



Owen Sound

AGENDA
REGIONAL RECREATION CENTRE STEERING COMMITTEE
Tuesday, May 18, 2010
10:00 a.m. – 12:30 p.m. Basement Boardroom, City Hall

- 1 CALL TO ORDER**
- 2 ADDITIONAL ITEMS**
- 3 DISCLOSURE OF PECUNIARY INTEREST AND THE GENERAL NATURE THEREOF**
- 4 CONFIRMATION OF MINUTES**
 - a) April 20, 2010
 - b) May 4, 2010
 - c) May 7, 2010
 - d) May 10, 2010
- 5 BUSINESS ARISING – Jim M**
 - a) Action Item Review (attached)
 - b) Correspondence from Dr. Hazel Lynn, Grey Bruce Health Unit (attached)
- 6 MANAGEMENT UPDATE – Jim H, Gayle**
 - a) Communication Strategies
 - b) Class B Costing
 - i) Cash Flow Projections
 - ii) Funding Source Update
 - iii) Sunshade Recommendation
 - iv) Tunnel Recommendation
 - v) Echo chill Recommendation
 - vi) VE 2 (Deferred Items) Recommendation
 - vii) VE 3 Items Recommendation
- 7 ARCHITECT UPDATE – Phil/Duff**
 - a) VE List with Total of all Cost Savings (attached)
 - b) Project Meeting/Milestone Calendar (attached)
 - c) Micro-Planning Meeting #7 – LEEDS (attached)
- 8 CONSTRUCTION UPDATE – Joseph/Brad**
 - a) Tender Update
 - b) Site Update
- 9 FUNDRAISING COMMITTEE UPDATE - Michael**
- 10 RESOLUTION TO MOVE IN-CAMERA**
- 11 OTHER BUSINESS**
- 12 ADJOURNMENT**
- 13 NEXT COMMITTEE MEETING: June 21, 2010**



Owen Sound

MINUTES

REGIONAL RECREATION CENTRE STEERING COMMITTEE (RRCSC)

Tuesday, April 20, 2010

10:00 A.M. Basement Boardroom, City Hall

- MEMBERS PRESENT:** Councillor Jim McManaman, Chair
Councillor David Adair
Mayor Ruth Lovell Stanners
Councillor Tom Pink (10:26 a.m.)
Councillor Bill Twaddle
Brian Dean, Family Y Vice President, Board of Directors
Michael Warren, Family Y Board Appointee
Mayor Francis Richardson, Municipality of Meaford
- ABSENT/REGRETS:** Councillor Ryan Thompson, Township of Georgian Bluffs
Evelyn Dean, Family Y President, Board of Directors
- GUESTS:** Joseph Acquino, Project Coordinator
Phil Fenech, Project Manager (teleconference)
Doug Bierer, Family Y Treasurer
Craig Ruppenthal, City Facilities Manager
- STAFF PRESENT:** Jim Harrold, City Manager
Gayle Graham, Family Y CEO
Brad McRoberts, Manager of Special Capital Projects
Sharon Edwards, EA - Recording Secretary

1. CALL TO ORDER – 10:04 A.M.

2. ADDITIONAL ITEMS

3. DISCLOSURE OF PECUNIARY INTEREST AND THE GENERAL NATURE THEREOF FOR MATTERS LISTED ON THE AGENDA.

There were no disclosures of pecuniary interest.

4. CONFIRMATION OF MINUTES

a) Minutes of Meeting – March 23, 2010 & April 6, 2010

Moved by Bill Twaddle

"THAT the Regional Recreation Centre Steering Committee approve the minutes of the meetings held on March 23, 2010, & April 6, 2010, as presented"

Carried unanimously.

4a

5. BUSINESS ARISING – Jim M

a) Action Item Review

Brad will arrange to have multiple Committee photo shoots taken at the building site during various stages of the project.

The Joint Management Team sub-committee is reviewing and compiling the equipment list.

The Golf Tournament will be held on June 30, 2010 at Cobble Beach. There has been a tremendous response and registration is almost full.

Phil will forward the Micro Planning LEEDS minutes to Committee ASAP.

Brad continues to work on the mock-up of the site sign and projects that it will be ready to present to Committee prior to the next meeting.

i) Sun Shade Costing

The sunshade costing (overhang along the south entrance) is projected to be \$30,000 to \$40,000. Committee has agreed to wait until the Class B costing estimate is circulated before making a decision. The Joint Management Team will review and make a recommendation to Committee at the next meeting.

ii) Green Roof Costing

The costing for the 'extensive' green roof is projected to be \$300,000 to \$340,000. The Architect Team does not recommend installing the green roof as it offers very little benefits in terms of storm water retention and insulation value, and no appreciable aesthetic value, since it would not be viewed from any of the spaces.

Moved by David Adair

"THAT the Regional Recreation Centre Steering Committee does not proceed with the Green Roof, and further

THAT Committee review the concept of having a reflective roof and also review the potential of having solar panels."

Carried unanimously.

iii) Costing for Deletion of Service Tunnels

The Construction Management (CM) Team was asked to assess the costs for the removal of the service tunnels around the south and east sides of the pool tanks. Brad advised Committee that the current plan for the service tunnels is having them at half height (north side of the pool is full height).

The CM Team provided two differential costs in which both would result in credits to the project. Committee has agreed to wait until the Class B costing estimate is circulated before making a decision on whether to maintain the tunnels as currently in the plan, or delete them based on one of the two suggested options. The Joint Management Team will review and make a recommendation to Committee at the next meeting.

- b) Correspondence from Ed Zantinge, Sound Light Video Solutions Inc.
Brad reviewed the correspondence from Mr. Zantinge and the response that Joseph provided on behalf of the Committee. Joseph and Phil will review the possibility of tendering out A/V services as a stand alone tender as opposed to including it with the Electrical tender. Committee has requested that the Joint Management Team review and make a recommendation to Committee at the next meeting.

Tom Pink entered the meeting at 10:26 a.m.

OMAFRA and Auditor's Visit

Jim H. reported that the City (Mayor, Brad and himself) have met with OMAFRA officials (Federal and Provincial) and took part in an review they are conducting of the infrastructure programs under the Economic Action Plan. We were one of over eighty projects that participated in their review.

Jim H. reported that the same City group along with Wayne Ritchie also met with officials from the office of the Auditor General of Ontario who were conducting a value-for-money audit on the stimulus funding allocated under the BCF program. The Contribution Agreement states that the Auditor General of Ontario may conduct an audit with respect to the use of Financial Assistance under the contribution agreement. Our project was randomly selected as part of their sample for site visits. The Committee was further informed that the audit was not on the Regional Recreation Centre project but on the BCF Program as a whole. They discussed our project and topics discussed included:

- Documented support that the project is incremental
- Support for the # of jobs that will be created for the project
- Support for project progress % to date
- Challenges faced with the implementation of project funding

Grey-Bruce School Update

Brad met with representatives from the local schools and recreation clubs that use the facilities at Victoria Park, and provided them with an orientation and update on the status of the project.

Agricultural Society

Brad met with the Agricultural Society, MTO, and Ontario Realty Corporation on April 16, 2010, to review and discuss the outline that the Ag Society is proposing. There were no issues presented by any party involved.

2 MANAGEMENT UPDATE – Jim H, Gayle, Brad

a) Communication Strategies

The Joint Management Team has been meeting on a weekly basis to discuss any issues that arise within the project. The cash flow projections will be reviewed when the Class B cost estimate is provided by the Architect Team.

Jim H. met with Jim Algie and reviewed the Y's draft communication strategy and also the City's key priorities and strategies. The messages from both are compatible (timing is slightly different) but the plans do mesh effectively

together. General discussion took place.

Jim H. will develop a higher detailed tactical plan and present to Committee at the next meeting.

b) Report: Full Funding Strategy

David suggested that the report be communicated to the media and the public. Brad reviewed the report with Committee and general discussion took place. Committee agreed that the various dates (accounting, substantial completion etc.) need to be articulated to Committee and the public in an effort to avoid confusion. Jim H. and Brad will chart dates and report back to Committee at the next meeting.

David left the meeting at 11:35 a.m.

Bill stated that we find out how many other projects are in the same deadline predicament as ours. Jim H. suggested that we work in conjunction with AMO and request that they poll other municipalities.

Moved by Michael Warren

"THAT the Regional Recreation Centre Steering Committee receive the report dated April 19, 2010, from the City Manger and Manager of Special Capital Projects entitled Regional Recreation Centre – Full Funding Strategy as amended, and further

THAT Staff and the Construction Manager continue to evaluate the use of additional shifts throughout the tendering processes to accelerate the project schedule with appropriate recommendations being returned for Committee consideration."

Carried unanimously.

c) Funding Review and Update

Jim Harrold advised Committee that once he receives the Class B costing estimate the funding source documents will be revised and updated and presented to Committee.

3 ARCHITECT UPDATE – Phil/Duff

a) Micro-Planning Meeting #7 – LEEDS minutes – deferred

Interiors Micro Planning meeting has been rescheduled to May 7, 2010 at 1:00 p.m.

4 CONSTRUCTION UPDATE – Joseph/Brad

a) Tender Update

Joseph reported that the Excavation and Backfill package is scheduled to close April 21, 2010, at Aquicon's office. There will be a recommendation to Committee and Council on April 26, 2010.

The Site Service tender package will be released early next week.

Phil and Joseph left the meeting at 12.10 p.m.

5 FUNDRAISING COMMITTEE UPDATE - Michael

6 MOTION TO MOVE IN-CAMERA

Moved by Mayor Lovell Stanners

"THAT the Regional Recreation Centre Steering Committee move In Camera to deal with the security of property of the City or a local board.

Carried unanimously.

7 OTHER BUSINESS

8 ADJOURNMENT

The Committee adjourned at 1:14 p.m. Next Steering Committee meeting is, May 18, 2010.



Owen Sound

MINUTES
REGIONAL RECREATION CENTRE STEERING COMMITTEE (RRCSC)
Tuesday, May 4, 2010
4:30 P.M. Basement Boardroom, City Hall

- MEMBERS PRESENT:** Councillor Jim McManaman
Councillor David Adair
Mayor Ruth Lovell Stanners, Chair
Councillor Bill Twaddle
Michael Warren, Family Y Board Appointee
Evelyn Dean, Family Y President, Board of Directors
- ABSENT/REGRETS:** Councillor Ryan Thompson, Township of Georgian Bluffs
Mayor Francis Richardson, Municipality of Meaford
Brian Dean, Family Y Vice President, Board of Directors
Councillor Tom Pink
- GUESTS:** Joseph Acquino, Project Coordinator
D'Arcy Arthurs, Principal Architect
City/Councillor Arlene Wright
Councillor Peter Lemon
Councillor Deb Haswell
Councillor John Christie
Marian Molodecki, Senior Consultant - Peto MacCallum
Marie Martin, Family Y Board
John Rossitter, Family Y Board
Mary Hewitt, Family Y Board
Tom Rice, Y Fundraising Committee Chair
Mark Cruikshank, Family Y Board
Wayne Ritchie, Director of Finance
Doug Bierer, Family Y Treasurer
Al Nightingale, Family Y Facilities Manager
Kim Williams, Family Y Centre Manager
- STAFF PRESENT:** Jim Harrold, City Manager
Gayle Graham, Family Y CEO
Brad McRoberts, Manager of Special Capital Projects
Sharon Edwards, EA - Recording Secretary

1. CALL TO ORDER – 4:35 P.M.

2. WELCOME & INTRODUCTIONS

Mayor Lovell Stanners welcomed Councillors, Family Y Board Members, Steering Committee Members and staff to the meeting. Introductions were made.

3. ADDITIONAL ITEMS (none)

4. DISCLOSURE OF PECUNIARY INTEREST AND THE GENERAL NATURE THEREOF FOR MATTERS LISTED ON THE AGENDA.

There were no disclosures of pecuniary interest.

5. CONFIRMATION OF MINUTES (none)

6. PRESENTATION FROM D'ARCY ARTHURS, SHORE TILBE PERKINS + WILL

D'Arcy presented a project update which outlined the following items:

- Recent completed milestones
- Next steps on site
- Recent soil information
- Impact on design
- Cost impact of poor soils
- Impact on schedule
- Options to consider
- Summary

Following the summary general discussion took place.

7. OTHER BUSINESS (none)

8. ADJOURNMENT

The Committee adjourned at 6:35 p.m. Next Steering Committee meeting is May 18, 2010, or at the call of the Chair.



Owen Sound

MINUTES
REGIONAL RECREATION CENTRE STEERING COMMITTEE (RRCSC)
Friday, May 7, 2010
10:00 A.M. Basement Boardroom, City Hall

- MEMBERS PRESENT:** Councillor Jim McManaman
Councillor David Adair
Mayor Ruth Lovell Stanners, Chair
Councillor Bill Twaddle
- ABSENT/REGRETS:** Councillor Ryan Thompson, Township of Georgian Bluffs
Mayor Francis Richardson, Municipality of Meaford
Brian Dean, Family Y Vice President, Board of Directors
Michael Warren, Family Y Board Appointee
Evelyn Dean, Family Y President, Board of Directors
Councillor Tom Pink
- GUESTS:** Joseph Acquino, Project Coordinator (Teleconference)
Phil Fenech, Principal Manager
Duff Balmer, Project Architect
Keith Richardson, NC Aquatics, Myrtha Pools
Al Nightingale, Family Y Facilities Manager
Kim Williams, Family Y Centre Manager
Craig Ruppenthal, Facilities Manager
- STAFF PRESENT:** Jim Harrold, City Manager
Gayle Graham, Family Y CEO
Brad McRoberts, Manager of Special Capital Projects
Sharon Edwards, EA - Recording Secretary

1. CALL TO ORDER – 10:00 A.M.

Quorum not present.

2. ADDITIONAL ITEMS (none)

3. DISCLOSURE OF PECUNIARY INTEREST AND THE GENERAL NATURE THEREOF FOR MATTERS LISTED ON THE AGENDA.

There were no disclosures of pecuniary interest.

4. INTRODUCTION

Brad gave an introduction and explanation (based on the critical path) as to why the meeting was called. A decision is required today or Monday, May 10, 2010, at the latest on some of the valued engineered items.

Brad introduced Keith Richards, NC Aquatics, Myrtha Pool representative to Committee members.

5. PROJECT COST AND SCHEDULE OVERVIEW - PHIL/BRAD

Brad reported that the Class B cost estimate resulted in an overage in the budget. The Architect and Construction Management Teams have worked together and documented a list of Valued Engineered (VE) savings. In addition to these identified savings, there is an approximate \$1.8 million cost that requires Committee review and approval.

6. MYRTHA POOL DISCUSSION – BRAD/PHIL FENECH – STP+W/KEITH RICHARDSON – NC AQUATICS

Keith Richardson presented Committee with an overview of Myrtha pools. The discussion addressed some Committee concerns regarding materials, warranty, costing, supply and installation.

Committee requested that Mr. Richardson forward warranty program/package and servicing information to Committee by Monday, May 10, 2010.

Joseph stated that a benefit of having the Myrtha pool is that it does not have to be acclimatized for testing and it can be purchased in advance and stored in a non-heated facility.

There is a possible 1-2 month savings in the schedule. Joseph will clarify where the time savings will occur in the schedule.

It was noted by Joseph that the cost of a Myrtha pool is the same, or up to 10% more than a concrete pool.

Joseph was asked to review what the schedule savings before March 2011 would be if Committee agreed to the Myrtha pool option, and he was also asked to provide a breakdown on the value of material that can be pre-purchased for a concrete pool (i.e. tile, grout).

Staff was directed to develop a report for Committees review and consideration at the Monday, May 10, 2010 meeting.

7. INITIAL VALUE ENGINEERING - UPDATE – DUFF BALMER

Class B cost results were higher than expected due to the following factors:

- Minor escalation
- Reconciliation between Class C and Class B design
- Micro-planning adjustments
- New information on poor soils and hydro-geologic conditions

Duff reviewed Value Engineering – VE 1 changes which are required in order to reduce the Class B costing. These changes will not affect program.

8. ADDITIONAL VALUE ENGINEERING - DUFF BALMER

Duff reviewed additional Value Engineering – VE 2 proposed changes which are recommended by the Architect and CM Teams in order to further reduce the Class B costing. Committee reviewed the recommendations.

The following items were not approved by Committee pending further investigation:

- Basement travel of YMCA elevator
- Shell only steam rooms
- Eco Chill - heat recovery system
- Space heating/cooling & dehumidification of the arenas

Committee requested that the Architect Team contact Stantec and request that they have discussion with Total Refrigeration Ltd. and Ice Cube Refrigeration in an effort to gather further information about their echo chill systems.

VE 2 recommendation to change folding chairs at upper arena cold viewing to moulded plastic benches – (\$9400.00) was not approved.

Brad asked Duff to provide an updated VE list to Committee showing revisions based on today's discussion and decisions.

9. OTHER BUSINESS (none)

10. ADJOURNMENT

The Committee adjourned at 2:10 p.m. Next Steering Committee meeting is, May 18, 2010 or at the call of the Chair.



Owen Sound

MINUTES
REGIONAL RECREATION CENTRE STEERING COMMITTEE (RRCSC)
Monday, May 10, 2010
4:30 P.M. Room 205, City Hall

MEMBERS PRESENT: Councillor Jim McManaman
Councillor David Adair (T/C)
Councillor Bill Twaddle
Michael Warren, Family Y Board Appointee
Evelyn Dean, Family Y President, Board of Directors
Councillor Tom Pink
Brian Dean, Family Y Vice President, Board of Directors (T/C)

ABSENT/REGRETS: Councillor Ryan Thompson, Township of Georgian Bluffs
Mayor Francis Richardson, Municipality of Meaford
Mayor Ruth Lovell Stanners, Chair

GUESTS: Phil Fenech, Principal Manager (T/C)
D'Arcy Arthurs, Principal Architect (T/C)
Al Nightingale, Family Y Facilities Manager
Craig Ruppenthal, City Facilities Manager
Doug Bierer, Family Y Treasurer
Duff Balmer, Project Architect (T/C 5:05 p.m.)
Joseph Acquino, Project Coordinator (T/C 5:05 p.m.)

STAFF PRESENT: Jim Harrold, City Manager
Gayle Graham, Family Y CEO
Brad McRoberts, Manager of Special Capital Projects (T/C)
Sharon Edwards, EA - Recording Secretary

1. CALL TO ORDER – 4:30 P.M.

2. ADDITIONAL ITEMS (none)

Sun Times report of May 7, 2010, being a closed meeting

3. DISCLOSURE OF PECUNIARY INTEREST AND THE GENERAL NATURE THEREOF FOR MATTERS LISTED ON THE AGENDA.

There were no disclosures of pecuniary interest.

4. MYRTHA POOL DISCUSSION – JIM MCMANAMAN

a) Costing Estimates Myrtha vs. Concrete Pools – Joseph

Based on the report received from Aquicon Construction, the installation of a Myrtha pool is not an option based on the following:

- Overall costing;
- The acceleration to the schedule will be 1-2 months after the March 2011 date.

Chair McManaman requested that the Architect Team consult with the Construction Management Team and Keith Richardson (Myrtha representative) to verify the numbers and report back to the City Manager by Tuesday.

b) Warranty Information – Phil/Duff

c) Designating Suppliers – Phil

d) Recommendation from the Y - Gayle

With the costing limitations that our project faces, the Family Y will consent to go with the Myrtha pool vs. concrete pool installation only if doing so makes good economical sense.

5. CLASS B COST VALUE ENGINEERING 2 – Phil

a) Outcomes – Phil

Committee agreed to keep a heat recovery system in the project. The Joint Management Committee will review and make a recommendation to Committee at the next meeting.

Change folding chairs at upper arena cold viewing to moulded plastic benches – (\$9400.00) to the not approved column.

The Management Committee will review the outstanding TBD items in the approved column and make recommendations to Committee at the next meeting.

b) Basement Travel to YMCA Elevator (Laundry Space) – Phil

David left the meeting at 5:40 p.m.

Committee discussed the elimination of the elevator to the basement. Consensus was that the *Basement Travel to the YMCA Elevator* be moved from pending to not approved.

6. OTHER BUSINESS

Jim H. reported that he spoke to Denis Langlois, Sun Times Reporter and corrected his assumption that RRCSC meetings are closed to the public. Jim assured him that all RRCSC meetings are open unless there is a specific reason (as outlined in the Municipal Act) to go in camera.

7. ADJOURNMENT

The Committee adjourned at 5:30 p.m. Next Steering Committee meeting is, May 18, 2010, or at the call of the Chair.

**Action Items
From May, 7, 10, 2010, RRC Steering Committee Meetings**

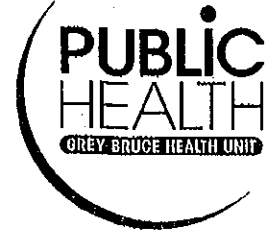
Date of Action	ACTION ITEM	RESPONSIBLE	COMPLETED?
November 30, 2009	Develop a YMCA Equipment plan.	Gayle/Jim	
March 23, 2010	Committee photo shot at Victoria Park once pad is established.	Brad	
	Letter to Committee regarding additional Family Y funding commitment.	Gayle	
	Forward 5 sets of presentation boards to Brad and e-copy to Sharon.	Duff	
	Complete the planning of the site sign – order and have mounted.	Brad	
April 20, 2010	Architect Team to forward Class B Costing Estimate to Sharon for circulation.	Phil	
	Sunshade costing review and recommendation to SC (once Class B Costing estimate is received).	Joint Mgmt. Committee	
	Tunnel costing review and recommendation to SC (once Class B Costing estimate is received).	Joint Mgmt. Committee	
	Committee to review the concept of having a reflective roof and solar panels.	Steering Committee	
	AT and CM Teams to review the possibility of tendering out A/V services as a stand alone.	Joseph/Phil	

5a

Date of Action	ACTION ITEM	RESPONSIBLE	COMPLETED?
	Review of cash flow projections (once Class B Costing estimate is received).	Joint Mgmt Committee	
	Development of a detailed tactical communication plan.	Jim H.	
	Full Funding Strategy: charted dates (accounting, substantial completion etc).	Brad/Jim H.	
	Revision of funding source documents (once Class B Costing estimate is received).	Jim H.	
May 7, 2010	Architect Team to contact Stantec re further investigation of Total Refrigeration Ltd and Ice Cube Refrigeration companies echo chill systems.	Architect Team	
May 10, 2010	Review and make a recommendation to Committee	Joint Mgmt Team	
	Class B VE 2 – Review outstanding TBD items and make recommendation to Committee	Joint Mgmt Team	

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MAY 04 2010



Please c.c.
Council
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April 29, 2010

Ruth Lovell Stanners, Mayor
City of Owen Sound
2nd Floor City Hall
808 2nd Avenue East
Owen Sound ON N4K 2H4

Jim McManaman, Chair
Owen Sound Regional Recreation Centre Steering Committee
2nd Floor City Hall
808 2nd Avenue East
Owen Sound ON N4K 2H4

Dear Mayor and Councillor McManaman:

Public health is described as the organized activity of society to protect, improve, and when necessary, restore the health of individuals, groups or entire populations. The new Regional Recreation Center is an excellent example of a community coming together in a concerted effort to protect, improve, and restore the health of the people who live here.

Obesity is a significant and growing health problem in Canada and unfortunately Owen Sound and Grey Bruce are not exempt from this trend. The issue results from an overindulgence of high calorie food and a lack of physical activity in either work or leisure pursuits. Recognizing the implication of this concern to our over-all wellbeing, the Grey Bruce Health Unit has targeted obesity for strategic attention over the next 3-5 years.

Public health interventions work best if they are targeted to specific need; designed to have measureable impact; are sustainable and are in partnership and collaboration with the community. The new Regional Recreational Centre combines all those attributes and, as such, can be expected to provide important health benefits to this community. It will be an inviting, sustainable facility that will offer a place for everyone, from babes to seniors, to engage in fitness, recreation and rehabilitative activity. An additional benefit is found in the opportunity it affords for our region's athletes to train, perform and share our resource with others.

Congratulations to the Owen Sound Family Y and City of Owen Sound for envisioning this facility. Through your persistence and patience, we are seeing this project become reality.

Together we build healthy communities,

Hazel Lynn, MD, FCFP, MHSc
Medical Officer of Health

CORP SERV	<input type="checkbox"/>
CLERK'S	<input checked="" type="checkbox"/>
MAY 7 5 2010	
INITIALS	BL

HEAD OFFICE: 101 17th Street East, Owen Sound, Ontario N4K 0A5 www.publichealthgreybruce.on.ca

OWEN SOUND
519-376-9420
1-800-263-3456
Fax 519-376-0605

WALKERTON
519-881-1920
1-800-263-3456
Fax 519-881-3920

7a

Owen Sound Regional Recreation Center
Value Engineering Version 2 and 3

VE ITEMS- VERSION 2	COST	STATUS
Delete tapestry stone at concrete stair walls and provide architecturally exposed concrete	\$ 60,000.00	Accepted
Delete tapestry stone at rinks and gym side of changerooms, and keep painted block	\$ 50,400.00	Accepted
Change stackbond to running bond	\$ 49,600.00	Accepted
Change porcelain tile to Olympia Stonewash (similar to Newcastle)	\$ 125,000.00	Accepted
Delete mosaic tile at fitness centre and change to painted abuse resistance drywall	\$ 29,600.00	Accepted
Change exterior aluminum paneling to non-insulated horizontal siding (one side)	\$ 168,000.00	Accepted
Delete interior aluminum panelling, add insulated horizontal siding	\$ 24,000.00	Accepted
Delete acoustic panels in gym, add acoustic deck from gridlines M-H and 12-15	\$ 36,000.00	Accepted
Delete basement travel of YMCA Elevator	NA	Rejected - possible \$45,000
Delete GB ceiling in arena 2F cold viewing	\$ 15,000.00	Accepted
Slope roof deck and structural steel to minimize use of sloped insulation	\$ 50,000.00	Accepted
Shell only steamrooms	NA	Deferred - possible \$70,000
Delete upgrade of YMCA elevator capacity	\$ 15,500.00	Accepted
Delete holes from -pool structural steel and structural steel elsewhere	\$ 8,000.00	Accepted
Delete z-girt / acoustic insulation from perf siding looking to pool	\$ 3,600.00	Accepted
Delete permeable pavers at parking, add asphalt	\$ 35,000.00	Accepted
Delete all site furnishings, keep 15 bike racks	\$ 53,000.00	Accepted
Delete concrete sidewalk and permeable pavers at amphitheatre	\$ 15,000.00	Accepted
Delete landscape finish carpentry	\$ 20,000.00	Accepted
Delete Eco Chill from Ice Rink	NA	Rejected - possible \$200,000
Delete insulation at infloor radiant heating	NA	Rejected - possible \$27,000
If Delete 2" insulation around rink apron	NA	Rejected - possible \$13,000
Delete concrete sealers from exposed floors	NA	Rejected - possible \$6,000
Delete bench viewing from ice level and associated concrete/misc metal work	NA	Rejected - possible \$11,000
Change folding chairs at arena cold viewing to moulded plastic benches	NA	Rejected - possible \$9,400
Reduce skate flooring in arena to 9,200sq.ft.	\$ 15,000.00	Accepted - increase quantity
Remove Stair to mechanical roof enclosure at north end of arena	\$ 54,600.00	Accepted
Change arena seating to bench style moulded plastic throughout	\$ 8,000.00	Accepted
Remove concrete retaining wall along east side of building	\$ 323,000.00	Accepted
Add driveway to service east side of building (combine with previous item)	\$ (21,000.00)	Accepted
Delete Dehumidification Pool unit	NA	Rejected - possible \$100,000
Deletion of structural steel beams at the fitness roof and replace with OWSJ	\$ 25,000.00	Accepted
Deletion of Radiant Heating under change rooms and lobby	NA	Rejected - energy saving item
Confirmation of Hydro Allowance	TBD	Accepted - pending amount

Owen Sound Regional Recreation Center
Value Engineering Version 2 and 3

	\$	1,162,300.00			
SUBTOTAL					
VE ITEMS- VERSION 3					
Electrical Revision - relocate electrical room to arena to reduce primary run	TBD				No decision
Mechanical Revision - relocate arena shower boiler to 2nd floor roof to reduce pipe runs	TBD				No decision
Delete aluminum panel soffit at canopies and replace with siding	\$	22,500.00			No decision
Change floor tile to linoleum at main corridors	\$	36,000.00			No decision
Delete scoreboards from signage allowance	\$	50,000.00			No decision
Roof assembly changes to vapour barrier and adhesive	\$	26,300.00			No decision
Change poured epoxy Pulastic flooring to adhered rubber sheet good track flooring	\$	10,000.00			No decision
Delete skylights	\$	35,000.00			No decision
Delete recessed floor grilles at entrances	\$	9,000.00			No decision
Reduce planting budget by \$20000	\$	20,000.00			No decision
Delete Lay in tile ceiling at Family, Male and Female Locker area (125 sm)	\$	5,000.00			No decision
Delete South and East Tunnels only (retain tunnel between and lane rope storage)	\$	15,000.00			No decision
SUBTOTAL	\$	228,800.00			

TOTAL VE ITEMS					
SUBTOTAL VE 2	\$	1,162,300.00			Approved
SUBTOTAL VE 3	\$	228,800.00			No decision
TOTAL VE SAVINGS	\$	1,391,100.00			

CONSTRUCTION COST ADJUSTMENT					
COST OVER RUN - CLASS B COST ESTIMATE	\$	3,906,540.00			
MINUS POOR SOILS COST CONTRIBUTION FROM CONTINGENCY/PROJECT BUDGET	\$	(2,100,000.00)			
MINUS TOTAL VE SAVINGS TO DATE	\$	(1,391,100.00)			
ADD TENDER VALUE FOR SEPARATE SLAB ON GRADE EXCAVATION	\$	360,000.00			
TOTAL VE SAVINGS REMAINING TO FIND	\$	775,440.00			

7b

Date	Remarks	Priority	Item
April 12 2010	<i>revised date from March 30</i>	***	SPA application
April 19 2010		**	M&E review with Owner - AM - Project Microplanning Meeting
April 19 2010		**	AV IT Security Microplanning - PM- Project Meeting
April 20, 2010		**	Completion of Class B costing
April 20, 2010	<i>revised to April 27th</i>	**	Steering Committee Project Meeting - Agenda TBD
April 20, 2010		**	Design Meeting - Microplanning - Interiors
April 27 2010	<i>revised date</i>	***	Steering Committee - Project Cost Review
May 7, 2010		***	VE 1 & 2 Review
May 10, 2010		***	VE 1 & 2 Review
May 17 2010		**	Calsson Tender Close
May 18 /2010		**	Steering Committee Project Meeting - Agenda - Cost update
May 19th	<i>revised date</i>	***	T 3 Site Services Tender (submission to Aquicon done)
May 25, 2010		**	Site Services Permit Application
May 25, 2010		**	Foundation Permit Application
May 26 2010	<i>revised date</i>	***	T 5A Elevator Tender (to Aquicon May 21st)
May 28 2010	<i>revised date</i>	***	T 5 Concrete Structure and Pool Tanks (to Aquicon May 21st)
June 7 2010		***	Full Building Permit Application
June 8 2010	<i>revised date</i>	*	Project Meeting - Presentation of Interior Finishes and Materials
June 16 2010		***	T 6 Structural Steel , Metal Deck (submission to Aquicon June 9th)
June 21 /2010		**	Steering Committee Project Meeting - Agenda TBD
June 23 2010		***	T 7 M&E and Fire Safety Systems Tender (submission to Aquicon June 16)
July 16 2010		***	T 8 Exterior Shell & Interior Partition Tender (submission to Aquicon July 9 2010)
July 19 2010	<i>to be confirmed</i>	**	Steering Committee Project Meeting - Agenda TBD
August 16 2010	<i>to be confirmed</i>	**	Steering Committee Project Meeting - Agenda TBD
August 23 2010		***	T 9 Finishes, AV/IT Security, Equipment & Landscaping Tender (submission to Aquicon August 16 2010)

7c

SHORE TILBE IRWIN & PARTNERS

Project Name: Owen Sound New Recreation Centre

Micro-planning Meeting 6a

Project No.: 0927

Meeting Date: March 1, 2010

Page: 1

Place: City of Owen Sound Offices

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X	Bill Twaddle	City of Owen Sound	
X	Jim McManaman	City of Owen Sound	
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Distribution: All those noted as present plus those noted below:

	Joseph Aquino	Aquicon Construction	joseph.aquino@aquicon.com
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Purpose – M&E Review

	Micro-planning Meeting 6a – LEED Workshop	Action by:
6.1	<p>Introductions Introductions were held and noted:</p> <ul style="list-style-type: none"> Fluent engineering have concluded their LEED Evaluation mandate with this presentation and pending report. <i>[Post meeting note: Finalized Sustainable Design Basis was received March 9, 2010]</i> LEED Certification is achievable but will entail further costs to the project to finalize. At this point LEED equivalency is being for this project. Mike Godawa was introduced for mechanical input 	Info
6.2	<p>LEED Workshop</p> <p>LEED Rating System has been used as an preliminary assessment framework, however as it was noted pursuing LEED Certification is the only means ensuring that the credit thresholds have been achieved.</p> <p>LEED target is gold. 39 points are required to achieve LEED Gold, it is recommended that 3-5 points be carried as a buffer to any unforeseen during the design and construction process. A complete list and explanation of points,</p>	Info

Micro-planning Meeting 6a

	<p>pursued, targeted or pending are incorporated into the report attached.</p>	
<p>6.3</p>	<p>LEED Checklist / Energy Modeling</p> <p>Checklist / modeling is presented / reviewed against the building program and function. No major concerns were raised with the checklist and the status of any credits.</p> <p>It was highlighted that there is no provision to have irrigation incorporated into LEED scoring.</p> <p>Whether or not a cistern was carried in the original cost of the building was to be determined. <i>[Post meeting note: a cistern was carried in the Class C costing but was removed in the Class B costing and applied to the site services package as part of the SWMF]</i></p> <p>The capital cost of investing in snow melting through radiant heat, at the public entries, was to be evaluated by the City of Owen Sound.</p> <p>Photo Voltaics (solar panels) were touched on by Fluent in their presentation, further consideration is required by the City. Future provisions will not benefit LEED Scoring. <i>[Post meeting note: The City has provided the consultants with the necessary literature, the City is to select the unit type required so design considerations can be finalized.]</i></p> <p>Fundamental Commissioning was discussed a being included in the standards fee. This is service is a standard required by LEED. Best Practice Commissioning is an optional service for LEED. It is not included in the standard fee. It is noted in the attached Sustainable Design Basis as a question, whether it is pursued or not.</p>	<p>Info</p>

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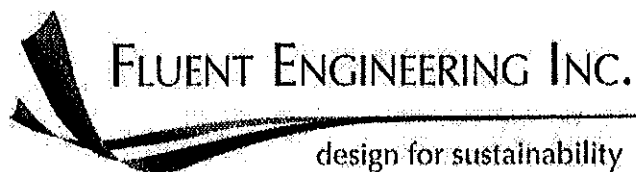
Sustainable Design Basis

Owen Sound Regional Recreation Centre

March 1, 2010

Prepared for:

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Schedule B – LEED Design Basis.....	Schedule B
Schedule C – Energy Conservation Recommendations.....	Schedule C

1 Project Overview

The proposed Owen Sound Regional Recreation Centre is a new two-storey, 11,420 sq.m multi-use recreational complex, located in Owen Sound, Ontario. The facility will be jointly operated by the City of Owen Sound and the YMCA and will include a twin pad arena, fitness areas, pool, gymnasium and a variety of ancillary spaces. The design team's intent is to target a GOLD level of LEED Certification as defined by the Leadership in Energy and Environmental Design Canada for New Construction (LEED® Canada-NC) v1.0 green building rating system. The purpose of this document is to provide an overview of the measures and strategies that are to be deployed to achieve this goal.

2 Sustainability Objectives

There are a variety of ways to measure sustainability. For this project the Leadership in Energy & Environmental Design (LEED) Rating System has been selected as the means for quantifying the projects sustainability targets. LEED is a point-based, third party verified rating system for buildings that are designed and constructed using environmental best practices. LEED is administered by the Canada Green Building Council (CaGBC), and awards successful projects one of four certification levels (Certified, Silver, Gold, or Platinum) depending on the project point total. There are 70 points available, as well as 7 prerequisites, distributed within 6 categories.

A GOLD level of Certification requires a minimum of 39 points; a buffer of 3-5 points is recommended to account for any unseen variances during the design and construction process. A listing of LEED credits being targeted and the associated point tally is included in SCHEDULE A – LEED Checklist. SCHEDULE B - LEED Design Basis provides a detailed analysis and overview of the approach that will be used to pursue the targeted credits.

The energy target for this project will be an energy cost savings of at least 45% (equal to 7 LEED points) over ASHRAE 90.1-1999. SCHEDULE C – Energy Concepts Report outlines the energy efficiency measures that will be used to reach this target.

Water savings will be realized through the use of low-flow indoor water fixtures and drought resistance species as opposed to irrigation systems. For irrigation, the goal will be to reduce potable water use by 100%. For indoor water use, a potable water savings of 40% will be targeted.

3 Project Parameters

The entire facility will be owner occupied and fit-out before application for LEED Certification. The following sections outline the specific LEED characteristics and assumptions for the building and associated property.

3.1 LEED Project Site Boundary

The LEED Project Boundary has yet to be finalized, but should also align with the extent of disturbance during construction activities.

3.2 Full Time Equivalent (FTE) Occupancy

The FTE calculation represents the average peak occupancy over the course of a typical week. As the project proceeds, expected occupancy numbers for the City and YMCA controlled areas will be finalized.

These numbers will impact the number of bicycle spaces and carpool parking stalls required, in addition, to water savings and cistern sizing calculations. This document is based on a FTE occupant load of 1489, which was estimated based on seat counts and ASHRAE 62-2004 occupant densities.

3.3 Occupied Areas

A variety of LEED Credits are applicable only to 'regularly occupied areas'. The following table delineates which room types are considered regularly occupied, and which are considered unoccupied:

Regularly Occupied Areas	Unoccupied Areas
Arena No. 1 and No. 2	Mechanical / Electrical Rooms
Offices, Service Counter	Garbage / Recycling
Pool	Arena Equipment / Mechanical
Program Room	Storage Rooms
Aquatic Monitor	Corridors, Stairs, Elevators
Multi-Purpose Room	Change Rooms, Washrooms
Lunch Room	Showers, Sauna
Gymnasium	Lobbies
Arena No. 1 and No.2 Viewing	Janitor Rooms
Arena Viewing Lobby	Telephone Room
Fitness Areas and Studio, Weights	Cardiac Care Room
Convenor's Room	

SCHEDULE A – LEED Checklist

POINTS PURSUED

LEED® Canada-New Construction v1.0 Checklist

Yes ? No

Owen Sound Regional Recreation Centre - Owen Sound ON

36 10 24

Certified 26-32 | Silver 33-38 | Gold 39-51 | Platinum 52-70

7	1	6	SS - SUSTAINABLE SITES	14 Possible Points
•			SSp1 - Erosion & Sedimentation Control: Develop and implement a site-specific erosion and sedimentation control plan, in accordance with EPA Guidelines OR local authority requirements, whichever are more stringent.	
1			SSc1 - Site Selection: Do not develop buildings, roads, or parking on land that is: lower than 1.5 m above the 100-year flood plain; reserved for forest, agriculture or public parks; ecologically sensitive; or within 30.5 m of wetlands.	
		1	SSc2 - Development Density: Design to meet a site density of 13,800 m ² /ha AND EITHER develop in an area with equivalent density OR develop a site that is within 800 m of residences and key amenities.	
		1	SSc3 - Redevelopment of Contaminated Sites: Develop on a contaminated site and work with an independent firm to provide remediation and documentation as required by the Provincial Contaminated Sites Program.	
	1		SSc4.1 - Public Transportation Access: Locate building within 800 m of a rail/subway station OR within 400 m of two or more public bus lines offering frequent service (planned/funded or existing).	
1			SSc4.2 - Bicycle Storage & Changing Rooms: Provide secure bicycle storage AND shower facilities within 183 m of the building for 5% of the regular building occupants (FTE).	
		1	SSc4.3 - Alternative Fuel Vehicles: Provide efficient (5L/100km) hybrid or alternative fuel vehicles for 3% of FTE occupants AND preferred parking OR an on-site refueling station.	
1			SSc4.4 - Parking Capacity: Provide preferred and designated parking for carpools for 10% of the non-visitor parking spaces AND EITHER size parking to match minimum zoning requirements OR add no new parking.	
		1	SSc5.1 - Protect or Restore Open Space: Limit site disturbance OR for previously developed sites, restore 50% of the site area (excluding the building footprint) by planting native/adaptive species.	
		1	SSc5.2 - Development Footprint: Exceed zoning open space requirement by 25%, OR if no zoning requirement exists, designate and preserve open space equal to building footprint.	
1			SSc6.1 - SWM Rate and Quantity: For sites with low imperviousness (≤50%), design for the post-development 1.5 year, 24 hr peak discharge rate and quantity to be equal to pre-development. Otherwise, design for a 25% decrease.	
1			SSc6.2 - SWM Treatment: Remove 80% of the average annual post-development total suspended solids (TSS) and 40% of the total phosphorous (TP) for all storms less than or equal to the 2 year, 24 hr storm.	
		1	SSc7.1 - Heat Island Effect, Non-Roof: Provide shade (within 5 years) OR use materials with an SRI ≥29 OR use open-grid pavement for 50% of impervious surfaces; OR locate 50% of parking below grade.	
1			SSc7.2 - Heat Island Effect, Roof: Use materials with an SRI of ≥78 (for roofs with 2:12 pitch or less) or ≥29 (for roofs over 2:12 pitch) for 75% of the roof area AND/OR use green roof for 50% of the roof area.	
1			SSc8 - Light Pollution Reduction: Design exterior lighting to be below ANSI/ASHRAE/IESNA Standard 90.1-2004 (≤50% of LPD allowance for facades/landscaping, and ≤80% of LPD allowance for all other areas).	

4	1	0	WE - WATER EFFICIENCY	5 Possible Points
2			WEc1 - Landscaping: Use native/adaptive drought tolerant plantings, high efficiency irrigation technologies AND/OR rainwater harvesting systems to reduce potable water usage (50% = 1 point, 100% = 2 points).	
	1		WEc2 - Innovative Wastewater Technologies: Reduce the use of potable water for building sewage conveyance by 50% OR treat 100% of wastewater on-site to tertiary standards.	
2			WEc3 - Indoor Water Use: Reduce potable water usage within the building by using high-efficiency fixtures and/or rainwater harvesting systems and/or greywater systems (20% = 1 point, 30% = 2 points).	

LEED® Canada-New Construction v1.0 Checklist for Owen Sound Regional Recreation Centre - Owen Sound ON

8	5	4	EA - ENERGY & ATMOSPHERE	17 Possible Points
•	/	/	EAp1 - Fundamental Commissioning (Cx): Engage a Cx Agent that is not a member of the design team to prepare a Cx plan, produce Cx specs, verify performance of systems, verify training and O&M manual, and provide a Cx report.	
•	/	/	EAp2 - Minimum Energy Performance: Use energy modeling to show a design energy cost savings of 18% or more relative to a reference building designed to ANSI/ASHRAE/IESNA 90.1-1999.	
•	/	/	EAp3 - CFC Reduction in HVAC&R Equipment: Design all base building HVAC&R systems to use non-CFC refrigerants AND ensure fire suppression equipment does not use halons.	
7	1	2	EAc1 - Optimize Energy Performance: Use energy modeling to show design energy cost savings relative to a reference building designed to ANSI/ASHRAE/IESNA 90.1-1999 (1 point for 15%, +1 point for every additional 5%).	
	1	2	EAc2 - Renewable Energy: Design the project to use on-site renewable energy (e.g. solar, wind, micro-hydro, renewable biomass) to offset purchased energy (5% = 1 point, 10% = 2 points, 20% = 3 points).	
	1		EAc3 - Best Practice Commissioning (Cx): Engage an independent Cx Agent to review design prior to CDs, review CDs, review contractor shop drawings, prepare a re-Cx manual for O&M staff, and review systems after a year.	
1			EAc4 - Ozone Protection: Design all base building HVAC&R systems to use non-HCFC refrigerants. This includes commercial refrigeration equipment and process loads (that exceed 15% of HVAC).	
	1		EAc5 - Measurement & Verification: Retain a firm to develop and implement an M&V Plan consistent with IPMVP to sub-meter lighting, cooling, heating, pumping, air-moving, process, and water equipment and loads.	
	1		EAc6 - Green Power: Provide 50% of the building's electricity consumption from approved off-site renewable sources (e.g. EcoLogo, or Green-e) for at least 2 years.	

4	3	7	MR - MATERIALS & RESOURCES	14 Possible Points
•	/	/	MRp1 - Storage & Collection of Recyclables: Design the building to include easily accessible areas dedicated to the separation, collection and storage of paper, cardboard, glass, plastic & metals.	
		1	MRc1.1 - Building Reuse: Maintain 75% (by area) of existing Walls, Floors, and Roof (exterior envelope and framing, excluding window assemblies). Achievable only if the new GFA is less than or equal to 2x the existing GFA.	
		1	MRc1.2 - Building Reuse: Maintain 95% (by area) of existing Walls, Floors, and Roof (exterior envelope and framing, excluding window assemblies). Achievable only if the new GFA is less than or equal to 2x the existing GFA.	
		1	MRc1.3 - Building Reuse: Maintain 50% of Interior Elements including interior walls, doors, floor coverings, ceiling systems, and built-in casework. Achievable only if the new GFA is less than or equal to 2x the existing GFA.	
1	1		MRc2 - Construction Waste Management: Implement a waste management plan to sort, quantify, and divert waste from landfill by salvaging or recycling materials (50% = 1 point, 75% = 2points).	
		2	MRc3 - Resource Reuse: Use salvaged or refurbished materials for a minimum percentage of DIVISIONS 2-10 total material cost (5% = 1 point, 10% = 2 points).	
1	1		MRc4 - Recycled Content: Use recycled content materials (post-consumer + ½ pre-consumer) for a minimum percentage of DIVISIONS 2-10 total material cost (7.5% = 1 point, 15% = 2 points).	
1	1		MRc5 - Regional Materials: Use materials that are extracted and manufactured within 800 km of the project site for a minimum percentage of DIVISIONS 2-10 total material cost (10% = 1 point, 20% = 2 points).	
		1	MRc6 - Rapidly Renewable Materials: Use materials derived from rapidly renewable plants (i.e. less than 10-year growth cycle) for a minimum percentage of DIVISIONS 2-10 total material cost (5% = 1 point).	
1			MRc7 - Certified Wood: Use Forest Stewardship Council (FSC) certified sustainably harvested wood for a minimum of 50% of all permanently installed wood-based materials and products (by cost).	
		1	MRc8 - Durable Building: Retain a firm to develop and implement a Building Durability Plan in accordance with the principles and requirements in CSA S478-95 (R2001).	

LEED® Canada-New Construction v1.0 Checklist for Owen Sound Regional Recreation Centre - Owen Sound ON

8	0	7	IEQ - INDOOR ENVIRONMENTAL QUALITY	15 Possible Points
•	/ / /	/ / /	IEQp1 - Minimum IAQ Performance: Meet the minimum requirements of ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality following the Ventilation Rate Procedure.	
•	/ / /	/ / /	IEQp2 - Environmental Tobacco Smoke (ETS) Control: Prohibit smoking within the building AND if providing designated smoking areas outdoors, ensure they are 7.5 m from any doors/fresh air intakes.	
1			IEQc1 - Carbon Dioxide (CO2) Monitoring: Install CO2 monitoring to ensure adequate ventilation (see ASHRAE 62.1-2004) and provide operational control and alarms if under ventilation occurs.	
		1	IEQc2 - Ventilation Effectiveness: Design ventilation systems for each space to provide an air change effectiveness (Eac) ≥0.9 based on ASHRAE 129-1997 (90% of room for 95% of the time).	
1			IEQc3.1 - Construction IAQ Management, During Construction: Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases.	
1			IEQc3.2 - Construction IAQ Management, Before Occupancy: Flush-out building AND/OR conduct IAQ testing (for PM10, CO,4-PC, TVOC, & Formaldehyde) prior to occupancy.	
1			IEQc4.1 - Low-Emitting Adhesives & Sealants: Ensure all products used within the weatherproofing system meet the VOC requirements of SCAQMD Rule #1168.	
1			IEQc4.2 - Low-Emitting Paints and Coating: Ensure all products used within the weatherproofing system meet the VOC requirements of GS-11, GS-03, AND/OR SCAQMD Rule #1113.	
1			IEQc4.3 - Low-Emitting Carpet: Ensure all products that make-up the carpet systems meet or exceed the requirements of the Carpet & Rug Institute's (CRI) Green Label IAQ Test Program.	
1			IEQc4.4 - Low-Emitting Composite Wood and Laminates: Ensure all wood/agrifibre based products including associated laminate adhesives contain no added urea-formaldehyde resins.	
1			IEQc5 - Indoor Chemical & Pollutant Source Control: Install permanent entryway grates, isolate sources of liquid/gaseous chemicals (e.g., photocopiers, janitor closets etc.) and install MERV 13 filtration in all air handling units.	
		1	IEQc6.1 - Controllability of Systems, Perimeter: For the building perimeter (within 5 m of outside wall), provide an average of one operable window and one lighting control zone per 18.5 m ² for all regularly occupied areas.	
		1	IEQc6.2 - Controllability of Systems, Non-Perimeter: For the building core, provide control of airflow, temperature, and lighting for at least 50% of the occupants in all regularly occupied areas.	
		1	IEQc7.1 - Thermal Comfort, Compliance: Design systems to comply with ASHRAE 55-2004 Thermal Comfort Conditions for Human Occupancy (and document according to Section 6.1.1 of the standard).	
		1	IEQc7.2 - Thermal Comfort, Monitoring: Provide a permanent monitoring system to ensure building performance meets comfort criteria of ASHRAE 55-2004 (and document accordingly).	
		1	IEQc8.1 - Daylight & Views, Daylight for 75% of Spaces: Achieve a minimum Daylight Factor of 2% (excluding direct sunlight penetration) or 250 Lux (25 fc) for 75% of regularly occupied areas.	
		1	IEQc8.2 - Daylight & Views, Views for 90% of Spaces: Achieve direct sightlines to the outdoors via vision glazing (0.76-2.3m) in 90% of all regularly occupied areas AND provide a vision glazing-to-floor ratio of 0.07.	

5	0	0	ID - INNOVATION & DESIGN PROCESS	5 Possible Points
1			IDc1.1 - Exemplary Performance, Water Efficiency: Indoor Water Usage (40%+)	
1			IDc1.2 - Green Housekeeping Program: EcoLogo Certified Cleaning Products and Program	
1			IDc1.3 - Innovation Credit - Process Energy Innovation Credit	
1			IDc1.4 - Innovation Credit - Exemplary Materials Innovation Credit	
1			IDc2 - LEED® Accredited Professional	

SCHEDULE B – LEED Approach

Sustainable Sites

SSp1 – Erosion & Sedimentation Control (Prerequisite)

[Required]

The requirements of this pre-requisite are anticipated to be satisfied in the baseline design. Specifically, the project is required to conform to the sediment and erosion control measures listed in the Environmental Protection Agency's Storm Water Management For Construction Activities document. If a local authority, such as the City of Owen Sound, has a more stringent standard, the project must adhere to it.

In an effort to integrate these requirements into the contract documents, the site designer of record will be required to indicate the location and extent of erosion control measures on a site plan. Measures will likely include:

- Stabilized construction entrance
- Siltation control fence
- Double-wrapped catch basins
- Soil stockpile protection (tarping or hydroseeding)
- Sediment trap (if required)

The designers of record will also be required to incorporate Fluent Engineering Inc.'s (FEI's) Erosion & Sedimentation Control Specifications into the contract documents.

During construction the general contractor will be required to take photos of the installed measures and inspect them on a bi-weekly basis, and after major storm events. The contractor will also be required to maintain a log identifying inspections, repairs, and maintenance undertaken. Digital photos will be required to demonstrate that all of the measures are being maintained.

SSc1 – Site Selection (1 Point)

[Targeted]

The site is previously developed and does not appear to meet any of the prohibited criteria (i.e., land within a floodplain, ecologically sensitive land, endangered species habitat, public parkland). As a result, achievement of this credit is anticipated.

SSc2 – Development Density (1 Point)

[Not Pursued]

The density of the project site and surrounding area are insufficient to meet the credit requirements. Typically, this credit is only achieved in densely populated downtown settings. This credit is not pursued.

SSc3 - Redevelopment of Contaminated Sites (1 Point)

[Not Pursued]

Unless otherwise indicated, the site is assumed to be uncontaminated. This credit is not pursued.

SSc4.1 – Public Transportation Access (1 Point)

[Pending]

Based on the current Owen Sound Transit route map, the "Core" route has stops immediately adjacent to the site on both 10th St. East and 8th Ave. East. The route schedule indicates a bus frequency of 30 minutes Monday through Friday and every hour on Saturdays. The final destination of this route is the

main terminal, located approximately 1 km from the project site. Given this information and the fact that Owen Sound has a population of less than 50,000 occupants, the project may be eligible to achieve this credit, see Credit Interpretation Requests (CIR) #115 and #366. A CIR would need to be submitted to confirm achievement; preparation and submission of CIR is outside the scope of this assessment.

SSc4.2 – Bicycle Storage & Changing Rooms (1 Point)**[Targeted]**

The requirements of this credit are anticipated to be satisfied in the baseline design. The number of bicycle spaces required for the project is at least 5% of the building occupant load number. In addition, one (1) shower for every eight (8) bicycle spaces must be provided in the building. The showers that will be provided in the ice pad and pool changing rooms are anticipated to meet this requirement. Based on a FTE occupant load of 1,489, a total of 75 bicycle spaces must be provided for the project within 183 m of the public entrance.

SSc4.3 – Alternative Fuel Vehicles (1 Point)**[Not Pursued]**

Based on the building usage and the assumption that building staff will use their personal vehicles to commute to work, this credit is not pursued.

SSc4.4 – Parking Capacity (1 Point)**[Targeted]**

To achieve this credit, a carpooling program must be developed for building staff. Of the total number of parking spaces allotted for staff, 10% must be reserved for carpool spaces and designated in a preferred location (i.e. immediately adjacent to the building entrance). A policy and management plan that organizes and encourages carpooling among staff must also be developed by the YMCA and the City of Owen Sound.

In addition to the carpooling requirements, the total number of parking spaces provided onsite must meet, but not exceed, the minimum local zoning requirements.

SSc5.1 – Protect or Restore Open Space (1 Point)**[Not Pursued]**

To meet credit requirements, a minimum of 50% of the non-building site area must be restored to naturalized conditions. To qualify for the credit, areas must be intensely vegetated, including a significant number of trees, shrubs and other groundcover, and require infrequent maintenance. Given the site location and anticipated uses, this approach is not realistic for this project.

SSc5.2 – Development Footprint (1 Point)**[Not Pursued]**

Since the City of Owen Sound's zoning bylaw does not have an open space requirement, the site must be designed to include a landscaped open space area equal to the building footprint (approximately 9,400 m²). Based on the proposed site plan, the majority of non-building site area will be comprised of asphalt paving and hard landscaping, with very little soft landscaping being provided. As such, this credit is not pursued.

SSc6.1 – Storm Water Management (SWM), Rate and Quantity (1 Point)**[Targeted]**

The current site is comprised of a dirt track, grass fields and asphalt parking. From this, it appears that the existing site imperviousness is less than 50%. As a result, a stormwater management plan that prevents the post-development 1.5 year, 24 hour peak discharge rate and quantity from exceeding the pre-development values must be implemented on site. The proposed approach is to direct Stormwater to an offsite pond located on the City of Owen Sound fairgrounds property. The proposed approach is intended to meet both the rate and quantity requirements as all water directed from the site will be handled by the Stormwater pond.

SSc6.2 – Storm Water Management (SWM), Treatment (1 Point)**[Targeted]**

To meet the requirements of this credit, the stormwater treatment measures must be implemented onsite to remove 80% of the average annual post-development total suspended solids (TSS) and 40% of the average annual post-development total phosphorous (TP) - based on annual loadings from storms less than or equal to the 2 year/ 24-hour storm. The proposed approach is to direct Stormwater to an offsite pond located on the City of Owen Sound fairgrounds property. Provided all water directed to this pond is infiltrated on city owned land, credit achievement is anticipated.

SSc7.1 – Heat Island Effect, Non-Roof (1 Point)**[Not Pursued]**

Options to help reduce the heat island effect created by the proposed parking lot and driveways include covered parking structures, open grid pavement, white concrete, and increased tree shading. Due to the extent of parking on the site, the cost premium associated with using these measures makes this credit cost prohibitive. It is also felt that the heat island effect does not represent a major area of concern for the community. For these reasons, this credit is not pursued.

SSc7.2 – Heat Island Effect, Roof (1 Point)**[Targeted]**

This credit requires that all flat roofs be constructed with a product having a solar reflectance index (SRI) of at least 78. Achieving this credit relies on the roofing material that is selected for the project. The majority of the roof area is assumed to be flat, for which a wide range of acceptable products is available.

Product	Material Type	SRI Performance
Carlisle Sure-Seal (White)	EPDM	105
Firestone EcoWhite	EPDM	99
Carlisle Sure-Weld (White)	TPO	110
Firestone (various)	TPO	92 - 105
Stevens EP	TPO	101
Various products	Metal	78 - 85

The two primary roofing systems will be: standing seam metal roof over the arenas, and a TPO roofing system over the YMCA portion of the project.

SSc8 – Light Pollution Reduction (1 Point)**[Targeted]**

For interior lighting, the designers must ensure that the maximum candela of all light fixtures fall within the building and do not exit out through windows. Alternatively, non-emergency luminaires can be automatically controlled to turn-off during unoccupied periods with manual override capability for after hour use. This can be accomplished through the use of timers, occupancy sensors, or lighting control systems.

On the exterior, lighting must be designed to meet the up-lighting and light trespass requirements of Environmental Zone (E2) for residential areas as defined in IESNA's RP-33-99 Lighting for Exterior Environments manual. Specifically, not more than 2% of the total initial fixture lumens are emitted above horizontal, resulting in unnecessary night sky pollution. At property lines, the maximum initial illuminance value can be no greater than 1.1 horizontal and vertical lux (0.10 footcandles) and no greater than 0.11 horizontal lux (0.01 horizontal footcandles) 3 metres beyond the site boundary.

In addition, the exterior lighting design must achieve significant energy savings over ASHRAE Standard 90.1-2004 requirements. For building facades and landscape features, the lighting power density must not exceed 50% of that permitted by the standard. For all other exterior areas the lighting power density must not exceed 80%.

Water Efficiency

WEc1 – Landscaping (2 points: 50%, 100%)

[Targeting 2 Points]

The intent of this credit is to reduce potable water use for irrigation by 100%. Drought-tolerant and native plant species are being selected by the landscape designers to eliminate the need for irrigation.

WEc2 – Innovative Wastewater Technologies (1 Point)

[Pending]

To achieve this credit the potable water used for building sewage conveyance must be reduced by at least 50%. For this project, the design team will explore the possibility of using a below-grade cistern. Using this technology, rainwater collected on the roof would be directed into a buried cistern for storage. Wastewater fixtures, including toilets and urinals, are then supplied with water by a pump for flushing. A level switch in the cistern ensures that toilets never “run dry” by adding municipal potable water if required. In addition to the prefabricated cistern and pump, this technology also requires that a second set of pipes be run to each washroom.

Based on a catchment area of 9,400 m² (all flat roof areas excluding canopies), a FTE occupant load of 1,489, and the fixture flow rates listed in the table below, the estimated effective cistern size (i.e. usable volume) required to meet the 50% potable water reduction requirement is 30 m³. This estimate must be reviewed once the roof plan, catchment areas and FTE occupant load are finalized.

WEc3 – Indoor Water Use (2 points: 20%, 30%)

[Targeting 2 Points]

A reduction of at least 40% potable water usage is targeted for non-process loads including toilet flushing, faucet usage, and showers. The project team will be required to specify high-efficiency fixtures, and vandal-proof flow restriction devices, where appropriate, to meet the performance requirements listed in the table below:

Fixture	Performance
Lavatory Faucets	1.9 LPM (0.5 GPM) with automatic “no-touch” control
Shower Head	5.7 LPM (1.5 GPM)
Kitchenette Faucet	5.7 LPM (1.5 GPM)
Kitchen Faucet	8.7 LPM (2.3 GPM)
Water Closets	4.2/6.0 L per flush, dual flush
Urinals	0.47 LPF (1/8 GPF)

Note: all fixture flow rates for proposed fixtures shall be quantified in LPM or GPM at 80 PSI.

A large portion of the potable water use in this building is expected to be associated with shower usage. This has been addressed by the engineers who have selected low flow fixtures in accordance with the table listed above.

Energy & Atmosphere

EAp1 - Fundamental Commissioning (Prerequisite)

[Required]

Fundamental Commissioning (Cx) is a LEED prerequisite. The Commissioning Authority (CxA) is responsible for ensuring all Cx activities required for LEED are completed. The typical process for achieving this pre-requisite is as follows:

Requirements		Responsibility	Timing
1.	Document Owner's Intent	The "Owner's Intent" document includes functional requirements for the facility – i.e., space usage, comfort parameters, operability/access requirements etc.	Concept Design (In Progress)
2.	Review of Architectural, Mechanical and Electrical Basis of Design (BOD)	The Designers are to provide their design briefs, or basis of design, detailing their approach to the design (i.e., proposed systems, strategy, and initial sizing etc.). These documents should be considered a response to the Owner's Intent, and should address the owner's needs. The CxA must complete a written review of the BOD to ensure they address all of the owners needs.	Prior to Construction Documents
4.	Develop & Implement a Commissioning Plan	The CxA in conjunction with the Owner shall develop a commissioning plan that details: <ul style="list-style-type: none"> - Organizational Chart of Commissioning Team - Roles/Responsibilities of Owner, Consultants, Contractors, and Equipment Suppliers/Manufacturers - Commissioning Process Schedule/Staging - Deficiency Identification/Correction process - Owner Staff Training Process 	During Construction Documents / Early Construction Process
5.	Incorporate Cx requirements into Contract Documents (CD)	The CxA shall develop commissioning specifications that will be tendered with the electrical/mechanical construction documents to ensure sub-trades understand their role/responsibilities in the commissioning process.	During Construction Documents
6.	Verify installation & performance of systems	As part of this requirement the CxA must provide Installation Verification Checklists and Functional Performance Checklists. In addition, the CxA is required to conduct site reviews, verify function performance and witness testing and training for staff.	During Equipment Startup and Controls Verification
7.	Review O&M Manuals for completeness	The CxA must review the Operations & Maintenance manuals as submitted by the Contractor(s) to ensure they are complete and include all the necessary information. The CxA shall issue a written review identifying deficiencies, or indicating its completeness.	Prior to Substantial Completion
8.	Complete a summary Cx Report	The CxA is to complete a final report documenting that all the required activities are complete, and that the building has been successfully commissioned.	Prior to Final LEED Certification

EAp2 – Minimum Energy Performance (Prerequisite) & EAc1 – Optimize Energy Performance [Targeted]

Please refer to the attached SCHEDULE C – Energy Concepts Report (dated March 1, 2010) for specific recommendations regarding energy efficiency upgrades.

EAp3 – CFC Reduction in HVAC&R Equipment (Prerequisite) & EAc4 – Ozone Protection [Targeted]

In order to satisfy this prerequisite and credit, all heating, ventilation, air conditioning and refrigeration equipment must use HFC refrigerants (i.e. R410a, R134a etc.). Due to the wide availability of equipment that meets this requirement, achievement of this prerequisite and credit are anticipated.

EAc2 – Renewable Energy (up to 3 Points) [1 Point Pending]

The Ontario Power Authority's new Feed-in Tariff (FIT) program now offers long-term guaranteed pricing for renewable electricity production. Please refer to the attached SCHEDULE C – Energy Concepts Report (dated March 1, 2010) for this analysis. At a minimum it is recommended that provisions be made to make the building "PV Ready", allowing the option of leasing the roof area to PV energy developers.

EAc3 – Best Practice Commissioning (1 Point) [Pending]

Due to the complexity of mechanical and electrical systems in this facility, we strongly recommend that Best Practice Commissioning be carried out for this project. In addition to the requirements of EAp1, this credit requires that the subsequent tasks outlined below be carried out:

Requirements		Description
1.	Concept Design Review	The CxA conducts a review of the design documents prior to the construction documents (i.e. working drawings) phase of the project.
2.	Construction Docs Review	The CxA conducts a review of the construction documents prior to the issue of contract documents (i.e. tender or "Issued for Construction" drawing set).
3.	Review Contractor Submittals	The CxA conducts reviews of the shop drawings and other contractor submittals (related to commissioned systems) throughout construction.
4.	Prepare Re-commissioning Manual	The CxA compiles relevant documentation and literature regarding commissioned systems in preparation for the re-commissioning of building systems in the future.
5.	One Year Review	The CxA works with the Owner to develop feedback mechanisms for occupant comfort and IAQ concerns, as well as resolving deficiencies within the first year of occupancy.

EAc5 – Measurement & Verification (1 Point) [Pending]

Pursuit of this credit is pending. This credit is for the development and implementation of an Energy Measurement & Verification (M&V) Plan consistent with Option D: Calibrated Simulation (Savings Estimation Method 2), as specified in the International Performance Measurement & Verification Protocol (IPMVP) Volume III: Concepts and Options for Determining Energy Savings in New Construction,

April 2003. A Water Measurement and Verification program, consistent with the principles of IPMVP Volumes: I (2002) and III, is also required.

A monitoring system capable of obtaining the following data will be installed to collect and store the necessary information necessary to carry out the analysis required by this credit:

- Total annual building energy consumption
- Annual energy consumption by type (i.e. electricity, natural gas, etc.)
- Annual energy consumption by load (i.e. lighting, process, plug loads, heating, cooling, hot water, etc.)
- Annual building water consumption (i.e. potable, non-potable)

Budgets associated with this credit should include both the measurement and verification consultant, and the metering system required to properly monitor resource usage.

EAc6 – Green Power (1 Point)

[Pending]

This credit requires the client to purchase at least 50% of the building's regulated electricity from renewable sources. This involves engaging in a minimum 2-year renewable energy contract with a qualified provider. The cost associated with this credit will depend on the regulated electricity consumption obtained from the final energy model.

Materials & Resources

MRp1 - Storage & Collection of Recyclables (Prerequisite)

[Required]

This pre-requisite is anticipated for the baseline design. The design team must ensure that areas in the building are designated for the collection and storage of recyclables including paper, cardboard, glass, plastics and metals. These areas must be clearly labeled on the architectural floor plans. For a building of this size, the LEED Reference Package recommends a minimum recycling area of 25.6 m². If the total area designated for recycling is less than the guideline, the team must provide rationale for why a smaller area is sufficient. Preference is for recycling areas to be provided indoors, however, if a convenient outdoor enclosure is used it can also contribute to this area.

MRc1 – Building Reuse (up to 3 points)

[Not Pursued]

The project is new construction and as such is not eligible to pursue this credit.

MRc2 – Construction Waste Management (2 points: 50%, 75%)

[1 Point Targeted, 1 Point Pending]

The first point is anticipated, and the second is pending. To achieve both points, 75% of all waste generated onsite during construction must be diverted from landfill. In addition to meeting this requirement, the project must also comply, by law, with the Ontario 3R regulations for waste diversion. The Contractor will be required to implement construction waste diversion measures including source separation, frequent bin inspection for cross contamination and employee training. Provisions will be added to the construction documents to fully outline the Contractor's scope of work with respect to the activities and documentation required to achieve this credit.

MRc3 – Resource Reuse (2 points: 5%, 10%)

[Not Pursued]

To achieve this credit, reused/refurbished building products must make up at least 5% of the total construction cost. Due to the significant cost of material required to meet the performance threshold, it is assumed that this credit will not be pursued.

MRc4 – Recycled Content (2 points: 7.5%, 15%)

[1 Point Targeted, 1 Point Pending]

The first point is anticipated, and the second is pending. This credit requires that the construction team use materials with high recycled content. FEI will provide a Material and Product specification section for inclusion into the construction documents. The Contractor will be required to ensure materials meet prescribed recycled values and satisfy the documentation requirements of the credit. Examples of materials that will be required to have a recycled content component include:

- 25%+ SCM's in concrete (footings, slabs, curbs etc.)
- 80%+ recycled – rebar, miscellaneous steel (i.e., structural, studs etc.)
- 50%+ recycled – insulation products
- 95%+ recycled – drywall
- 50%+ recycled – composite wood products

FEI will provide a list of specific materials to target once an elemental cost analysis has been carried out for the project.

MRc5 – Regional Materials (2 points: 10%, 20%)**[1 Point Targeted, 1 Point Pending]**

The first point is anticipated, and the second is pending. The project shall use materials that can be readily sourced within 800 km of the site, including (but not limited to):

- Asphalt
- Ready-Mix concrete
- Rebar and miscellaneous metals
- Drywall
- Wood

FEI will provide a Material and Product specification section for inclusion into the construction documents. The Contractor will be required to ensure materials meet prescribed recycled values and satisfy the documentation requirements of the credit. FEI will provide a list of specific materials to target once an elemental cost analysis has been carried out for the project.

MRc6 – Rapidly Renewable Materials (1 Point)**[Not Pursued]**

To achieve this credit, at least 5% of the total construction cost must be associated with renewable building products, such as bamboo, linoleum, or cork. Due to cost implications and limited availability, it is assumed that this credit will not be pursued.

MRc7 – Certified Wood (1 Point)**[Targeted]**

This credit is targeted. To satisfy credit requirements the construction team must procure Forest Stewardship Council (FSC) Certified wood and products that represent 50% of the total wood-based materials cost. Millwork, wood doors, and blocking should be specified as FSC Certified to reach the 50% threshold. Cost for this credit is related to the surcharge placed on FSC products. Recent reports on costs of FSC certified products indicate that the premiums have dropped dramatically over the past few years. In addition to meeting the requirements of this credit, composite wood materials (e.g. plywood, millwork) are also required to be free of added urea-formaldehyde as per credit IEQc4.4.

Product	Possible Products / Suppliers
MDF	Panel Source – Purekor Platinum MDF < www.panelsource.net > SierraPine – Arreis, Medite II, Medex < www.sierrapine.com >
MDF (agrifibre)	Kirei Wheatboard < kireiusa.com/wheatboard_viewer/wheatboard.html >
Particleboard	Panel Source – Purekor Platinum Particleboard < www.panelsource.net > SierraPine – Encore Line < www.sierrapine.com > Uniboard – NuGreen FSC Certified Particleboard < www.uniboard.com >
Plywood	Panel Source – Purekor Platinum Plywood < www.panelsource.net > Columbia Forest Products – PureBond < www.columbiaforestproducts.com > Note: All plywood products that are labeled Can-Ply “Exterior Grade” are UF free
Wood Doors	Lambton Doors < www.lambtondoors.com > Baillargeon Doors < www.baillargeondors.com > Marshfield Doors < www.marshfielddoors.com >

The key opportunity for this project is the selection of FSC Certified Wood Floors. Provided these can be sourced in a cost effective manner, credit achievement is anticipated.

MRc8 – Durable Building**[Not Pursued]**

To achieve this credit, a building science consultant (with specific qualifications) must develop and implement a Building Durability Plan in accordance with CSA S478-95 (R2001).

Indoor Environmental Quality

IEQp1 - Minimum IAQ Performance (Prerequisite)

[Required]

This prerequisite requires that the mechanical design meet the outdoor air requirements established by ASHRAE standard 62-2004. To demonstrate compliance, the mechanical Engineer must provide design calculations using the methodology outlined in the standard. Achievement of this prerequisite is anticipated, as it is also an Ontario Building Code requirement.

IEQp2 - Environmental Tobacco Smoke (ETS) Control (Prerequisite)

[Required]

To achieve this prerequisite smoking must be prohibited in the building and designated smoking areas must be located at least 7.5 meters away from entries, outdoor air intakes and operable windows. Achievement of this prerequisite is anticipated.

IEQc1 – Carbon Dioxide (CO₂) Monitoring (1 Point)

[Targeted]

This credit requires that CO₂ be measured in the occupied spaces and that control is available to adjust the amount of outdoor air (OA) provided according to the space level conditions (reduce OA volumes when the space is unoccupied). This provides energy savings as well as satisfies the requirements of this credit. CO₂ setpoints must be prepared and documented in compliance with Appendix C of ASHRAE 62.1-2004. This credit is targeted and will be further explored during energy investigations.

IEQc2 – Ventilation Effectiveness (1 Point)

[Not Pursued]

The type of mechanical systems and distribution methods that are selected will dramatically impact the feasibility of this credit. As a result of the wide range of space-uses expected in this building and difficulty of achieving the necessary effectiveness, this credit will not be pursued.

IEQc3 – Construction IAQ Management (up to 2 points)

[2 Points Targeted]

These credits are targeted. The construction indoor air quality credits relate to two stages – during construction, and following substantial completion, immediately prior to occupancy:

During Construction

FEI would prepare an Indoor Air Quality During (IAQ) Construction specification section for the design term incorporate into the contract documents. This section prescribes documentation and IAQ management practices in accordance with the credit requirements.

Before Occupancy

Following substantial completion, the construction team will be required to sufficient time to carryout a building flush-out. The credit allows two flush-out options; the first allows the Contractor to flush out the full building immediately prior to occupancy. The second option allows a partial flush out before occupancy and the remaining amount to be carried out during occupancy. The final flush-out duration will depend on the outdoor air capacity of the systems selected. A specific duration will be calculated once the design has been completed.

An alternative option (to the flush-out) is to carry out air quality testing. In order to demonstrate high indoor air quality after construction is complete, a third-party contractor must be engaged to conduct IAQ testing prior to occupancy. This testing typically takes one day to perform and must take place after substantial completion, but prior to occupancy.

If a phased occupancy is planned for this facility (e.g., ice pads occupied prior to YMCA), additional planning will be required to ensure that areas still in construction do not infringe on or affect IAQ management efforts and test results in the completed area. Typically this would involve constructing a temporary divide between areas of the project and maintaining the area still in construction under negative pressure.

IEQc4.1 – Low-Emitting Products: Adhesives & Sealants (1 Point)

[Targeted]

To achieve this credit, all adhesives and sealants applied onsite and installed within the building weather barrier must meet the volatile organic compound (VOC) limits of the South Coast Air Quality Management District Rule (SCAQMD) 1168. Allowable limits would be added to the construction documents using a Material and Product specification provided by FEI.

IEQc4.2 – Low-Emitting Products: Paints & Coatings (1 Point)

[Targeted]

To achieve this credit, all paints and coatings applied onsite and installed within the building weather barrier must meet the volatile organic compound (VOC) limits of Green Seal standards GS-11 and GC-03, as well as, SCAQMD Rule 1113. Allowable limits will be added to the construction documents using a Material and Product specification that would be provided by FEI.

Manufacturer	Product Lines
Benjamin Moore	EcoSpec or equivalent
Pittsburg Paints	PurePerformance, Speedhide etc.
Sherwin-Williams	Harmony, ProGreen etc.
Sico	Low-VOC Products

IEQc4.3 – Low-Emitting Products: Carpet (1 Point)

[Targeted]

This credit is targeted. To achieve this credit, the carpet, adhesive (and under pad if provided) must meet the Carpet & Rug Institute (CRI) Green Label (or Green Label Plus) program requirements. In addition, carpet systems with styrene butadiene latex backing should not be specified – this will avoid increased IAQ testing fees due to the need for specialized testing equipment. FEI would provide the design team with a material and product specification section for incorporation into the contract documents.

In the event that carpet is not provided in the building, this credit can still be achieved by installing resilient flooring that is FloorScore, GREENGUARD™ or GREENGUARD™ Children and Schools certified.

IEQc4.4 – Low-Emitting Products: Composite Wood and Laminates (1 Point) [Targeted]

This credit is targeted and requires that composite wood, agrifibre and laminate adhesives be free of added urea formaldehyde (UF). Key products to consider include plywood, wood doors and millwork. The additional cost for the credit is directly related to the extent of wood materials to be used in the building. In addition to meeting the requirements of this credit, wood materials are also required to be FSC certified as per credit MRc7. Sources of UF-free wood products were provided under MRc7.

IEQc5 – Indoor Chemical & Pollutant Source Control (1 Point) [Targeted]

To achieve this credit, three requirements must be satisfied. First, permanent entryway grates must be provided at primary entrances to capture dirt and other contaminants. Second, segregated areas with deck-to-deck partitions are required for housekeeping, photocopying, and zamboni rooms. These rooms must have exhaust that maintains the room at a negative pressure compared with surrounding spaces (at least an average of 5 Pascal (Pa) with a min. of 1 Pa when the door to the room is closed). Doors to these rooms must be equipped with self-closing devices. Finally, filters with a Minimum Efficiency Reporting Value (MERV) of 13 must be installed in air handling equipment. This credit is targeted.

IEQc6.1 – Controllability of Systems, Perimeter (1 Point) [Not Pursued]

Pursuit of this credit is not practical given the types of regularly occupied space uses within this facility.

IEQc6.2 – Controllability of Systems, Non-Perimeter (1 Point) [Not Pursued]

Pursuit of this credit is not practical given the types of regularly occupied space uses within this facility.

IEQc7 - Thermal Comfort, Compliance & Monitoring (up to 2 Points) [Not Pursued]

To achieve the first point, the mechanical systems must be design to provide comfort conditions in compliance with ASHRAE 55-2004 in all regularly occupied spaces. The second point can be achieved by installing equipment to monitor the zone temperatures and humidity to confirm they meet the comfort criteria of the standard.

IEQc8 – Daylight for 75% & Views for 90% of Regularly Occupied Spaces (Up to 2 pts) [Not Pursued]

These credits are not targeted for this project since the specific performance thresholds are impractical to achieve in an ice pad environment. With that said, where possible the principles of daylighting and views are to be applied to regularly occupied spaces.

Innovation & Design Process

IDc1.1 – Exemplary Performance in Indoor Water Use Reduction (1 Point)

[Targeted]

Innovation points can be achieved for attaining exemplary performance for various credits. For this project the design team will target exemplary performance for credit WEc3, Indoor Water Use. To achieve this point an indoor non-process potable water use reduction of at least 40% must be reached. This will be achieved using low flow water fixtures.

IDc1.2 – Green Housekeeping Program (1 Point)

[Targeted]

To achieve this credit, green-cleaning products must be sourced and used by the City of Owen Sound and the YMCA for all housekeeping activities. Many manufactures provide products that are Green Seal or EcoLogo Certified. The best approach to achieving this credit is to have a cleaning product supplier propose a range of green products and create a green housekeeping program for the building. At a minimum, this program should include the following information:

- A statement of purpose for the environmentally friendly cleaning program
- Building specific cleaning requirements and procedures
- Cleaning product information (i.e., datasheet/MSDS), including Green Seal or EcoLogo certification documentation
- Training methodology/program
- New product criteria & review process

The final certification package should include documentation in accordance with the program, and confirmation from the Owner that their maintenance staff will be trained accordingly and will implement the program as instructed.

IDc1.3 & IDc1.4 – Innovation Credits – To be determined (1 Point each)

[Targeted]

A variety of additional innovation opportunities will be explored for this project. Potential credits include:

- Process energy savings associated with ice pad refrigeration and pool equipment
- Exemplary performance in Materials and Resources credits (e.g. Construction Waste Management, Recycled Content, Regional Materials)
- Process water savings associated with pool design, equipment and management procedures
- GREENGUARD™ certified systems furniture and seating
- Green building education

IDc2 – LEED® Accredited Professional (1 Point)

[Targeted]

This credit requires that a LEED A.P. be a member of the design team. Fluent Engineering Inc. staff members are LEED Accredited Professionals. The requirement of this credit is achieved.

SCHEDULE C – Energy Conservation Recommendations

Energy Concepts Report

Owen Sound Regional Recreation Centre

March 1, 2010

Prepared for:

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Acronyms & Abbreviations

A/M/E – Architectural / Mechanical / Electrical Consultants

ASHARE – American Society of Heating Air Conditioning & Refrigeration Engineers

ANSI – American National Standards Institute

CSA – Canadian Standards Association

CoG – Centre of Glass (value)

CO₂ – Carbon Dioxide

CWM – Construction Waste Management

Cx - Commissioning

DOAS – Dedicated Outdoor Air System

EA – Energy & Atmosphere (LEED Category)

FTE – Full Time Equivalent Occupants

GSHP – Ground Source Heat Pump

HVAC&R – Heating, Ventilation, Air Conditioning & Refrigeration

HFC – Hydrofluorocarbons

IAQ – Indoor Air Quality

ID – Innovation & Design (LEED Category)

IESNA – Illuminating Engineering Society of North America

IPMVP – International performance Measurement & Verification Protocol

LEED – Leadership in Energy & Environmental Design

Low-E – Low Emissivity (glass)

L/min - Litres per Minute (flow)

MERV – Minimum Efficiency Reporting Value (air filter rating scale)

M&V – Measurement & Verification

NFRC – National Fenestration Rating Council

NRCC – National Research Council Canada

OA – Outdoor Air (a.k.a. Fresh Air)

OBC – Ontario Building Code

O&M – Operations & Maintenance

PSI – Pounds per Square Inch

PV – Photovoltaic (Solar Electric)

R (or R-Value) – Resistance to Thermal Heat Transfer

RTU – Roof Top Unit

T_{db} - Dry Bulb Temperature

T_{wb} - Wet Bulb Temperature

USgpm – United States Gallons per Minute

VAV – Variable Air Volume

VRF – Variable Refrigerant Flow

VVT – Variable Volume Variable Temperature HVAC System

WSHP – Water Source Heat Pump

W/ft² – Watts per Square Foot (lighting)

1 Introduction

This report provides a summary of design concepts aimed at improving the overall energy performance of the new Owen Sound Regional Recreation Centre building. These concepts include architectural, mechanical, and electrical energy conservation measures. Each of the main building systems affecting energy performance has been considered including: the building envelope, lighting systems, ventilation systems, space heating systems, space cooling systems, and service water heating systems.

Our intent is to highlight proven technologies, systems, and design strategies that will result in a building that significantly exceeds the minimum requirements of the applicable industry energy standards (i.e. ASHRAE Standard 90.1-2004, OBC+SB10) and positions the project for LEED certification. To effectively cover a range of potential energy conservation measures under consideration, we present a 'Starting Point' design scenario for the Proposed Building, as well as multiple potential upgrade scenarios. These scenarios provide important information for the design team and the building Owner to help establish the overall goals for the project in terms of energy conservation.

The report is organized into the following main sections:

<u>1</u>	<u>Introduction</u>	<u>3</u>
<u>2</u>	<u>ASHRAE/IESNA Standard 90.1 Mandatory Provisions</u>	<u>4</u>
<u>3</u>	<u>Project Description</u>	<u>5</u>
<u>4</u>	<u>Site/Weather Data</u>	<u>5</u>
<u>5</u>	<u>General Building Parameters</u>	<u>5</u>
<u>6</u>	<u>Building Performance Assumptions</u>	<u>6</u>
<u>7</u>	<u>Energy Assessment Approach</u>	<u>12</u>
<u>8</u>	<u>Energy Assessment Results</u>	<u>13</u>
<u>9</u>	<u>Comparison of Onsite Renewable Energy Generation Technologies</u>	<u>16</u>

Note: These preliminary energy assessment studies are applicable only for guidance. It is important to note that the results presented in this report are *not predictions of actual energy consumption or costs* of the proposed design after construction. Actual consumption will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by the standard, changes in energy rates between design of the building and occupancy, and precision of the calculation tool.

2 ASHRAE/IESNA Standard 90.1 Mandatory Provisions

The Ontario Building Code and the LEED rating system both require the Mandatory Provisions of ASHRAE/IESNA Standard 90.1 to be satisfied as part of minimum energy performance requirements.

The Designers of Record (Architectural, Mechanical, and Electrical) are responsible to ensure that all of these Mandatory Provisions are met. Specifically, this includes the ASHRAE/IESNA Standard 90.1 Mandatory Provisions listed in the following sections of the standard:

- Section 5, Building Envelope
- Section 6, HVAC
- Section 7, Service Water Heating
- Section 8, Power
- Section 9, Lighting
- Section 10, Other Equipment.

To facilitate this process, Fluent Engineering Inc. has prepared standard Compliance Documentation forms (see Appendix A) to be used by the Designers of Record to demonstrate compliance.

Mandatory Compliance Form	Responsible Party
Building Envelope	Architect
HVAC Equipment	Mechanical Engineer
Service Water Heating	Mechanical Engineer
Power	Electrical Engineer
Lighting	Electrical Engineer (or Architect)
Other Equipment (Motors)	Mechanical Engineer (or Electrical Engineer)

3 Project Description

The proposed new Owen Sound Regional Recreation Centre is a two-story, 125,000 sq.ft. facility. This building is predominantly a recreational facility including a natatorium (pool area), twin-pad arena, gymnasium, running track and fitness gym, as well as having multi-purpose and community areas.

4 Site/Weather Data

Location Owen Sound, Ontario
 Winter Design Conditions $T_{db} = -21\text{ }^{\circ}\text{C}$
 Summer Design Conditions $T_{db} = 29\text{ }^{\circ}\text{C}$, $T_{wb} = 22\text{ }^{\circ}\text{C}$
 Weather File Muskoka, Ontario

5 General Building Parameters

Total Modeled Floor Area 11,420 m²
 Occupant Densities as defined by the drawings (where indicated) or ASHRAE 62-2004
 Heating Setpoint (excluding spaces detailed below) 22 °C
 Cooling Setpoint (excluding spaces detailed below) 24 °C

5.1 Arena Specific Parameters

Operating Schedules Weekdays 6AM to 6PM | Sat & Sun 5 AM to 11 PM
 Temperature Setpoint – Ice Rink 18 °C
 Temperature Setpoint – Changerooms 25 °C
 Humidity Setpoint – Ice Rink 35% RH

5.2 Aquatics Specific Parameters

Operating Schedules Weekdays 6 AM to 10 PM | Sat 8 AM to 8 PM | Sun 8 AM to 5 PM
 Temperature Setpoint – Pool Area 29 °C
 Temperature Setpoint – Changerooms 26 °C
 Humidity Setpoint – Pool Area 60% RH

5.3 Gymnasium & Fitness Specific Parameters

Operating Schedules Weekdays 6 AM to 10 PM | Sat 8 AM to 8 PM | Sun 8 AM to 5 PM
 Temperature Setpoint 21 °C

6 Building Performance Assumptions

6.1 Lighting Loads

	OBC (A90.1-2004 + SB10)	Starting Point (ASHRAE 90.1-2004)
Ice Arena		25 W/m ²
Gymnasium		15 W/m ²
Natorium		15 W/m ²
Fitness/Studio/Track		10 W/m ²
Change/Locker Rooms		6 W/m ²
Program/Multipurpose		14 W/m ²
Mechanical/Electrical Rooms		16 W/m ²
Storage		9 W/m ²
Lobby		14 W/m ²
Corridors		5 W/m ²
Washrooms		10 W/m ²

6.2 Other Internal Loads

	OBC (A90.1-2004 + SB10)	Starting Point
Lighting Control		None
Receptacles – Building Average ¹		1.1 W/m ²
Ventilation – Total Building ²		ASHRAE 62-2004
Peak Occupancy ³		1,489

- 1) As defined by the NRCC Performance Compliance for Buildings, does not include Rink and Pool process loads
- 2) Total estimated building ventilation is ~34,000 cfm (zone distribution effectiveness = 0.8)
- 3) Peak Occupancy number is the sum of all peak zone occupancies: Fitness/Track = 621, Fitness Studio = 55, Gymnasium = 40, Arena Viewing 1 & 2 = 202, Rinks 1 & 2 = 120, Pool = 30, Pool/Gym Changerooms = 74, Arena Changerooms = 60, Multipurpose = 73, Program Room = 37, etc.

6.3 Building Envelope

Assembly	OBC (A90.1-2004 + SB10)	Starting Point
Wall & Roof Systems		
Roof Construction	Built-up roof with continuous layer of polyiso	
Roof R-Value ¹ [ft ² ·F·h /Btu]	R-22	R-30
Above-Grade Wall R-Value ¹ [ft ² ·F·h /Btu]	R-15	R-20 (general) R-30 (pool area)
Window Systems		
Overall window-to-wall ratio	15%	15%
Window Description	Double-glazed, hard-coat low-e (e = 0.60) with 6mm air gap	Double-glazed, soft-coat low-e (surface #3, e = 0.04), warm edge, with 6mm argon gap
Window Glazing ²	U _{fixed} - 0.54	U _{fixed} - 0.29
CoG U-Value [Btu/ft ² ·F·h]	U _{oper} - 0.54	U _{oper} - 0.29
CoG - Solar Heat Gain Coeff. (SHGC)	0.41	0.38
Framing Composition	Aluminum	Aluminum
Frame thermal break – General	3 mm	3 mm
Frame thermal break – Pool	3 mm	15 mm

- 1) R-values are for insulation layer only including the effects of thermal bridging (does not include the rest of the wall assembly).
 2) Fenestration performance determined in accordance with NFRC 100-2004 and NFRC 200-2004 for standard size.

6.4 Systems-level Characteristics

To address the variety of space types and corresponding system types, the various areas within the project have been grouped into the following categories:

6.4.1 Natatorium (Pool Area) - AHU-1

Parameters	OBC (A90.1-2004 + SB10)	Starting Point
System Type	Packaged CV RTU	
System Level Heating Source	80% Eff. Furnace	Hot water coil supplied by boiler plant
Zone Level Heating Source	None	
Cooling Source	DX Cooling Coil COP = 2.9	
Dehumidification	Max Humidity = 60 %	
RTU Fan Power	Supply Fan TSP = 4.0" w.g.	
Heat Recovery	None	
Air-Side Economizing	Yes – 100% Economizing	
Airflow	Auto-sized	

6.4.2 Pool & Gym Change Rooms (AHU-2), Rink Change Rooms (AHU-8)

Parameters	OBC (A90.1-2004 + SB10)	Starting Point
System Type	Packaged DOAS CV RTU	
System Level Heating Source	80% Eff. Furnace	
Zone Level Heating Source	None	Hot water reheat supplied by boiler plant
Cooling Source	DX Cooling Coil COP = 2.9	
Dehumidification	None	
RTU Fan Power	Supply Fan TSP = 2.5" w.g.	
Heat Recovery	None	AHU-2: 70% Effective (wheel) AHU-8: 55% Effective (plate) Supply Fan TSP = 1.5" w.g. Return Fan TSP = 1.5" w.g.
Air-Side Economizing	Yes – 100% Economizing	
Airflow	Auto-sized	

6.4.3 Lobby & Admin (AHU-3), Multipurpose & Program Rm (AHU-5), Arena Viewing & Office (AHU-7)

Parameters	OBC (A90.1-2004 + SB10)	Starting Point
System Type	Packaged VAV RTU	
System Level Heating Source	80% Eff. Furnace	
Zone Level Heating Source	Hot water reheat supplied by boiler plant	
Cooling Source	DX Cooling Coil COP = 2.9	
Dehumidification	None	
RTU Fan Power	Supply Fan TSP = 3.0" w.g.	
Heat Recovery	None	
Air-Side Economizing	Yes – 100% Economizing	
Airflow	Auto-sized	

6.4.4 Gymnasium (AHU-4), Track & Fitness (AHU-9)

Parameters	OBC (A90.1-2004 + SB10)	Starting Point
System Type	Packaged CV RTU	
System Level Heating Source	80% Eff. Furnace	
Zone Level Heating Source	None	
Cooling Source	DX Cooling Coil COP = 2.9	
Dehumidification	None	
RTU Fan Power	Supply Fan TSP = 4.0" w.g.	
Heat Recovery	None	
Air-Side Economizing	Yes – 100% Economizing	
Airflow	Auto-sized	

6.4.5 Arenas (Ice Area) – AHU-6

Parameters	OBC (A90.1-2004 + SB10)	Starting Point
System Type	Packaged CV RTU	
System Level Heating Source	80% Eff. Furnace	
Zone Level Heating Source	None	
Cooling Source	DX Cooling Coil COP = 2.9	
Dehumidification	Max Humidity = 35 %	
RTU Fan Power	Supply Fan TSP = 2.0" w.g.	
Heat Recovery	None	
Air-Side Economizing	Yes – 100% Economizing	
Airflow	Auto-sized	

6.5 Plant-level Characteristics

	OBC (A90.1-2004 + SB10)	Starting Point
Heating Loop Source	Natural Gas Boiler, 80%	Natural Gas Boiler, 86%
Domestic Hot Water Loop Source	Natural Gas Water Heater, 80%	Natural Gas Water Heater, 93%
Fixture Flow Rates	Lav. Faucets = 8.3 L/min Showers = 9.5 L/min	Lav. Faucets = 3.8 L/min Showers = 6.5 L/min
Boiler Pumps Pump Motors	Constant speed ; Standard efficiency	Constant speed ; Premium efficiency

6.6 Process-Level Characteristics¹

	OBC (A90.1-2004 + SB10)	Starting Point
Load Reduction Strategies		
Evaporation Controls on Pool	None	None
Ceiling Type	Standard	Standard
Process Cooling End Uses		
Ice Pad Brine Circulation Loop	2 - Pass	2 – Pass
Ice Pad Tube Conc. Coverage	TBD	TBD
Process Heating End Uses		
Under Slab Heating	Natural Gas - 80% Ret Water Temp: 160F-140F	Waste heat recovered from refrigeration plant
Snow Melt Pit	Natural Gas - 80% Ret Water Temp: 160F-140F	Waste heat recovered from refrigeration plant
Surfacing Water Heating	Natural Gas - 80%	Waste heat recovered from refrigeration plant

- 1) Process-Level characteristics have not been simulated within the energy model but can be included to augment building energy and cost savings.

7 Energy Assessment Approach

Four different energy models were generated. The first model represents the reference building as defined by Ontario Building Code (OBC) SB-10 using the ASHRAE 90.1-2004 compliance path. This model is used as the baseline to which all other building models are compared. The second model, called the "Starting Point", is meant to reflect typical design practices and is based on the current design as detailed by the architectural drawings, mechanical design report, and information from the owner and design team. The final two models include additional measures to the "Starting Point" model and are meant to provide a range of options that illustrate various design upgrade possibilities. The upgraded energy models, "Upgrade A" and "Upgrade B", consist of the following energy efficiency measures:

Upgrade A:

- Reduced building LPD to 10% below ASHRAE 90.1-2004 levels (achieved primarily by using T5 and T5HO lamps with high efficiency ballasts)
- Expand the use of heat recovery (65% effective) to systems serving the gymnasium (AHU-4) and fitness areas (AHU-9)
- Use VFD control on boiler pump(s)
- Use ultra low-flow fixtures (lav faucets = 1.9 L/min, showers = 5.7 L/min)
- Preheat heating water (assumed annual load reduction = 40%) and domestic hot water (assumed annual load reduction = 70%) using condenser waste heat from refrigeration system

Upgrade B:

All measures under Upgrade A, plus:

- Occupancy Sensors in all spaces except arena rinks
- Daylight sensors in exterior day-lit spaces (pool area, arena lobby/corridors, fitness/track area)
- Increased heat recovery effectiveness to 75% for both DOA systems (AHU-2 & AHU-8)
- Demand-controlled ventilation in pool, gymnasium, and fitness areas

Additional Opportunities (not modeled)

Process Energy

Opportunity	Space
Four pass arrangement for ice pad slab tubing	Ice Pads
1" concrete coverage for ice pad slab tubing	Ice Pads
Low-emissivity ceilings (see Process Savings below)	Ice Pads
Cycle brine pump in sequence with compressors	Ice Pads
Dehumidification re-heat using waste heat	Ice Pads/Pool
Evaporation Control on Pool Surface (solid or liquid)	Pool

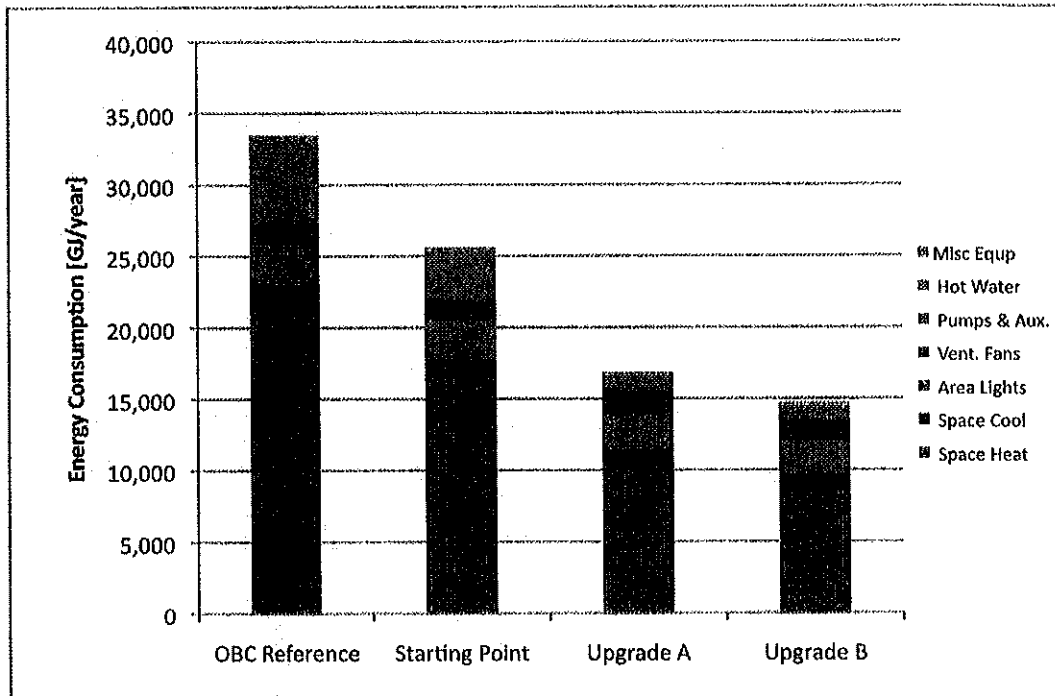
Process Water

Opportunity	Space
Pre-heat ice resurfacing water using water heat	Ice Pads
Evaporation Control on Pool Surface (solid or liquid)	Pool
Collect and store backwash water and use indoors	Pool
Explore alternative to chlorine treatment	Pool

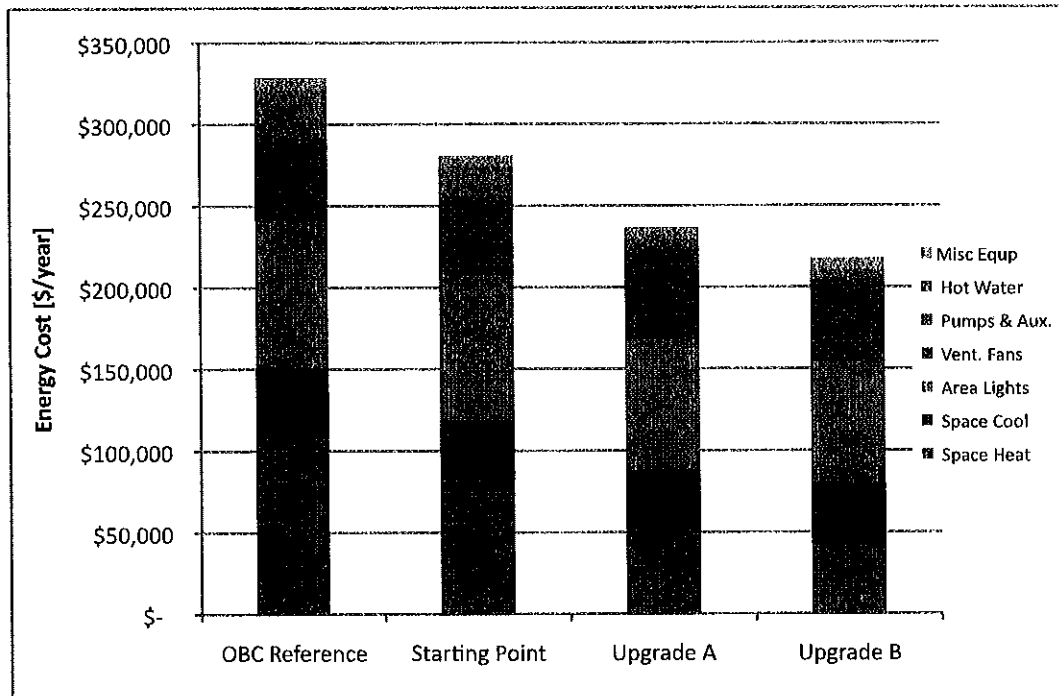
8 Energy Assessment Results

The following graphs and table summarize the results of the energy simulations:

Graph 8.1 – Energy Consumption Results [GJ]



Graph 8.2 – Energy Cost Results [\$ /yr]



Summary Table of Results:

	OBC Reference	Starting Point	Scenario A	Scenario B
Total Energy Use in GJ (per year)	33,467	25,614	20,291	18,171
Total Energy Cost (per year)	\$328,815	\$280,804	\$236,550	\$217,539
Energy Density in kWh/m ²	814	623	494	442
% Energy Savings	-	24%	39%	46%
% Cost Savings	-	15%	28%	34%
Potential LEED Points ¹	-	4	6	7
Peak Demand in kW	631	560	551	529

1) Compared to ASHRAE 90.1-1999 Reference Building.

Process Energy Savings Analysis – Low-e Ceiling in Rinks

In addition to the building systems analysis (above), an additional analysis was performed to determine the impact of a low-e ceiling in the arenas. Using the accepted ASHRAE standard methodology, the energy load required to cool the ice was determined for a standard roof deck, a low-e roof deck and a low-e ceiling. In order to complete the analysis, the following assumptions were made:

- Refrigeration System Efficiency, COP = 4
- Ceiling Temperature = 18°C
- Ice Surface Temperature = -4°C
- Ice to Roof Deck Height = 10 m
- Ice to Ceiling Height = 7.5 m
- Ice emissivity = 0.95

The following tables illustrate the potential energy savings attributed to low-e ceilings and low-e roof decks for an indoor temperature of 18°C.

Rink 1: Ice All Year Round

	Annual Radiant Energy Load		Input Energy		
	mWh	mWh Savings	mWh	mWh Savings	% Reduction
Roof Deck	103.1	-	265.4	-	-
Low-E Roof Deck	79.1	24.0	101.5	163.8	61.7%
Low-E Ceiling	92.7	968.7	23.2	242.2	91.3%

Rink 2: No Ice Apr, May, June

	Annual Radiant Energy Load		Input Energy		
	mWh	mWh Savings	mWh	mWh Savings	% Reduction
Roof Deck	199.1	-	199.1	-	-
Low-E Roof Deck	132.9	66.2	76.2	122.9	61.7%
Low-E Ceiling	17.4	726.8	17.4	181.7	91.3%

The following tables illustrate the potential energy savings attributed to low-e ceilings and low-e roof decks for an indoor temperature of 0°C.

Rink 1: Ice All Year Round

	Annual Radiant Energy Load		Input Energy		
	mWh	mWh Savings	mWh	mWh Savings	% Reduction
Roof Deck	138.9	-	138.9	-	-
Low-E Roof Deck	102.9	36.0	53.1	85.7	61.7%
Low-E Ceiling	12.1	506.9	12.1	126.7	91.3%

Rink 2: No Ice Apr, May, June

	Annual Radiant Energy Load		Input Energy		
	mWh	mWh Savings	mWh	mWh Savings	% Reduction
Roof Deck	96.4	-	96.4	-	-
Low-E Roof Deck	70.5	25.9	36.9	59.5	61.7%
Low-E Ceiling	8.4	361.8	8.4	88.0	91.3%

It can be seen from the tables above that the use of either a low-e ceiling or a low-e roof deck has the potential to provide significant savings. The low-e ceiling provides greater benefit than the low-e roof deck. Furthermore, reducing the indoor thermostat setpoint of the arena from 18°C to 0°C will reduce the load on the refrigeration system in half. This should be taken into consideration when determining the heating setpoints for the arenas.

Note: These potential results are based on assessments of the proposed design scenario at a very early design stage. The final energy model and actual energy consumption is highly sensitive to design details, therefore the final calculation of achieved energy consumption and cost savings can not be made until the design is complete and the final energy model is prepared.

9 Comparison of Onsite Renewable Energy Generation Technologies

Our philosophy on energy conservation is to invest first and foremost in energy efficiency technologies, while making provisions for onsite renewable energy technologies. To this end we conducted an analysis as to the renewable energy potential onsite. We relied on the Ontario Wind Energy Atlas, and local solar insolation data to conduct this preliminary assessment.

	Wind Turbine	Solar Photovoltaic
Typical System Size	250 kW	250 kW
Physical Size	50 m tall	20,000 ft ²
Annual Energy Generated	548 MWh	244 MWh
FIT Rate	\$135 / MWh	\$701 / MWh
FIT Payment Amount	\$73,900	\$171,000
Estimated Capital Cost	\$1.5 million	\$2.0 million
Simple Payback	20.1 yrs	11.7 yrs
LEED EAc2 Renewable Energy Points	2 Points	1 Point

Since there are restrictions on the placement of wind turbines in close proximity to residences (it is prohibited under new Ontario Green Energy Act legislation), and based on the economic predictions for each of the technologies – it appears that the solar-photovoltaic option (provided a Feed-in-Tariff contract can be secured) represents a viable opportunity for this project as detailed in the table above.

For the purposes of the LEED Analysis we have included the renewable solar-photovoltaic option as pending. Since this technology is so capital intensive, we recommend at the very least that the owner group consider leasing the roof area to a third-party developer as an alternative approach.