5 electric wall heaters
Cooling System: None
Ventilation System: large central exhaust in attic and small exhaust fan on south wall Crawlspace is vented and vents are manually plugged in winter
HVAC Controls: locked stats
HVAC Maintenance/Training: explained to operators how demand billing works and gave strategies on how to limit demand
Water Supply System: well and septic field
Domestic Hot Water System: 40 gal HWT 3000W, no insulation on pipes
Water Fixtures: 1 mop sink, 1 double kitchen sink, 1 single kitchen sink, 1 bar sink, Men's: 3 urinals (very hi flow), 3 lavs (hi flow), 2 w.c. (13.25 LPF) Ladies: 3 lavs (can take aerators), 5 w.c. (13.25 LPF)

ELECTRICAL
Indoor Lighting: elec room: 2 incand, cloak room: 4 incand, hall: 28 100W incand + 16 incand in track lights, Stage: 13 incand, storage: 1 incand, Behind stage: 8 incand, men's: 6 incand. Ladies: 2 x 4', 2 tube T12 Kitchen: 12 x 100W incand, Concession: 5 incand
Outdoor Lighting: All outdoor lighting is off except during functions. 1 yard light, 4 x 500W halogen lights over side doors, 4 pot lights (3 x 100W + 1 x 150W)
Exit Signs: Off except during functions, 6 incand
Motors:
Parking Lot Plugs:
OTHER BUILDING SYSTEMS
Ceiling fans
PROCESS SYSTEMS
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
hydro
NOTES
Recommend building a vestibule to enclose front entrance. Now, when the doors are opened, cold air rushes into the entire hall.

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale		**Date: October 19, 2005**
Toured By: Joel Lambert		**Construction Date:??? Very old**
Building: Steep Rock Community Hall		**Renovations:**
Address:		
L x W x H: 98 x 30 x 12	**Area: ≈3000 ft² + second floor of boarding house**	
Building Capacity:		
Building Floor Plan:		**Occupied Times: Boarding house: rented in summer, vacant in winter but still heated**

ARCHITECHTURAL/STRUCTURAL

Wall type/R-value: Concrete block wall with stucco on outside. Uninsulated.

Roof Type/R-value: No insulation in boarding house roof. Hall has blown in insulation (unknown type) ≈10" thick.

Door Type/weather stripping: 34" hollow uninsulated wood door w/ average of ¼" gap around ½ of door c/w 34 x 20 single pane window above door. Kitchen: old steel door – needs repair/replacement, frame is loose, can't tell if its

Insulated but w/s is good. Ladies room: 1 very old wood panel door to exterior (no insulation) needs w/s. SW entrance: hollow wood door w/ 3/8" gap at sill c/w 34x20 single pane fixed window above door.

Boarding House: 2 wood panel doors (very old – no insulation)

Window type/caulking: Hall: 6 sets of 3 28" x 42" single pane vertical sliders (guess 50+ yrs old), kitchen: 1 28 x 42 single pane window. Ladies room: 28 x 42 single pane vertical slider, SW entrance has window covered w/ insulation

Boarding House: 14 x 24 / 54 old vert. Sliders (single pane) , 2 24 x 42 old vert. Sliders (single pane). All boading house windows have storm windows except for 6 of them. Two windows are cracked (1 w/ & 1 w/o storm window), in basement there are 2 windows, single pane 24 x 16 (one is covered with insulation)

MECHANICAL

Heating System: 30 kW elec furnace ducted under benches on sides of hall. Hall kept at 50°F unoccupied (according

to the sign on the wall). 2 ceiling fans, one elec wall heater in kitchen. Boarding House: oil-fired furnace

Cooling System: None

Ventilation System: Exhaust fan mounted in attic exhausts air from hall through BDD in ceiling

HVAC Controls: one regular stat (8' A.F.F.), set as cold as it would go.

HVAC Maintenance/Training:

Water Supply System:

Domestic Hot Water System: 1 electric HWT serves hall and boarding house – no insulation on pipes

Water Fixtures: Kitchen: 1 single sink, 1 double sink, men's: 1 lav high flow (can't take aerator), 2 w.c. old (very high flow), 1 urinal ladies: 1 lav (can't take aerator), 2 w.c. old (very high flow)

Boarding House: kitchen sink, 1 w.c. (hi flow), 1 lav (can't take aerator), 1 old claw foot tub

ELECTRICAL
Indoor Lighting: Hall: 10 incand Vestibule: 1 incand., Kitchen: 2 incand, stage 1 incand, men's: 1 x 150W incand Ladies room: 2 incand., SW entrance: 3 incand Boarding house: 16 incand.
Outdoor Lighting: 4 incand.
Exit Signs: 3 very old globe exit signs
Motors:
Parking Lot Plugs:
OTHER BUILDING SYSTEMS
PROCESS SYSTEMS
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
NOTES

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale		**Date: October 20, 2005**
Toured By: Joel Lambert and Ray Bodnar		**Construction Date: approx 1985**
Building: St. Martin Community Hall		**Renovations:**
Address:		
L x W x H: 50 x 120 x 12	**Area: 6000 ft²**	
Building Capacity: liquor permit for 248 people		
Building Floor Plan:		**Occupied Times: 6 hrs/wk for bingo and cleanup, 20 hrs/month for court and "special court", 2.5 hrs/month for meetings, 6 socials per year (about 1 every two months) assume 5 hours per social**

ARCHITECHTURAL/STRUCTURAL
Wall type/R-value: R20, 1¼" rigid styrofoam insulation on outside of foundation (damaged and broken away above Grade; an average of 6" of concrete is exposed without insulation). The last 20' of building at back the insulation is covered with tin (this is an addition).
Roof Type/R-value: R40
Door Type/weather stripping: Three sets of double doors need w/s badly (can see light around doors)
Window type/caulking: None
Other:
MECHANICAL
Heating System: 2 Thermolec electric duct heaters downstream of York AHU (23 kW each).
Cooling System: three ClimateMaster condensing units outside – York AHU inside (has 2 evaporators), 1 evaporator Is located downstream of a fan.
Ventilation System: Two roof-mounted exhaust fans c/w BDD's
HVAC Controls: manual stats (one is heat cool) (one is cool only) Hall is kept at 18-19°C unoccupied and at 21°C occupied
HVAC Maintenance/Training:
Water Supply System: Well and septic system – sewage pump (1/3 HP)
Domestic Hot Water System: 72 gal electric HWT, no pipe insulation
Water Fixtures: Men's: 2 urinals on tank (autoflush), 2 w.c., 2 lavs (hi flow) Women's: 3 w.c., 2 lavs, one triple sink in kitchen

ELECTRICAL
Indoor Lighting: 18 x 8', 2 tube T12, 11 x 4', 4 tube T12, 10 x 4', 2 tube T12 11 x 60W incand, 1 x 100W incand flood light
Outdoor Lighting: 1 incand on all the time (need photocell), 3 incand. (off at time of inspection), 2 flood lights
Exit Signs: 3
Motors: sewage pump 1/3 HP, well pump ½ HP
Parking Lot Plugs:
OTHER BUILDING SYSTEMS
Ceiling fans
PROCESS SYSTEMS
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
NOTES

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale	**Date:** October 20, 2005
Toured By: Ray Bodnar, Kathy Rawluk	**Construction Date:** 1950
Building: Gypsumville Hall	**Renovations:** Kitchen added in 1960.
Address: Gypsumville	
L x W x H: 70' x 56' x 12' H + 24' x 16' / **Area:** 4300 ft²= 400 SM	
Building Capacity: 80 in small hall, 160 in large hall	
Building Floor Plan: One small hall and one large hall with common wall.	**Occupied Times:** approx. 22 hrs per month.

ARCHITECHTURAL/STRUCTURAL
Wall type/R-value: 6" walls with stucco outside and wood paneling inside. R20. Floor has no insulation in exposed crawlspace.
Roof Type/R-value: Sloped shingled roof with old tile ceiling. R40.
Door Type/weather stripping: 3 metal doors, 2 with no caulking, stripping is good. 2 old wood doors with poor stripping and caulking – replace doors door in front does not close tightly and needs w/s across bottom, 2 side exit doors (36") need w/s at sill
Window type/caulking: Some triple pane 2002 good. 2 – 24" x 24" 2 pane aluminum sliders with poor caulking to be replaced.
Other: Ceiling fans.
MECHANICAL
Heating System: 1 electric furnace in large hall being replaced. Note it has exposed return duct in crawlspace and poor supply distribution. Electric baseboards in washrooms with wall stats. 3 unit heaters in small hall with integral stats.
Cooling System: None
Ventilation System: 3 wall exhaust fans with BDD's, very leaky. No exhaust for fryer in small hall!!!
HVAC Controls: Count down timers on exhaust fans. (good idea for other halls)
HVAC Maintenance/Training:
Water Supply System: well and septic field
Domestic Hot Water System: electric HWT, 3000 W, 175 L, no insulation on piping.
Water Fixtures: 3 high flow toilets, 4 low flow sinks 2 urinals high flow

ELECTRICAL
Indoor Lighting: 19 – 60W & 38 - 100W incandescent;
Outdoor Lighting: 4 – 100W incandescent needs photocel
Exit Signs: 7 incandescent
Motors:
Parking Lot Plugs: none
OTHER BUILDING SYSTEMS
PROCESS SYSTEMS
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
Hydro
NOTES

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale		**Date: October 19, 2005**
Toured By: Joel Lambert		**Construction Date: approx. late 1970's**
Building: Moosehorn Curling Rink		**Renovations:**
Address: Moosehorn, MB		
L x W x H: see sketch	**Area:**	
Building Capacity:		
Building Floor Plan: see sketch		**Occupied Times: Nov – April, 3 days/wk 7:00 pm – 11 pm plus** **4 weekends/yr each Friday 7pm-11pm, Sat 8 am-1am, Sun 9 am-8pm**

ARCHITECHTURAL/STRUCTURAL
Wall type/R-value: metal clad exterior, pole construction, fibreglass insulation (likely R20)
Roof Type/R-value: metal clad exterior – well insulated
Door Type/weather stripping: five exterior doors (uninsulated) but have 1.5" styrofoam and plywood on exterior. Styrofoam is breaking away around edges – doors should be replaced. 1 glass door (double pane) between rink and lobby - all doors need weather stripping
Window type/caulking: - no windows to exterior, between rink and lobby 1 x 72"h x 96" w, 4 x 72"h x 72" w 1 x 72"h x 42" w
Other:
MECHANICAL
Heating System: in ice rink: 2 elec UH's, in lobby: 5 elec UH's + 2 baseboards They keep the rink area heated to 5-6℃
Cooling System: None
Ventilation System: HRV for lobby
HVAC Controls: stats on UH's in lobby, wall stats for UH's in rink
HVAC Maintenance/Training:
Water Supply System: well
Domestic Hot Water System: elec HWT with no pipe insulation
Water Fixtures: 1 triple sink, 1 bar sink, 3 lavs that can't take aerators, 5 w.c. (13.25 lpf), 1 urinal (seems low flow), 1 mop sink

ELECTRICAL
Indoor Lighting: 28 x T12, 8’ x 2 tube, 10 x T12, 4’x1tube, 3 x 100W incand.
Outdoor Lighting: One light on hydro pole in front of building
Exit Signs: 5
Motors: sewage and well pumps
Parking Lot Plugs: none
OTHER BUILDING SYSTEMS
PROCESS SYSTEMS
Ice plant: Comco Rink Pak, Model 2PAD, with air cooled condenser. 20 HP compressor, 5 hp pump, single Condenser fan.
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
- hydro
NOTES

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale		**Date:** Oct. 19, 2005
Toured By: Ray Bodnar, Richard Shannon		**Construction Date:** approx. 1979
Building: Moosehorn Fire Hall		**Renovations:** None.
Address: Moosehorn		
L x W x H: 12.2 m x 15m + 4m x 2m x 4 m h	**Area:** 191 sm	
Building Capacity: 10		
Building Floor Plan: Trick garage and meeting room		**Occupied Times:** 1 meeting/month plus 1 hr/day every second day to check up. Hall receives 18 calls per year for fire. Total occupancy = 28 hrs/month

ARCHITECHTURAL/STRUCTURAL
Wall type/R-value: Stucco with drywall 6" batt R20.
Roof Type/R-value: Sloped shingled roof , 2- 6" fiberglass, assume R40.
Door Type/weather stripping: 2- old wood doors to outside washroom with 6/10 stripping – replace doors. 1 metal insulated steel door to fire hall good with good stripping. One door to small addition boarded up – leave as is. 2 – 14' x 12' vehicle doors, 1 with damaged stripping (1" gap 6 ft long) Replace stripping on both doors
Window type/caulking: double pane aluminum sliders 2 – 8' x 3' plus 1 – 3' x 3', good caulking – replace windows.
Other: ceiling fans.
MECHANICAL
Heating System: 4 electric baseboards and force flows with 2 integral stats.
Cooling System: No A/C.
Ventilation System: No ventilation in fire hall.
HVAC Controls: 6 integral stats. no setback.
HVAC Maintenance/Training:
Water Supply System: Well to cistern, well pump and sewage pump.
Domestic Hot Water System: 1 - 189 L, 3000 W electric water heater, no pipe insulation.
Water Fixtures: 3 toilets , 3 sinks, 1 urinals all high flow.

ELECTRICAL
Indoor Lighting: T12's: 2 x 4' lamps = 13 (40 W); 5 – 100 W incandescent.
Outdoor Lighting:
Exit Signs: None.
Motors:
Parking Lot Plugs: None
OTHER BUILDING SYSTEMS
PROCESS SYSTEMS
5 HP compressor used 2hrs/month 2 – 3 HP water pumps to fill trucks plus 1 – 1 HP submersible
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
Hydro.
NOTES

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale		**Date: October 20, 2005**
Toured By: Joel Lambert		**Construction Date: West half 1984, East half 1990's**
Building: Gypsumville Fire Hall		**Renovations:**
Address:		
L x W x H: 50' x 62' x 14'	**Area: 3100 ft²**	
Building Capacity:		
Building Floor Plan:		**Occupied Times: 2 hours/week max.**

ARCHITECHTURAL/STRUCTURAL
Wall type/R-value: metal clad exterior. Old part has 6" wall filled with cellulose blown-in (approx. R16), New part has 6" fibreglass batt R20
Roof Type/R-value: roof insulation similar to walls (assume R20)
Door Type/weather stripping: man door (36" w/ steel frame w/ 24" x 36" single pane window) at front needs w/s (quite bad at sill), 14 ' x 14' overhead door on north side has good w/s and door is tight. 12' x 12' overhead door on east side has gaps in w/s where door is not tight but not bad, 14' x 12' overhead door on east wall w/s is good and door is tight
Window type/caulking: none
Other:- no insulation on foundation below man door but can't tell anywhere else.
MECHANICAL
Heating System:6 electric unit heaters w/ built-in thermostats, plus one elec baseboard in washroom with stat set at 8℃. - keep at 18℃ to keep water warm for fire calls in winter
Cooling System: none
Ventilation System: none
HVAC Controls: UH's have internal stats, one wall stat for baseboard heater in washroom
HVAC Maintenance/Training:
Water Supply System: well and septic field. Submersible well pump fills a 4000 gallon underground cistern. This water is then used to fill fire trucks
Domestic Hot Water System: electric HWT 3 kW, 40 gals, no pipe insulation, water very hot
Water Fixtures: 1 w.c. 13.25 LPF, 1 lav (can't take aerator), 1 kitchen sink in the office, 1 shower that is not used

ELECTRICAL
Indoor Lighting: 10 x 8', 2 tube T12, 2 x 4' 2 tube T12, 1 x 100W incand
Outdoor Lighting: 3 exterior wall packs work on sentinel (tour guide said bulbs last a very long time)
Exit Signs: none
Motors:
Parking Lot Plugs: one outdoor receptacle (2 plugs) between overhead doors on east side – not used to plug in cars
OTHER BUILDING SYSTEMS
PROCESS SYSTEMS
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
Hydro (does not look like a demand meter)
NOTES

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale	**Date:** Oct. 21, 2005
Toured By: Ray Bodnar, Bev Yaworski	**Construction Date:** approx. 40 yrs old
Building: Grahamdale R. M. Municipal Office	**Renovations:** Some new windows and new front door.
Address: Moosehorn	
L x W x H: 15m x 10m x 3m H / **Area:** 150 sm	
Building Capacity: approx 4	
Building Floor Plan: Offices and council chamber	**Occupied Times:** 40 hrs/week; 8:30 AM to 4:30 PM

ARCHITECHTURAL/STRUCTURAL
Wall type/R-value: Wood/stucco exterior with drywall interior, 4" walls. Assume R10.
Roof Type/R-value: Sloped metal roof , old tile ceiling, 6" joists with blown in fiberglass assume R20.
Door Type/weather stripping: Front and side door are good, Back door is old wood with poor stripping – replace.
Window type/caulking: New windows: 3 pane installed in 2003, Old windows: 2 pane 3 – 30" x 88" - poor caulking to be replaced.
Other: ceiling fans.
MECHANICAL
Heating System: Baseboard electric heat with 5 wall stats. Building kept at 70 F when unoccupied.
Cooling System: Separate fan coil unit in ceiling (filter never changed – poor access) with high efficiency condenser outside.
Ventilation System: 1 Broan fan in washroom.
HVAC Controls: standard heat stats. no setback.
HVAC Maintenance/Training:
Water Supply System: Well pump and sewage pump to field.
Domestic Hot Water System: 1 – 130 Liter, 3000 W electric water heater, no pipe insulation.
Water Fixtures: 2 toilets , 1 urinal, 2 sinks, all high flow.

ELECTRICAL
Indoor Lighting: 5 – 100 W incandescent; 30 – T12 – 4’ x 2 – 34 W
Outdoor Lighting: 4 – 60 W incandescent.
Exit Signs: None.
Motors:
Parking Lot Plugs: 3
OTHER BUILDING SYSTEMS
PROCESS SYSTEMS
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
Hydro.
NOTES
Owner did not know there was a filter to change in A/C blower, training provided.

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale		**Date: October 19, 2005**
Toured By: Joel Lambert		**Construction Date: ???**
Building: Museum – CFB Gypsumville		**Renovations:**
Address: Railway Avenue		
L x W x H: 30 x 12	**Area: 360 ft²**	
Building Capacity:		
Building Floor Plan:		**Occupied Times: same occupancy times as museum usually (but it wasn't open this year)**

ARCHITECHTURAL/STRUCTURAL
Wall type/R-value:
Roof Type/R-value:
Door Type/weather stripping:
Window type/caulking:
Other:
MECHANICAL
Heating System:
Cooling System:
Ventilation System:
HVAC Controls:
HVAC Maintenance/Training:
Water Supply System:
Domestic Hot Water System:
Water Fixtures:

ELECTRICAL
Indoor Lighting: 3 x 100W incand
Outdoor Lighting: 1 x 60W incand (not used)
Exit Signs:
Motors:
Parking Lot Plugs:
OTHER BUILDING SYSTEMS
PROCESS SYSTEMS
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
NOTES

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale		**Date: October 19, 2005**
Toured By: Joel Lambert		**Construction Date: ??? old**
Building: Masonic Hall - Moosehorn		**Renovations:**
Address: Railway Avenue		
L x W x H: 60 x 30.5	**Area: 1830 ft²**	
Building Capacity:		
Building Floor Plan:		**Occupied Times: summer – 5 days/wk 9am – 4pm**

ARCHITECHTURAL/STRUCTURAL
Wall type/R-value:
Roof Type/R-value:
Door Type/weather stripping:
Window type/caulking:
Other:
MECHANICAL
Heating System: one portable electric heater used only a few hours per year
Cooling System: none Ceiling fan in Tea room
Ventilation System: Bathroom fan There is a portable dehumidifier (Danby D30H)
HVAC Controls: None
HVAC Maintenance/Training:
Water Supply System: well
Domestic Hot Water System: undercounter electric HWT, 3000W, 114 L
Water Fixtures: all water systems are drained in the winter. There was ethylene glycol in the toilets. Tea room: 1 double kitchen sink, 1 single kitchen sink, 1 w.c. (hi flow), 1 lav (can't take aerator)

ELECTRICAL
Indoor Lighting: Tee room: 10 tea light bulbs. Kitchen: 2 x 100W incand. Exhibit room: 5 track lights with 3 halogen bulbs each (this lighting was recommended by the Man and Nature Museum), 8 incand, 2 x 4', 1 tube T12.
Outdoor Lighting: 1 x 100W incand and one empty light socket
Exit Signs: none
Motors:
Parking Lot Plugs: none
OTHER BUILDING SYSTEMS
PROCESS SYSTEMS
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
NOTES

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale		**Date: October 19, 2005**
Toured By: Joel Lambert		**Construction Date:**
Building: Museum - CN Moosehorn		**Renovations:**
Address: Railway Avenue		
L x W x H: 64 x 18.5	**Area: ≈1350**	
Building Capacity:		
Building Floor Plan:		**Occupied Times:**

ARCHITECHTURAL/STRUCTURAL
Wall type/R-value:
Roof Type/R-value:
Door Type/weather stripping:
Window type/caulking: 7 x 34" x 66" single pane vertical sliders w/ storm windows
Other:
MECHANICAL
Heating System: None (2 elec UH and 1 elec baseboard heater that are not used)
Cooling System: None
Ventilation System: None
HVAC Controls: None
HVAC Maintenance/Training: None
Water Supply System: Well – Same well as Masonic Hall
Domestic Hot Water System: Electric HWT in bathroom, 1500W, 12 gal
Water Fixtures: 1 hi flow w.c. , 1 antique lavatory (they don't want it replaced)

ELECTRICAL
Indoor Lighting: Washroom: 1 incand, Exhibit areas: 5 x 4', 2 tube T12, 1 x 8', 2 tube T12, 3 antique incand In showcases: 4 x 2', 1 tube T12. 3 x 4', 1 tube T12
Outdoor Lighting: 2 incand in back – not used, 5 incand in front – not used (may be disconnected)
Exit Signs: None
Motors: Well Pump
Parking Lot Plugs: None
OTHER BUILDING SYSTEMS
PROCESS SYSTEMS
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
NOTES

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale	**Date:** Oct. 20, 2005
Toured By: Ray Bodnar, Edmund Russell	**Construction Date:** approx. 20 yrs old
Building: Camper New Horizons Senior Centre	**Renovations:** None.
Address: Camper	
L x W x H: 18m x 7m x 2.4m H / **Area:** 126 sm	
Building Capacity: approx 25	
Building Floor Plan: Recreation room for seniors	**Occupied Times:** 3 hrs/week

ARCHITECHTURAL/STRUCTURAL
Wall type/R-value: Vinyl siding with drywall interior, 6" walls plus styrofoam, R25.
Roof Type/R-value: Sloped shingled roof , drywall ceiling, assume R40.
Door Type/weather stripping: 2 metal insulated steel doors, stripping good, re-do caulking
Window type/caulking: 3 pane wood frame installed in 1985, poor caulking 2 – 44" x 34"
Other: ceiling fans.
MECHANICAL
Heating System: Baseboard electric heat with 2 wall stats. 2 baseboards in washrooms with integral stats. Building kept at 55 F when unoccupied.
Cooling System: None.
Ventilation System: 2 Broan fans in washrooms.
HVAC Controls: standard heat stats. no setback.
HVAC Maintenance/Training:
Water Supply System: Well pump and sewage pump to field.
Domestic Hot Water System: 1 – 22 gal, 3000 W electric water heater, no pipe insulation.
Water Fixtures: 2 toilets , 2 sinks, all high flow.

ELECTRICAL
Indoor Lighting: 2 – 90 W incandescent; 7 – T12 – 8' x 2 – 60W
Outdoor Lighting: 2 – 150 W incandescent.
Exit Signs: None.
Motors:
Parking Lot Plugs: None
OTHER BUILDING SYSTEMS
PROCESS SYSTEMS
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
Hydro.
NOTES
As this building is rarely used, consider re-locating activities to the Camper Hall and close this building down.

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale		**Date: October 21, 2005**
Toured By: Joel Lambert		**Construction Date: ???**
Building: Moosehorn Senior's Centre		**Renovations: Second floor is unused and entrance is blocked. Insulation batts have been laid over the floor, therefore the second floor is like an attic.**
Address:		
L x W x H: 62' x 46' x 10'	**Area: 2852 ft²**	
Building Capacity:		
Building Floor Plan:		**Occupied Times: approx. 8.5 hours/week plus special occations.**

ARCHITECHTURAL/STRUCTURAL

Wall type/R-value: R12 fibreglass in all walls. Information provided by Ed Kohut.

Roof Type/R-value: fibreglass layed on second floor (second floor turned into an attic. ?? R-value ??

East door: wood door, striker is loose so door is not kept tight, needs w/s, door likely not insulated.

Door Type/weather stripping: SW door: wood door, w/s is good but door is probably not insulated.

Window type/caulking:62 x 46 new double pane (2005), 64 x 48 fixed triple pane (builder quality) 2003, 64 x 48 fixed and awning good quality triple pane 2004, 34 x 28 horiz slider (old, 2 single pane sliders, east facing), 38 x 30 horiz slider, wood double pane (north facing)

Other:

MECHANICAL

Heating System: electric wall heaters – no ceiling fans, 1 unit heater, 1 dehumidifier

Cooling System: None

Ventilation System: None

HVAC Controls: Programmable stat set to 60°F when unoccupied.

HVAC Maintenance/Training:

Water Supply System: well + 2000 gallon holding tank for sewage

Domestic Hot Water System: elec HWT, approx 40 usgal, no insulation on pipes, water is very hot.

Water Fixtures: 1 lav (hi flow, can't take aerator), 2 w.c. (13.25 LPF), 1 bar sink (serves as lav for men's washroom), 1 double kitchen sink, 1 dishwasher

ELECTRICAL
Indoor Lighting: 20 x 4', 2 tube T12, 9 x 8', 2 tube T12, 3 incand.
Outdoor Lighting: one socket for incand but no bulb on porch, one incand in porch on (sentinel or motion sensor) on all the time.
Exit Signs: 2 incand exit signs (turned off)
Motors:
Parking Lot Plugs: none
OTHER BUILDING SYSTEMS
PROCESS SYSTEMS
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
hydro
NOTES

BUILDING INSPECTION INVENTORY
Revision 2

Municipality: Grahamdale		**Date:** Oct. 19, 2005
Toured By: Ray Bodnar, John Sveinson, Gordon Garing		**Construction Date:** approx. 12 yrs old
Building: Faulkner New Horizons Senior Centre		**Renovations:** None.
Address: Faulkner		
L x W x H: 12m x 8.5m x 2.4m H	**Area:** 102 sm	
Building Capacity: approx 160		
Building Floor Plan: Recreation Room for seniors		**Occupied Times:** 8hrs/week in winter; 4 hrs/week in summer

ARCHITECHTURAL/STRUCTURAL
Wall type/R-value: Vinyl siding with drywall interior, 6" walls, R20.
Roof Type/R-value: Sloped shingled roof , drywall ceiling, assume R40.
Door Type/weather stripping: 2 metal insulated steel doors 5/10 stripping – redo stripping.
Window type/caulking: 3 pane PVC installed in 2004
Other: ceiling fans.
MECHANICAL
Heating System: 1 electric furnace with 1 standard wall stat. Building kept at 55 F when unoccupied.
Cooling System: None.
Ventilation System: 2 Broan fans in washrooms, no fresh air intake, complaints of being stuffy.
HVAC Controls: 1 standard stat. no setback.
HVAC Maintenance/Training:
Water Supply System: Well pump in other building.
Domestic Hot Water System: 1 – 38 gal, 3000 W electric water heater, no pipe insulation.
Water Fixtures: 2 toilets , 2 sinks, 2 urinals all high flow.

ELECTRICAL
Indoor Lighting: 18 – 100 W incandescent.
Outdoor Lighting: 2 – 100 W floodlights on photocell.
Exit Signs: 2 incandescent.
Motors:
Parking Lot Plugs: None
OTHER BUILDING SYSTEMS
PROCESS SYSTEMS
BUILDING SERVICES (Hydro, Gas, Oil, Water, etc.)
Hydro.
NOTES

APPENDIX B

TABLES TO CALCULATE ENERGY SAVINGS

TABLE OF CONTENTS – APPENDIX B

Table B.1.1 - Energy Breakdown for the North Interlake Recreation Centre

	Energy Consumption (kWh)	% of Total Energy Consumption
HVAC	57,288	74%
Lighting	17,632	23%
Hot Water	3,020	4%
Total	**77,940**	

Table B.1.2 - Electricity Usage for the North Interlake Recreation Centre

	Consumption Data			Calculated Costs		
Month (2004-2005)	**Maximum KVA**	**Billed KVA**	**Energy (kWh)**	**Demand Charge**	**Energy Charge**	**Total Charge**
September	29	0	2,160	$0	$127	$162
October	44	0	4,320	$0	$253	$307
November	42	0	8,100	$0	$475	$559
December	48	0	13,320	$0	$736	$857
January	49	0	14,040	$0	$763	$888
February	54	4	13,740	$33	$752	$913
March	41	0	8,820	$0	$517	$607
April	32	0	5,820	$0	$349	$414
May	29	0	3,900	$0	$234	$285
June	29	0	1,740	$0	$104	$137
July	9	0	1,080	$0	$65	$92
August	9	0	900	$0	$54	$80
TOTAL		**4**	**77,940**	**$33**	**$4,429**	**$5,301**

Notes

There is no charge for the first 50 KVA of monthly demand; a charge of $8.32 is applied to each KVA above 50.

The Total Charge column includes the energy charge, the demand charge, the monthly basic charge, and 14% taxes.

Table B.1.3 - Lighting Analysis Summary for the North Interlake Recreation Centre

Description	Quantity	Current Conditions		After Improvements	
		Annual Energy Consumption (kWh)	Annual Cost	Annual Energy Consumption (kWh)	Annual Cost
Incandescent bulbs (100 W) in bowling alley - convert to compact fluorescents.	2	124	$7	35	$2
4' T12 fluorescents in bowling alley - no recommended upgrade	44	1,142	$69	1,142	$69
Incandescent bulbs (100 W) in curling lounge - convert to compact fluorescents.	3	238	$14	67	$4
Incandescent bulbs (60 W) in curling lounge - convert to compact fluorescents.	17	808	$49	215	$13
4' T12 fluorescents in curling lounge - convert to T8s (28x2)	56	1,863	$112	1,153	$69
4' T12 fluorescents in 2nd floor storage - no recommended upgrade	8	17	$1	17	$1
8' T12 fluorescents in 2nd floor storage - no recommended upgrade	12	46	$3	46	$3
8' T12 fluorescents in curling rink - convert to T8s (36x2)	72	4,220	$253	2,566	$154
4' T12 fluorescents in lobby - convert to T8s (26x4)	104	3,459	$208	2,142	$129
4' T12 fluorescents in lobby - no recommended upgrade	3	100	$6	100	$6
4' T12 fluorescents in lobby - convert to T8s (18x2)	36	1,198	$72	741	$45
Incandescent bulb in lobby - convert to compact fluorescent	1	48	$3	13	$1
200W Incandescent bulb in pump room - convert to compact fluorescent	1	52	$3	14	$1
100W Incandescent bulb in furnace room - convert to compact fluorescent	1	26	$2	7	$0
Exit Signs - Convert Incandescents to LEDs	6	1,577	$95	158	$9
Outdoor floodlights on photocell - no recommended upgrade	2	876	$53	876	$53
Outdoor wall packs-no recommended upgrade	7	1,840	$110	1,840	$110
TOTALS		**17,632**	**$1,059**	**11,132**	**$668**

Annual Energy Savings (kWh)	**6,500**
Annual Cost Savings	**$390**
Percent Annual Energy Savings	**37%**

The Bowling Alley is occupied from September to May for 16 hours per week.
The Curling Rink and lounge are occupied 3 evenings a week for 8 hours plus 3 weekend bonspiels per year.
The Senior's Centre is occupied for 4 hours per week.
The Exit signs are assumed to be on 24 hours a day, 365 days per year
The outdoor lights are assumed to be on 12 hours per day, 365 days per year.

Table B.1.4 (a) Window and Door Replacement Calculations for the North Interlake Recreation Centre

Description	Existing				New			Savings	
	Area (ft^2)	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	Energy (kWh)	Cost
Replace double pane windows from lounge to outside with triple pane windows (2-23"x48")	15.33	2.000	602	$36	6.25	193	$12	410	$25
Replace single pane windows between 2nd floor storage and rink with triple pane windows (2-40"x54")	30	1.000	2,357	$142	6.25	377	$23	1,980	$119
Replace single pane windows between lobby and curling rink with triple pane windows (3x3-56"x38")	133	1.000	10,450	$627	6.25	1,672	$100	8,778	$527
TOTALS			**13,410**	**$805**		**2,242**	**$135**	**11,168**	**$671**

Table B.1.4 (b) Window and Door Infiltration Calculations for the North Interlake Recreation Centre

Description	Crack Length (ft)	Crack Width (in)	Leakage on typical door (cfm)	Leakage on these doors (cfm)	Annual Heat Loss (BTU)	Annual Heat Loss (kWh)	Cost
Weatherstrip doors to outside (7)	35	0.05	125	120	34,614,529	10,145	$609
Seal windows from lounge to outside (2)	5.92	0.025	50	8	2,340,601	686	$41
TOTALS						**10,145**	**$609**

The crack length around the windows and doors is a quarter of the perimter

The centre is maintained at 21^{o}C (70 ^{o}F)

Table B.1.5 - Water Usage for the North Interlake Recreation Centre

	Qty	Est. # of Uses/Hr/ Fixture	Est. # of Uses/Yr	Current Flow (LPF or LPC)	Current Water Usage (L/Yr)	New Flow (LPF or LPC)	New Water Usage (L/Yr)	Water Saved (L/Yr)	Hot Water Savings (kWh)	Cost Savings
Main Floor Washroom										
Sinks	10	0.9	11,550	1.60	18,480	0.32	3,696	14,784	554	$33
Toilets	9	0.6	6,600	13.25	87,450	6.00	39,600	47,850	NA	NA
High Flow Urinals	2	1.3	3,300	9.50	31,350	3.80	12,540	18,810	NA	NA
Low Flow Urinals	1	1.3	1,650	3.80	6,270	3.80	6,270	0	NA	NA
Total					**143,550**		**62,106**	**81,444**	**554**	**$33**

Frequency at Which Fixtures are Used			
	Females	**Males**	**Totals**
Number of People	10	10	
Number of Toilet Uses/day	3	1	
Number of Toilets	9	9	
Toilet Uses/hour/fixture	0.42	0.14	0.56
Number of Urinals	0	3	
Number of Urinal Uses/day	0	3	
Urinal Uses/hr/fixture	0	1.25	1.25
Number of Sinks	10	10	
Number of Sink Uses/day	3	4	
Sink Uses/hr/fixture	0.375	0.5	0.875

Current Hot Water Usage (kWh)		
Fixture	**L/Yr**	**kWh**
Sinks	18,480	693
Total	**18,480**	**693**

The current sinks are assumed to consume 2.5 gpm and the new sinks are 0.5 gpm

The current toilets are assumed to use 3.5 gallons per flush and the new toilets use 1.5 gallons per flush

The current high flow urinals are assumed to use 2.5 gallons per flush and the water efficient urinals consume 1 gallon per flush

Table B.1.6 Energy Savings with Heating, Ventilating, and Air Conditioning for North Interlake Recreation Centre

Description	% of Time Unoccupied	Heating Degree Days below 70 F	Heating Degree Days below 59 F	Current Energy Used to Heat (kWh)	Heat Savings (kWh)
Setback thermostats to 59 F	84.93%	11,171	9,527	18,905	2,362

Description	Quantity	Flow Rate (cfm)	Heating Degree Days below 70 F	Heating Efficiency	Energy Savings (kWh)
Replace back draft damper with motorized damper	1	75	11,171	100%	6,364

Table B.2.1 - Energy Breakdown for the Camper Community Hall

	Energy Consumption (kWh)	% of Total Energy Consumption
HVAC	44,945	85%
Lighting	5,765	11%
Hot Water	2,210	4%
Total	**52,920**	

Table B.2.2 - Electricity Usage for Camper Hall

	Consumption Data			Calculated Costs		
Month (2004-2005)	**Maximum KVA**	**Billed KVA**	**Energy (kWh)**	**Demand Charge**	**Energy Charge**	**Total Charge**
September	0	0	2,520	$0	$148	$186
October	0	0	2,400	$0	$141	$178
November	0	0	4,860	$0	$285	$343
December	0	0	11,520	$0	$666	$778
January	0	0	1,500	$0	$88	$118
February	0	0	8,820	$0	$517	$607
March	0	0	6,780	$0	$397	$471
April	0	0	5,880	$0	$353	$416
May	0	0	4,260	$0	$256	$310
June	0	0	2,340	$0	$140	$178
July	0	0	540	$0	$32	$55
August	0	0	1,500	$0	$90	$121
TOTAL		**0**	**52,920**	**$0**	**$3,113**	**$3,761**

Notes

There is no charge for the first 50 KVA of monthly demand; a charge of $8.32 is applied to each KVA above 50.

The Total Charge column includes the energy charge, the demand charge, the monthly basic charge, and 14% taxes.

Table B.2.3 - Lighting Analysis Summary for Camper Hall

Description	Quantity	Current Conditions		After Improvements	
		Annual Energy Consumption (kWh)	Annual Cost	Annual Energy Consumption (kWh)	Annual Cost
4' x 2 T12 fluorescents - replace with T8 lamps and ballasts.	38	775	$47	466	$28
4' x4 T12 fluorescents - replace with T8 lamps and ballasts.	96	1,957	$117	1,178	$71
4' x1 T12 fluorescents - replace with T8 lamps and ballasts.	4	82	$5	49	$3
Indoor incandescent bulbs - convert to compact fluorescents.	15	374	$22	94	$6
Exit Signs - Convert Incandescents to LEDs	1	263	$16	26	$2
Outdoor lights on sentinel	3	125	$7	125	$7
Outdoor incandescents - convert to high pressure sodium lights.	5	2,190	$131	1,095	$66
TOTALS		**5,765**	**$346**	**3,033**	**$182**

Annual Energy Savings (kWh)	**2,732**
Annual Cost Savings	**$164**
Percent Annual Energy Savings	**47%**

These calculations are assuming that the hall is occupied for 8 hours a week (416 hours/year)

The Exit signs are assumed to be on 24 hours a day, 365 days per year

The outdoor incandescent lights are assumed to be on 12 hours per day, 365 days per year.

Table B.2.4 Window and Door Infiltration Calculations for Camper Hall

Description	Crack Length (ft)	Crack Width (in)	Leakage on typical door (cfm)	Leakage on these doors (cfm)	Annual Heat Loss (BTU)	Annual Heat Loss (kWh)	Cost
Weatherstrip kitchen door (1-3'x7')	5	0.05	125	17	4,944,933	1,449	$87
Weatherstrip double doors at front entrance (1-6'x7')	6.5	0.05	125	22	6,428,412	1,884	$113
Weatherstrip side exit doors (2-3'x7')	10	0.05	125	34	9,889,865	2,898	$174
TOTALS						**6,232**	**$374**

The crack length around the doors is a quarter of the perimeter

The hall is assumed to be kept at 10 ^{o}C (50 ^{o}F)

Table B.2.5 - Water Usage for Camper Hall

Fixture	Qty	Est. # of Uses/Hr/ Fixture	Est. # of Uses/Yr	Current Flow (LPF or LPC)	Current Water Usage (L/Yr)	New Flow (LPF or LPC)	New Water Usage (L/Yr)	Water Saved (L/Yr)	Hot Water Savings (kWh)	Cost Savings
Sinks	6	3.6	9,100	1.60	14,560	0.32	2,912	11,648	436	$26
Toilets	6	3.6	9,100	13.25	120,575	6.00	54,600	65,975	NA	NA
Urinals	3	3.1	3,900	3.80	14,820	3.80	14,820	0	NA	NA
Total					**149,955**		**72,332**	**77,623**	**436**	**$26**

Frequency at Which Fixtures are Used			
	Females	Males	Totals
Number of People	25	25	
Number of Toilet Uses/day	3	4	
Number of Toilets	6	6	
Toilet Uses/hour/fixture	1.56	2.08	3.65
Number of Urinal Uses/day	0	3	
Number of Urinals	0	3	
Urinal Uses/hour/fixture	0.00	3.13	3.13
Number of Sinks	6	6	
Number of Sink Uses/day	3	4	
Sink Uses/hr/fixture	1.56	2.08	3.65

Current Hot Water Usage (kWh)		
Fixture	L/Yr	kWh
Sinks	14,560	546
Total	**14,560**	**546**

The current sinks are assumed to consume 2.5 gpm and the new sinks are 0.5 gpm

The current toilets are assumed to use 3.5 gallons per flush and the new toilets use 1.5 gallons per flush

The current urinals are assumed to use 1 gallon per flush

Table B.3.1 - Energy Breakdown for Moosehorn Community Hall

	Energy Consumption (kWh)	% of Total Energy Consumption
HVAC	80,430	89%
Lighting	6,385	7%
Hot Water	3,352	4%
Total	**90,168**	

Table B.3.2 - Electricity Usage for Moosehorn Community Hall

	Consumption Data			Calculated Costs		
Month (2004-2005)	**Maximum KVA**	**Billed KVA**	**Energy (kWh)**	**Demand Charge**	**Energy Charge**	**Total Charge**
September	0	0	3,144	$0	$184	$242
October	0	0	4,824	$0	$283	$354
November	0	0	7,644	$0	$448	$543
December	0	0	10,584	$0	$620	$739
January	0	0	16,164	$0	$845	$997
February	0	0	19,944	$0	$985	$1,163
March	0	0	4,464	$0	$262	$330
April	0	0	7,764	$0	$466	$558
May	0	0	7,644	$0	$459	$555
June	0	0	3,624	$0	$218	$280
July	0	0	2,484	$0	$149	$202
August	0	0	1,884	$0	$113	$161
TOTAL		**0**	**90,168**	**$0**	**$5,032**	**$6,125**

Notes

There is no charge for the first 50 KVA of monthly demand; a charge of $8.32 is applied to each KVA above 50.

The Total Charge column includes the energy charge, the demand charge, the monthly basic charge, and 14% taxes.

Table B.3.3 - Lighting Analysis Summary for Moosehorn Community Hall

Description	Quantity	Current Conditions		After Improvements	
		Annual Energy Consumption (kWh)	Annual Cost	Annual Energy Consumption (kWh)	Annual Cost
4' x 2 T12 fluorescents - replace with T8 lamps and ballasts.	88	1,725	$104	1,038	$62
8' T12 fluorescents - convert to T8s (3x2).	6	278	$17	130	$8
Indoor 100W incandescent bulbs - convert to compact fluorescents.	11	440	$26	123	$7
Outdoor Incandescents - convert to high pressure sodium.	6	2,628	$158	1,314	$79
Exit Signs - convert incandescents to LEDs.	5	1,314	$79	131	$8
TOTALS		**6,385**	**$383**	**2,737**	**$164**

Annual Energy Savings (kWh)	**3,649**
Annual Cost Savings	**$219**
Percent Annual Energy Savings	**57%**

These calculations are assuming that the hall is occupied on 4 hrs/week and twice a month for socials

The Exit signs are assumed to be on 24 hours a day, 365 days per year

The outdoor lights are assumed to be on 12 hours per day, 365 days per year.

Table B.3.4 (a) Window and Door Replacement Calculations for Moosehorn Community Hall

Description	Existing				New			Savings	
	Area (ft^2)	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	Energy (kWh)	Cost
Replace old 7'x3' wood doors with insulated wood doors (4)	84	1.578	4,184	$251	6.67	990	$59	3,194	$192
Replace double pane 2'x1' aluminum sliders with triple pane windows (5)	10	2.000	393	$24	6.25	126	$8	267	$16
TOTALS			**4,576**	**$275**		**1,115**	**$67**	**3,461**	**$208**

Table B.3.4 (b) Window and Door Infiltration Calculations for Moosehorn Community Hall

Description	Crack Length (ft)	Crack Width (in)	Leakage on typical door (cfm)	Leakage on these doors (cfm)	Annual Heat Loss (BTU)	Annual Heat Loss (kWh)	Cost
Weatherstrip old wood doors (4)	20	0.05	125	68	19,779,731	5,797	$348
Weatherstrip metal doors (3)	15	0.05	125	51	14,834,798	4,348	$261
TOTALS						**10,145**	**$609**

The crack length around the doors is a quarter of the perimeter

The hall is assumed to be kept at 70 F

Table B.3.5 - Water Usage for the Moosehorn Community Hall

Fixtures	Qty	Est. # of Uses/Hr/ Fixture	Est. # of Uses/Yr	Current Flow (LPF or LPC)	Current Water Usage (L/Yr)	New Flow (LPF or LPC)	New Water Usage (L/Yr)	Water Saved (L/Yr)	Hot Water Savings (kWh)	Cost Savings
Sinks	6	3.6	8,750	1.60	14,000	0.32	2,800	11,200	420	$25
Toilets	7	1.8	5,000	13.25	66,250	6.00	30,000	36,250	NA	NA
Urinals	2	4.7	3,750	9.50	35,625	3.80	14,250	21,375	NA	NA
Total					**115,875**		**47,050**	**68,825**	**420**	**$25**

Frequency at Which Fixtures are Used			
	Females	Males	Totals
Number of People	25	25	
Number of Toilet Uses/day	3	1	
Number of Toilets	7	7	
Toilet Uses/hour/fixture	1.34	0.45	1.79
Number of Urinal Uses/day	0	3	
Number of Urinals	0	2	
Urinal Uses/hour/fixture	0.00	4.69	4.69
Number of Sinks	6	6	
Number of Sink Uses/day	3	4	
Sink Uses/hr/fixture	1.56	2.08	3.65

Current Hot Water Usage (kWh)		
Fixture	L/Yr	kWh
Sinks	14,000	525
Total	**14,000**	**525**

The current sinks are assumed to consume 2.5 gpm and the new sinks are 0.5 gpm

The current water closets are assumed to use 3.5 gallons per flush and the new wash closets use 1.5 gallons per flush

The urinals are assumed to use 2.5 gpf and the new urinals 1 gpf

Table B.3.6 Energy Savings with Heating, Ventilating, and Air Conditioning for Moosehorn Community Hall

Description	% of Time Unoccupied	HDD below 70 F	HDD below 59 F	Current Energy Used to Heat (kWh)	Heat Savings (kWh)
Setback thermostats to 59 F	95.43%	11,171	9,527	72,387	10,167

Description	Quantity	Flow Rate (cfm)	Heat Loss (KWH)	Energy Savings for all HRVs (kWh)
Replace BDDs with motorized dampers	2	20	1,697	3,394

Table B.4.1 - Energy Breakdown for Grahamdale Community Hall

	Energy Consumption (kWh)	% of Total Energy Consumption
HVAC	71,698	85%
Lighting	9,205	11%
Hot Water	3,269	4%
Total	**84,172**	

Table B.4.2 - Electricity Usage for Grahamdale Community Hall

	Consumption Data			Calculated Costs		
Month (2004-2005)	**Maximum KVA**	**Billed KVA**	**Energy (kWh)**	**Demand Charge**	**Energy Charge**	**Total Charge**
September	0	0	2,981	$0	$175	$251
October	0	0	7,341	$0	$430	$542
November	0	0	6,381	$0	$374	$478
December	0	0	11,621	$0	$670	$817
January	0	0	12,461	$0	$703	$854
February	0	0	9,381	$0	$550	$679
March	0	0	10,971	$0	$643	$785
April	0	0	6,931	$0	$416	$524
May	0	0	9,721	$0	$584	$734
June	0	0	3,731	$0	$224	$308
July	0	0	871	$0	$52	$117
August	0	0	1,781	$0	$107	$187
TOTAL		**0**	**84,172**	**$0**	**$4,927**	**$6,275**

Notes

There is no charge for the first 50 KVA of monthly demand; a charge of $8.32 is applied to each KVA above 50.

The Total Charge column includes the energy charge, the demand charge, the monthly basic charge, and 14% taxes.

Table B.4.3 - Lighting Analysis Summary for Grahamdale Community Hall

Description	Quantity	Current Conditions		After Improvements	
		Annual Energy Consumption (kWh)	Annual Cost	Annual Energy Consumption (kWh)	Annual Cost
4' T12 fluorescents - convert to T8s (9x2)	18	360	$22	217	$13
8' T12 fluorescents - convert to T8s (27x2)	54	2,556	$153	1,190	$71
Indoor 100W incandescent bulbs - convert to compact fluorescents	6	245	$15	69	$4
Outdoor incandescents - convert to high pressure sodium with photocells	7	3,679	$221	920	$55
Exit Signs - Convert Incandescents to LEDs	9	2,365	$142	237	$14
TOTALS		**9,205**	**$553**	**2,631**	**$158**

Annual Energy Savings (kWh)	**6,574**
Annual Cost Savings	**$395**
Percent Annual Energy Savings	**71%**

These calculations are assuming that the hall is occupied for 34 hours per month

The Exit signs are assumed to be on 24 hours a day, 365 days per year

The outdoor lights are on 24 hours per day, 365 days per year.

Table B.4.4 (a) Window and Door Replacement Calculations for the Grahamdale Community Hall

Description	Existing				New			Savings	
	Area (ft^2)	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	Energy (kWh)	Cost
Replace old 3'x7' wood doors with insulated wood doors (3)	63	1.578	2,018	$121	6.67	477	$29	1,540	$92
TOTALS			**2,018**	**$121**		**477**	**$29**	**1,540**	**$92**

Table B.4.4 (b) Window and Door Infiltration Calculations for the Grahamdale Community Hall

Description	Crack Length (ft)	Crack Width (in)	Leakage on typical door (cfm)	Leakage on these doors (cfm)	Annual Heat Loss (BTU)	Annual Heat Loss (kWh)	Cost
Weatherstrip wood doors (3)	15	0.05	125	51	9,539,369	2,796	$168
Weatherstrip metal doors (4)	20	0.05	125	68	12,719,158	3,728	$224
TOTALS						**6,523**	**$392**

Table B.4.4 (c) Floor Insulation Upgrade for the Grahamdale Community Hall

Description	Existing				New			Savings	
	Area (ft^2)	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	Energy (kWh)	Cost
Upgrade floor insulation	6490	4.000	81,978	$4,922	12	27,326	$1,641	54,652	$3,281
TOTALS			**81,978**	**$4,922**		**27,326**	**$1,641**	**54,652**	**$3,281**

The crack length around the doors is a quarter the perimeter

The hall is assumed to be kept at 50 F when unoccupied.

Table B.4.5 - Water Usage for Grahamdale Community Hall

Fixtures	Qty	Est. # of Uses/Hr/ Fixture	Est. # of Uses/Yr	Current Flow (LPF or LPC)	Current Water Usage (L/Yr)	New Flow (LPF or LPC)	New Water Usage (L/Yr)	Water Saved (L/Yr)	Hot Water Savings (kWh)	Cost Savings
Sinks	6	11	26,775	1.60	42,840	0.32	8,568	34,272	1,284	$77
Toilets	6	11	26,775	13.25	354,769	6.00	160,650	194,119	NA	NA
Urinals	2	5	3,825	9.50	36,338	3.80	14,535	21,803	NA	NA
Total					**433,946**		**183,753**	**250,193**	**1,284**	**$77**

Frequency at Which Fixtures are Used			
	Females	**Males**	**Totals**
Number of People	25	25	
Number of Toilet Uses/day	3	4	
Number of Toilets	2	2	
Toilet Uses/hour/fixture	4.6875	6.25	10.9375
Number of Urinals	0	2	
Number of Urinal Uses/day	0	3	
Urinal Uses/hour/fixture	0	4.6875	4.6875
Number of Sinks	2	2	
Number of Sink Uses/day	3	4	
Sink Uses/hr/fixture	4.6875	6.25	10.9375

Current Hot Water Usage (kWh)		
Fixture	**L/Yr**	**kWh**
Sinks	42,840	1,605
Total	**42,840**	**1,605**

The current sinks are assumed to consume 2.5 gpm and the new sinks are 0.5 gpm

The current toilets are assumed to use 3.5 gallons per flush and the new toilets use 1.5 gallons per flush

The urinals are assumed to use 2.5 gpf and the low flow urinals use 1 gpf

Table B.4.6 Energy Savings with Heating, Ventilating, and Air Conditioning for Grahamdale Community Hall

Description	Quantity	Flow Rate (cfm)	Heat Loss (kWh)	Energy Savings for all HRVs (kWh)
Replace BDDs with motorized dampers	2	20	1,091	2,182

Table B.5.1 - Energy Breakdown for Faulkner Community Hall

	Energy Consumption (kWh)	% of Total Energy Consumption
HVAC	62,315	90%
Lighting	4,499	7%
Hot Water	2,210	3%
Total	**69,024**	

Table B.5.2 - Electricity Usage for Faulkner Community Hall

	Consumption Data			Calculated Costs		
Month (2004-2005)	**Maximum KVA**	**Billed KVA**	**Energy (kWh)**	**Demand Charge**	**Energy Charge**	**Total Charge**
September	60	10	2,942	$83	$172	$327
October	56	6	3,482	$50	$204	$325
November	61	11	6,902	$92	$404	$601
December	65	15	8,402	$125	$492	$739
January	52	2	15,962	$17	$837	$1,012
February	53	3	9,662	$25	$566	$710
March	54	4	8,942	$33	$524	$671
April	51	1	5,162	$8	$310	$396
May	50	0	3,782	$0	$227	$295
June	47	0	1,502	$0	$90	$139
July	17	0	1,682	$0	$101	$151
August	42	0	602	$0	$36	$77
TOTAL		**52**	**69,024**	**$433**	**$3,965**	**$5,445**

Notes

There is no charge for the first 50 KVA of monthly demand; a charge of $8.32 is applied to each KVA above 50.

The Total Charge column includes the energy charge, the demand charge, the monthly basic charge, and 14% taxes.

Table B.5.3 - Lighting Analysis Summary for Faulkner Community Hall

Description	Quantity	Current Conditions		After Improvements	
		Annual Energy Consumption (kWh)	Annual Cost	Annual Energy Consumption (kWh)	Annual Cost
60W Incandescents - convert to compact fluorescts	39	973	$58	243	$15
100W incandescents - convert to compact fluorescents	56	2,330	$140	652	$39
4' T12 fluorescent lamps - replace with T8 lamps and ballasts.	4	82	$5	49	$3
Outdoor halogens - Convert to high pressure sodium	4	832	$50	166	$10
Outdoor pot lights	4	166	$10	166	$10
Yard light	1	42	$2	42	$2
Exit Signs - No recommendations since exit signs are rarely used	6	75	$4	75	$4
TOTALS		**4,499**	**$270**	**1,394**	**$84**

Annual Energy Savings (kWh)	**3,105**
Annual Cost Savings	**$186**
Percent Annual Energy Savings	**69%**

These calculations are assuming that the hall is occupied for 8 hours a week (416 hours/year)

The Exit signs are assumed to be on 24 hours a day, 365 days per year

The outdoor lights are assumed to be on 12 hours per day, 365 days per year.

Table B.5.4 Window and Door Infiltration Calculations for Faulkner Community Hall

Description	Crack Length (ft)	Crack Width (in)	Leakage on typical door (cfm)	Leakage on these doors (cfm)	Annual Heat Loss (BTU)	Annual Heat Loss (kWh)	Cost
Weatherstrip metal doors on side of hall (4)	20	0.05	125	68	16,869,520	4,944	$297
Weatherstrip double doors in front (1)	10	0.05	125	34	8,434,760	2,472	$148
TOTALS						**7,416**	**$445**

The crack length around the doors is a quarter the perimeter.

The hall is assumed to be kept at 15 ^{o}C (59 ^{o}F)

Table B.5.5 - Water Usage for Faulkner Community Hall

Fixtures	Qty	Est. # of Uses/Hr/ Fixture	Est. # of Uses/Yr	Current Flow (LPF or LPC)	Current Water Usage (L/Yr)	New Flow (LPF or LPC)	New Water Usage (L/Yr)	Water Saved (L/Yr)	Hot Water Savings (kWh)	Cost Savings
Sinks	6	3.6	9,100	1.60	14,560	0.32	2,912	11,648	436	$26
Toilets	7	1.8	5,200	13.25	68,900	6.00	31,200	37,700	NA	NA
Urinals	3	0.1	70	9.50	662	3.80	265	397	NA	NA
Total					**84,122**		**34,377**	**49,745**	**436**	**$26**

Frequency at Which Fixtures are Used			
	Females	Males	Totals
Number of People	25	25	
Number of Toilet Uses/day	3	1	
Number of Toilets	7	7	
Toilet Uses/hour/fixture	1.34	0.45	1.79
Number of Urinals	0	3	
Number of Urinal Uses/day	0	3	
Urinal Uses/hr/fixture	0.00	0.06	0.06
Number of Sinks	6	6	
Number of Sink Uses/day	3	4	
Sink Uses/hr/fixture	1.56	2.08	3.65

Current Hot Water Usage (kWh)		
Fixture	L/Yr	kWh
Sinks	14,560	546
Total	**14,560**	**546**

The current sinks are assumed to consume 2.5 gpm and the new sinks are 0.5 gpm

The current water closets are assumed to use 3.5 gallons per flush and the new wash closets use 1.5 gallons per flush

The urinals are assumed to use 2.5 gpf and the low flow urinals use 1 gpf

Table B.5.6 Energy Savings with Heating, Ventilating, and Air Conditioning for Faulkner Community Hall

Description	Quantity	Flow Rate (cfm)	Heat Loss (kWh)	Energy Savings for all HRVs (kWh)
Install motorized damper	1	20	1,447	1,447

Table B.6.1 - Energy Breakdown for Steep Rock Community Hall

	Energy Consumption (kWh)	% of Total Energy Consumption
HVAC	6,400	71.6%
Lighting	2,497	27.9%
Hot Water	43	0.5%
Total	**8,940**	

Table B.6.2 - Electricity Usage for Steep Rock Community Hall

	Consumption Data			Calculated Costs		
Month (2004-2005)	**Maximum KVA**	**Billed KVA**	**Energy (kWh)**	**Demand Charge**	**Energy Charge**	**Total Charge**
September	0	0	490	$0	$29	$51
October	0	0	490	$0	$29	$51
November	0	0	5,960	$0	$349	$416
December	0	0	0	$0	$0	$18
January	0	0	0	$0	$0	$18
February	0	0	0	$0	$0	$18
March	0	0	0	$0	$0	$18
April	0	0	0	$0	$0	$18
May	0	0	1,840	$0	$110	$144
June	0	0	100	$0	$6	$25
July	0	0	60	$0	$4	$22
August	0	0	0	$0	$0	$18
TOTAL		**0**	**8,940**	**$0**	**$527**	**$817**

Notes

There is no charge for the first 50 KVA of monthly demand; a charge of $8.32 is applied to each KVA above 50.

The Total Charge column includes the energy charge, the demand charge, the monthly basic charge, and 14% taxes.

Table B.6.3 - Lighting Analysis Summary for Steep Rock Community Hall

Description	Quantity	Current Conditions		After Improvements	
		Annual Energy Consumption (kWh)	Annual Cost	Annual Energy Consumption (kWh)	Annual Cost
Incandescents in hall, kitchen, washrooms, vestibule, stage, and sw entrance - convert to compact fluorescents	20	1,440	$86	403	$24
Incandescents in boarding house - convert to compact fluorescents	16	154	$9	43	$3
Outdoor Incandescents - convert to high pressure sodium	4	115	$7	58	$3
Exit Signs - Convert Incandescents to LEDs	3	788	$47	79	$5
TOTALS		**2,497**	**$150**	**583**	**$35**

Annual Energy Savings (kWh)	**1,915**
Annual Cost Savings	**$115**
Percent Annual Energy Savings	**77%**

These calculations are assuming that the lights in the boarding house are on for 6 hours a day from June to September and all the hall lights are on 8 hours/month.

The Exit signs are assumed to be on 24 hours a day, 365 days per year

The outdoor lights are assumed to be on 12 hours per day, 150 days per year.

Table B.6.4 (a) Window and Door Replacement Calculations for the Steep Rock Community Hall

Description	Existing				New			Savings	
	Area (ft^2)	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	Energy (kWh)	Cost
Hall: Replace old wood doors to hall with insulated wood doors (3)	63	1.578	157	$9	6.67	37	$2	120	$7
Hall: Replace old steel door with insulated steel door (1)	21	1.500	55	$3	6.8	12	$1	43	$3
Hall: Replace 28"x42" single pane vertical sliders in hall with triple pane windows (20)	163	1.000	642	$39	6.25	103	$6	539	$32
House: Replace old wood doors with insulated doors (2)	42	1.578	2,973	$179	6.67	703	$42	2,270	$136
House: Replace 24"x54" single pane windows with triple pane windows (14)	126	1.000	14,073	$845	6.25	2,252	$135	11,821	$710
House: Replace 24"x42" windows with triple pane windows (2)	14	1.000	1,564	$53	6.25	250	$8	1,313	$45
House: Replace 24"x16" single pane windows in basement with triple pane windows (2)	5	1.000	596	$20	6.25	95	$3	500	$17
TOTALS			**19,902**	**$1,138**		**3,415**	**$196**	**16,487**	**$942**

Table B.6.4 (b) Window and Door Infiltration Calculations for Steep Rock Community Hall

Description	Crack Length (ft)	Crack Width (in)	Leakage on typical door (cfm)	Leakage on these doors (cfm)	Annual Heat Loss (BTU)	Annual Heat Loss (kWh)	Cost
Hall: Windows (20)	100	0.025	50	137	1,985,061	582	$20
Hall: Old wood doors (3)	15	0.05	125	51	741,740	217	$7
House: Windows (18)	54.333	0.025	50	74	30,552,575	8,954	$304
House: Wood panel doors (2)	10	0.05	125	34	14,057,933	4,120	$140
TOTALS						**13,873**	**$470**

Table B.6.4 (c) Wall/Roof Insulation Upgrade for Steep Rock Community Hall

Description	Existing				New			Savings	
	Area (ft^2)	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	Energy (kWh)	Cost
House: Upgrade roof insulation	800	6.000	14,892	$894	40	2,234	$134	12,658	$760
House: Upgrade wall insulation	2200	6.000	40,952	$2,459	20	12,286	$738	28,667	$1,721
Hall: Upgrade wall insulation	2000	6.000	1,310	$79	20	393	$24	917	$55
TOTALS			**57,154**	**$3,432**		**14,912**	**$895**	**42,241**	**$2,536**

The crack length around the windows and doors is a quarter of the perimeter

The boarding house is assumed to be kept at 59 F

The hall is only heated when it is occupied

Table B.6.5 - Water Usage for Steep Rock Community Hall

Fixtures	Qty	Est. # of Uses/Hr/ Fixture	Est. # of Uses/Yr	Current Flow (LPF or LPC)	Current Water Usage (L/Yr)	New Flow (LPF or LPC)	New Water Usage (L/Yr)	Water Saved (L/Yr)	Hot Water Savings (kWh)	Cost Savings
Sinks	3	2.5	720	1.60	1,152	0.32	230	922	35	$2
Toilets	5	7.3	3,500	13.25	46,375	6.00	21,000	25,375	NA	NA
Urinals	1	9.4	900	9.50	8,550	3.80	3,420	5,130	NA	NA
Total					**56,077**		**24,650**	**31,427**	**35**	**$2**

Frequency at Which Fixtures are Used			
	Females	Males	Totals
Number of People	25	25	
Number of Toilet Uses/day	3	1	
Number of Toilets	5	5	
Toilet Uses/hour/fixture	1.88	0.63	2.50
Number of Urinals	0	1	
Number of Urinal Uses/day	0	3	
Urinal Uses/hour/fixture	0.00	9.38	9.38
Number of Sinks	3	3	
Number of Sink Uses/day	3	4	
Sink Uses/hr/fixture	3.13	4.17	7.29

Current Hot Water Usage (kWh)		
Fixture	L/Yr	kWh
Sinks	1,152	43
Total	**1,152**	**43**

The current sinks are assumed to consume 2.5 gpm and the new sinks are 0.5 gpm

The current toilets are assumed to use 3.5 gallons per flush and the new toilets use 1.5 gallons per flush

The current high flow urinals consume 2.5 gpf and low flow urinals consume 1 gpf

Table B.7.1 - Energy Breakdown for St. Martin Community Hall

	Energy Consumption (kWh)	% of Total Energy Consumption
HVAC	86,426	87%
Lighting	10,327	10%
Hot Water	2,031	2%
Total	**98,784**	

Table B.7.2 - Electricity Usage for St. Martin Community Hall

	Consumption Data			Calculated Costs		
Month (2004-2005)	**Maximum KVA**	**Billed KVA**	**Energy (kWh)**	**Demand Charge**	**Energy Charge**	**Total Charge**
September	36	0	3,002	$0	$176	$236
October	38	0	7,262	$0	$426	$521
November	37	0	11,642	$0	$671	$804
December	42	0	15,482	$0	$819	$972
January	62	12	17,582	$100	$900	$1,178
February	48	0	14,222	$0	$770	$917
March	47	0	12,662	$0	$710	$848
April	47	0	7,802	$0	$468	$567
May	43	0	6,122	$0	$368	$455
June	50	0	1,322	$0	$79	$127
July	24	0	722	$0	$43	$86
August	44	0	962	$0	$58	$102
TOTAL		**12**	**98,784**	**$100**	**$5,489**	**$6,814**

Notes

There is no charge for the first 50 KVA of monthly demand; a charge of $8.32 is applied to each KVA above 50.

The Total Charge column includes the energy charge, the demand charge, the monthly basic charge, and 14% taxes.

Table B.7.3 - Lighting Analysis Summary for St. Martin Community Hall

Description	Quantity	Current Conditions		After Improvements	
		Annual Energy Consumption (kWh)	Annual Cost	Annual Energy Consumption (kWh)	Annual Cost
8' T12 fluorescent bulbs - convert to T8s (18x2)	36	2,556	$153	1,190	$71
4' T12 fluorescent bulbs - convert to T8s (11x4)	44	1,319	$79	794	$48
4' T12 fluorescent bulbs - convert to T8s (10x2)	20	600	$36	361	$22
60W Incandescent bulbs - replace with compact fluorescents	11	404	$24	101	$6
100W Incandescent flood light - replace with compact fluorescent	1	61	$4	17	$1
Outdoor incandescent flood lights - convert to high pressure sodium	2	1,314	$79	657	$39
Outdoor incandescent bulb - convert to high pressure sodium with photocell	1	1,314	$79	329	$20
Outdoor incandescents - convert to high pressure sodium	3	1,971	$118	986	$59
Exit signs - Replace incandescents with LEDs	3	788	$47	79	$5
TOTALS		**10,327**	**$620**	**4,513**	**$271**

Annual Energy Savings (kWh)	**5,814**
Annual Cost Savings	**$349**
Percent Annual Energy Savings	**56%**

These calculations are assuming that the hall is occupied for 612 hours/year

The Exit signs are assumed to be on 24 hours a day, 365 days per year

One of the outdoor lights is on 24 hrs/day while the others are assumed to be on 12 hours per day, 365 days per year.

Table B.7.4 Window and Door Infiltration Calculations for the St. Martin Community Hall

Description	Crack Length (ft)	Crack Width (in)	Leakage on typical door (cfm)	Leakage on these doors (cfm)	Annual Heat Loss (BTU)	Annual Heat Loss (kWh)	Cost
Weatherstrip double doors (3)	39	0.05	125	133	38,570,475	11,304	$679
TOTALS						**11,304**	**$679**

The crack length around the doors is half the perimeter

The hall is assumed to be kept at 70 F

Table B.7.5 - Water Usage for St. Martin Community Hall

Fixtures	Qty	Est. # of Uses/Hr/ Fixture	Est. # of Uses/Yr	Current Flow (LPF or LPC)	Current Water Usage (L/Yr)	New Flow (LPF or LPC)	New Water Usage (L/Yr)	Water Saved (L/Yr)	Hot Water Savings (kWh)	Cost Savings
Sinks	4	2.5	6,120	1.60	9,792	0.32	1,958	7,834	294	$18
Toilets	5	5.5	16,734	13.25	221,730	6.00	100,406	121,324	NA	NA
Urinals	2	4.7	5,738	Auto	496,692	3.80	21,803	474,890	NA	NA
Total					**728,214**		**124,167**	**604,047**	**294**	**$18**

Frequency at Which Fixtures are Used			
	Females	Males	Totals
Number of People	25	25	
Number of Toilet Uses/day	3	1	
Number of Toilets	5	5	
Toilet Uses/hour/fixture	1.875	0.625	2.5
Number of Urinals	0	2	
Number of Urinal Uses/day	0	3	
Urinal Uses/hr/fixture	0	4.6875	4.6875
Number of Sinks	4	4	
Number of Sink Uses/day	3	4	
Sink Uses/hr/fixture	2.34375	3.125	5.46875

Current Hot Water Usage (kWh)		
Fixture	L/Yr	kWh
Sinks	9,792	367
Total	**9,792**	**367**

The current sinks are assumed to consume 2.5 gpm and the new sinks are 0.5 gpm

The current toilets are assumed to use 3.5 gallons per flush and the new toilets use 1.5 gallons per flush

The automatic flush urinals are assumed to consume 5 gallons every 20 minutes

Table B.7.6 Energy Savings with Heating, Ventilating, and Air Conditioning for St. Martin Community Hall

Description	% of Time Unoccupied	HDD below 70 F	HDD below 59 F	Current Energy Used to Heat	Heat Savings (kWh)
Setback Thermostats to 59 F	93.01%	11,171	9,527	86,426	11,828

Description	Quantity	Flow Rate (cfm)	Heat Loss (kWh)	Energy Savings for all HRVs (kWh)
Replace BDDs with motorized dampers	2	20	1,697	3,394

Table B.8.1 - Energy Breakdown for Gypsumville Memorial Hall

	Energy Consumption (kWh)	% of Total Energy Consumption
HVAC	62,480	88%
Lighting	6,648	9%
Hot Water	1,717	2%
Total	**70,845**	

Table B.8.2 - Electricity Usage for Gypsumville Memorial Hall

	Consumption Data			Calculated Costs		
Month (2004-2005)	**Maximum KVA**	**Billed KVA**	**Energy (kWh)**	**Demand Charge**	**Energy Charge**	**Total Charge**
September	0	0	3,984	$0	$233	$298
October	0	0	4,164	$0	$244	$310
November	0	0	7,104	$0	$416	$507
December	0	0	11,004	$0	$645	$767
January	0	0	12,804	$0	$716	$850
February	0	0	10,104	$0	$592	$707
March	0	0	9,564	$0	$560	$671
April	0	0	5,424	$0	$326	$402
May	0	0	3,921	$0	$235	$301
June	0	0	564	$0	$34	$71
July	0	0	1,644	$0	$99	$145
August	0	0	564	$0	$34	$71
TOTAL		**0**	**70,845**	**$0**	**$4,135**	**$5,099**

Notes

There is no charge for the first 50 KVA of monthly demand; a charge of $8.32 is applied to each KVA above 50.

The Total Charge column includes the energy charge, the demand charge, the monthly basic charge, and 14% taxes.

Table B.8.3 - Lighting Analysis Summary for Gypsumville Memorial Hall

Description	Quantity	Current Conditions		After Improvements	
		Annual Energy Consumption (kWh)	Annual Cost	Annual Energy Consumption (kWh)	Annual Cost
Indoor 100W incandescent bulbs - convert to compact fluorescents	38	1,003	$60	281	$17
Indoor 60W Incandescent bulbs - convert to compact fluorescents	19	301	$18	75	$5
Outdoor 100W incandescents - convert to high pressure sodium with photocells	4	3,504	$210	876	$53
Exit Signs - Convert Incandescents to LEDs	7	1,840	$110	184	$11
TOTALS		**6,648**	**$399**	**1,416**	**$85**

Annual Energy Savings (kWh)	**5,232**
Annual Cost Savings	**$314**
Percent Annual Energy Savings	**79%**

These calculations are assuming that the hall is occupied for 22 hours per month (264 hours/year)

The Exit signs are assumed to be on 24 hours a day, 365 days per year

The outdoor lights are assumed to be on 12 hours per day, 365 days per year.

Table B.8.4 (a) Window and Door Replacement Calculations for Gypsumville Memorial Hall

Description	Existing				New			Savings	
	Area (ft^2)	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	Energy (kWh)	Cost
Replace old 7'x3' wood doors with insulated wood doors (2)	42	1.578	2,092	$126	6.67	495	$30	1,597	$96
sliders with triple pane windows (2-24"x24")	8	2.000	314	$19	6.25	101	$6	214	$13
TOTALS			**314**	**$19**		**101**	**$6**	**214**	**$13**

Table B.8.4 (b) Window and Door Infiltration Calculations for Gypsumville Memorial Hall

Description	Crack Length (ft)	Crack Width (in)	Leakage on typical door (cfm)	Leakage on these doors (cfm)	Annual Heat Loss (BTU)	Annual Heat Loss (kWh)	Cost
Weatherstrip old wood doors (2)	10	0.05	125	34	9,889,865	2,898	$174
Caulk metal doors (2)	5	0.025	50	7	1,977,973	580	$35
Weatherstrip and realign front door (1)	5	0.05	125	17	4,944,933	1,449	$87
Weatherstrip side exit doors (2)	10	0.05	125	34	9,889,865	2,898	$174
Seal double pane windows (2)	24	0.025	50	33	9,494,271	2,782	$167
TOTALS						**3,478**	**$209**

Table B.8.4 (c) Floor Insulation Upgrade for Gypsumville Memorial Hall

Description	Existing				New			Savings	
	Area (ft^2)	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	Energy (kWh)	Cost
Upgrade floor insulation	4300	6.000	56,311	$3,381	12	28,156	$1,690	28,156	$1,690
TOTALS			**56,311**	**$3,381**		**28,156**	**$1,690**	**28,156**	**$1,690**

The crack length around the doors is a quarter the perimeter

The crack length around the windows is a quarter of the perimter

The hall is assumed to be kept at 70 F

Table B.8.5 - Water Usage for Gypsumville Memorial Hall

Fixtures	Qty	Est. # of Uses/Hr/ Fixture	Est. # of Uses/Yr	Current Flow (LPF or LPC)	Current Water Usage (L/Yr)	New Flow (LPF or LPC)	New Water Usage (L/Yr)	Water Saved (L/Yr)	Hot Water Savings (kWh)	Cost Savings
Sinks	4	4.2	4,400	0.32	1,408	0.32	1,408	0	0	$0
Toilets	3	5.5	4,331	13.25	57,389	6.00	25,988	31,402	NA	NA
Urinals	2	4.7	2,475	9.50	23,513	3.80	9,405	14,108	NA	NA
Total					**82,310**		**36,801**	**45,509**	**0**	**$0**

Frequency at Which Fixtures are Used			
	Females	Males	Totals
Number of People	25	25	
Number of Toilet Uses/day	3	1	
Number of Toilets	3	3	
Toilet Uses/hour/fixture	3.13	1.04	4.17
Number of Urinals	0	2	
Number of Urinal Uses/day	0	3	
Urinal Uses/hr/fixture	0.00	4.69	4.69
Number of Sinks	4	4	
Number of Sink Uses/day	3	4	
Sink Uses/hr/fixture	2.34	3.13	5.47

Current Hot Water Usage (kWh)		
Fixture	L/Yr	kWh
Sinks	1,408	53
Total	**1,408**	**53**

The current sinks are assumed to consume 0.5 gpm

The current toilets are assumed to use 3.5 gallons per flush and the new toilets use 1.5 gallons per flush

The current urinals consume 2.5 gpf and low flow urinals consume 1 gpf

Table B.8.6 Energy Savings with Heating, Ventilating, and Air Conditioning for Gymsumville Memorial Hall

Description	% of Time Unoccupied	HDD below 70 F	HDD below 59 F	Current Energy Used to Heat	Heat Savings (KWH)
Setback Thermostats to 59 F	96.99%	11171	9,527	62,480	8,916

Description	Existing				New			Savings	
	Area (ft^2)	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	Energy (kWh)	Cost
Insulate heat return duct in crawlspace	47	1.000	3,693	$222	12	308	$18	3,385	$203

Description	Quantity	Flow Rate (cfm)	Heat Loss (KWH)	Energy Savings for all HRVs (KWH)
Replace BDDs with motorized dampers	3	20	1,697	5,090

Table B.9.1 - Energy Breakdown for Moosehorn Curling Rink

	Energy Consumption (kWh)	% of Total Energy Consumption
HVAC	71,294	54%
Lighting	4,827	4%
Hot Water	2,178	2%
Motors	53,761	41%
Total	**132,060**	

Table B.9.2 - Electricity Usage for Moosehorn Curling Rink

	Consumption Data			Calculated Costs		
Month (2004-2005)	**Maximum KVA**	**Billed KVA**	**Energy (kWh)**	**Demand Charge**	**Energy Charge**	**Total Charge**
September	9	0	1,260	$0	$74	$109
October	25	0	1,920	$0	$113	$153
November	57	7	21,240	$58	$1,016	$1,249
December	53	3	19,500	$25	$974	$1,163
January	54	4	26,400	$33	$1,136	$1,358
February	56	6	21,360	$50	$1,019	$1,243
March	57	7	22,980	$58	$1,056	$1,296
April	55	5	10,560	$42	$634	$790
May	17	0	1,980	$0	$119	$161
June	4	0	1,620	$0	$97	$136
July	14	0	1,740	$0	$104	$144
August	4	0	1,500	$0	$90	$128
TOTAL		**32**	**132,060**	**$266**	**$6,432**	**$7,930**

Notes

There is no charge for the first 50 KVA of monthly demand; a charge of $8.32 is applied to each KVA above 50.

The Total Charge column includes the energy charge, the demand charge, the monthly basic charge, and 14% taxes.

Table B.9.3 - Lighting Analysis Summary for Moosehorn Curling Rink

Description	Quantity	Current Conditions		After Improvements	
		Annual Energy Consumption (kWh)	Annual Cost	Annual Energy Consumption (kWh)	Annual Cost
8' T12 fluorescent lamps - convert to T8s (28x2)	56	2,546	$153	1,185	$71
4' T12 fluorescent lamps - convert to T8s (10x1)	10	192	$12	116	$7
Indoor 100W incandescent bulbs - convert to compact fluorescents	3	118	$7	33	$2
Outdoor light	1	657	$39	657	$39
Exit signs - convert incandescents to LEDs	5	1,314	$79	131	$8
TOTALS		**4,827**	**$290**	**2,122**	**$127**

Annual Energy Savings (kWh)	**2,705**
Annual Cost Savings	**$162**
Percent Annual Energy Savings	**56%**

These calculations are assuming that the Curling Rink is occupied for 392 hours/year

The Exit signs are assumed to be on 24 hours a day, 365 days per year

The outdoor lights are assumed to be on 12 hours per day, 365 days per year.

Table B.9.4 (a) Window and Door Replacement Calculations for the Moosehorn Curling Rink

Description	Existing				New			Savings	
	Area (ft^2)	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	Energy (kWh)	Cost
Replace uninsulated exterior doors with insulated doors (5)	105	1.578	5,229	$314	6.67	1,237	$74	3,993	$240
Replace double pane glass door between rink and lobby with triple pane door (1)	21	2.000	386	$23	6.25	123	$7	262	$16
Replace double pane windows between rink and lobby with triple pane windows (6)	213	2.000	3,910	$235	6.25	52	$3	3,858	$232
TOTALS			**3,910**	**$235**		**52**	**$3**	**3,858**	**$232**

Table B.9.4 (b) Window and Door Infiltration Calculations for the Moosehorn Curling Rink

Description	Crack Length (ft)	Crack Width (in)	Leakage on typical door (cfm)	Leakage on these doors (cfm)	Annual Heat Loss (BTU)	Annual Heat Loss (kWh)	Cost
Weatherstrip exterior doors (5)	25	0.05	125	85	24,724,663	7,246	$435
TOTALS						**7,246**	**$435**

The crack length around the doors is a quarter of the perimeter

The curling rink is assumed to be kept at 41 F for 6 months of the year, the rest of the building is kept at 70 F

Table B.9.5 - Water Usage for Moosehorn Curling Rink

Fixtures	Qty	Est. # of Uses/Hr/ Fixture	Est. # of Uses/Yr	Current Flow (LPF or LPC)	Current Water Usage (L/Yr)	New Flow (LPF or LPC)	New Water Usage (L/Yr)	Water Saved (L/Yr)	Hot Water Savings (kWh)	Cost Savings
Sinks	3	7.3	8,575	1.60	13,720	0.32	2,744	10,976	411	$25
Toilets	5	2.5	4,900	13.25	64,925	6.00	29,400	35,525	NA	NA
Urinals	1	9.4	3,675	3.80	13,965	3.80	13,965	0	NA	NA
Total					**92,610**		**46,109**	**46,501**	**411**	**$25**

Frequency at Which Fixtures are Used			
	Females	Males	Totals
Number of People	25	25	
Number of Toilet Uses/day	3	1	
Number of Toilets	5	5	
Toilet Uses/hour/fixture	1.875	0.625	2.5
Number of Urinals	0	1	
Number of Urinal Uses/day	0	3	
Urinal Uses/hr/fixture	0	9.375	9.375
Number of Sinks	3	3	
Number of Sink Uses/day	3	4	
Sink Uses/hr/fixture	3.125	4.166667	7.291667

Current Hot Water Usage (kWh)		
Fixture	L/Yr	kWh
Sinks	13,720	514
Total	**13,720**	**514**

The current sinks are assumed to consume 2.5 gpm and the new sinks are 0.5 gpm

The current toilets are assumed to use 3.5 gallons per flush and the new toilets use 1.5 gallons per flush

The urinals are assumed to be low flow and use 1 gpf

Table B.9.6 Energy Savings with Heating, Ventilating, and Air Conditioning for Moosehorn Curling Rink

Description	% of Time Unoccupied	HDD below 70 F	HDD below 59 F	Current Energy Used to Heat	Heat Savings (kWh)
Setback thermostats to 59 F	95.53%	11171	9,527	53,471	7,515

Description	Annual Energy Savings (kWh)	Annual Cost Savings ($)	Installation Cost	Simple Payback Years
Install Geothermal Heating System	47,529	$2,854	$56,614	19.84

Table B.9.7 Energy Consumption and Savings Calculations for Motors in Moosehorn Curling Rink

Description	Rated HP	Required HP	# of hours	Current Motors				Energy Savings of Premium Efficiency Versus Standard Efficiency Motor		
				Eff.	Actual HP	kW	kWh	Actual HP	kW	kWh
Compressor	20	16	2,200	85%	18.82	14.04	30881	0.48	0.36	787
Brine Pump	5	4	4,320	85%	4.71	3.51	15160	0.12	0.09	387
Condenser fan	5	4	2,200	85%	4.71	3.51	7720	0.12	0.09	197
TOTAL							**53,761**			**1,371**

Table B.10.1 - Energy Breakdown for Moosehorn Fire Hall

	Energy Consumption (kWh)	% of Total Energy Consumption
HVAC	48,101	95.6%
Lighting	168	0.3%
Hot Water	2,051	4.1%
Total	**50,320**	

Table B.10.2 - Electricity Usage for Moosehorn Fire Hall

	Consumption Data			Calculated Costs		
Month (2004-2005)	Maximum KVA	Billed KVA	Energy (kWh)	Demand Charge	Energy Charge	Total Charge
September	0	0	1,500	$0	$88	$118
October	0	0	2,510	$0	$147	$186
November	0	0	3,620	$0	$212	$260
December	0	0	5,930	$0	$347	$414
January	0	0	9,380	$0	$550	$645
February	0	0	7,100	$0	$416	$492
March	0	0	6,560	$0	$384	$456
April	0	0	5,690	$0	$342	$403
May	0	0	3,180	$0	$191	$236
June	0	0	3,220	$0	$193	$238
July	0	0	650	$0	$39	$63
August	0	0	980	$0	$59	$85
TOTAL		**0**	**50,320**	**$0**	**$2,969**	**$3,595**

Notes

There is no charge for the first 50 KVA of monthly demand; a charge of $8.32 is applied to each KVA above 50.

The Total Charge column includes the energy charge, the demand charge, the monthly basic charge, and 14% taxes.

Table B.10.3 - Lighting Analysis Summary for the Moosehorn Fire Hall

Description	Quantity	Current Conditions		After Improvements	
		Annual Energy Consumption (kWh)	Annual Cost	Annual Energy Consumption (kWh)	Annual Cost
4' T12 fluorescent lamps - replace with T8s	26	428	$26	258	$15
Indoor 100W incandescent bulbs - replace with compact fluorescents	5	168	$10	47	$3
TOTALS		**596**	**$36**	**305**	**$18**

Annual Energy Savings (kWh)	**291**
Annual Cost Savings	**$17**
Percent Annual Energy Savings	**49%**

These calculations are assuming that the Fire Hall is occupied for 28 hours/month

Table B.10.4 (a) Window and Door Replacement Calculations for the Moosehorn Fire Hall

Description	Existing				New			Savings	
	Area (ft^2)	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	Energy (kWh)	Cost
Replace old wood doors to outside washroom with insulated doors (2)	42	1.578	2,092	$126	6.67	495	$30	1,597	$96
Replace 8'x3' double pane aluminum sliders with triple pane windows (2)	48	2.000	1,886	$113	6.25	603	$36	1,282	$77
Replace 3'x3' double pane aluminum sliders with triple pane windows (1)	9	2.000	354	$21	6.25	113	$7	240	$14
TOTALS			**4,331**	**$260**		**1,211**	**$73**	**3,120**	**$187**

Table B.10.4 (b) Window and Door Infiltration Calculations for the Moosehorn Fire Hall

Description	Crack Length (ft)	Crack Width (in)	Leakage on typical door (cfm)	Leakage on these doors (cfm)	Annual Heat Loss (BTU)	Annual Heat Loss (kWh)	Cost
Weatherstrip wood pedestrian doors to outside washroom (2)	10	0.05	125	34	9,889,865	2,898	$98
Weatherstrip vehicle door with damaged stripping (1)	6	1	NA	90	25,991,238	7,617	$258
Weatherstrip vehicle door (1)	13	0.05	125	44	12,856,825	3,768	$128
TOTALS						**14,284**	**$484**

The crack length around the pedestrian doors and one of the vehicle doors is a quarter of the perimeter

The fire hall is assumed to be kept at 70 F

Table B.10.5 - Water Usage for Moosehorn Fire Hall

Fixtures	Qty	Est. # of Uses/Hr/ Fixture	Est. # of Uses/Yr	Current Flow (LPF or LPC)	Current Water Usage (L/Yr)	New Flow (LPF or LPC)	New Water Usage (L/Yr)	Water Saved (L/Yr)	Hot Water Savings (kWh)	Cost Savings
Sinks	3	1.6	1,596	1.60	2,554	0.32	511	2,043	77	$5
Toilets	3	0.6	588	13.25	7,791	6.00	3,528	4,263	NA	NA
Urinals	1	3.0	1,008	9.50	9,576	3.80	3,830	5,746	NA	NA
Total					**19,921**		**7,869**	**12,051**	**77**	**$5**

Frequency at Which Fixtures are Used			
	Females	Males	Totals
Number of People	2	8	
Number of Toilet Uses/day	3	1	
Number of Toilets	3	3	
Toilet Uses/hour/fixture	0.25	0.33	0.58
Number of Urinals	0	1	
Number of Urinal Uses/day	0	3	
Urinal Uses/hr/fixture	0.00	3.00	3.00
Number of Sinks	3	3	
Number of Sink Uses/day	3	4	
Sink Uses/hr/fixture	0.25	1.33	1.58

Current Hot Water Usage (kWh)		
Fixture	L/Yr	kWh
Sinks	2,554	96
Total	**2,554**	**96**

The current sinks are assumed to consume 2.5 gpm and the new sinks are 0.5 gpm

The current toilets are assumed to use 3.5 gallons per flush and the new toilets use 1.5 gallons per flush

The current urinals are assumed to use 2.5 gpf and the low flow urinals consume 1 gpf

Table B.10.6 Energy Savings with Heating, Ventilating, and Air Conditioning for Moosehorn Fire Hall

Description	% of Time Unoccupied	HDD below 70 F	HDD below 59 F	Current Energy Used to Heat (kWh)	Heat Savings (kWh)
Setback thermostats to 59 F	96.16%	11,171	9,527	48,101	6,806

Table B.11.1 - Energy Breakdown for the Gypsumville Fire Hall

	Energy Consumption (kWh)	% of Total Energy Consumption
HVAC	44,783	92%
Lighting	2,243	5%
Hot Water	1,694	3%
Total	**48,720**	

Table B.11.2 - Electricity Usage for the Gypsumville Fire Hall

	Consumption Data			Calculated Costs		
Month (2004-2005)	Maximum KVA	Billed KVA	Energy (kWh)	Demand Charge	Energy Charge	Total Charge
September	0	0	1,550	$0	$91	$122
October	0	0	3,040	$0	$178	$221
November	0	0	7,010	$0	$411	$486
December	0	0	7,740	$0	$454	$535
January	0	0	11,420	$0	$663	$773
February	0	0	7,080	$0	$415	$491
March	0	0	2,060	$0	$121	$156
April	0	0	3,920	$0	$235	$285
May	0	0	3,230	$0	$194	$239
June	0	0	510	$0	$31	$53
July	0	0	640	$0	$38	$62
August	0	0	520	$0	$31	$54
TOTAL		**0**	**48,720**	**$0**	**$2,861**	**$3,476**

Notes

There is no charge for the first 50 KVA of monthly demand; a charge of $8.32 is applied to each KVA above 50.

The Total Charge column includes the energy charge, the demand charge, the monthly basic charge, and 14% taxes.

Table B.11.3 - Lighting Analysis Summary for the Gypsumville Fire Hall

Description	Quantity	Current Conditions		After Improvements	
		Annual Energy Consumption (kWh)	Annual Cost	Annual Energy Consumption (kWh)	Annual Cost
8' T12 fluorescent lamps - convert to T8s (10x2)	20	241	$14	112	$7
4' T12 fluorescent lamps - convert to T8s (2x2)	4	20	$1	12	$1
Indoor 100W incandescent bulbs - convert to compact fluorescents	1	10	$1	3	$0
Outdoor wall packs on sentinel	3	1,971	$118	1,971	$118
TOTALS		**2,243**	**$135**	**2,099**	**$126**

Annual Energy Savings (kWh)	**145**
Annual Cost Savings	**$9**
Percent Annual Energy Savings	**6%**

These calculations are assuming that the Fire Hall is occupied for 2 hours a week (104 hours/year)

The Exit signs are assumed to be on 24 hours a day, 365 days per year

The outdoor lights are assumed to be on 12 hours per day, 365 days per year.

Table B.11.4 Window and Door Infiltration Calculations for the Gypsumville Fire Hall

Description	Crack Length (ft)	Crack Width (in)	Leakage on typical door (cfm)	Leakage on these doors (cfm)	Annual Heat Loss (BTU)	Annual Heat Loss (kWh)	Cost
Weatherstrip steel frame pedestrian door (1)	5	0.05	125	17	4,741,425	1,390	$47
Weatherstrip 12'x12' overhead door on east side (1)	6	0.05	125	20	5,689,710	1,667	$57
TOTAL						**3,057**	**$104**

The crack length around the pedestrian door is a quarter of the perimeter

The crack length around the overhead door is an eigth of the perimeter

The office is assumed to be kept at 18 ^{o}C (64 ^{o}F) to keep water warm for fire calls in winter.

Table B.11.5 - Water Usage for the Gypsumville Fire Hall

Fixtures	Qty	Est. # of Uses/Hr/ Fixture	Est. # of Uses/Yr	Current Flow (LPF or LPC)	Current Water Usage (L/Yr)	New Flow (LPF or LPC)	New Water Usage (L/Yr)	Water Saved (L/Yr)	Hot Water Savings (kWh)	Cost Savings
Sinks	1	4.8	494	1.60	790	0.32	158	632	24	$1
Toilets	1	4.8	494	13.25	6,546	6.00	2,964	3,582	NA	NA
Total					**7,336**		**3,122**	**4,214**	**24**	**$1**

Frequency at Which Fixtures are Used			
	Females	Males	Totals
Number of People	2	8	
Number of Toilet Uses/day	3	4	
Number of Toilets	1	1	
Toilet Uses/hour/fixture	0.75	4	4.75
Number of Sinks	1	1	
Number of Sink Uses/day	3	4	
Sink Uses/hr/fixture	0.75	4	4.75

Current Hot Water Usage (kWh)		
Fixture	L/Yr	kWh
Sinks	790	30
Total	**790**	**30**

The current sinks are assumed to consume 2.5 gpm and the new sinks are 0.5 gpm

The current toilets are assumed to use 3.5 gallons per flush and the new toilets use 1.5 gallons per flush

Table B.12.1 - Energy Breakdown for the Moosehorn Administration Building

	Energy Consumption (kWh)	% of Total Energy Consumption
HVAC	14,544	59%
Lighting	8,197	33%
Hot Water	1,737	7%
Total	**24,478**	

Table B.12.2 - Electricity Usage for the Moosehorn Administration Building

	Consumption Data			Calculated Costs		
Month (2004-2005)	Maximum KVA	Billed KVA	Energy (kWh)	Demand Charge	Energy Charge	Total Charge
September	0	0	1,032	$0	$60	$94
October	0	0	1,252	$0	$73	$109
November	0	0	2,122	$0	$124	$167
December	0	0	3,332	$0	$195	$248
January	0	0	4,692	$0	$275	$338
February	0	0	3,972	$0	$233	$290
March	0	0	3,372	$0	$198	$250
April	0	0	1,732	$0	$104	$142
May	0	0	116	$0	$7	$33
June	0	0	872	$0	$52	$85
July	0	0	1,162	$0	$70	$105
August	0	0	822	$0	$49	$81
TOTAL		**0**	**24,478**	**$0**	**$1,441**	**$1,942**

Notes

There is no charge for the first 50 KVA of monthly demand; a charge of $8.32 is applied to each KVA above 50.

The Total Charge column includes the energy charge, the demand charge, the monthly basic charge, and 14% taxes.

Table B.12.3 - Lighting Analysis Summary for the Moosehorn Administration Building

Description	Quantity	Current Conditions		After Improvements	
		Annual Energy Consumption (kWh)	Annual Cost	Annual Energy Consumption (kWh)	Annual Cost
4' T12 fluorescent lamps - convert to T8s (30x2)	60	5,242	$315	3,245	$195
Indoor 100W incandescent bulbs - convert to compact fluorescents	5	1,040	$62	291	$17
Outdoor incandescents - convert to high pressure sodium	4	1,051	$63	526	$32
Install Parking Lot Controllers	3	864	$52	432	$26
TOTALS		**8,197**	**$492**	**4,494**	**$270**

Annual Energy Savings (kWh)	**3,703**
Annual Cost Savings	**$222**
Percent Annual Energy Savings	**45%**

These calculations are assuming that the Admin Building is occupied for 40 hours a week (2080 hrs/yr)

The outdoor lights are assumed to be on 12 hours per day, 365 days per year.

Table B.12.4 (a) Window and Door Replacement Calculations for the Moosehorn Administration Building

Description	Existing				New			Savings	
	Area (ft^2)	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	Energy (kWh)	Cost
Replace old wood back door with an insulated wood door	21	1.578	1,046	$63	6.67	247	$15	799	$48
Replace double pane windows with triple pane windows (3 - 30"x88")	55	2.000	2,161	$130	6.25	691	$42	1,469	$88
TOTALS			**3,207**	**$193**		**939**	**$56**	**2,268**	**$136**

Table B.12.4 (b) Window and Door Infiltration Calculations for the Moosehorn Administration Building

Description	Crack Length (ft)	Crack Width (in)	Leakage on typical door (cfm)	Leakage on these doors (cfm)	Annual Heat Loss (BTU)	Annual Heat Loss (kWh)	Cost
Weatherstrip old wood back door (1)	5	0.05	125	17	4,944,933	1,449	$87
Seal 30" x 88" windows (3)	7.375	0.025	50	10	2,917,510	855	$51
TOTALS						**2,304**	**$138**

Table B.12.4 (c) Wall/Roof Insulation Upgrade for the Moosehorn Administration Building

Description	Existing				New			Savings	
	Area (ft^2)	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	Energy (kWh)	Cost
Upgrade roof insulation	1615	20.000	6,345	$381	40	3,172	$190	3,172	$190
Upgrade wall insulation	1615	12.000	10,575	$635	20	6,345	$381	4,230	$254
TOTALS			**16,920**	**$1,016**		**9,517**	**$571**	**7,402**	**$444**

The crack length around the windows and doors is a quarter of the perimter

The building is assumed to be kept at 70 F

Table B.12.5 - Water Usage for the Moosehorn Administration Building

Fixtures	Qty	Est. # of Uses/Hr/ Fixture	Est. # of Uses/Yr	Current Flow (LPF or LPC)	Current Water Usage (L/Yr)	New Flow (LPF or LPC)	New Water Usage (L/Yr)	Water Saved (L/Yr)	Hot Water Savings (kWh)	Cost Savings
Sinks	2	0.9	3,640	1.60	5,824	0.32	1,165	4,659	175	$10
Toilets	2	0.9	3,640	13.25	48,230	6.00	21,840	26,390	NA	NA
Urinals	1	0.8	1,560	9.50	14,820	3.80	5,928	8,892	NA	NA
Total					**68,874**		**28,933**	**39,941**	**175**	**$10**

Frequency at Which Fixtures are Used			
	Females	Males	Totals
Number of People	2	2	
Number of Toilet Uses/day	3	4	
Number of Toilets	2	2	
Toilet Uses/hour/fixture	0.375	0.5	0.875
Number of Urinals	0	1	
Number of Urinal Uses/day	0	3	
Urinal Uses/hr/fixture	0	0.75	0.75
Number of Sinks	2	2	
Number of Sink Uses/day	3	4	
Sink Uses/hr/fixture	0.375	0.5	0.875

Current Hot Water Usage (kWh)		
Fixture	L/Yr	kWh
Sinks	5,824	218
Total	**5,824**	**218**

The current sinks are assumed to consume 2.5 gpm and the new sinks are 0.5 gpm

The current toilets are assumed to use 3.5 gallons per flush and the new wash closets use 1.5 gallons per flush

The urinals are assumed to conume 2.5 gpf and the low flow urinals use 1 gpf

Table B.12.6 - Energy Savings with Heating, Ventilating, and Air Conditioning for Moosehorn Administration Building

Description	% of Time Unoccupied	HDD below 70 F	HDD below 59 F	Current Energy Used to Heat (kWh)	Heat Savings (kWh)
Setback Thermostats to 59 ^{o}F	76.26%	11,171	9,527	13,090	1,469

Table B.13.1 - Energy Breakdown for the Moosehorn Heritage Museum

	Energy Consumption (kWh)	% of Total Energy Consumption
Lighting	4,960	84%
Hot Water	970	16%
Total	**5,930**	

Table B.13.2 - Electricity Usage for the Moosehorn Heritage Museum

	Consumption Data			Calculated Costs		
Month (2004-2005)	**Maximum KVA**	**Billed KVA**	**Energy (kWh)**	**Demand Charge**	**Energy Charge**	**Total Charge**
September	0	0	0	$0	$0	$0
October	0	0	710	$0	$42	$83
November	0	0	0	$0	$0	$0
December	0	0	850	$0	$50	$93
January	0	0	0	$0	$0	$0
February	0	0	1,610	$0	$94	$143
March	0	0	0	$0	$0	$0
April	0	0	570	$0	$34	$74
May	0	0	0	$0	$0	$0
June	0	0	680	$0	$41	$83
July	0	0	0	$0	$0	$0
August	0	0	1,510	$0	$91	$140
TOTAL		**0**	**5,930**	**$0**	**$351**	**$616**

Notes

There is no charge for the first 50 KVA of monthly demand; a charge of $8.32 is applied to each KVA above 50.

The Total Charge column includes the energy charge, the demand charge, the monthly basic charge, and 14% taxes.

Table B.13.3 - Lighting Analysis Summary for the Moosehorn Heritage Museum

Description	Quantity	Current Conditions		After Improvements	
		Annual Energy Consumption (kWh)	Annual Cost	Annual Energy Consumption (kWh)	Annual Cost
Museum-CFB Gypsumville - Interior 100W incandescents - convert to compact fluorescents	3	240	$14	67	$4
Masonic hall tea room - tea light bulbs - no upgrade recommended	10	480	$29	480	$29
Masonic hall kitchen - 100W incandescents - convert to compact fluorescents	2	160	$10	45	$3
Masonic hall exhibit room - halogen track lights - no upgrade recommended	15	1,800	$108	1,800	$108
Masonic hall exhibit room - incandescents - convert to compact fluorescents	8	640	$38	179	$11
Masonic hall exhibit room - 4' T12 fluorescent lamps - convert to T8s (2x1)	2	78	$5	47	$3
Masonic hall outdoor incandescent - convert to high pressure sodium	1	438	$26	219	$13
Museum - CN Moosehorn - washroom incandescent - convert to compact fluorescent	1	80	$5	22	$1
Museum - CN Moosehorn - exhibit area 4' T12 fluorescents - convert to T8s (5x2)	10	392	$24	236	$14
Museum - CN Moosehorn - exhibit area 8' T12 fluorescents - convert to T8s (1x2)	2	186	$11	86	$5
Museum - CN Moosehorn - antique incandescents - no upgrade recommended)	3	240	$14	240	$14
Museum - CN Moosehorn - 2' T12 fluorescents in showcases - convert to T8s (4x1)	4	109	$7	51	$3
Museum - CN Moosehorn 4' T12 fluorescents - convert to T8s (3x1)	3	118	$7	71	$4
TOTALS		**4,960**	**$298**	**3,544**	**$213**

Annual Energy Savings (kWh)	**1,416**
Annual Cost Savings	**$85**
Percent Annual Energy Savings	**29%**

These calculations are assuming that the museum is used thougout the summer for 40 hrs/week (800 hrs/yr)

The Exit signs are assumed to be on 24 hours a day, 365 days per year

The outdoor lights are assumed to be on 12 hours per day, 365 days per year.

Table B.13.4 - Water Usage for the Moosehorn Museum

	Qty	Est. # of Uses/Hr/ Fixture	Est. # of Uses/Yr	Current Flow (LPF or LPC)	Current Water Usage (L/Yr)	New Flow (LPF or LPC)	New Water Usage (L/Yr)	Water Saved (L/Yr)	Hot Water Savings (kWh)	Cost Savings
Masonic Hall Washroom										
Sinks	1	1.8	1,400	1.60	2,240	0.32	448	1,792	67	$4
Toilets	1	1.8	1,400	13.25	18,550	6.00	8,400	10,150	NA	NA
Museum Washroom										
Antique Sinks	1	1.8	1,400	1.60	2,240	1.60	2,240	0	0	$0
Toilets	1	1.8	1,400	13.25	18,550	6.00	8,400	10,150	NA	NA
Total					**41,580**		**19,488**	**22,092**	**67**	**$4**

Frequency at Which Fixtures are Used			
	Females	**Males**	**Totals**
Number of People	4	4	
Number of Toilet Uses/day	3	4	
Number of Toilets	2	2	
Toilet Uses/hour/fixture	0.75	1	1.75
Number of Sinks	2	2	
Number of Sink Uses/day	3	4	
Sink Uses/hr/fixture	0.75	1	1.75

Current Hot Water Usage (kWh)		
Fixture	**L/Yr**	**kWh**
Sinks	4,480	168
Total	**4,480**	**168**

The current sinks are assumed to consume 2.5 gpm and the new sinks are 0.5 gpm

The current toilets are assumed to use 3.5 gallons per flush and the new toilets use 1.5 gallons per flush

The antique sink will not be replaced

Table B.14.1 - Energy Breakdown for the Camper New Horizons Seniors Centre

	Energy Consumption (kWh)	% of Total Energy Consumption
HVAC	7,593	75%
Lighting	1,504	15%
Hot Water	993	10%
Total	**10,090**	

Table B.14.2 - Electricity Usage for the Camper New Horizons Seniors Centre

	Consumption Data			Calculated Costs		
Month (2004-2005)	**Maximum KVA**	**Billed KVA**	**Energy (kWh)**	**Demand Charge**	**Energy Charge**	**Total Charge**
September	0	0	50	$0	$3	$21
October	0	0	140	$0	$8	$27
November	0	0	1,020	$0	$60	$86
December	0	0	1,600	$0	$94	$125
January	0	0	2,340	$0	$137	$174
February	0	0	1,900	$0	$111	$145
March	0	0	1,540	$0	$90	$121
April	0	0	1,090	$0	$65	$92
May	0	0	190	$0	$11	$31
June	0	0	140	$0	$8	$28
July	0	0	50	$0	$3	$22
August	0	0	30	$0	$2	$20
TOTAL		**0**	**10,090**	**$0**	**$593**	**$892**

Notes

There is no charge for the first 50 KVA of monthly demand; a charge of $8.32 is applied to each KVA above 50.

The Total Charge column includes the energy charge, the demand charge, the monthly basic charge, and 14% taxes.

Table B.14.3 - Lighting Analysis Summary for the Camper New Horizons Seniors Centre

Description	Quantity	Current Conditions		After Improvements	
		Annual Energy Consumption (kWh)	Annual Cost	Annual Energy Consumption (kWh)	Annual Cost
8' T12 (60W) fluorescent lamps - convert T8s (7x2)	14	162	$10	96	$6
Indoor 90W incandescent bulbs - convert to compact fluorescents	2	28	$2	7	$0
Outdoor 150W incandescent bulbs - convert to high pressure sodium	2	1,314	$79	657	$39
TOTALS		**1,504**	**$90**	**760**	**$46**

Annual Energy Savings (kWh)	**743**
Annual Cost Savings	**$45**
Percent Annual Energy Savings	**49%**

These calculations are assuming that this Seniors Centre is occupied for 3 hrs a week (156 hrs/yr)

The outdoor lights are assumed to be on 12 hours per day, 365 days per year.

Table B.14.4 Window and Door Infiltration Calculations for the Camper New Horizons Seniors Centre

Description	Crack Length (ft)	Crack Width (in)	Leakage on typical door (cfm)	Leakage on these doors (cfm)	Annual Heat Loss (BTU)	Annual Heat Loss (kWh)	Cost
Caulk steel door frames (2)	5	0.025	50	7	1,479,363	434	$26
Caulk windows (2- 44"x34")	6.5	0.025	50	9	1,923,172	564	$34
TOTAL						**997**	**$60**

The crack length around the door frames is a quarter of the perimeter

The crack length around the windows is a quarter of the perimeter

The building is assumed to be kept at 13 ^{o}C (55 ^{o}F)

Table B.14.5 - Water Usage for the Camper New Horizons Seniors Centre

Fixtures	Qty	Est. # of Uses/Hr/ Fixture	Est. # of Uses/Yr	Current Flow (LPF or LPC)	Current Water Usage (L/Yr)	New Flow (LPF or LPC)	New Water Usage (L/Yr)	Water Saved (L/Yr)	Hot Water Savings (kWh)	Cost Savings
Sinks	2	5.5	1,716	1.60	2,746	0.32	549	2,196	82	$5
Toilets	2	5.5	1,716	13.25	22,737	6.00	10,296	12,441	NA	NA
Total					**25,483**		**10,845**	**14,637**	**82**	**$5**

Frequency at Which Fixtures are Used			
	Females	Males	Totals
Number of People	12	13	
Number of Toilet Uses/day	3	4	
Number of Toilets	2	2	
Toilet Uses/hour/fixture	2.25	3.25	5.5
Number of Sinks	2	2	
Number of Sink Uses/day	3	4	
Sink Uses/hr/fixture	2.25	3.25	5.5

Current Hot Water Usage (kWh)		
Fixture	L/Yr	kWh
Sinks	2,746	103
Total	**2,746**	**103**

The current sinks are assumed to consume 2.5 gpm and the new sinks are 0.5 gpm

The current toilets are assumed to use 3.5 gallons per flush and the new toilets use 1.5 gallons per flush

Table B.15.1 - Energy Breakdown for the Moosehorn Senior Citizens Handicraft Centre

	Energy Consumption (kWh)	% of Total Energy Consumption
HVAC	22,379	85%
Lighting	2,204	8%
Hot Water	1,737	7%
Total	**26,320**	

Table B.15.2 - Electricity Usage for the Moosehorn Senior Citizens Handicraft Centre

	Consumption Data			Calculated Costs		
Month (2004-2005)	Maximum KVA	Billed KVA	Energy (kWh)	Demand Charge	Energy Charge	Total Charge
September	0	0	870	$0	$51	$76
October	0	0	1,050	$0	$62	$88
November	0	0	2,050	$0	$120	$155
December	0	0	3,500	$0	$205	$252
January	0	0	5,240	$0	$307	$368
February	0	0	4,150	$0	$243	$295
March	0	0	3,670	$0	$215	$263
April	0	0	2,710	$0	$163	$201
May	0	0	1,140	$0	$68	$96
June	0	0	400	$0	$24	$45
July	0	0	1,160	$0	$70	$97
August	0	0	380	$0	$23	$44
TOTAL		**0**	**26,320**	**$0**	**$1,551**	**$1,982**

Notes

There is no charge for the first 50 KVA of monthly demand; a charge of $8.32 is applied to each KVA above 50.

The Total Charge column includes the energy charge, the demand charge, the monthly basic charge, and 14% taxes.

Table B.15.3 - Lighting Analysis Summary for the Moosehorn Senior Citizens Handicraft Centre

Description	Quantity	Current Conditions		After Improvements	
		Annual Energy Consumption (kWh)	Annual Cost	Annual Energy Consumption (kWh)	Annual Cost
4' T12 fluorescent lamps - convert to T8s (20x2)	40	960	$58	578	$35
8' T12 fluorescent lamps - convert to T8s (9x2)	18	1,023	$61	476	$29
Indoor incandescent bulbs - convert to compact fluorescents	3	147	$9	41	$2
Outdoor incandescents - convert to high pressure sodium	1	74	$4	37	$2
TOTALS		**2,204**	**$132**	**1,132**	**$68**

Annual Energy Savings (kWh)	**1,072**
Annual Cost Savings	**$64**
Percent Annual Energy Savings	**49%**

These calculations are assuming that the seniors centre is occupied for 490 hours/year

Table B.15.4 (a) Window and Door Replacement Calculations for the Moosehorn Senior Citizens Handicraft Centre

Description	Existing				New			Savings	
	Area (ft^2)	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	R-Value ($^oF\ ft^2hr/BTU$)	Annual Heat Loss (kWh)	Cost	Energy (kWh)	Cost
Replace old wood east door with an insulated wood door (1)	21	1.578	892	$54	6.67	211	$13	681	$41
Replace southwest wood door with an insulated wood door (1)	21	1.578	892	$54	6.67	211	$13	681	$41
Replace single pane sliders with triple panes (2-34"x28")	13.22	1.000	886	$53	6.25	142	$9	744	$45
TOTALS			**1,778**	**$107**		**353**	**$21**	**1,425**	**$86**

Table B.15.4 (b) Window and Door Infiltration Calculations for the Moosehorn Senior Citizens Handicraft Centre

Description	Crack Length (ft)	Crack Width (in)	Leakage on typical door (cfm)	Leakage on these doors (cfm)	Annual Heat Loss (BTU)	Annual Heat Loss (kWh)	Cost
Weatherstrip east wood door (1)	10	0.05	125	34	8,434,760	2,472	$148
Seal single pane sliders (2)	5.17	0.025	50	7	1,743,184	511	$31
TOTALS						**2,472**	**$148**

The crack length around the east door is half the perimeter

The crack length around the windows is a quarter of the perimter

The centre is assumed to be kept at 15 ^oC (59 ^oF)

Table B.15.5 - Water Usage for the Moosehorn Senior Citizens Handicraft Centre

Fixtures	Qty	Est. # of Uses/Hr/ Fixture	Est. # of Uses/Yr	Current Flow (LPF or LPC)	Current Water Usage (L/Yr)	New Flow (LPF or LPC)	New Water Usage (L/Yr)	Water Saved (L/Yr)	Hot Water Savings (kWh)	Cost Savings
Sinks	2	5.5	5,390	1.60	8,624	0.32	1,725	6,899	259	$16
Toilets	2	5.5	5,390	13.25	71,418	6.00	32,340	39,078	NA	NA
Total					**80,042**		**34,065**	**45,977**	**259**	**$16**

Frequency at Which Fixtures are Used			
	Females	Males	Totals
Number of People	12	13	
Number of Toilet Uses/day	3	4	
Number of Toilets	2	2	
Toilet Uses/hour/fixture	2.25	3.25	5.5
Number of Sinks	2	2	
Number of Sink Uses/day	3	4	
Sink Uses/hr/fixture	2.25	3.25	5.5

Current Hot Water Usage (kWh)		
Fixture	L/Yr	kWh
Sinks	8,624	323
Total	**8,624**	**323**

The current sinks are assumed to consume 2.5 gpm and the new sinks are 0.5 gpm

The current toilets are assumed to use 3.5 gallons per flush and the new toilets use 1.5 gallons per flush

Table B.16.1 - Energy Breakdown for the Faulkner Seniors Centre

	Energy Consumption (kWh)	% of Total Energy Consumption
HVAC	6,557	64%
Lighting	1,963	19%
Hot Water	1,659	16%
Total	**10,180**	

Table B.16.2 - Electricity Usage for the Faulkner Seniors Centre

	Consumption Data			Calculated Costs		
Month (2004-2005)	**Maximum KVA**	**Billed KVA**	**Energy (kWh)**	**Demand Charge**	**Energy Charge**	**Total Charge**
September	0	0	360	$0	$21	$42
October	0	0	700	$0	$41	$65
November	0	0	1,030	$0	$60	$87
December	0	0	1,960	$0	$115	$149
January	0	0	1,350	$0	$79	$108
February	0	0	1,500	$0	$88	$118
March	0	0	1,490	$0	$87	$117
April	0	0	620	$0	$37	$60
May	0	0	560	$0	$34	$56
June	0	0	230	$0	$14	$34
July	0	0	140	$0	$8	$28
August	0	0	240	$0	$14	$35
TOTAL		**0**	**10,180**	**$0**	**$599**	**$899**

Notes

There is no charge for the first 50 KVA of monthly demand; a charge of $8.32 is applied to each KVA above 50.

The Total Charge column includes the energy charge, the demand charge, the monthly basic charge, and 14% taxes.

Table B.16.3 - Lighting Analysis Summary for the Faulkner Seniors Centre

Description	Quantity	Current Conditions		After Improvements	
		Annual Energy Consumption (kWh)	Annual Cost	Annual Energy Consumption (kWh)	Annual Cost
Indoor 100W incandescent bulbs - convert to compact fluorescents	18	562	$34	157	$9
Outdoor 100W floodlights on photocell - replace with high pressure sodium	2	876	$53	438	$26
Exit Signs - Convert Incandescents to LEDs	2	526	$32	53	$3
TOTALS		**1,963**	**$118**	**648**	**$39**

Annual Energy Savings (kWh)	**1,315**
Annual Cost Savings	**$79**
Percent Annual Energy Savings	**67%**

These calculations are assuming that the senior centre is occupied for 8 hrs/week in winter and 4 hrs/week in summer (312 hrs/yr)

The Exit signs are assumed to be on 24 hours a day, 365 days per year

The outdoor lights are assumed to be on 12 hours per day, 365 days per year.

Table B.16.4 Window and Door Infiltration Calculations for the Faulkner Seniors Centre

Description	Crack Length (ft)	Crack Width (in)	Leakage on typical door (cfm)	Leakage on these doors (cfm)	Annual Heat Loss (BTU)	Annual Heat Loss (kWh)	Cost
Weatherstrip steel doors (2)	10	0.05	125	34	7,397,169	2,168	$130
TOTAL						**2,168**	**$130**

The crack length around the doors is a quarter of the perimeter

The building is assumed to be kept at 13 ^{o}C (55 ^{o}F)

Table B.16.5 - Water Usage for the Faulkner Seniors Centre

Fixtures	Qty	Est. # of Uses/Hr/ Fixture	Est. # of Uses/Yr	Current Flow (LPF or LPC)	Current Water Usage (L/Yr)	New Flow (LPF or LPC)	New Water Usage (L/Yr)	Water Saved (L/Yr)	Hot Water Savings (kWh)	Cost Savings
Sinks	2	6.6	4,095	1.60	6,552	0.32	1,310	5,242	196	$12
Toilets	2	3.8	2,340	13.25	31,005	6.00	14,040	16,965	NA	NA
Urinals	2	2.8	1,755	9.50	16,673	3.80	6,669	10,004	NA	NA
Total					**54,230**		**22,019**	**32,210**	**196**	**12**

Frequency at Which Fixtures are Used			
	Females	Males	Totals
Number of People	15	15	
Number of Toilet Uses/day	3	1	
Number of Toilets	2	2	
Toilet Uses/hour/fixture	2.8125	0.9375	3.75
Number of Urinals	0	2	
Number of Urinal Uses/day	0	3	
Urinal Uses/hr/fixture	0	2.8125	2.8125
Number of Sinks	2	2	
Number of Sink Uses/day	3	4	
Sink Uses/hr/fixture	2.8125	3.75	6.5625

Current Hot Water Usage (kWh)		
Fixture	L/Yr	kWh
Sinks	6,552	246
Total	**6,552**	**246**

The current sinks are assumed to consume 2.5 gpm and the new sinks are 0.5 gpm

The current toilets are assumed to use 3.5 gallons per flush and the new toilets use 1.5 gallons per flush

The urinals are assumed to consume 2.5 gpf and the low flow urinals consume 1 gpf

APPENDIX C

WATER EFFICIENCY

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Leaks

- A leak of one drop per second wastes 10,000 litres of water per year. A toilet that runs after a flush can waste 200,000 litres of water per year. Fixing a hot water leak will save energy as well as water.

- Check for differing water meter readings at bedtime and in the morning. If no water has been intentionally used, a difference in meter readings indicates a leak.
- If a few drops of food colouring put in your toilet tank seep into the toilet bowl (without flushing), check the flapper valve, valve seat and flapper lift chain for the source of the leak.
- Conduct a periodic "leak check" a minimum of twice a year on water using fixtures and appliances, including outside hose connections. Replace worn washers, O-rings and faulty fixtures.

On-Site Wastewater Systems

- Wise water management is necessary. All septic systems have limitations and water conservation should be practiced.
- Do not use substitutes for toilet paper. These products may not decompose in the tank and could clog the system.
- Perform regular maintenance checks on your entire system, including regular pump outs of the septic tank and inspection of the disposal field for signs of saturation or leakage.

For More Information, Please Contact:

Water Efficiency Coordinator
Pollution Prevention
Manitoba Conservation
123 Main Street, Suite 160
Winnipeg MB R3C 1A5

Phone: (204) 945-8980 or
1-800-282-8069 ext. 8980
Fax: (204) 945-1211
E-mail: lliebgott@gov.mb.ca

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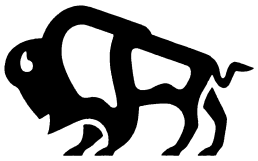
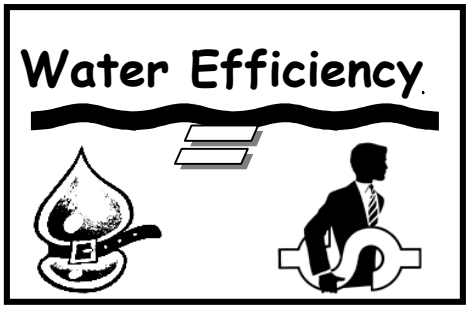


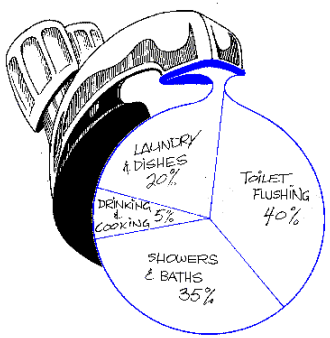
Pollution Prevention
Manitoba Conservation



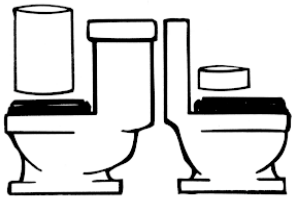
Water Use

How you can reduce yours!

- Save money.
- Delay the need to expand our water and wastewater treatment plants.
- Prolong the life of in-ground sewage disposal systems, i.e., septic fields.
- Protect our water sources.



Bathroom



- Replace toilets that flush 13 to 26 litres of water with 6 litre or dual flush toilets, cutting water used by toilets by half or more. See www.cwwa.ca for toilet performance ratings. In the mean time, reduce water per flush in toilets by up to 35% by installing early closure devices (don't use bricks – as they break down, pieces interfere with the flapper seal).
- Refrain from using the toilet to dispose of trash.
- A partially filled tub uses less water than a long shower; a short shower uses less than a full tub.
- Replace your 20 litre per minute showerhead with a low-flow 9.5 litre per minute showerhead. You'll use less than half the water.
- Make it a habit to be finished your shower in less than 5 minutes.
- Install a water conserving 3.5 litre per minute aerator on your bathroom tap.
- When shaving, rinse the razor in a cup or a partially filled sink instead of letting the tap run.
- Brush teeth using a glass of water to rinse.

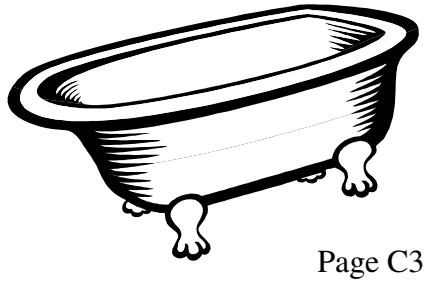
Kitchen & Laundry

- Install a water saving 9 litre per minute aerator on the kitchen tap.
- Rinse dishes in a stoppered sink or basin, not with running water.
- Wash vegetables in a basin or stoppered sink, then quickly rinse using running water.
- Keep drinking water in the fridge. Wash the container and change the water every few days.
- Thaw food in the fridge rather than under a running tap. This conserves both energy and water.

- Compost organic wastes instead of using a sink garbage disposal.
- Buy a low water use dishwasher to save on energy, water and detergent costs.
- Wash only full loads of laundry and dishes.
- Front loading washing machines use less water than top-loading washers do. If unavailable, choose a clothes washer with a suds saver, and water saving cycle.

General Water Use

- Only use water treatment or softening systems, if required. If possible, only use softened water for bathing and cleaning – use unsoftened water for cooking, drinking and watering plants.
- Ensure a water softener regenerates only when the resin is exhausted.
- Turn the system off if you will be away for more than a few days.
- Insulate hot water tank and pipes to reduce the need to run water until it is hot. Install a heat trap on the pipe above your water heater to save energy and water.
- Know location of sink, toilet and main shut off valves in case a pipe or water heater blows, or so you can turn off your water when you are away.
- If your water pipes tend to freeze, do not let the tap run continuously. This wastes water, and overloads sewer systems. Instead, install heat tape or connect a pump-back reservoir system (discuss options with your plumber, electrician or call Manitoba Conservation).



APPENDIX D

INCENTIVE PROGRAMS

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Table D.1 Manitoba Hydro Power Smart Incentives

Item	Incentives	Contacts
Compact Fluorescents	$5 - Non-reflectorized screw in lamp, $10 - Reflectorized screw-in lamp, $45 - New hard wired fixture	Kelly Epp at kepp@hydro.mb.ca or 204-474-4051
T8 Electronic Fluorescents	T8 Premium Ballast - $20, T8 Standard Ballast - $15, T8 Dimmable Ballast - $60, 8 Foot T8 Ballast - $35	Kelly Epp at kepp@hydro.mb.ca or 204-474-4051
LED Exit Signs	$45 per new sign	Kelly Epp at kepp@hydro.mb.ca or 204-474-4051
High Pressure Sodium Lighting	The lesser of $500 per kilowatt saved or $100 of lighting fixture cost	Kelly Epp at kepp@hydro.mb.ca or 204-474-4051
Parking Lot Controllers	$25 for each controlled circuit	May Arason-Li at marasonli@hydro.mb.ca or 204-474-7813
Air Barrier System	$0.46 per square foot or $5 per square meter of net wall area	May Arason-Li at marasonli@hydro.mb.ca or 204-474-7813
Windows	Depends on replacement window's U-Value and net window area	May Arason-Li at marasonli@hydro.mb.ca or 204-474-7813
Geothermal Heat Pump	Manitoba Hydro will pay up to half the cost of a feasabillity study to help decide whether a geothermal heat pump is the right choice for you building. Manitoba Hydro also offers a custom incentive towards the capital cost of your heat pump system, based on the energy savings calculated in the feasability study.	Domenic Marinelli at dmarinelli@hydro.mb.ca or 204-474-4273

Notes

For general information and information kits contact:
Power Smart for Business
Phone: 474-3676
Email Address: powersmartforbusiness@hydro.mb.ca

Table D.2. Other Incentive Programs

Program Name	Eligibility	What Type of Projects are Available	Ref. Page	Available Funding	Funding Maximums	Deadline For Applications	Prospect of Funding	Project Sponsor	Contact	Email	Website
Energy Innovators Initiative: Energy Retrofit Assistance (ERA)	Comm. & Institutional Bldgs. Aboriginal, northern, rural or remote communities may receive special consideration.	Projects that reduce energy consumption. Includes costs for project planning and development, materials and labour, monitoring and tracking and staffing training and awareness.	13	$7.50/GJ (277.8 kW H)	up to 25% of costs based on energy savings ($250,000 max)	On-going	Good	NRCan	MarieLynn Tremblay	Marie_Lyne.Tremblay@nrcan-rncan.gc.ca	http://oee.nrcan.gc.ca/commercial/financial-assistance/existing/retrofits/implementation.cfm?attr=0
Municipal Rural Infrastructure Fund (MRIF)	All MB local governments	Projects that construct, restore or improve infrastructure that ensures sustainable use and management of water and wastewater resources. Projects that construct, restore or improve public arts and heritage infrastructure, such as museums, heritage sites, sites for performings arts, and cultural or community centres. - See detailed program info for more info. Program has many requirements and caveats.	23, 46, 54		2/3 of the approved costs	On-going	Good	Canada-Manitoba Infrastructure Programs		infra@gov.mb.ca	http://www.infrastructure.mb.ca/e/index.html
Renewable Energy Development Initiative (REDI)	…Municipalities…, solar air/water heating, biomass	Projects involving solar air or water heating and clean burning biomass combustion projects.	25	25% of purchase and install of qualifying system	$80,000	31-Mar-07		NRCan		redi.penser@nrcan.gc.ca	http://www2.nrcan.gc.ca/es/erb/erb/english/View.asp?x=455
Community Places Program	Non-profit community organizations in MB, except public schools, universities, hospitals, nursing homes, monnercial coops, federal, provincial and city of Winnipeg departments.	Projects involving the upgrading, construction or acquisition of community facilities available to the general community. Priority given to proposals for critical repairs to extend the life of existing well-used facilities. Projects must provide lasting, long-term benefits to the community.		Up to 50% of first $15,000 and 1/3 of the rest of project	$50,000			Manitoba Culture, Heritage and Tourism	Varies by region	www.gov.mb.ca/chc/grants	http://www.gov.mb.ca/chc/grants
Sustainable Development Innovations Fund (SDIF)	Municipal corporations, local governments, private and non-profit organizations and businesses	Sustainable community development, Eco-efficiency initiatives, environmental stewardship. Emphasis on youth involvement, first nations and northern communities.	55		$50,000 (usually $25,000 or less)		fair	Manitoba Conservation		sdif@gov.mb.ca	http://www.gov.mb.ca/conservation/pollutionprevention/sdif/index.html

APPENDIX E

TRANSPORTATION AND EQUIPMENT EFFICIENCY

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Transportation and Equipment Efficiency for Small Municipalities (< 10,000 population).

Municipal governments may wish to:

- Assess Regulatory, Standards & Industry "Best Practices" to ensure compliance and demonstrated "Due Diligence". Includes Provincial, Federal, Society of Automotive Engineers (SAE), Canadian Standards Association (CSA), American National Standards Institute (ANSI), Workplace Safety & Health audits, Safety inspections, Workplace Hazardous Materials Information System (WHMIS), Transportation of Dangerous Goods regulation (TDG), etc.

- Review current fuelling habits & education on "economical operation" (Driver training, minimal idling, proper lubricants for seasonal operation etc.)

- Review "Alternative Fuel" options, e.g., Diesel and Biodiesel, Propane, Compressed Natural Gas (CNG). Note: Electric Vehicles are not an option yet due to initial cost and the prevailing ambient temperatures experienced in Manitoba

- Consider recycling initiatives for disposal of Fleet Waste Stream products, eg. tires, lubricating oil, anti-freeze, aerosol cans, paints, controlled products, ferrous & non-ferrous scrap metal, plastics etc.

Other Opportunities:

Transportation Demand Management

- Education & awareness programs on ride-sharing, telecommuting & teleconferencing

Encouragement of Alternative Modes of Transportation

- Possibility of van based transit or "pool" operations for commuting within towns & outlying areas. May be viable for transporting groups of employees to & from work locations

- Provision of bike racks, lockable bike containers or small fenced compounds at key locations

- Education & awareness programs on vehicle emissions, "fuel saving" driving habits etc.

Traffic & Parking Management

- Possibility of synchronizing traffic lights (if installed) and implementing parking fees etc. to manage parking

CHOOSING A VEHICLE

Vehicle Construction

The following points are important when considering fuel efficiency.

- A five speed manual transmission is about 5% more efficient than an automatic.
- Smaller engines use less fuel.
- Front wheel drive vehicles are lighter and therefore more fuel efficient than rear wheel drive vehicles
- SUV's tend to have low fuel efficiency
- Front wheel drive vehicles provide better traction than rear wheel drive in most cases.
- Small engines with a turbocharger can help make up the power difference between large and small engines by using energy from hot exhaust.

Vehicle Ratings

The Office of Energy Efficiency of Natural Resources Canada, issues a list of the most fuel efficient vehicles in each of a number of categories. See their website for the latest list.

Extra Features

Air conditioning, power steering, and roof racks are some of the big energy using extras. Air conditioning can increase your fuel consumption by 10 to 20 percent in city driving. A fully loaded roof rack can add 25% to your fuel costs. Even empty, it will add about 1% due to wind resistance

DRIVING ECONOMICALLY

Driving technique is critical to fuel economy.

- Maintain recommended tire pressure to maximize fuel efficiency and tire life.
- Keep your engine well tuned and maintained.
- One minute of idling uses more fuel than restarting the engine.
- Avoid jack-rabbit starts.
- An open sun roof and open windows increase air resistance, especially on the highway. Use the car's ventilation system instead.
- Most cars use 10% less fuel when driven at 55 miles per hour as opposed to 62, or 90 kilometers as opposed to 100.
- Adjust your speed in advance of changes in traffic flow. Take your foot off the accelerator and progressively gear down rather than accelerating up to a stop sign and breaking hard.

ENGINE BLOCK HEATERS - IS THERE A SAVINGS?

- In sub-freezing temperatures, the first 15 to 20 minutes of driving, after a cold start cause the engine to use about 30% more fuel than a warm engine.
- A timer can be installed for your vehicle's block heater to start warming the engine a couple hours before you head out.
-

- With the cost of electricity accounted for, you should still come out ahead, over the course of a winter.

FUEL OPTIONS

- Diesel engines are more fuel efficient than gasoline engines, as Diesel contains 10% more energy per unit volume than gasoline. Higher diesel engine costs are offset by increased fuel economy and engine life.
- Many fleet operators are converting their vehicles to biodiesel for cost advantages and a cleaner burn.
- There are many advantages to a dual-fuel system, which allows you to switch between gasoline and propane or natural gas with the flick of a switch.
- Hybrid vehicles…

From the Office of Energy Efficiency, Natural Resources Canada:

Buying a Fuel-Efficient Vehicle

- Fuel consumption can vary widely from one vehicle to the next. Whether you're buying new or used, the choices you make today will either save you money (through reduced fuel consumption) or cost you money for years to come.

- How big is big enough? It's always a good idea to avoid buying more vehicle than you need. Larger vehicles tend to be heavier and have bigger and more powerful engines, so consider buying the most fuel-efficient vehicle that meets your everyday needs.

- If you're buying a new vehicle, check the EnerGuide label for its fuel consumption rating. EnerGuide labels are now affixed to all new light-duty vehicles sold in Canada.

- Fuel consumption ratings for all new cars, light-duty trucks and vans sold in Canada are also available in the free Fuel Consumption Guide. You can download a PDF version of the Guide, or call 1 800 387-2000 to order your free copy. Past editions are available, so you can also check fuel consumption ratings for used vehicles.

- Have a look at the list of the most recent winners of the EnerGuide Awards, presented each model year to the manufacturers of the most fuel-efficient vehicles in different classes – two-seater, subcompact, compact, mid-sized and large cars, as well as station wagons, vans, pickup trucks and special purpose vehicles.

- Your choice of transmission will directly affect the cost of the vehicle and its fuel consumption. As a general rule, a manual transmission is more fuel efficient than an automatic, assuming you shift properly. If you buy an automatic, the more gears, the better.

- Four-wheel drive and all-wheel drive offer superior traction and braking under slippery conditions, but the weight and friction of additional drivetrain parts can increase fuel consumption by 5 to 10 percent compared with two-wheel drive vehicles. How often would you need to use this option, and is it worth the extra fuel cost for as long as you own the vehicle?

- Under normal driving conditions, smaller engines deliver better fuel economy than larger engines. Choose the smallest engine that meets your everyday needs.

- Are you willing to pay a fuel penalty for as long as you own your vehicle just to have the convenience of options such as power windows, seats and mirrors? Many options increase fuel consumption by adding weight, increasing aerodynamic drag, or drawing extra power from the engine.

- Do you really need an air conditioner? Operating an air conditioner in hot weather can increase fuel consumption by more than 20 percent in city driving. Consider using the car's ventilation system and options such as a sunroof and tinted glass.

- For most drivers, cruise control saves fuel on the highway by keeping your speed constant and avoiding inadvertent speeding.

- Explore your fuel options. Will a fuel-efficient diesel vehicle meet your needs? What about propane or natural gas, which produce fewer greenhouse gas emissions and are cheaper to use than gasoline or diesel fuel? Ethanol fuel blends are also widely used by Canadian motorists. And hybrid vehicles, which use a combination of high-power batteries and an internal combustion engine, are beginning to appear on the North American market.

Please note – this list of websites is not comprehensive. They have not been reviewed for accuracy, but may provide ideas and options appropriate for some municipalities.

Other vehicle and equipment information can be found on the Internet at:
http://oee.nrcan.gc.ca/publications/infosource/home/index.cfm?act=category&PrintView=N&Text=N

http://www.betterroads.com/articles/NewProds/oct05bid.htm

http://www.edmunds.com/advice/specialreports/articles/102946/article.html

http://www.betterroads.com/articles/NewProds/oct05bid.htm

http://snow.grounds-mag.com/ar/grounds_maintenance_september_2/

http://www.missoulian.com/articles/2003/11/15/news/local/news03.txt

http://rocktoroad.com/grader.html

http://news.thomasnet.com/fullstory/29180/3281

http://www.forester.net/gx_0501_graders.html

http://www.epa.gov/greenkit/quick_start.htm#greenfleet

Self Audit

Municipal Operations -Efficiency Survey

(Transportation, Road Repair, Snow Clearance, Waste Disposal, etc.)

Name of Organisation: _____
Address: _____
_____
_____
Contact Name: _____
Phone No. _____
Name of person completing form: _____
Date: _____

Vehicles and Construction Equipment						
	Gasoline	**Diesel**	**CNG**	**Propane**	**Other**	**Total**
Total Fuel Usage L/Year						
Greenhouse Gas Emissions (tonnes)						

Fuel Use Minimization Considerations

 What type of vehicles/equipment, if any, are you planning to replace in the next few years?_____
_____
_____

 Can you downsize these vehicles/equipment?
Comments:_____
_____
_____

 Can you make process or other changes to minimize use of, or eliminate these vehicles/equipment? Comments:_____
_____
_____

 Do you have a policy in place to make fuel efficiency one of the vehicle/equipment purchase requirements? Yes ___ No ___

 Have you made operational changes such as reducing idling time of vehicles and equipment, and using block heaters and timers to reduce warm up time?
Yes ___ No ___

 Have you encouraged more energy efficient driving behaviour through training, policies, and ongoing reminders? Yes ___ No ___

 Do you have procedures in place to detect and rectify leakage of above-ground and under-ground fuel storage tanks? Yes __ No ___

 Do you use automatic shut-off fill nozzles at pumps? Yes ___ No ___

Comments

_____
_____
_____
_____
_____
_____

APPENDIX F

ENERGY CONSUMPTION MONITORING SPREADSHEETS AND GRAPHS

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Table F.1 - Energy Consumption Monitoring Data for the North Interlake Recreation Centre

	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009			2009-2010		
Month	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**
September	2,160	142.3	2,160			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
October	4,320	405.1	4,320			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
November	8,100	599	8,100			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
December	13,320	1087.6	13,320			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
January	14,040	1208.4	14,040			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
February	13,740	906.5	13,740			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
March	8,820	846.1	8,820			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
April	5,820	371.7	5,820			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
May	3,900	273	3,900			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
June	1,740	66.9	1,740			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
July	1,080	38.7	1,080			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
August	900	56.8	900			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
TOTAL	77,940	6002.1	77,940	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!

Notes

* Energy consumption should be recorded following the implementation of the energy saving opportunities.

1. Enter the year in row 3 of this table (starting in column E,F,G).

2. Enter the "Billed Energy Consumption" (in kWh) taken from the hydro bill next to the appropriate month.

3. Go to the following website to collect information on the Heating Degree Days for Arborg, Manitoba: http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=

4. Once you've arrived at this website, select the appropriate month and click the mouse on "GO"

5. From this website, record the last number highlighted in blue (refer to page F35) in the column "Heat Deg Days". This number should be entered under the heading HDD of this table, next to the appropriate month.

6. The "Energy Normalized to 2004-2005" will be calculated automatically and this point will show up on the Energy Consumption graph.

Figure F.1 - Energy Consumption Monitoring Graph for the North Interlake Recreation Centre

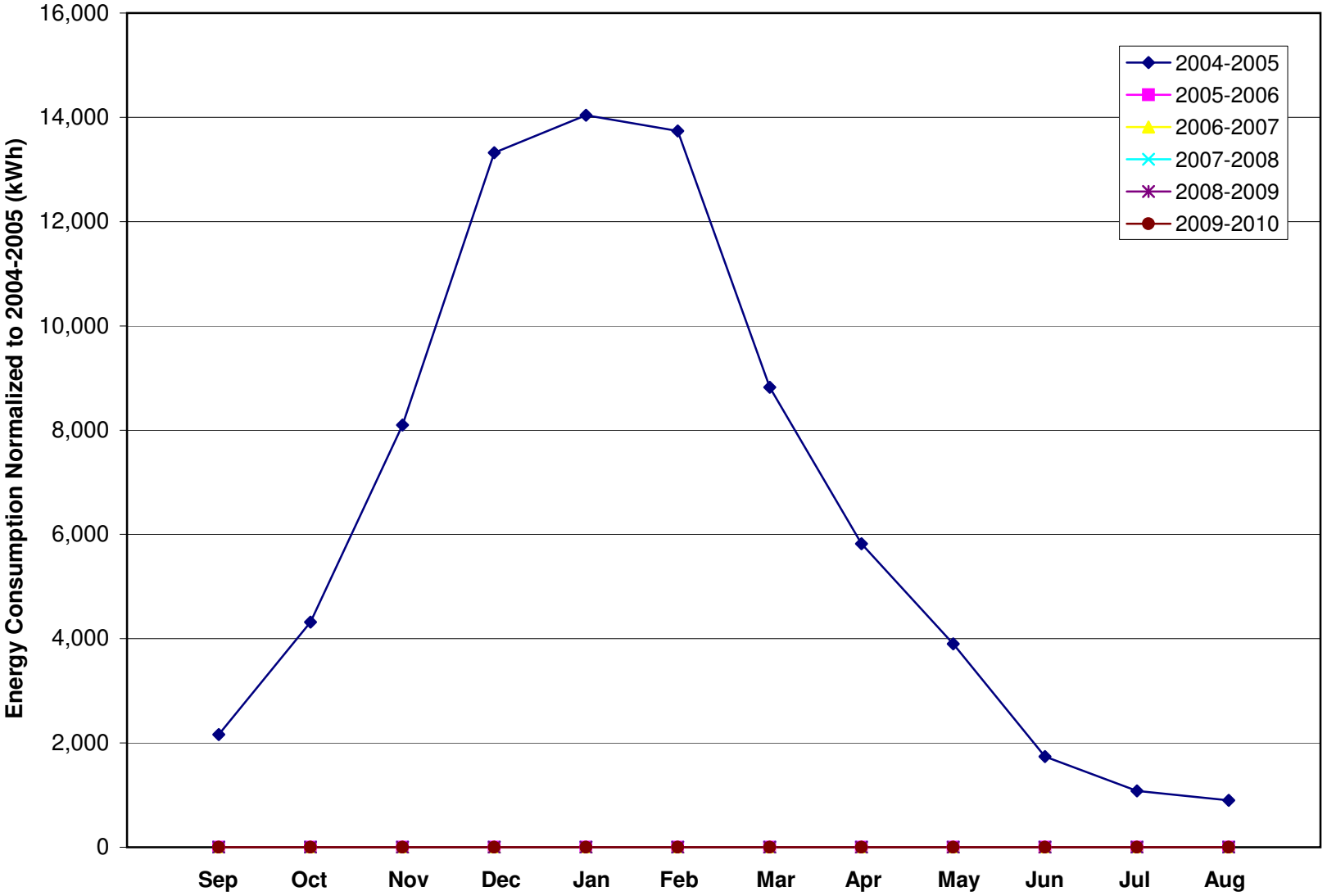


Table F.2 - Energy Consumption Monitoring Data for Camper Hall

	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009			2009-2010		
Month	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**
September	2,520	142.3	2,520			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
October	2,400	405.1	2,400			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
November	4,860	599	4,860			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
December	11,520	1087.6	11,520			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
January	1,500	1208.4	1,500			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
February	8,820	906.5	8,820			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
March	6,780	846.1	6,780			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
April	5,880	371.7	5,880			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
May	4,260	273	4,260			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
June	2,340	66.9	2,340			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
July	540	38.7	540			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
August	1,500	56.8	1,500			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
TOTAL	52,920	6002.1	52,920	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!

Notes

* Energy consumption should be recorded following the implementation of the energy saving opportunities.

1. Enter the year in row 3 of this table (starting in column E,F,G).

2. Enter the "Billed Energy Consumption" (in kWh) taken from the hydro bill next to the appropriate month.

3. Go to the following website to collect information on the Heating Degree Days for Arborg, Manitoba: http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=

4. Once you've arrived at this website, select the appropriate month and click the mouse on "GO"

5. From this website, record the last number highlighted in blue (refer to page F35) in the column "Heat Deg Days". This number should be entered under the heading HDD of this table, next to the appropriate month.

6. The "Energy Normalized to 2004-2005" will be calculated automatically and this point will show up on the Energy Consumption graph.

Figure F.2 - Energy Consumption Monitoring Graph for Camper Hall

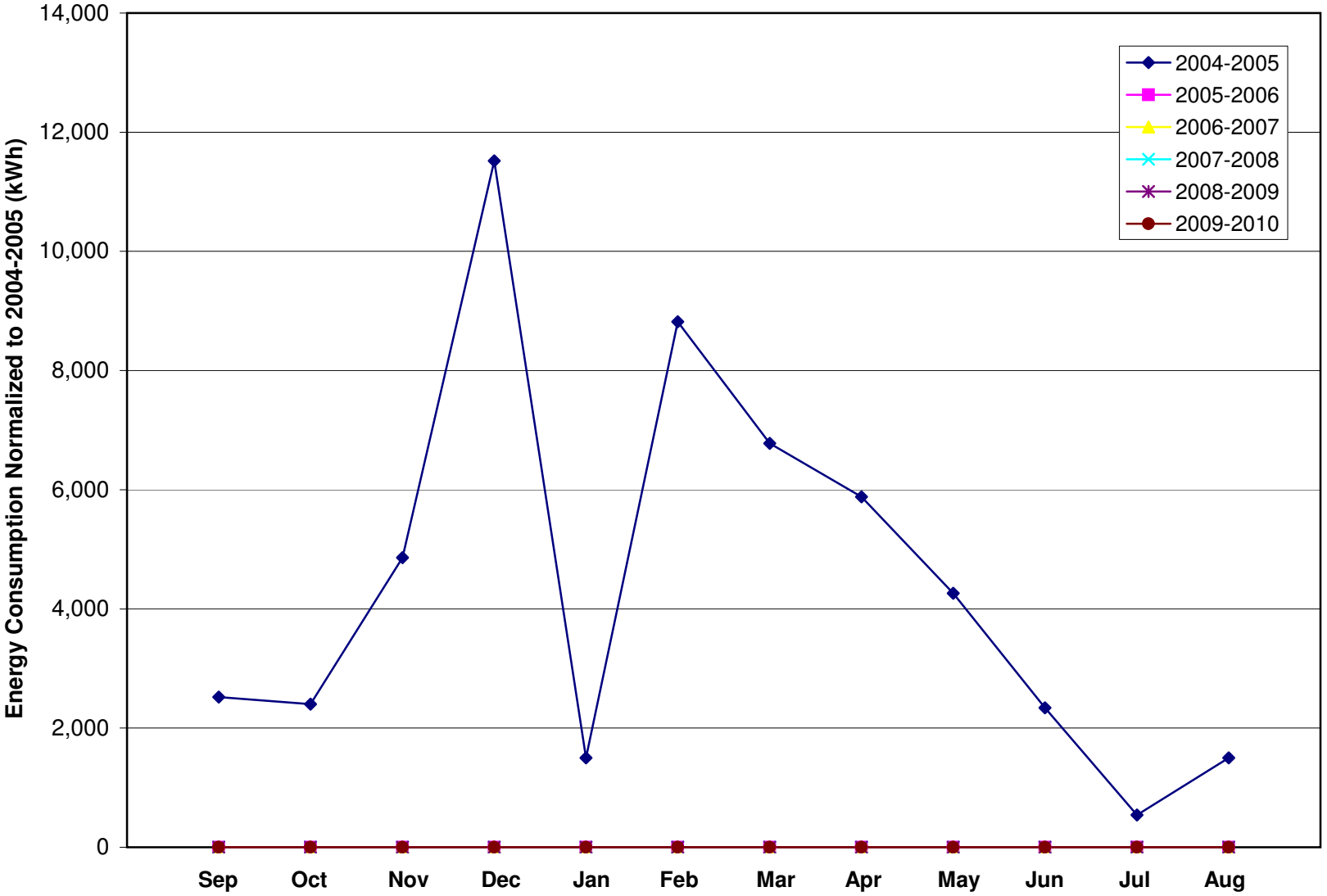


Table F.3 - Energy Consumption Monitoring Data for Moosehorn Community Hall

	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009			2009-2010		
Month	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)
September	3,144	142.3	3,144			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
October	4,824	405.1	4,824			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
November	7,644	599	7,644			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
December	10,584	1087.6	10,584			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
January	16,164	1208.4	16,164			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
February	19,944	906.5	19,944			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
March	4,464	846.1	4,464			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
April	7,764	371.7	7,764			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
May	7,644	273	7,644			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
June	3,624	66.9	3,624			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
July	2,484	38.7	2,484			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
August	1,884	56.8	1,884			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
TOTAL	90,168	6002.1	90,168	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!

Notes

* Energy consumption should be recorded following the implementation of the energy saving opportunities.

1. Enter the year in row 3 of this table (starting in column E,F,G).

2. Enter the "Billed Energy Consumption" (in kWh) taken from the hydro bill next to the appropriate month.

3. Go to the following website to collect information on the Heating Degree Days for Arborg, Manitoba: http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=

4. Once you've arrived at this website, select the appropriate month and click the mouse on "GO"

5. From this website, record the last number highlighted in blue (refer to page F35) in the column "Heat Deg Days". This number should be entered under the heading HDD of this table, next to the appropriate month.

6. The "Energy Normalized to 2004-2005" will be calculated automatically and this point will show up on the Energy Consumption graph.

Figure F.3 - Energy Consumption Monitoring Graph for Moosehorn Community Hall

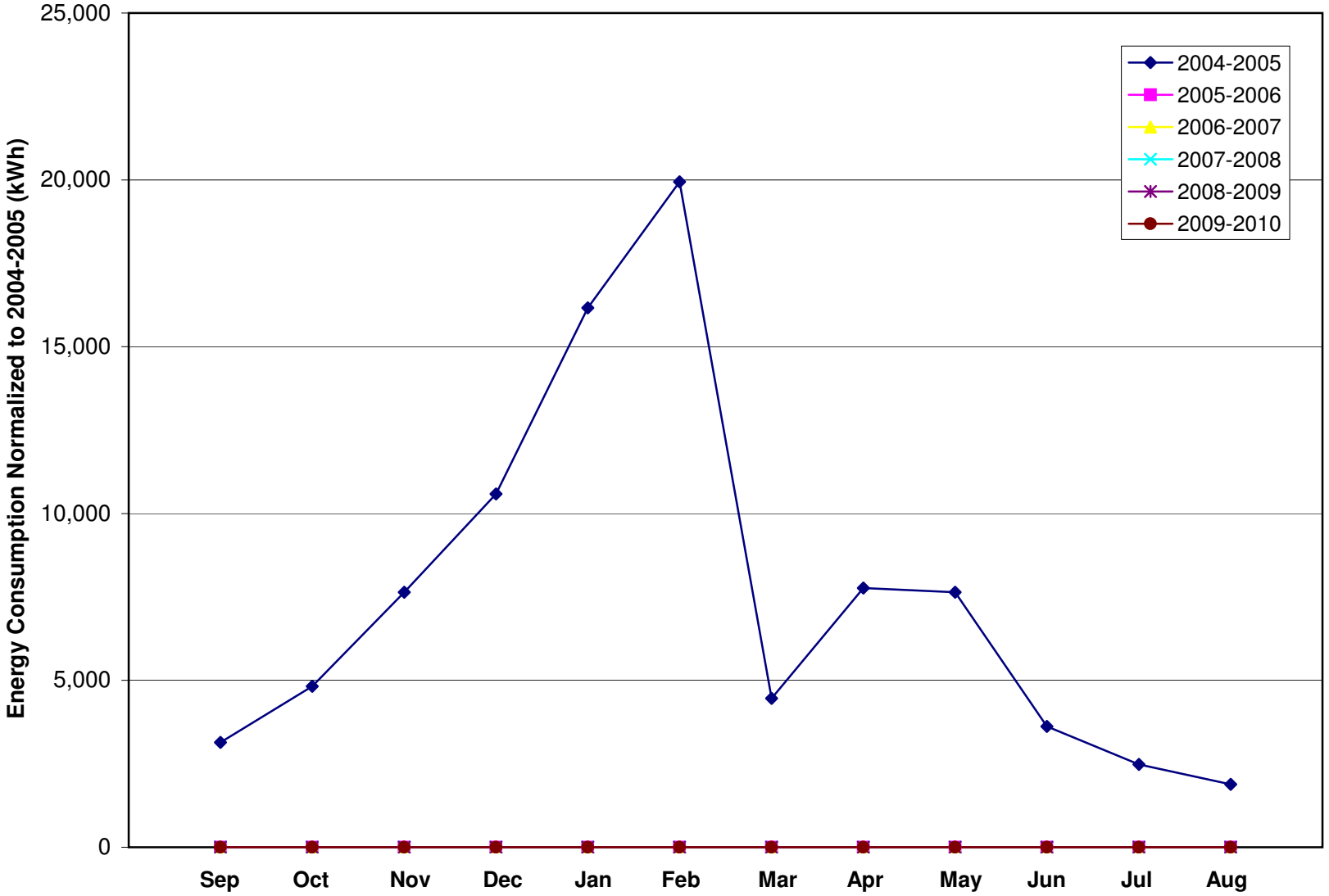


Table F.4 - Energy Consumption Monitoring Data for Grahamdale Community Centre

	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009			2009-2010		
Month	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)
September	2,981	142.3	2,981			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
October	7,341	405.1	7,341			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
November	6,381	599	6,381			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
December	11,621	1087.6	11,621			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
January	12,461	1208.4	12,461			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
February	9,381	906.5	9,381			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
March	10,971	846.1	10,971			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
April	6,931	371.7	6,931			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
May	9,721	273	9,721			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
June	3,731	66.9	3,731			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
July	871	38.7	871			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
August	1,781	56.8	1,781			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
TOTAL	84,172	6002.1	84,172	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!

Notes

* Energy consumption should be recorded following the implementation of the energy saving opportunities.

1. Enter the year in row 3 of this table (starting in column E,F,G).

2. Enter the "Billed Energy Consumption" (in kWh) taken from the hydro bill next to the appropriate month.

3. Go to the following website to collect information on the Heating Degree Days for Arborg, Manitoba: http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=

4. Once you've arrived at this website, select the appropriate month and click the mouse on "GO"

5. From this website, record the last number highlighted in blue (refer to page F35) in the column "Heat Deg Days". This number should be entered under the heading HDD of this table, next to the appropriate month.

6. The "Energy Normalized to 2004-2005" will be calculated automatically and this point will show up on the Energy Consumption graph.

Figure F.4 - Energy Consumption Monitoring Graph for Grahamdale Community Centre

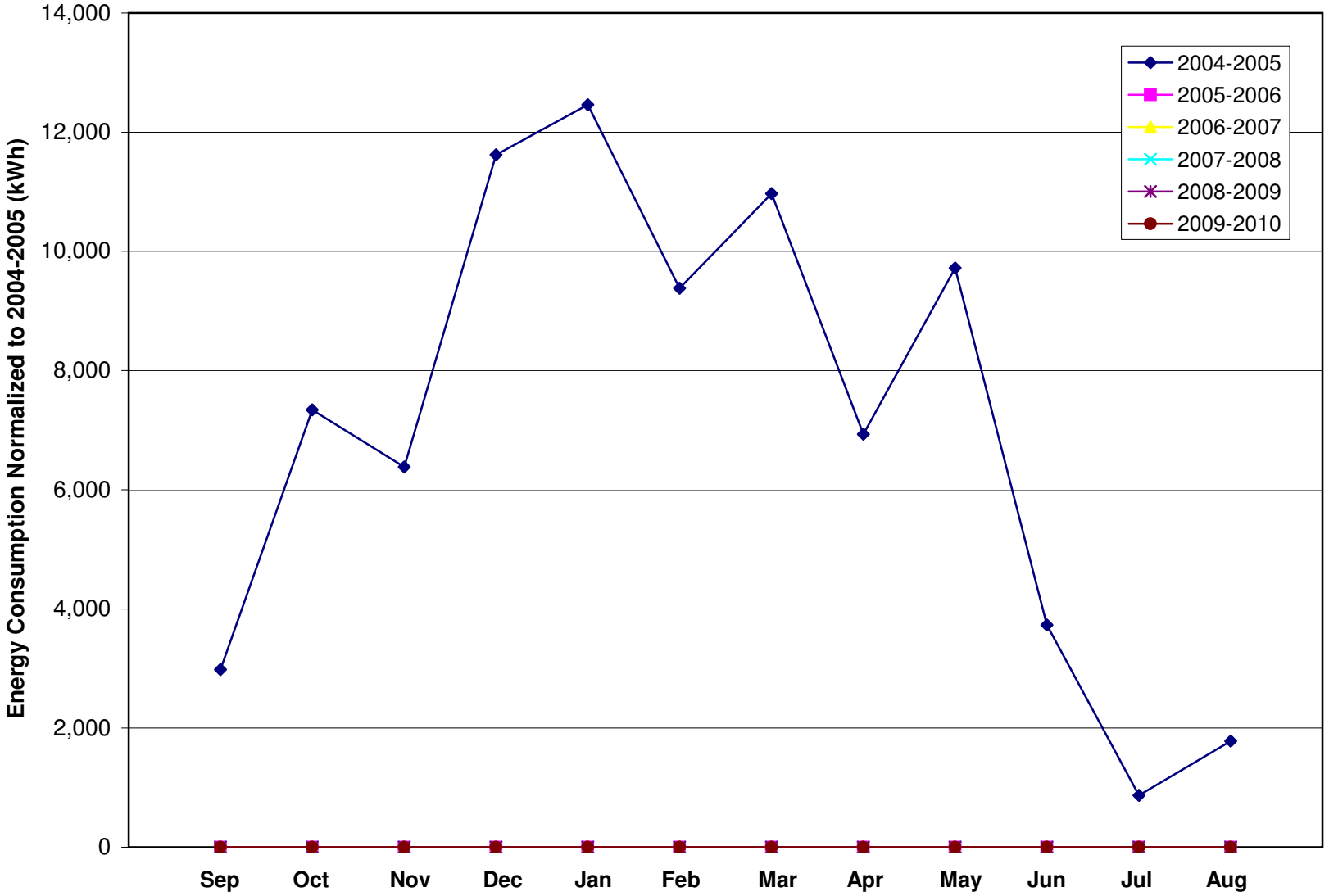


Table F.5 - Energy Consumption Monitoring Data for Faulkner Community Hall

	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009			2009-2010		
Month	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)
September	2,942	142.3	2,942			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
October	3,482	405.1	3,482			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
November	6,902	599	6,902			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
December	8,402	1087.6	8,402			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
January	15,962	1208.4	15,962			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
February	9,662	906.5	9,662			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
March	8,942	846.1	8,942			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
April	5,162	371.7	5,162			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
May	3,782	273	3,782			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
June	1,502	66.9	1,502			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
July	1,682	38.7	1,682			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
August	602	56.8	602			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
TOTAL	69,024	6002.1	69,024	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!

Notes

* Energy consumption should be recorded following the implementation of the energy saving opportunities.

1. Enter the year in row 3 of this table (starting in column E,F,G).

2. Enter the "Billed Energy Consumption" (in kWh) taken from the hydro bill next to the appropriate month.

3. Go to the following website to collect information on the Heating Degree Days for Arborg, Manitoba: http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=

4. Once you've arrived at this website, select the appropriate month and click the mouse on "GO"

5. From this website, record the last number highlighted in blue (refer to page F35) in the column "Heat Deg Days". This number should be entered under the heading HDD of this table, next to the appropriate month.

6. The "Energy Normalized to 2004-2005" will be calculated automatically and this point will show up on the Energy Consumption graph.

Figure F.5 - Energy Consumption Monitoring Graph for Faulkner Community Hall

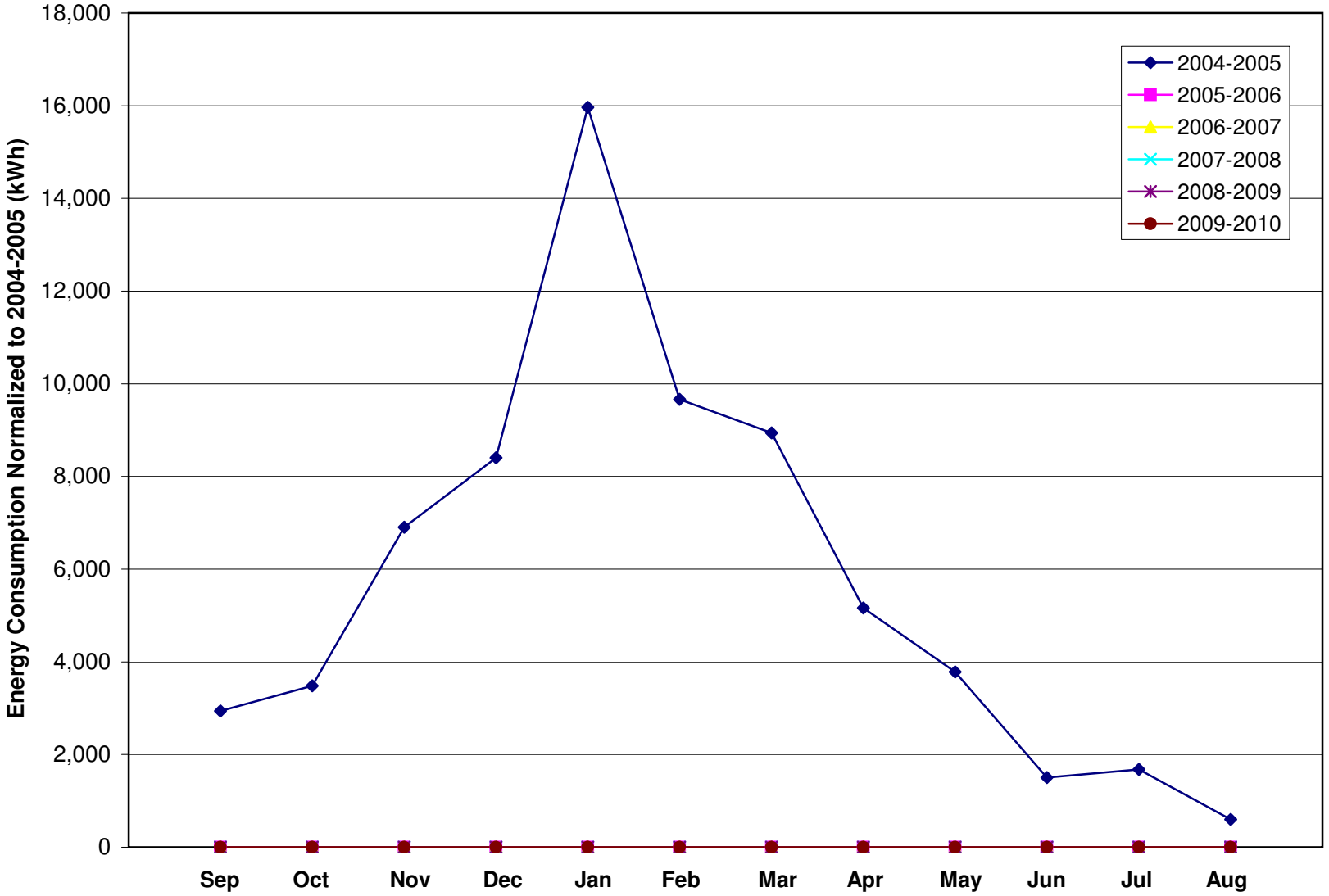


Table F.6 - Energy Consumption Monitoring Data for Steep Rock Community Hall

	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009			2009-2010		
Month	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**
September	490	142.3	490			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
October	490	405.1	490			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
November	5,960	599	5,960			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
December	0	1087.6	0			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
January	0	1208.4	0			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
February	0	906.5	0			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
March	0	846.1	0			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
April	0	371.7	0			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
May	1,840	273	1,840			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
June	100	66.9	100			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
July	60	38.7	60			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
August	0	56.8	0			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
TOTAL	8,940	6002.1	8,940	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!

Notes

* Energy consumption should be recorded following the implementation of the energy saving opportunities.

1. Enter the year in row 3 of this table (starting in column E,F,G).

2. Enter the "Billed Energy Consumption" (in kWh) taken from the hydro bill next to the appropriate month.

3. Go to the following website to collect information on the Heating Degree Days for Arborg, Manitoba: http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=

4. Once you've arrived at this website, select the appropriate month and click the mouse on "GO"

5. From this website, record the last number highlighted in blue (refer to page F35) in the column "Heat Deg Days". This number should be entered under the heading HDD of this table, next to the appropriate month.

6. The "Energy Normalized to 2004-2005" will be calculated automatically and this point will show up on the Energy Consumption graph.

Figure F.6 - Energy Consumption Monitoring Graph for Steep Rock Community Hall

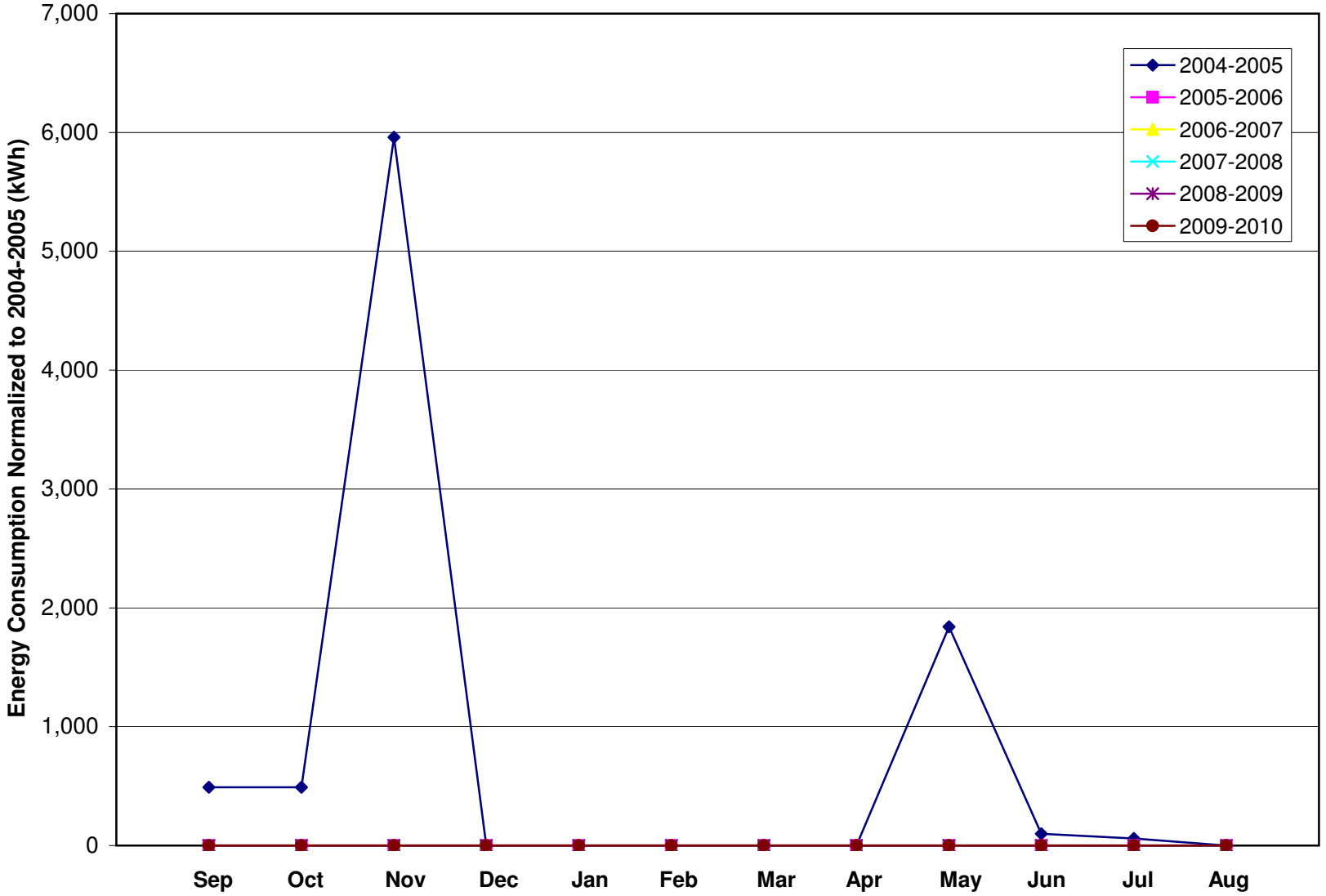


Table F.7 - Energy Consumption Monitoring Data for St. Martin Community Hall

	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009			2009-2010		
Month	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)
September	3,002	142.3	3,002			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
October	7,262	405.1	7,262			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
November	11,642	599	11,642			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
December	15,482	1087.6	15,482			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
January	17,582	1208.4	17,582			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
February	14,222	906.5	14,222			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
March	12,662	846.1	12,662			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
April	7,802	371.7	7,802			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
May	6,122	273	6,122			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
June	1,322	66.9	1,322			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
July	722	38.7	722			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
August	962	56.8	962			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
TOTAL	98,784	6002.1	98,784	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!

Notes

* Energy consumption should be recorded following the implementation of the energy saving opportunities.

1. Enter the year in row 3 of this table (starting in column E,F,G).

2. Enter the "Billed Energy Consumption" (in kWh) taken from the hydro bill next to the appropriate month.

3. Go to the following website to collect information on the Heating Degree Days for Arborg, Manitoba: http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=

4. Once you've arrived at this website, select the appropriate month and click the mouse on "GO"

5. From this website, record the last number highlighted in blue (refer to page F35) in the column "Heat Deg Days". This number should be entered under the heading HDD of this table, next to the appropriate month.

6. The "Energy Normalized to 2004-2005" will be calculated automatically and this point will show up on the Energy Consumption graph.

Figure F.7 - Energy Consumption Monitoring Graph for St. Martin Community Hall

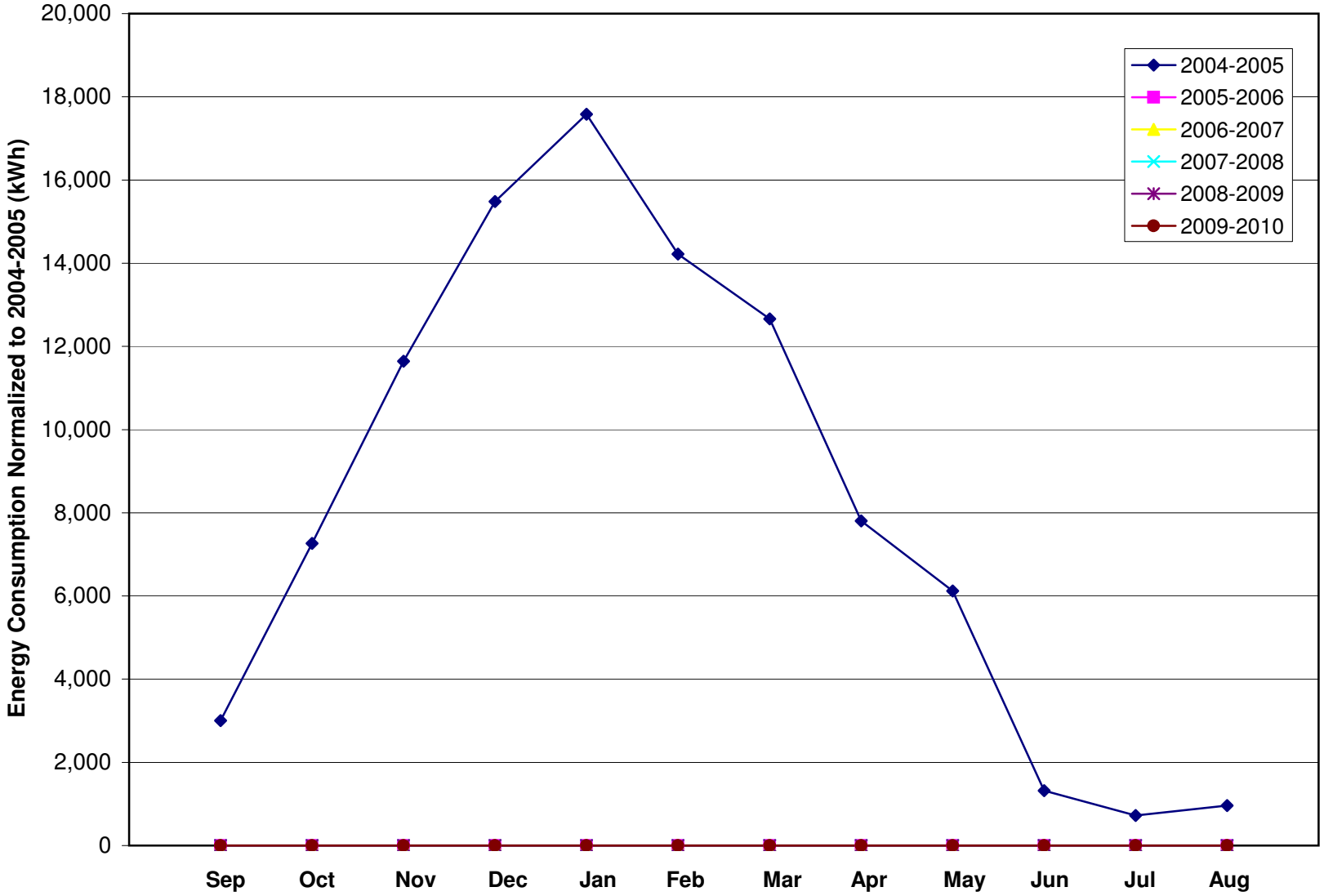


Table F.8 - Energy Consumption Monitoring Data for Gypsumville Memorial Hall

	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009			2009-2010		
Month	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**
September	3,984	142.3	3,984			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
October	4,164	405.1	4,164			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
November	7,104	599	7,104			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
December	11,004	1087.6	11,004			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
January	12,804	1208.4	12,804			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
February	10,104	906.5	10,104			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
March	9,564	846.1	9,564			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
April	5,424	371.7	5,424			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
May	3,921	273	3,921			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
June	564	66.9	564			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
July	1,644	38.7	1,644			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
August	564	56.8	564			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
TOTAL	70,845	6002.1	70,845	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!

Notes

* Energy consumption should be recorded following the implementation of the energy saving opportunities.

1. Enter the year in row 3 of this table (starting in column E,F,G).

2. Enter the "Billed Energy Consumption" (in kWh) taken from the hydro bill next to the appropriate month.

3. Go to the following website to collect information on the Heating Degree Days for Arborg, Manitoba: http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=

4. Once you've arrived at this website, select the appropriate month and click the mouse on "GO"

5. From this website, record the last number highlighted in blue (refer to page F35) in the column "Heat Deg Days". This number should be entered under the heading HDD of this table, next to the appropriate month.

6. The "Energy Normalized to 2004-2005" will be calculated automatically and this point will show up on the Energy Consumption graph.

Figure F.8 - Energy Consumption Monitoring Graph for Gypsumville Memorial Hall

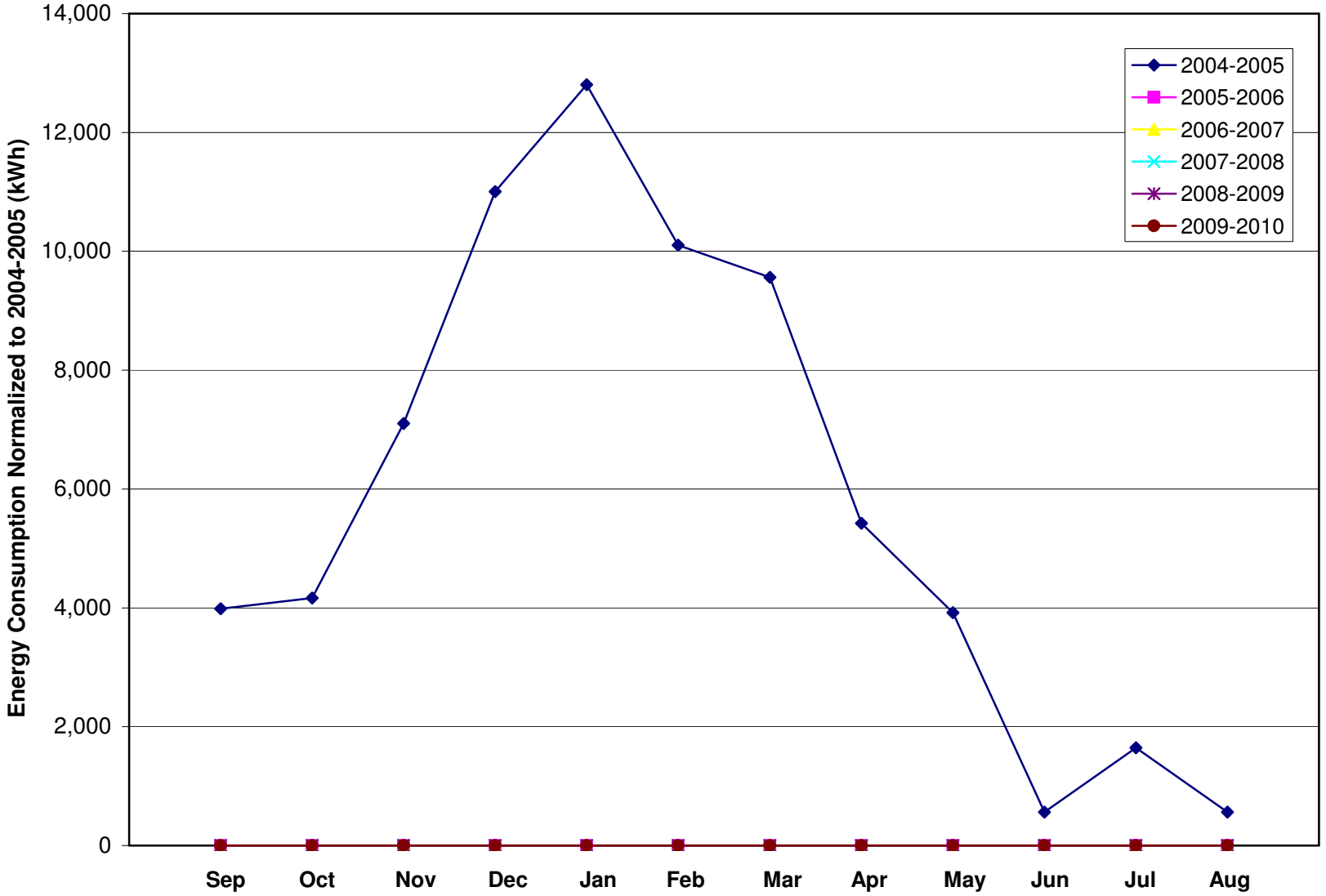


Table F.9 - Energy Consumption Monitoring Data for Moosehorn Curling Rink

	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009			2009-2010		
Month	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)
September	1,260	142.3	1,260			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
October	1,920	405.1	1,920			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
November	21,240	599	21,240			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
December	19,500	1087.6	19,500			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
January	26,400	1208.4	26,400			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
February	21,360	906.5	21,360			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
March	22,980	846.1	22,980			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
April	10,560	371.7	10,560			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
May	1,980	273	1,980			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
June	1,620	66.9	1,620			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
July	1,740	38.7	1,740			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
August	1,500	56.8	1,500			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
TOTAL	132,060	6002.1	132,060	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!

Notes

* Energy consumption should be recorded following the implementation of the energy saving opportunities.

1. Enter the year in row 3 of this table (starting in column E,F,G).

2. Enter the "Billed Energy Consumption" (in kWh) taken from the hydro bill next to the appropriate month.

3. Go to the following website to collect information on the Heating Degree Days for Arborg, Manitoba: http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=

4. Once you've arrived at this website, select the appropriate month and click the mouse on "GO"

5. From this website, record the last number highlighted in blue (refer to page F35) in the column "Heat Deg Days". This number should be entered under the heading HDD of this table, next to the appropriate month.

6. The "Energy Normalized to 2004-2005" will be calculated automatically and this point will show up on the Energy Consumption graph.

Figure F.9 - Energy Consumption Monitoring Graph for Moosehorn Curling Rink

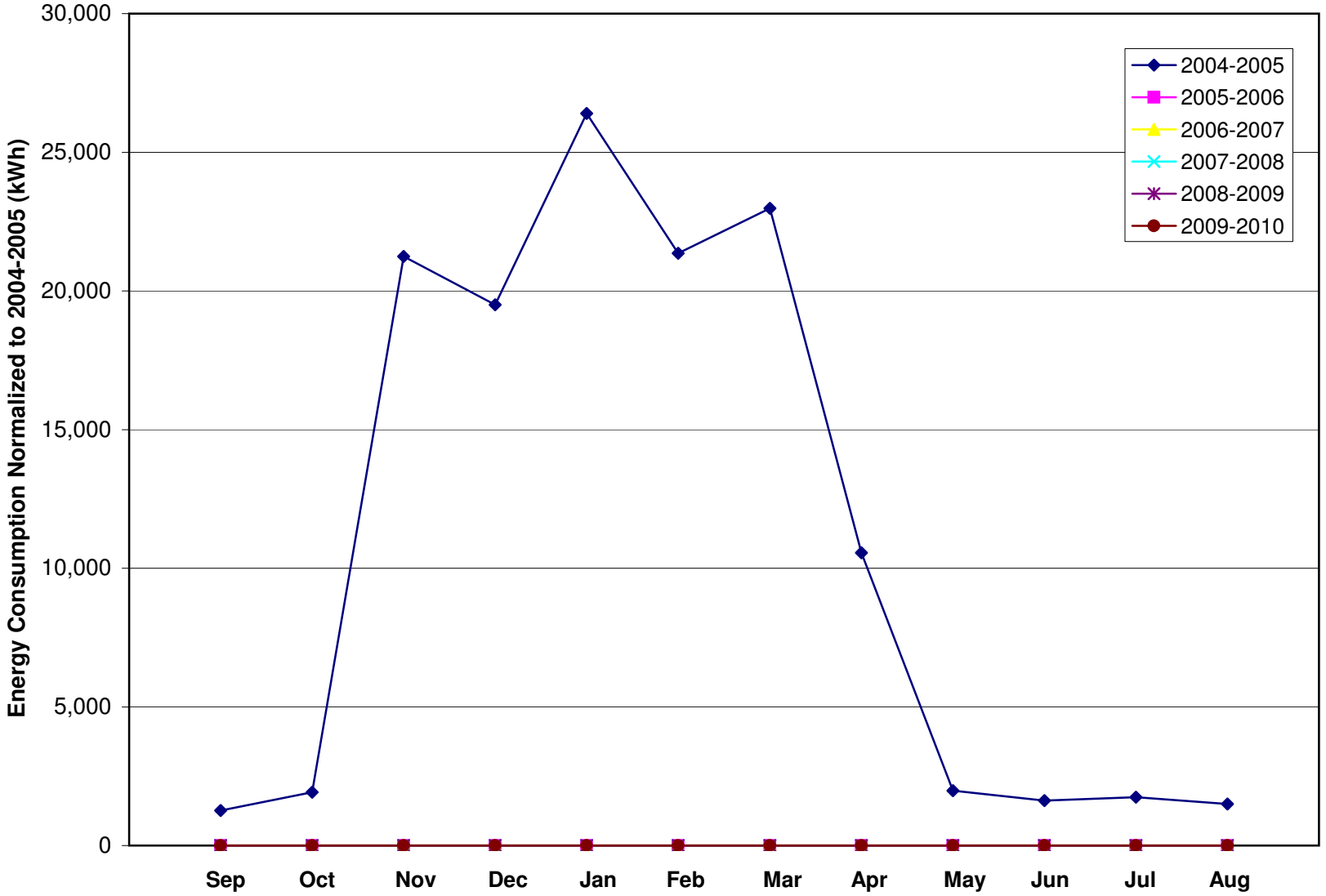


Table F.10 - Energy Consumption Monitoring Data for Moosehorn Fire Hall

	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009			2009-2010		
Month	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)
September	1,500	142.3	1,500			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
October	2,510	405.1	2,510			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
November	3,620	599	3,620			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
December	5,930	1087.6	5,930			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
January	9,380	1208.4	9,380			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
February	7,100	906.5	7,100			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
March	6,560	846.1	6,560			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
April	5,690	371.7	5,690			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
May	3,180	273	3,180			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
June	3,220	66.9	3,220			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
July	650	38.7	650			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
August	980	56.8	980			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
TOTAL	50,320	6002.1	50,320	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!

Notes

* Energy consumption should be recorded following the implementation of the energy saving opportunities.

1. Enter the year in row 3 of this table (starting in column E,F,G).

2. Enter the "Billed Energy Consumption" (in kWh) taken from the hydro bill next to the appropriate month.

3. Go to the following website to collect information on the Heating Degree Days for Arborg, Manitoba: http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=

4. Once you've arrived at this website, select the appropriate month and click the mouse on "GO"

5. From this website, record the last number highlighted in blue (refer to page F35) in the column "Heat Deg Days". This number should be entered under the heading HDD of this table, next to the appropriate month.

6. The "Energy Normalized to 2004-2005" will be calculated automatically and this point will show up on the Energy Consumption graph.

Figure F.10 - Energy Consumption Monitoring Graph for Moosehorn Fire Hall

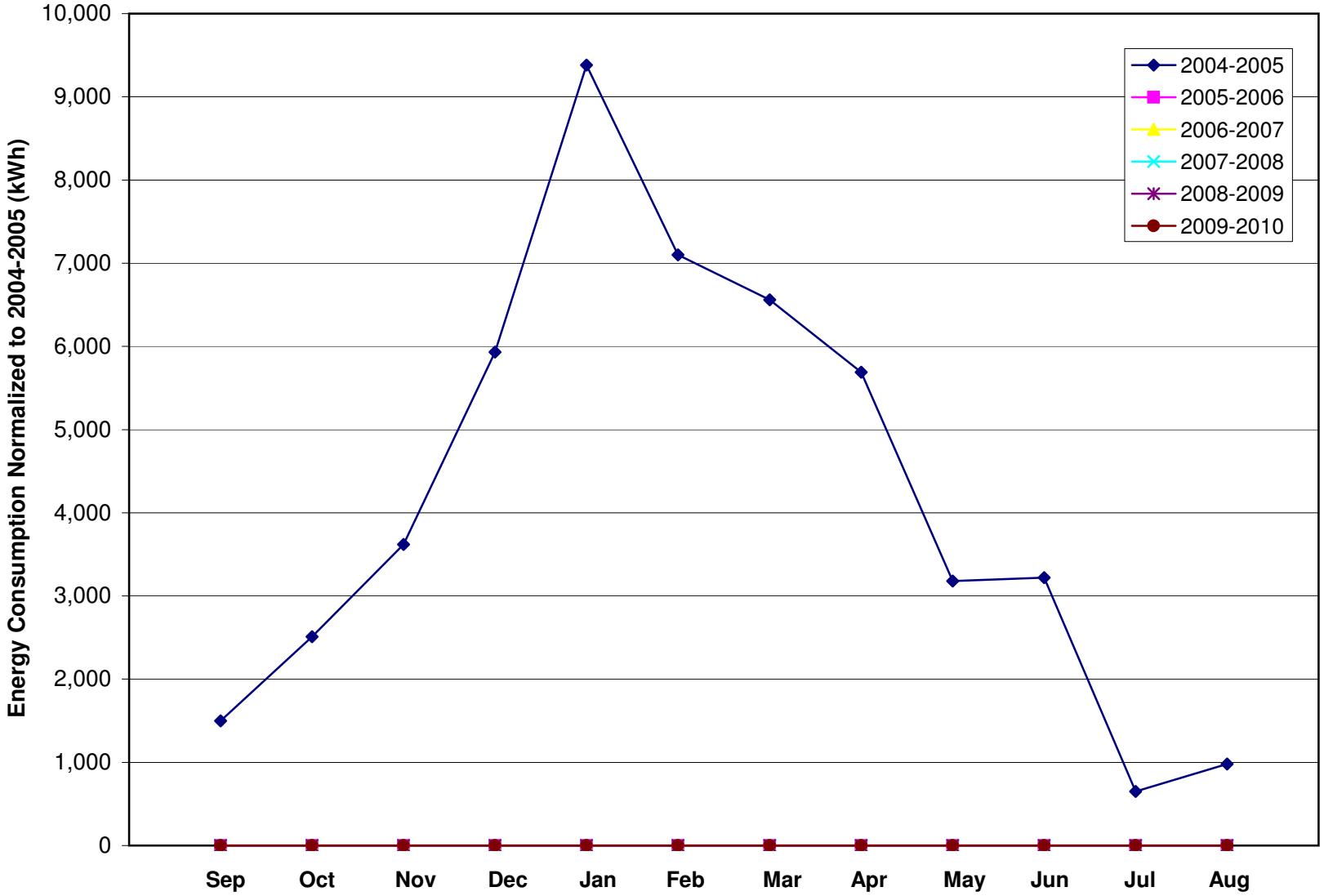


Table F.11 - Energy Consumption Monitoring Data for Gypsumville Fire Hall

	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009			2009-2010		
Month	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**	**Billed Energy Consumption (kWh)**	**HDD (°C days/mo)**	**Energy Normalized to 2004-2005 (kWh)**
September	1,550	142.3	1,550			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
October	3,040	405.1	3,040			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
November	7,010	599	7,010			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
December	7,740	1087.6	7,740			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
January	11,420	1208.4	11,420			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
February	7,080	906.5	7,080			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
March	2,060	846.1	2,060			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
April	3,920	371.7	3,920			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
May	3,230	273	3,230			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
June	510	66.9	510			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
July	640	38.7	640			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
August	520	56.8	520			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
TOTAL	48,720	6002.1	48,720	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!

Notes

* Energy consumption should be recorded following the implementation of the energy saving opportunities.

1. Enter the year in row 3 of this table (starting in column E,F,G).

2. Enter the "Billed Energy Consumption" (in kWh) taken from the hydro bill next to the appropriate month.

3. Go to the following website to collect information on the Heating Degree Days for Arborg, Manitoba: http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=

4. Once you've arrived at this website, select the appropriate month and click the mouse on "GO"

5. From this website, record the last number highlighted in blue (refer to page F35) in the column "Heat Deg Days". This number should be entered under the heading HDD of this table, next to the appropriate month.

6. The "Energy Normalized to 2004-2005" will be calculated automatically and this point will show up on the Energy Consumption graph.

Figure F.11 - Energy Consumption Monitoring Graph for Gypsumville Fire Hall

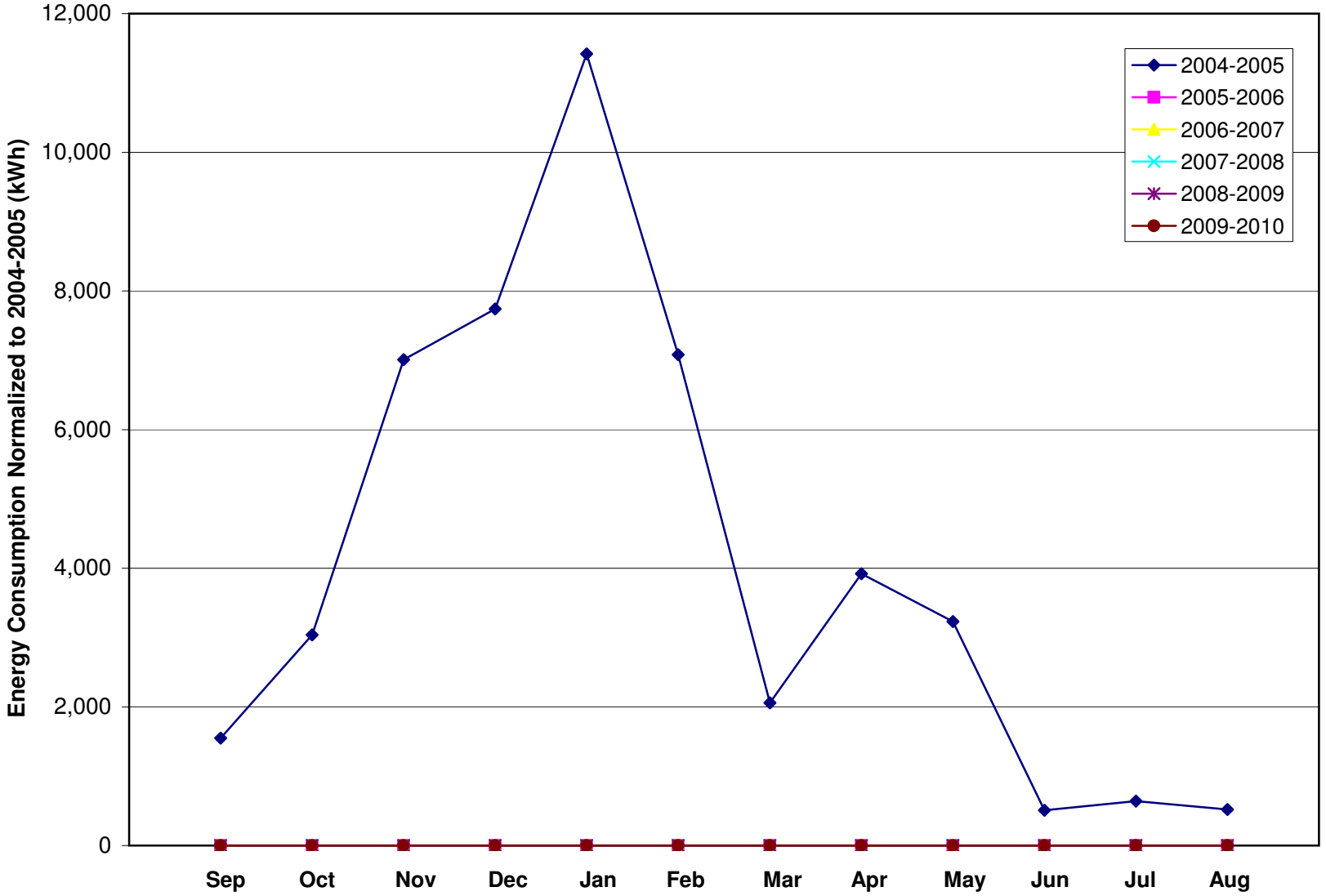


Table F.12 - Energy Consumption Monitoring Data for Moosehorn Administration Building

	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009			2009-2010		
Month	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)
September	1,032	142.3	1,032			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
October	1,252	405.1	1,252			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
November	2,122	599	2,122			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
December	3,332	1087.6	3,332			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
January	4,692	1208.4	4,692			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
February	3,972	906.5	3,972			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
March	3,372	846.1	3,372			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
April	1,732	371.7	1,732			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
May	116	273	116			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
June	872	66.9	872			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
July	1,162	38.7	1,162			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
August	822	56.8	822			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
TOTAL	24,478	6002.1	24,478	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!

Notes

* Energy consumption should be recorded following the implementation of the energy saving opportunities.

1. Enter the year in row 3 of this table (starting in column E,F,G).

2. Enter the "Billed Energy Consumption" (in kWh) taken from the hydro bill next to the appropriate month.

3. Go to the following website to collect information on the Heating Degree Days for Arborg, Manitoba: http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=

4. Once you've arrived at this website, select the appropriate month and click the mouse on "GO"

5. From this website, record the last number highlighted in blue (refer to page F35) in the column "Heat Deg Days". This number should be entered under the heading HDD of this table, next to the appropriate month.

6. The "Energy Normalized to 2004-2005" will be calculated automatically and this point will show up on the Energy Consumption graph.

Figure F.12 - Energy Consumption Monitoring Graph for Moosehorn Administration Building

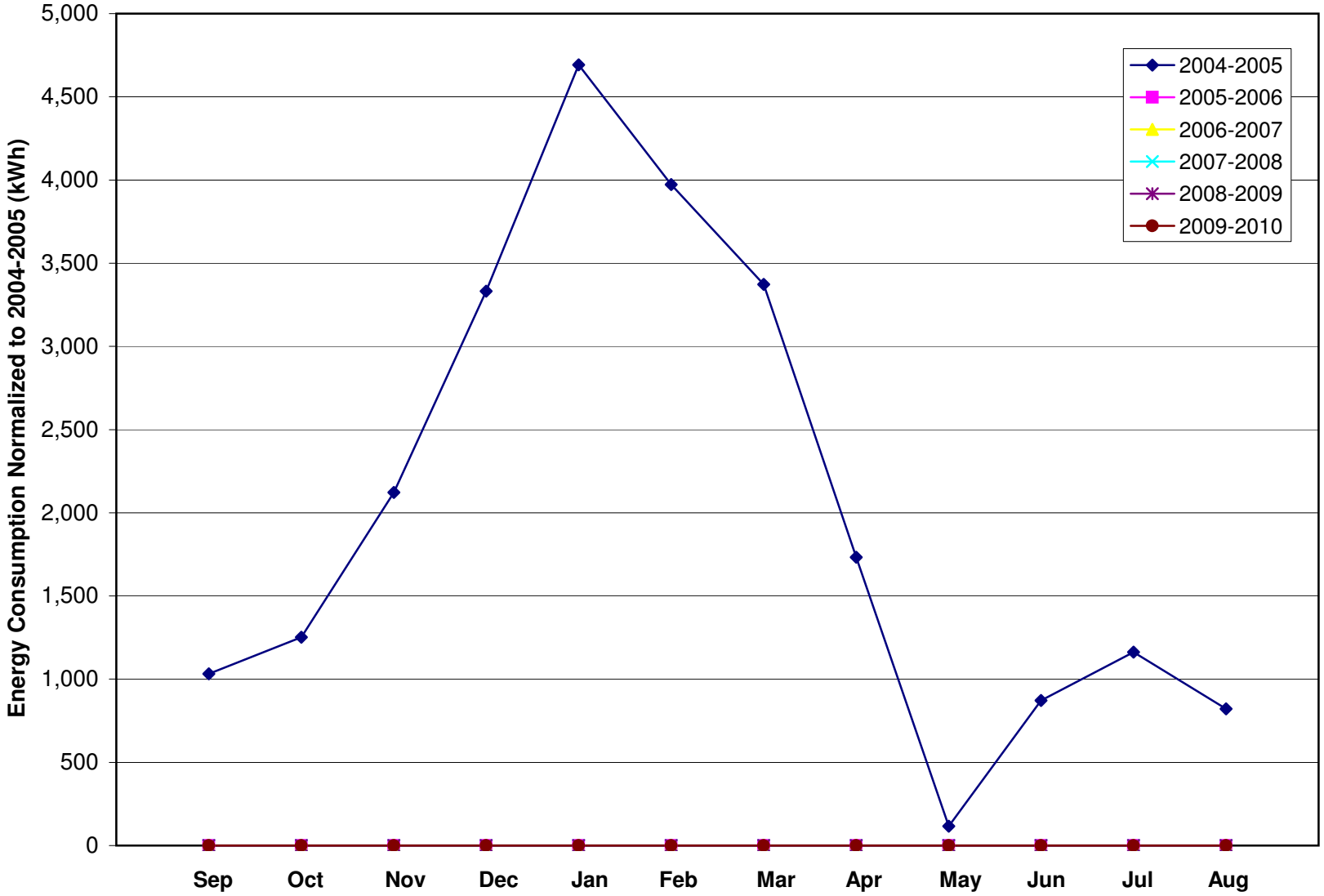


Table F.13 - Energy Consumption Monitoring Data for Moosehorn Heritage Museum

	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009			2009-2010		
Month	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)
September	0	142.3	0			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
October	710	405.1	710			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
November	0	599	0			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
December	850	1087.6	850			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
January	0	1208.4	0			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
February	1,610	906.5	1,610			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
March	0	846.1	0			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
April	570	371.7	570			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
May	0	273	0			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
June	680	66.9	680			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
July	0	38.7	0			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
August	1,510	56.8	1,510			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
TOTAL	5,930	6002.1	5,930	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!

Notes

* Energy consumption should be recorded following the implementation of the energy saving opportunities.

1. Enter the year in row 3 of this table (starting in column E,F,G).

2. Enter the "Billed Energy Consumption" (in kWh) taken from the hydro bill next to the appropriate month.

3. Go to the following website to collect information on the Heating Degree Days for Arborg, Manitoba: http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=

4. Once you've arrived at this website, select the appropriate month and click the mouse on "GO"

5. From this website, record the last number highlighted in blue (refer to page F35) in the column "Heat Deg Days". This number should be entered under the heading HDD of this table, next to the appropriate month.

6. The "Energy Normalized to 2004-2005" will be calculated automatically and this point will show up on the Energy Consumption graph.

Figure F.13 - Energy Consumption Monitoring Graph for Moosehorn Heritage Museum

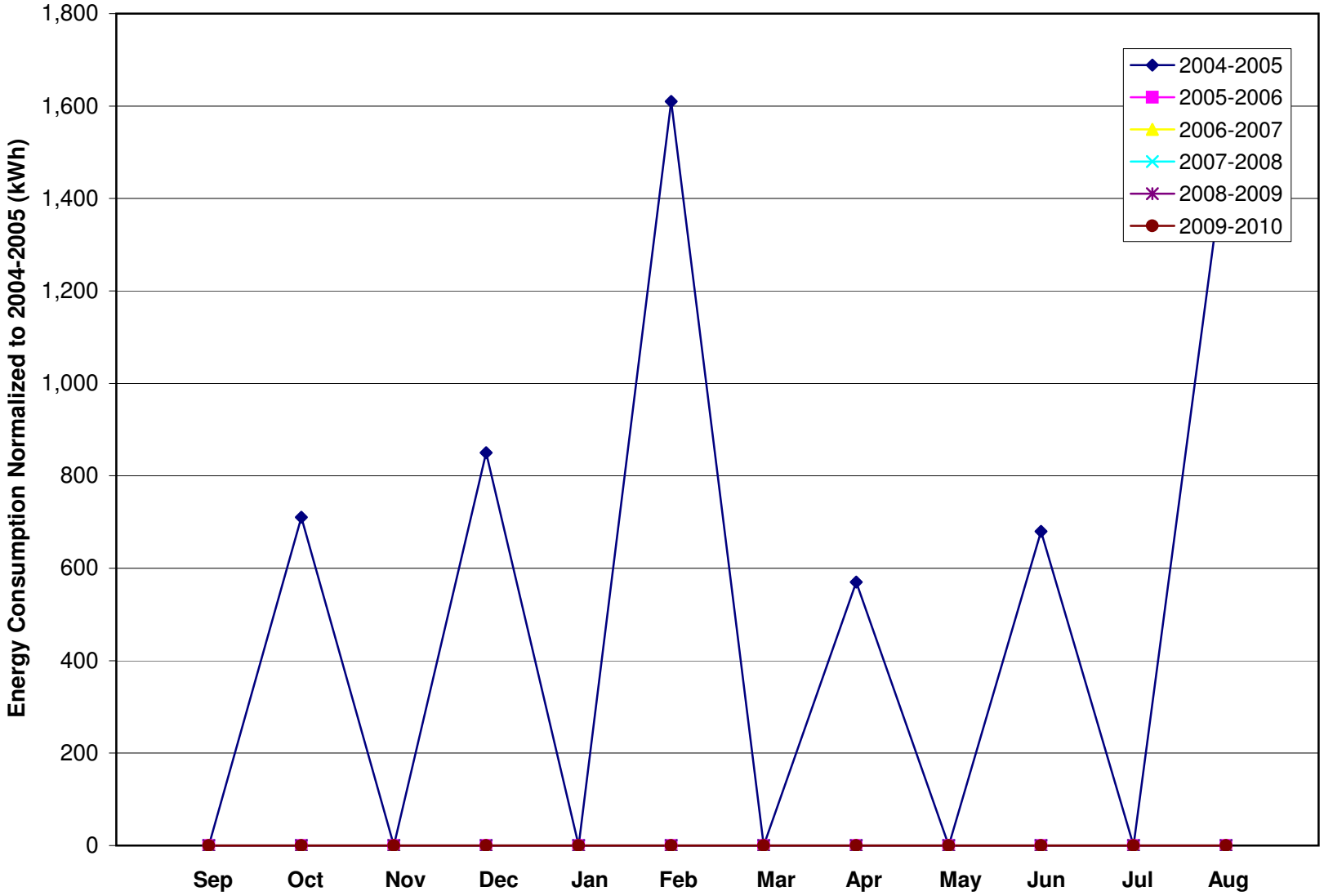


Table F.14 - Energy Consumption Monitoring Data for Camper New Horizons Seniors Centre

	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009			2009-2010		
Month	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)
September	50	142.3	50			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
October	140	405.1	140			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
November	1,020	599	1,020			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
December	1,600	1087.6	1,600			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
January	2,340	1208.4	2,340			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
February	1,900	906.5	1,900			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
March	1,540	846.1	1,540			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
April	1,090	371.7	1,090			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
May	190	273	190			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
June	140	66.9	140			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
July	50	38.7	50			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
August	30	56.8	30			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
TOTAL	10,090	6002.1	10,090	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!

Notes

* Energy consumption should be recorded following the implementation of the energy saving opportunities.

1. Enter the year in row 3 of this table (starting in column E,F,G).

2. Enter the "Billed Energy Consumption" (in kWh) taken from the hydro bill next to the appropriate month.

3. Go to the following website to collect information on the Heating Degree Days for Arborg, Manitoba: http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=

4. Once you've arrived at this website, select the appropriate month and click the mouse on "GO"

5. From this website, record the last number highlighted in blue (refer to page F35) in the column "Heat Deg Days". This number should be entered under the heading HDD of this table, next to the appropriate month.

6. The "Energy Normalized to 2004-2005" will be calculated automatically and this point will show up on the Energy Consumption graph.

Figure F.14 - Energy Consumption Monitoring Graph for Camper New Horizons Seniors Centre

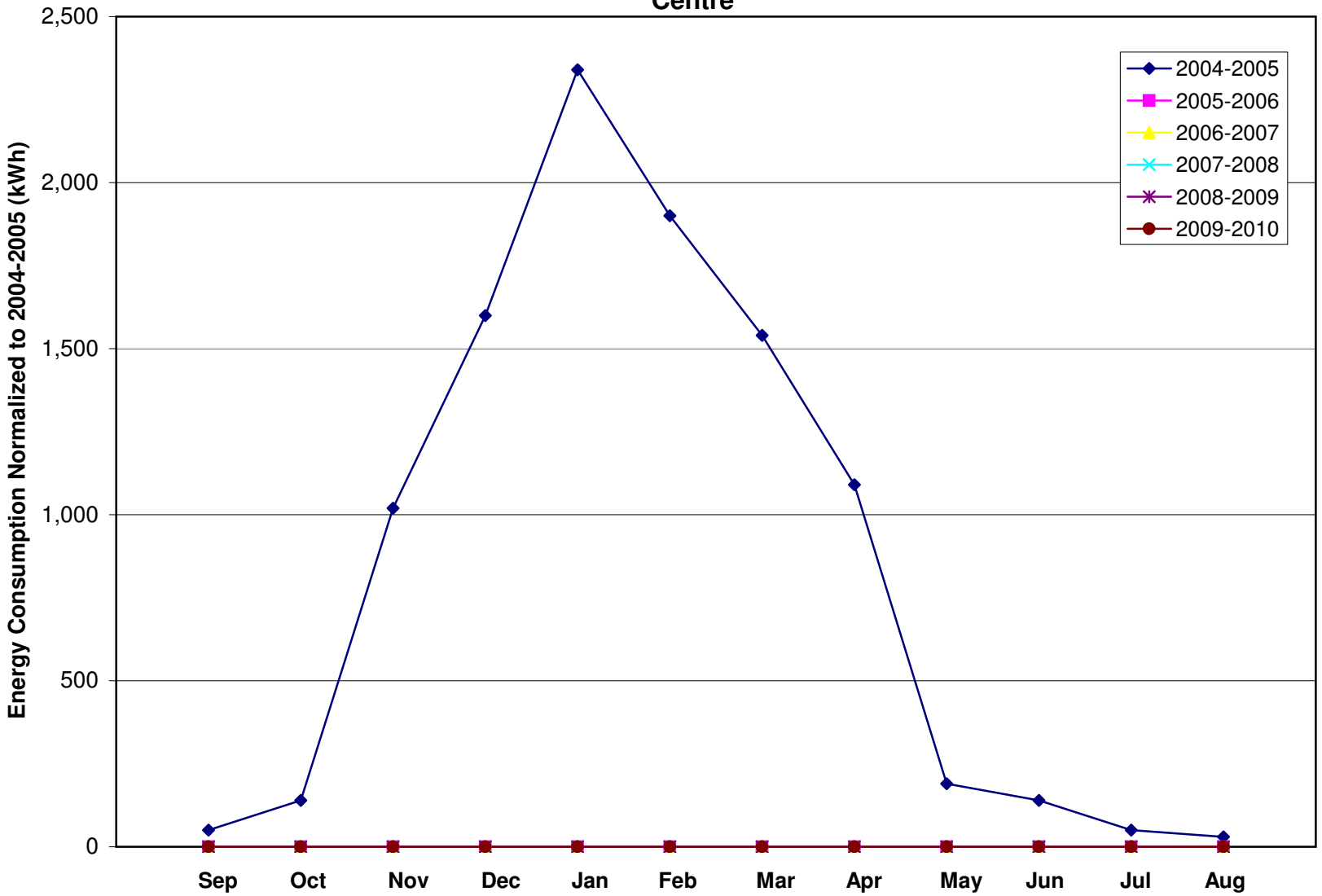


Table F.15 - Energy Consumption Monitoring Data for Moosehorn Senior Citizens Handicraft Centre

	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009			2009-2010		
Month	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)
September	870	142.3	870			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
October	1,050	405.1	1,050			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
November	2,050	599	2,050			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
December	3,500	1087.6	3,500			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
January	5,240	1208.4	5,240			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
February	4,150	906.5	4,150			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
March	3,670	846.1	3,670			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
April	2,710	371.7	2,710			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
May	1,140	273	1,140			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
June	400	66.9	400			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
July	1,160	38.7	1,160			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
August	380	56.8	380			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
TOTAL	26,320	6002.1	26,320	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!

Notes

* Energy consumption should be recorded following the implementation of the energy saving opportunities.

1. Enter the year in row 3 of this table (starting in column E,F,G).

2. Enter the "Billed Energy Consumption" (in kWh) taken from the hydro bill next to the appropriate month.

3. Go to the following website to collect information on the Heating Degree Days for Arborg, Manitoba: http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=

4. Once you've arrived at this website, select the appropriate month and click the mouse on "GO"

5. From this website, record the last number highlighted in blue (refer to page F35) in the column "Heat Deg Days". This number should be entered under the heading HDD of this table, next to the appropriate month.

6. The "Energy Normalized to 2004-2005" will be calculated automatically and this point will show up on the Energy Consumption graph.

Figure F.15 - Energy Consumption Monitoring Graph for Moosehorn Senior Citizens Handicraft Centre

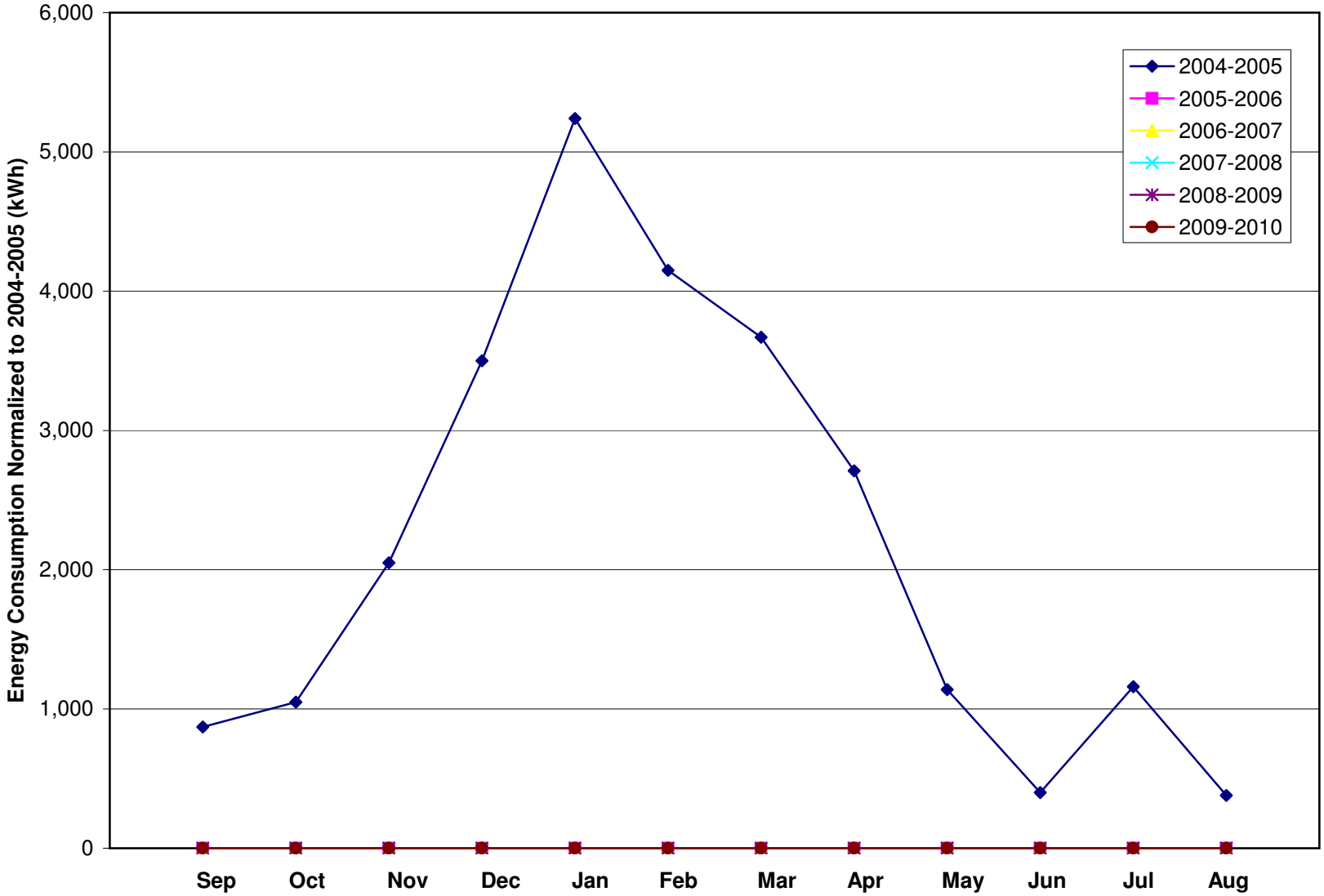


Table F.16 - Energy Consumption Monitoring Data for Faulkner Seniors Centre

	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009			2009-2010		
Month	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)	Billed Energy Consumption (kWh)	HDD (°C days/mo)	Energy Normalized to 2004-2005 (kWh)
September	360	142.3	360			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
October	700	405.1	700			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
November	1,030	599	1,030			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
December	1,960	1087.6	1,960			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
January	1,350	1208.4	1,350			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
February	1,500	906.5	1,500			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
March	1,490	846.1	1,490			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
April	620	371.7	620			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
May	560	273	560			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
June	230	66.9	230			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
July	140	38.7	140			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
August	240	56.8	240			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!			#DIV/0!
TOTAL	10,180	6002.1	10,180	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!

Notes

* Energy consumption should be recorded following the implementation of the energy saving opportunities.

1. Enter the year in row 3 of this table (starting in column E,F,G).

2. Enter the "Billed Energy Consumption" (in kWh) taken from the hydro bill next to the appropriate month.

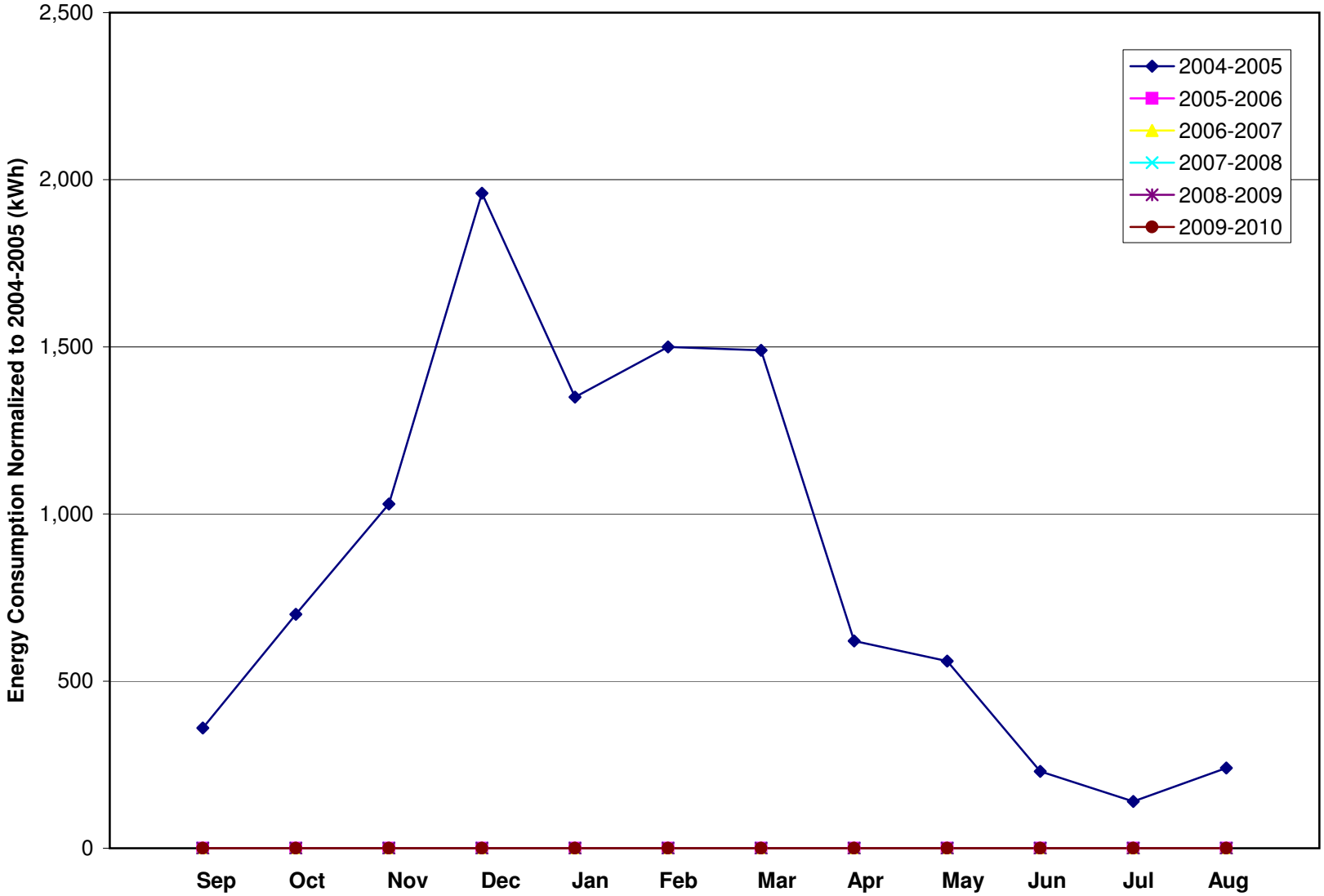
3. Go to the following website to collect information on the Heating Degree Days for Arborg, Manitoba: http://www.climate.weatheroffice.ec.gc.ca/climateData/dailydata_e.html?timeframe=2&Prov=CA&StationID=3717&Year=2006&Month=1&Day=

4. Once you've arrived at this website, select the appropriate month and click the mouse on "GO"

5. From this website, record the last number highlighted in blue (refer to page F35) in the column "Heat Deg Days". This number should be entered under the heading HDD of this table, next to the appropriate month.

6. The "Energy Normalized to 2004-2005" will be calculated automatically and this point will show up on the Energy Consumption graph.

Figure F.16 - Energy Consumption Monitoring Graph for Faulkner Seniors Centre



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Daily Data Report for January 2006

Notes on Data Quality.

ARBORG
MANITOBA

Latitude: 50° 55' N **Longitude:** 97° 4' W **Elevation:** 224.00 m

Climate ID: 5030080 **WMO ID:** **TC ID:**

Daily Data Report for January 2006

Day	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days C	Cool Deg Days C	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's Deg	Spd of Max Gust km/h
01†	-3.5	-4.5	-4.0	22.0	0.0	0.0	0.0	0.0	25		
02†	-2.0	-7.0	-4.5	22.5	0.0	0.0	0.1	0.1	25		
03†	-1.5	-4.0	-2.8	20.8	0.0	0.0	0.1	0.1	25		
04†		-2.5							25		
05											
06†	0.0	-6.0	-3.0	21.0	0.0	0.0	0.0	0.0	25		
07†	-4.0	-4.5	-4.3	22.3	0.0	0.0	1.5	1.5	25		
08†	-4.0	-6.5	-5.3	23.3	0.0	0.0	0.0	0.0	25		
09†	-1.0	-13.5	-7.3	25.3	0.0	0.0	0.0	0.0	25		
10†	2.0	-6.0	-2.0	20.0	0.0	0.0	0.1	0.1	25		
11†	-1.5	-8.5	-5.0	23.0	0.0	0.0	11.0	11.0	25		
12†	-4.5	-12.5	-8.5	26.5	0.0	0.0	0.1	0.1	35		
13†	-4.5	-18.0	-11.3	29.3	0.0	0.0	0.1	0.1	35		
14†	-6.0	-18.0	-12.0	30.0	0.0	0.0	0.0	0.0	35		
15†	-4.0	-7.5	-5.8	23.8	0.0	0.0	5.0	5.0	35		
16†	-5.0	-5.5	-5.3	23.3	0.0	0.0	2.0	2.0	40		
17†	-10.5	-15.0	-12.8	30.8	0.0	0.0	0.0	0.0	40		
18†	-11.5	-24.0	-17.8	35.8	0.0	0.0	0.1	0.1	40		
19†	-8.5	-22.0	-15.3	33.3	0.0	0.0	0.0	0.0	40		
20†	-15.0	-20.5	-17.8	35.8	0.0	0.0	0.0	0.0	40		
21†	-15.5	-24.5	-20.0	38.0	0.0	0.0	0.0	0.0	40		
22†	-8.0	-34.0	-21.0	39.0	0.0	0.0	0.0	0.0	40		
23†	0.0	-19.0	-9.5	27.5	0.0	0.0	3.0	3.0	40		
24†	-3.5	-6.0	-4.8	22.8	0.0	0.0	0.0	0.0	42		
25†	-3.5	-17.5	-10.5	28.5	0.0	0.0	0.0	0.0	42		
26†	3.0	-6.5	-1.8	19.8	0.0	0.0	0.0	0.0	42		
27†	-3.0	-7.0	-5.0	23.0	0.0	0.0	0.0	0.0	40		
28†	-7.0	-24.0	-15.5	33.5	0.0	0.0	2.0	2.0	40		
29†	-5.5	-12.0	-8.8	26.8	0.0	0.0	0.0	0.0	40		
30†	-5.0	-22.5	-13.8	31.8	0.0	0.0	0.0	0.0	40		
31†	0.0	-17.0	-8.5	26.5	0.0	0.0	0.0	0.0	40		
Sum				**786.0***	**0.0***	**0.0***	**25.1***	**25.1***			
Avg	**-4.6**	**-13.2**	**-8.9**								
Xtrm	**3.0**	**-34.0**								**M**	**M**

Legend

[empty] = No data available

M = Missing

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APPENDIX G

THE MUNICIPALITIES TRADING COMPANY OF MANITOBA LTD. REPORT

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MEMBER SERVICES

The Municipalities Trading Company of Manitoba Ltd. (MTCML) allows AMM members to purchase products and services at lower prices through the power of bulk buying. This year was another great success. Sales remained consistent and the stable pool of official suppliers continued to change and grow. The products sales have consistently remained between 6.5 and 7.4 million dollars for the last 4 years.

The MTCML provides a major source of revenue for the AMM and allows the AMM membership dues to remain one of the lowest in Canada. This past year, the MTCML was able to rebate another $350,000 to our members based on their MTCML sales, bringing the cumulative rebate over the past four years to $1,250,000.

MTCML Official Suppliers

Official Suppliers are very important to the success of the MTCML. These suppliers offer hundreds of products and services that municipalities use. The Trading Company has individual contracts with each of these suppliers that ensure the best possible pricing for the purchasing members. In return, suppliers have direct contact with Manitoba's municipal market and can be a part of regular marketing opportunities through the AMM (mailings, Convention, trade shows, etc.) Each of our suppliers has shown long term commitment to the MTCML, creating a stable purchasing environment for the members of the AMM.

Corporate Members

At present fourteen companies make up the Corporate Members list of the AMM, five of these new for 2004/2005. These members assist the buying group in providing many services and hosting various events throughout the year.

*Last year, the MTCML was able to rebate **$350,000** to our members based on their MTCML sales, bringing the total rebate over the past four years to **$1,250,000**.*

Major Programs

There are also two major buying programs offered by the Trading Company. These programs are owned by the AMM membership, managed by the AMM and each administered by a company that has expertise in the program area.

Petroleum Products Buying Group (PPBG)

AMM has entered into contracts with both Imperial Oil and Petro Canada, on behalf of all of our participating Members, for the supply of gasoline, diesel and lubricants. Our objective is to combat one-sided pricing advantages enjoyed by petroleum suppliers and to assist our Members to purchase fuel at a lower cost while still supporting the local fuel dealers. Currently there are 77 AMM Members who purchase over 6,000,000 litres of fuel each year and about 130 other municipalities in Saskatchewan and Alberta who purchase an additional 29,000,000 litres of fuel annually.

The concept of AMM purchasing large volumes of fuel on behalf of our Members and the careful analysis of industry pricing means fuel savings for member municipalities in all three provinces. At the same time, local fuel dealers are supported. The program is administered by Prairie Fuel Advisors Inc., who also act as our purchasing agent.

The only cost for joining the PPBG is 1.2¢ per litre for the fuel purchased and 10¢ per litre for lubricants. A municipality may withdraw from the PPBG at any time, and there is no cost to withdraw.

M.T.C.M.L.

MEMBER SERVICES

M.T.C.M.L.

Insurance

All AMM members outside of Winnipeg participate in the insurance program, administered by Hayhurst Elias Dudek on behalf of the AMM. Coverage includes property/road machinery and equipment; crime (loss of money); comprehensive general liability; errors and omissions liability; environmental impairment (pollution) liability; fire vehicle insurance; plus accident insurance for Councils, fire departments, ambulance services, and other 'volunteers'.

A major part of the program is the $3,500,000 annual self-insurance loss pool that keeps premiums much lower than if individual municipalities purchased their own coverage. Insurance is purchased from various providers for coverage in excess of the $3,500,000 annual loss pool amount, to provide complete protection. This allows the opportunity for significant refunds in low-claims years.

Last year, the AMM was able to offer an average 5% reduction in our insurance rates. As well, as a result of excellent risk management by municipalities, the AMM was able to refund $918,000 to municipalities out of the insurance loss pool.

Official Suppliers have shown long-term commitment to the MTCML.

MTCML Official Suppliers

Acklands Grainger Inc.
Airmaster Sales
Armtec
Bridgestone Canada Inc.
CD Awards
Darwen Road Technologies Ltd.
Denray Tire
Dust Free Road Maintenance
Fort Distributors Ltd.
Grand & Toy
Guardian Traffic Services Manitoba Ltd.
Hayhurst Elias Dudek Inc.
Kal Tire
MTS
Michelin
Norquay Printers Ltd.
PCO Orkin Swat Team
Prairie Fuel Advisors Inc.
Shippam & Associates Inc.
Souris Rock Shop
Tirecraft
Westcon Equipment & Rentals
Westman Steel Industries

AMM Corporate Members

Borland Construction
Cochrane Engineering
Guertin Equipment
Hayhurst Elias Dudek
Innovative Municipal Products Inc.
Manitoba Aboriginal and Northern Affairs
Manitoba Heavy Construction Association
Manitoba Hydro
Manitoba Mixed Concrete Association
Manitoba Pork Council
Mazer Group Construction Equipment
Robert Watson, Attorney
Strong-Coley & Associates
Westcon Equipment & Rentals Ltd.