Proposed Facility Enhancements for the Revelstoke Nordic Ski Club

Draft Report

Wildland Consulting Inc.
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Dave Kaegi
Wildland Consulting Inc.
P.O. Box 2569
Revelstoke, BC, V0E 2S0
Ph: 250-837-5734
Fax: 250-837-5764
Email: wildland@telus.net

TABLE OF CONTENTS

Revelstoke Nordic Ski Club
Proposed Facility Enhancements

1.0 Background

The Revelstoke Nordic Ski Club is the second oldest ski club in Canada. The Revelstoke Nordic Ski Club can trace its roots back to 1891. Today the club is a registered non-profit organization. The primary focus of the club has been to provide groomed and track set skiing opportunities on the trail system located at the base of Mount MacPherson at an elevation of about 640 meters, 7 km south of Revelstoke on Highway 23 South (Figure One). Almost all of the services provided by the club are accomplished by the thousands of volunteer hours of its members. These services include trail maintenance, trail grooming, machine servicing, special events, and a Ski League Program for children. The club has approximately 350 members.

Under the provisions of a User Agreement with the BC Ministry of Tourism, Culture and Arts, the club maintains the cross country ski trail system on Mount MacPherson. The Revelstoke area is famous for its prodigious snowfall and the trail system's easterly aspect helps keep snow conditions excellent. Approximately 22 km of trails are groomed for both skating and classic technique with a Bombardier BR275. Grooming usually starts in late November with a final grooming in late March. The User Agreement requires the trails to be groomed at least once a week (usually prior to the weekend or after a significant snowfall) and it authorizes the club to collect fees for trail use.

The City of Revelstoke is growing as a result of its designation as a Resort Community. Much of this development is associated with the excellent winter sport opportunities found in the area (alpine skiing at Revelstoke Mountain Resort, cross country skiing at the Mount MacPherson Trails, back country ski touring, snowmobiling, snow shoeing). The membership of the club is expanding each year as is the use of the trails by members and non members alike. Users of the trail system have expressed interested for enhanced services such as a heated warming facility and lit trails for night skiing.

In terms of facilities, the Revelstoke Nordic Ski Club only has the Ole Sandberg Cabin which is located on the Main Loop Trail approximately 2.5 kilometers for the trail head parking lot. It is a log structure with a large covered deck that is heated by a wood stove. The other built structure the club has is a portable small ticket booth for the issuing and collection of trail fees which is only staffed on weekends and over the Christmas holiday period. The booth is located at the trail head parking lot just off of Hwy 23 South.

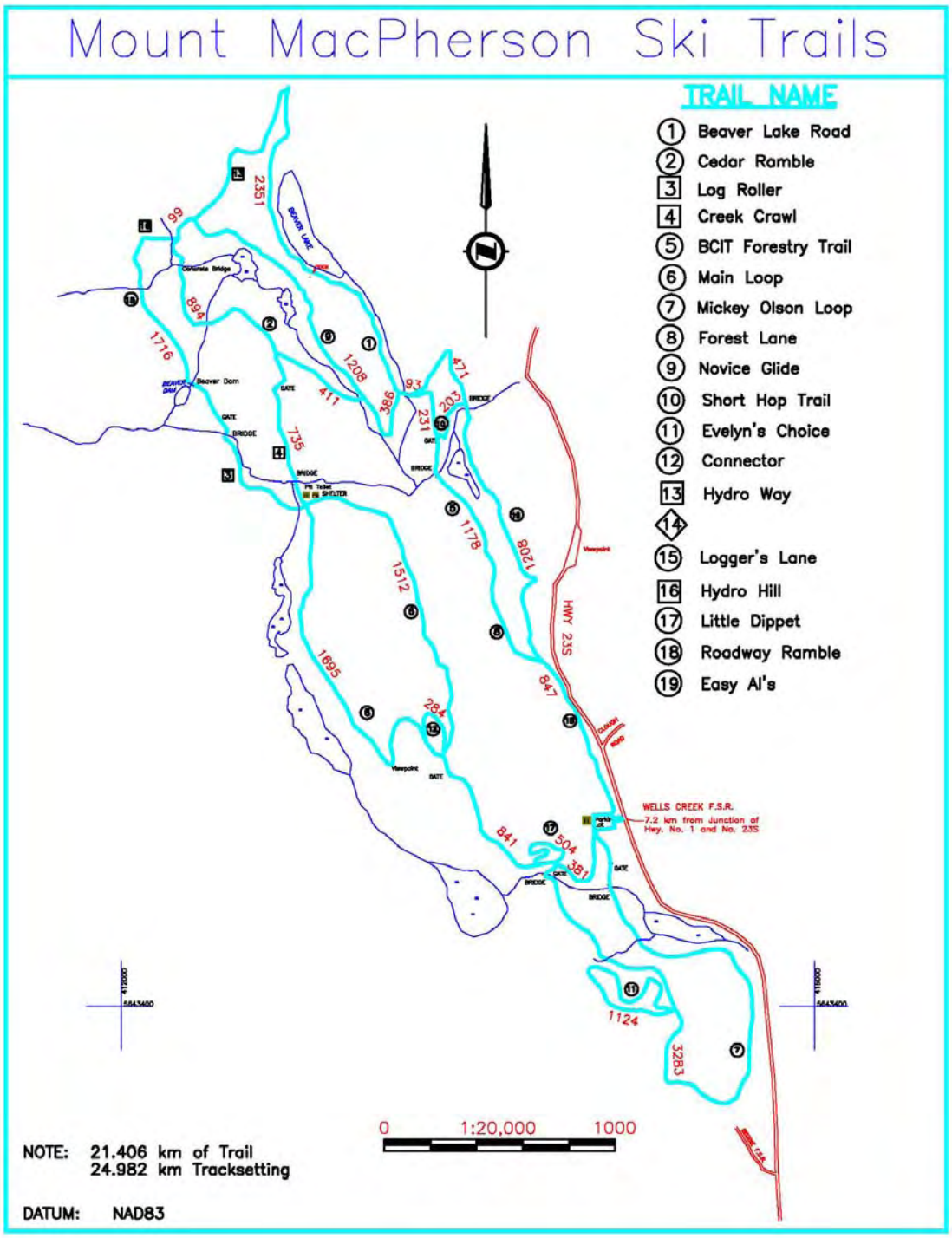


Figure One – Mount MacPherson Cross County Ski Trails

Ole Sandberg Cabin on Main loop trail at 2.5 km mark.

Bev's Hut Ticket Booth at trailhead parking lot.

1.1 Proposed Facilities

The Revelstoke Nordic Ski Club is examining the potential to expand the services and facilities it provides to its membership and the skiing public. The proposed expanded facilities include:

- A Day Lodge (600 to 1200 sq foot in size) at the trail head;
- A 40 x 50 foot maintenance building for safe storage of the groomer and associated trail maintenance equipment;
- A custodian residence (mobile home 14x 56 ft) to provide on site security for the facilities;
- 3.5 kilometers of lit trails for night skiing;
- A mini hydro electric system to generate enough power to provide all of the energy needs for all of the above services and facilities.

These projects would be phased in over a number of years.

Year One	• Day Lodge and Custodian Residence,
Year Two	• Maintenance facility
Year Three	• Trail lighting and Mini Hydro power plant

The timing of any given project could be brought forward or delayed depending upon available funding.

2.0 Methodology

The Revelstoke Nordic Ski Club received $10,000 worth of funding ($7,500 from the Columbia Basin Trust – Community Development Program, and $2,500 from the Colombia Shuswap Regional District - Economic Opportunity Fund) to hire a consultant to investigate the feasibility, design and cost (capital and on going annual operations and maintenance) of developing the proposed facilities outlined above. The club hired Wildland Consulting Inc. of Revelstoke to undertake this work.

A number of steps were taken to research and develop the potential designs and layouts for the proposed development projects. This included discussions with numerous trades people and professionals. One of the first steps was the development of a questionnaire.

2.1 Questionnaire

As part of the study, a questionnaire was developed to gather information from other cross country ski clubs throughout British Columbia on the design criteria and cost for constructing and operating a day lodge, maintenance facility, custodian facility and trail lights (Refer to Appendix One for a copy of the questionnaire). The idea was to learn as much as possible from other clubs so the Revelstoke Nordic Ski Club could avoid the pit falls other clubs have experienced in the development of similar facilities.

A total of 37 questionnaires were emailed to the majority of cross country ski clubs in BC. A total of 8 written responses were received (22% response rate).

The key findings from the survey results were the following:

Day Lodge

- Average size of the main floor for a Day Lodge is 1411 Sq Ft. The lodge is either constructed on a crawl space or full basement.
- Majority do not have running water.
- All had electrical heating sources.
- Half the facilities are staffed, half are not.

Comments

- *Build it larger then you think you will need. Always need more space.*
- *Use an open concept design.*
- *Use in floor heating for main source of building heat.*

- *Ensure day lodge has a nice covered deck that overlooks stadium area.*
- *Keep the design simple.*
- *Ensure you have lots of room for medal presentations, indoor lessons, potluck suppers, races etc with a good quality kitchen, lots of storage and room to wax.*
- *Have an indoor / outdoor sound system.*

Maintenance Building

- Construction varies between metal frame, wood frame or Quonset.
- Most built on a cement slab, some on cement slab with gravel pad beneath groomer storage area.
- Most have a workshop as part of the facility.
- Average size is 1,365 sq ft.
- Maintenance building is typically not heated, with no running water, only electricity.

Comments

- *Make sure it is large enough to fit future needs.*
- *Make sure the facility is close to the trails.*

Custodian Facility

- Those that have a custodian facility, all use mobile homes.

Comments

- *Having the custodian living beside our facilities has decreased vandalism to our chalet and Track setter Shed to almost zero.*
- *Find someone who would like to live at the ski trails and provide a trailer pad and hook-ups, they provide the trailer and stray for free. This works best if they like to ski.*
- *We don't have a custodian facility but there is a couple who live in a mobile home on our property at no cost above the parking lot who watch the parking lot – they don't actually check out the facility but would call authorities of something was suspicious.*

Ski Trail Lighting System

- 7 out of 8 respondents have lit trails ranging from .5 km to 5 km.
- Average length of lit trails is 2.9 km.
- All but one system have wiring above ground.
- Typical distance between wooden pole light standards is 50 meters.

- Most light systems are on a timer. All shut off at 10:00 PM and are on an average of 4 to 5 hours per day.
- A variety of bulb types are used from Halogen to metal halide, mercury vapor, high pressure sodium and fluorescent ranging from 250 to 400 watts.
- Annual operations and maintenance cost range from a low of $500 to a high of $10,000.

Comments

- *Our biggest issue is the line above the ground. I would put all of your efforts into burying the line in the ground.*
- *Above ground wiring is high maintenance. Trees fall on lines. Underground wiring is costly.*
- *Take to Telus and BC Hydro for donation of pales and to help with setting poles. Go to a 347 volt system and the underground system.*
- *Put wiring in the ground.*
- *Have fewer lights and install them facing parallel to trails.*

2.2 Land Tenure

As previously stated, the Revelstoke Nordic Ski Club currently has a land tenure User Agreement with the Ministry of Tourism, Culture and the Arts. The User Agreement requires the trails be groomed at least once a week (usually prior to the weekend or after a significant snowfall) and it authorizes the club to collect fees for trail use. This form of tenure is not suitable for the type of infrastructure that is being proposed by the club. Should the proposed development projects become a reality, the Club would need to get a non-profit License of Occupation for the physical foot print of the facilities from the Integrated Land Management Bureau. The club would need a sponsoring government agency to acquire this tenure on their behalf.

3.0 Site Plan

The propose facilities will be centered around the existing parking lot at the Mount MacPherson Cross Country Ski Trails off Hwy 23 S. The proposed location for the Day Lodge, Custodian Residence will be on the west side of the parking lot up in what is now a treed area off of the stadium area. This location provides easy access to the parking lot, yet far enough away from the vehicles to give the feel of a ski chalet in the mountains. It will be oriented in a north / south direction to maximum the radiant heating capacity of the sun. The Custodian

Residence would be located 100 meters north of the Day lodge in a similar orientation. These areas will need to be cleared of trees, leveled and the surface water removed by installing drainage ditches. Water and septic services would be located in between both of these structures.

The Maintenance Storage building will be located south of the parking lot beneath the bank, just off of Mickey Olson Loop Trail. This location will partially hide the large structure yet be visible from the Custodian Residence for security purposes. Like the Day Lodge, the area has surface water that will be removed by installing drainage ditches.

Refer to Figure Two below for locations of the proposed facilities.

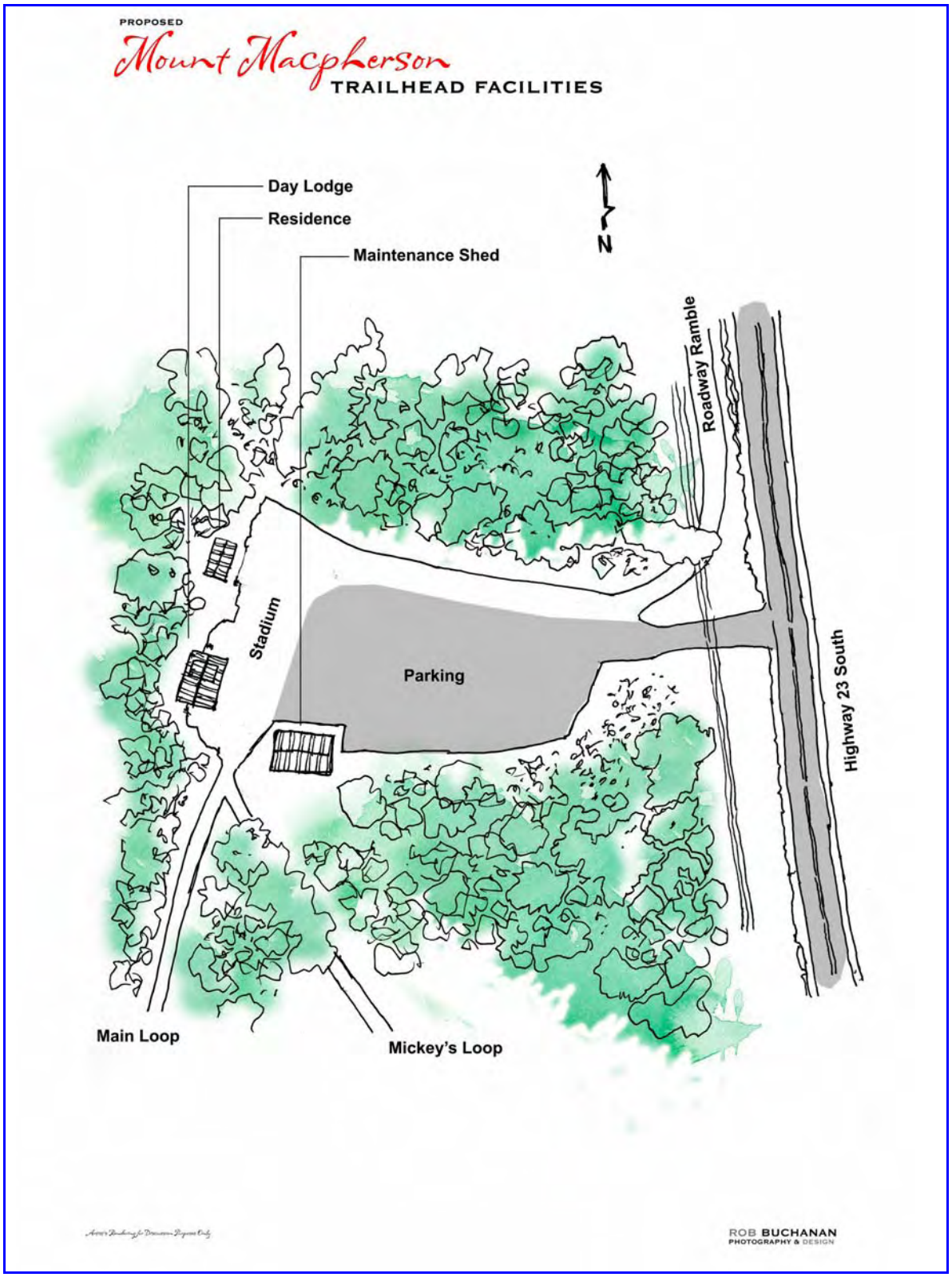


Figure Two - Site plan for proposed facilities

4.0 Day Lodge

Many of the Nordic ski facilities throughout British Columbia have some sort of Day Lodge or Warming Hut facility either at their trail head or on the trail system itself. Often these facilities are an important aspect to the cross country skiing experience. They provide a meeting point at the start and end of a ski outing, a place to change into and out of ski wear, a location to have a lunch / snack and warm up, and finally as a social gathering venue. In addition, many Day Lodges are also the location where trail fees are collected and sold, visitor information is provided and public safety / first aid is administered.

At the Mount MacPherson trails, skiers can often be seen chatting to one another around the trailhead parking lot or by the ticket booth before or after a ski outing. This area also serves as the "Stadium Area " for the club. This is where the children's ski programs meet each week, as well as where special club events are held (Team Scream Relay Race, Pot Luck dinners, etc.).

The concept is to construct a Day Lodge that can be used by the Nordic Club throughout the winter months, as well as rented to other clubs and user groups in the remainder of the year.

4.1 Site Preparation

Water, septic and electrical services will need to be installed on the site. Pending site specific citing which will occur in the spring, drinking water will be from a deep well drilled up slow of the facilities. The nearest drinking water well to the proposed facilities is the Sidjak property located across the road from the proposed Day Lodge site. The Sidjak property well was drilled to a depth of 320 feet with the static water level at 50 feet. That site is slightly higher in elevation then the proposed Day Lodge site. According to Mr. Sidjak, his well was drilled primarily in bedrock. Only the top 20 feet is composed of over burden. It is anticipated that the well at the Day Lodge site will hit water at a depth of 150 to 300 feet level.

A septic tank and field will be installed in close proximity to both the Day Lodge and the Custodian Residence to maximize efficiency.

Electrical power will come off of the hydro lines that run along Hwy 23 S.

As previously mentioned, a fair amount of ground preparation will be required to level the site and drain the surface water out of the area.

4.2 Day Lodge Functions and Spatial requirements

The new Day Lodge will fulfill a number of functions including:

- The sale of trail passes and collection of fees;
- An enclosed and warm waxing room;
- An enclosed dry warm storage area;
- Provision of washroom facilities;
- A place to warm up during cold days;
- A meeting location for children's and adult ski programs;
- A location for waxing clinics;
- A lunch / snack room location;
- A location for social gatherings and club events / pot luck dinners;
- A location from which races can be organized and held;
- A location for club meetings;
- A First Aid centre;
- A place to rest and relax during and after a day of skiing;
- A covered deck out of the elements for outdoor activities such as barbeques.

Given these range of functions, it is estimated that spatial requirements for the new Day Lodge will be the following:

Function	Area Required	Potential Location in Day Lodge
Fee collection office	42 to 64 sq ft	basement or main floor
Storage room	50 to 100 sq ft	basement or main floor
Waxing room	400 to 500 sq ft	basement
Washrooms (men's & women's)	45 to 72 sq ft each	Basement or main floor
Open space for eating, resting, warming up, special events	500 to 1000 sq ft	Main floor
Meeting room / office	300 to 400 sq ft	Basement or 2nd floor / loft
Cooking facilities	50 to 90 sq ft	Main floor
1st aid storage	15 sq ft	Basement or main floor
Covered outdoor deck	200 to 500 sq ft	Main floor and basement

Based upon these spatial requirements, the size of the proposed Day Lodge should be in the range of 1400 to 2241 sq feet (not including a covered deck) on one floor. If a full walk out basement and loft area are included in the design, the

spatial area required can be reduced to 600 to 1120 sq feet for the main floor and basement.

4.3 Design Criteria

There are a number of specific design criteria that any new Day Lodge must meet in order for the facility to function well, be user friendly, require minimal daily and annual maintenance and upkeep, and be financially feasible for the club to operate. These will have a bearing on the final cost for the facility.

These design criteria include:

- Be esthetically pleasing and attractive to visitors (use of natural materials such as wood and wood accents);
- easily accessible and visible from the parking lot;
- constructed of quality material that will require minimal daily and annual maintenance and repair (commercial grade versus residential grade products,);
- simplicity in design to minimize construction costs (square corners, straight lines, simple angles);
- discourage the temptation for vandalism and mischief (hardy building exterior and interior finish and security features);
- ensure visitor safety and security at all times (eg. Non sliding roof for snow loads);
- minimize daily and annual operating costs (high energy efficiency);
- minimize daily custodial duties (durable flooring and walls, low flow toilet fixtures, etc);
- maximize functionality.

4.4 Design Options

A number of BC Based recreational building design companies were contacted to solicit potential designs for the Day Lodge. After discussions with these various companies and reviewing their products, the Greystokes International – Wilderness Cabin Company (www.wildernesscabin.com) based out of Kelowna was selected as the design company of choice. They have an excellent national and international reputation for designing recreational buildings that are attractive and functional. Greystokes has constructed over 50 chalet style buildings at the Big White Ski Resort. Consequently they understand the unique design criteria

for deep snow environments. They have also worked with other Nordic ski clubs in BC on designing Day Lodges.

Based upon the Club's spatial needs and design criteria, Greystokes came up with a base design that fulfills all of the requirements and can be either scaled up or down depending up the club's budget and preference. The layout is the same in each design with the rooms are either slightly larger or smaller. The base design utilizes a full walk in basement with internal connecting stairway to the main floor and upper loft. They have designed three sizes based upon a main floor plan of either 600 sq ft (total 1480 sq ft on 3 floors), 816 sq ft (total 1968 sq ft on 3 floors) or 1120 sq ft (total 2632 sq ft on 3 floors). All three designs also have a large covered deck. The design is primarily of wood frame construction with many cedar accents (cedar ridge beam and tongue and groove vaulted ceiling) on a stepped full cement basement. Greystoke – Wilderness Cabin Company provides a complete building kit will all materials required to erect the building (excluding cement foundation).

The following figures provide the layout of the 1120 sq ft model. Appendix Two has the layout for the 600 and 816 sq ft models.

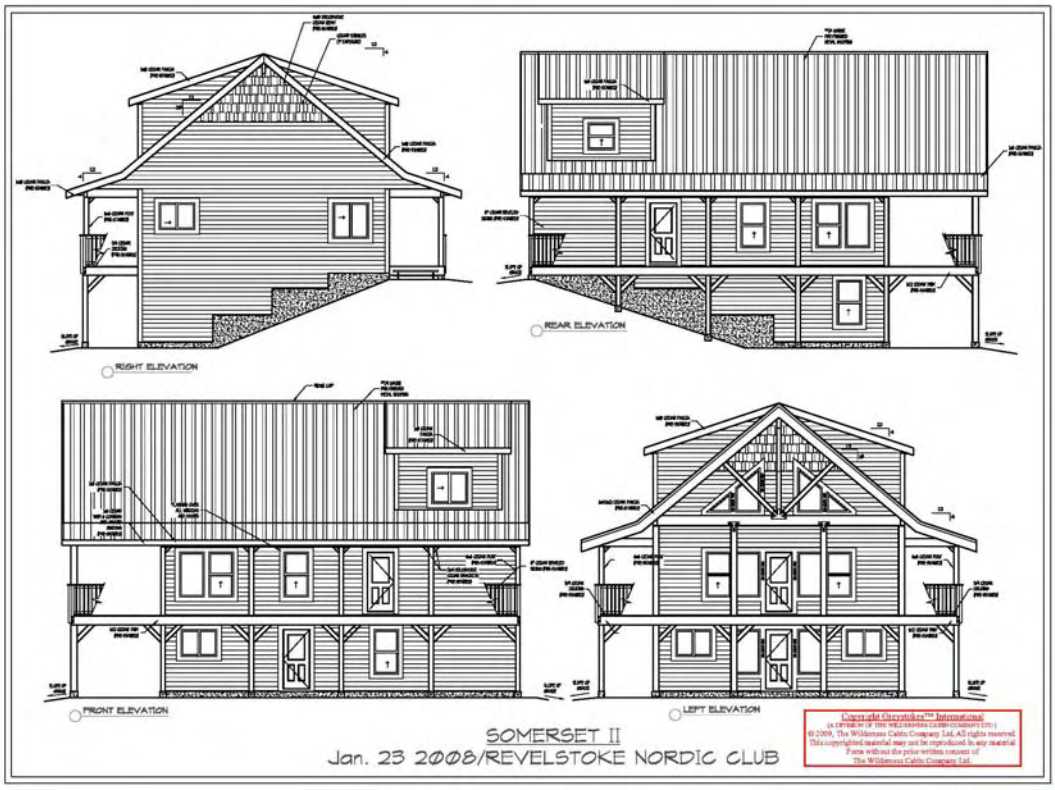


Figure Three – Elevation views of 1120 sq foot design

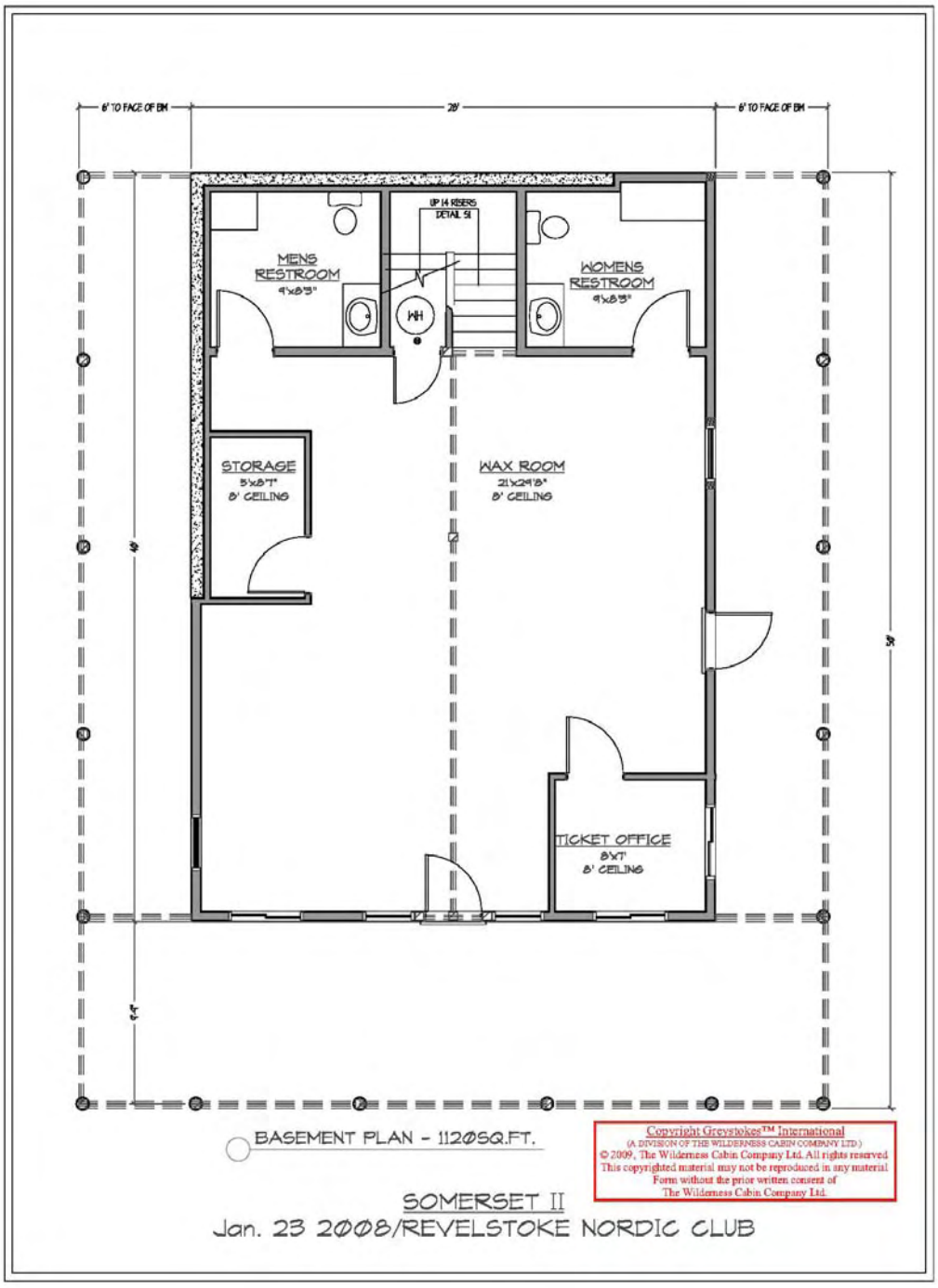


Figure Four – Basement layout

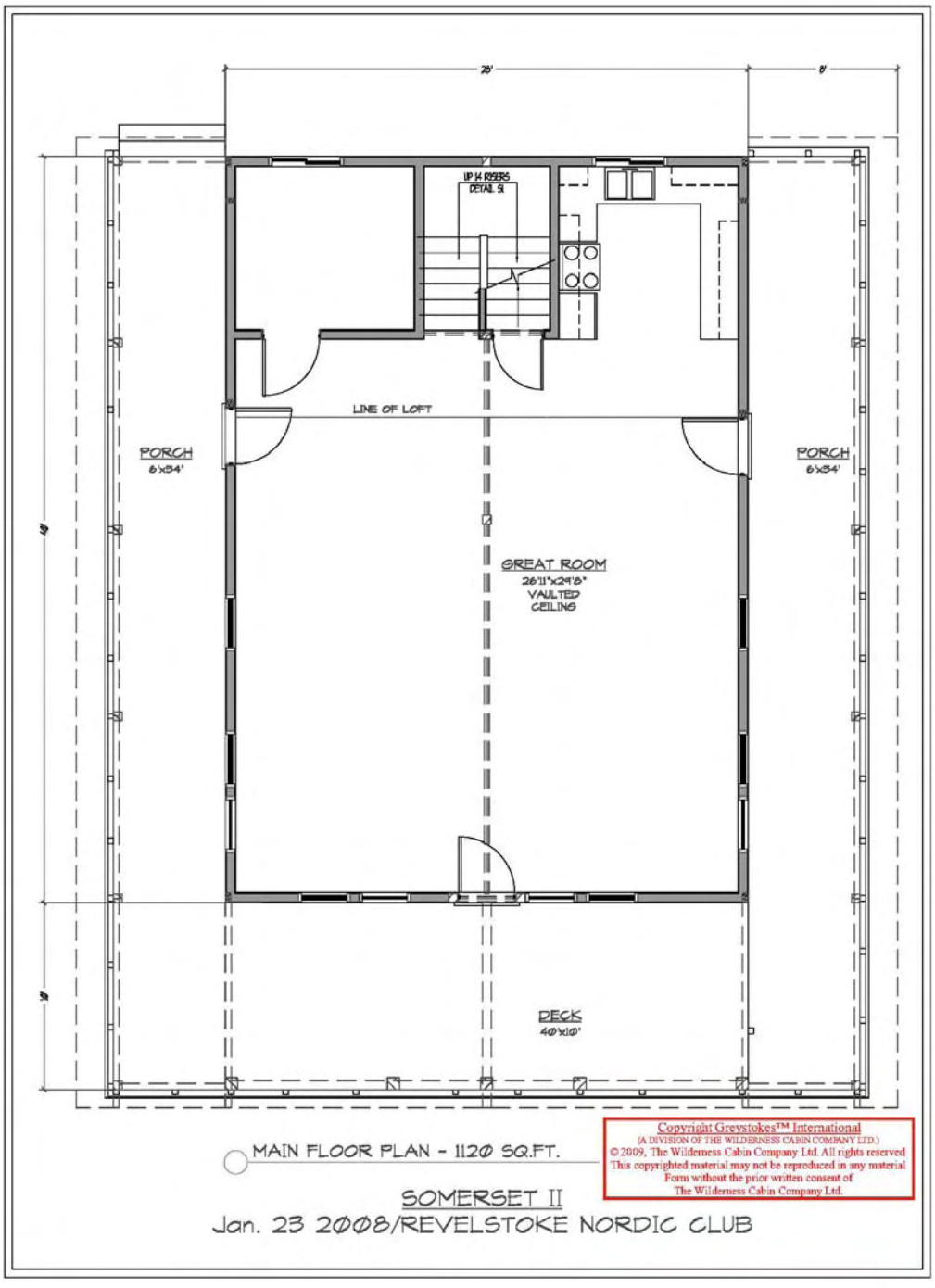


Figure Five – Main Floor layout

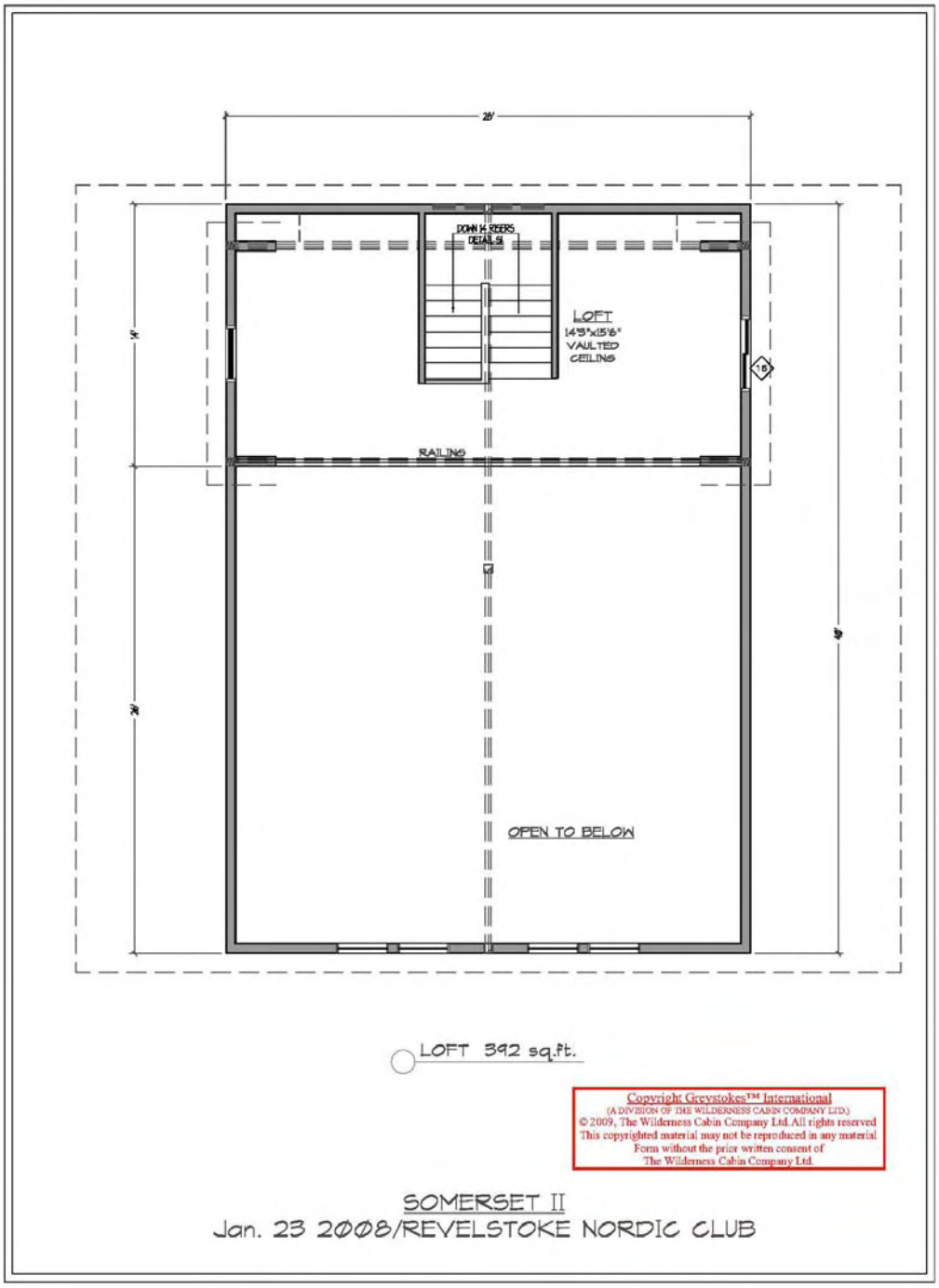


Figure Six – 2nd Floor Loft layout

The following figures depict the Day Lodge in a winter and summer setting. Note the location of the proposed Maintenance Facility on the left, and the proposed Custodian Residence on the right.

Figure Seven – Day Lodge in winter setting

Figure Eight – Day Lodge in summer setting

4.5 Construction Costs

The following tables outline the estimated construction costs for each of the three designs. The cost estimates do not include volunteer time to complete certain tasks such as interior and exterior painting, installation of floor covering material. The cost of the associated site infrastructure (drilled well, septic system, and installation of electrical power to the site), have been added on to the cost of the Day Lodge facility. Though these services will be required for use by the Day Lodge as well as the Custodian Residence and Maintenance Facility, for simplicity of budgeting, they have been captured with the construction costs for the Day Lodge. All cost estimates include all appropriate taxes.

Option One (600 sq ft main fl – total 1480 sq ft model)	**Cost**
Package Kit	$89,600
Electrical	$18,350
Plumbing	$22,500
Construction	$143,104
Insurance during construction	$800
Site Preparation	$5,375
Sub Total	*$279,729*
Miscellaneous Contingency Expense 15%	$41,959
Plus sewer / water / site prep	$45,000
Total	**$366,688**

Option Two (816 sq ft main fl – total 1968 sq ft model)	**Cost**
Package Kit	$116,480
Electrical	$19,300
Plumbing	$23,750
Construction	$159,084
Insurance during construction	$875
Site Preparation	$5,375
Sub Total	*$324,864*
Miscellaneous Contingency Expense 15%	$48,730
Plus Sewer / water / site prep	$45,000
Total	**$418,594**

Option Three (1120 sq ft main fl – total 2632 sq ft model)	**Cost**
Package Kit	$150,080
Electrical	$20,600
Plumbing	$25,000
Construction	$176,760
Insurance during construction	$1,365
Site Preparation	$5,375
Sub Total	*$379,180*
Miscellaneous Contingency Expense 15%	$56,877
Plus Sewer / water / site prep	$45,000
Total	**$481,057**

4.6 Annual Operating Costs

The following annual operating costs have been developed based upon the premise that the Day Lodge will be a new building requiring minimal addition maintenance costs for the first ten years. Any unforeseen substantial repair costs, would in all probability be covered by the Club applying for financial assistance from one of the funding agencies listed in Section 10 of this report. Failing success with this approach, other mechanisms would have to be examined such as the use of volunteers and donations to undertake subsequent repair and renovation work.

Some revenue has been calculated to account for building rentals for special events, weddings, etc. This revenue stream could easily grow to thousands of dollars per year give the location and attractive building design. However, for the first year, this will not be included in the annual calculation of operating expenses.

Option 1(600 sq ft Model)	**Cost**
Hydro (heat, lights)	$950
Insurance	$1,600
Annual Maintenance	$800
Total	***$3,350***

Option 2 (816 sq ft Model)	**Cost**
Hydro (heat, lights)	$1,300
Insurance	$1,800
Annual Maintenance	$1,100
Total	***$4,200***

Option 3 (1120 sq ft Model)	**Cost**
Hydro (heat, lights)	$1,800
Insurance	$2,100
Annual Maintenance	$1,500
Total	***$5,400***

The additional monies required to cover the operating cost for the Day Lodge, would result in a fee increase for adult and family annual club memberships (assuming a total membership of 174 Adult and 26 Family and a 70% and 30% portioning of costs) of the following amounts:

	Adult	**Family**
Option 1(600 Sq Ft model)	$13	$39
Option 2(816 Sq Ft model)	$17	$48
Option 3(1120 Sq Ft model)	$22	$62

5.0 Custodian Residence

It became apparent from the results of the questionnaire that was sent to clubs throughout the province; that the placement of a Custodian Residence at the trail head parking lot at Mount MacPherson can provide a range of benefits. In lieu of receiving either free or subsidized rent, the custodian would be expected to undertake a number of tasks. These tasks could include:

- Provision of security services for the various built facilities to minimize the damage and cost associated with vandalism and inappropriate behavior.
- Daily opening and closing of the Day Lodge during the ski season. In addition, the custodian would manage use of the facility in the snow free periods of the year.
- Provision of daily janitorial services in the Day Lodge.
- Provision of maintenance and repair services on the Day Lodge.
- Provision of trail maintenance services.
- Provision of first aid and other public safety services.
- Provision of winter trail grooming services.

The Custodian Residence will be situated in a high visibility location to ensure that the public is aware of the custodian's presence. The main access point to the parking lot, Day Lodge and Maintenance Facility must be visible from the residence. Therefore the proposed location for the residence as previously noted, is 100 meters north of the Day Lodge on the far west side of the Stadium

area (refer to Figure 2). This location will provide a good vantage point to the above mentioned facilities.

5.1 Site Preparation

The same site preparation work required for the Day Lodge will apply for the location of the Custodian Residence. The area will need to be partially cleared of trees, surface water drained from the site by constructing drainage ditches and installing culverts, and the removal of ground material to construct a level building site.

5.2 Custodian Residence Functions and Spatial Requirements

The primary function of a Custodian Residence is to provide a comfortable accommodation facility that will be attractive to a person or couple who would like to fulfill the tasks required of the position as outlined above. The residence must be large enough to accommodate the spatial requirements of up to two individuals. These features should include:

Feature	Square Feet required
Master bedroom	140 sq. ft
Second bedroom	120 sq. ft
Bathroom	40 sq. ft.
Kitchen	60 sq. ft.
Dining Room	70 sq. ft.
Living Room	230 sq. ft.
Laundry Room	35 sq. ft
Entry room	100 sq. ft.

The total area required for a reasonably sized Custodian Residence is 795 square feet.

5.3 Design Criteria

The key design criteria for the Custodian Residence is practicality of design versus the cost of the structure. The Club does not need a substantial home or permanent residence to be built on site. A module or manufactured home that can easily be installed on site would be adequate. Specific design criteria to be considered are:

- Size versus cost of structure;
- Built for the snow load of the site;

- Low annual maintenance requirements;
- Comfortable and practical design for a one to two person home.

The Figure Nine below is an example of a mobile / manufactured home that would meet the club's spatial requirements and needs.

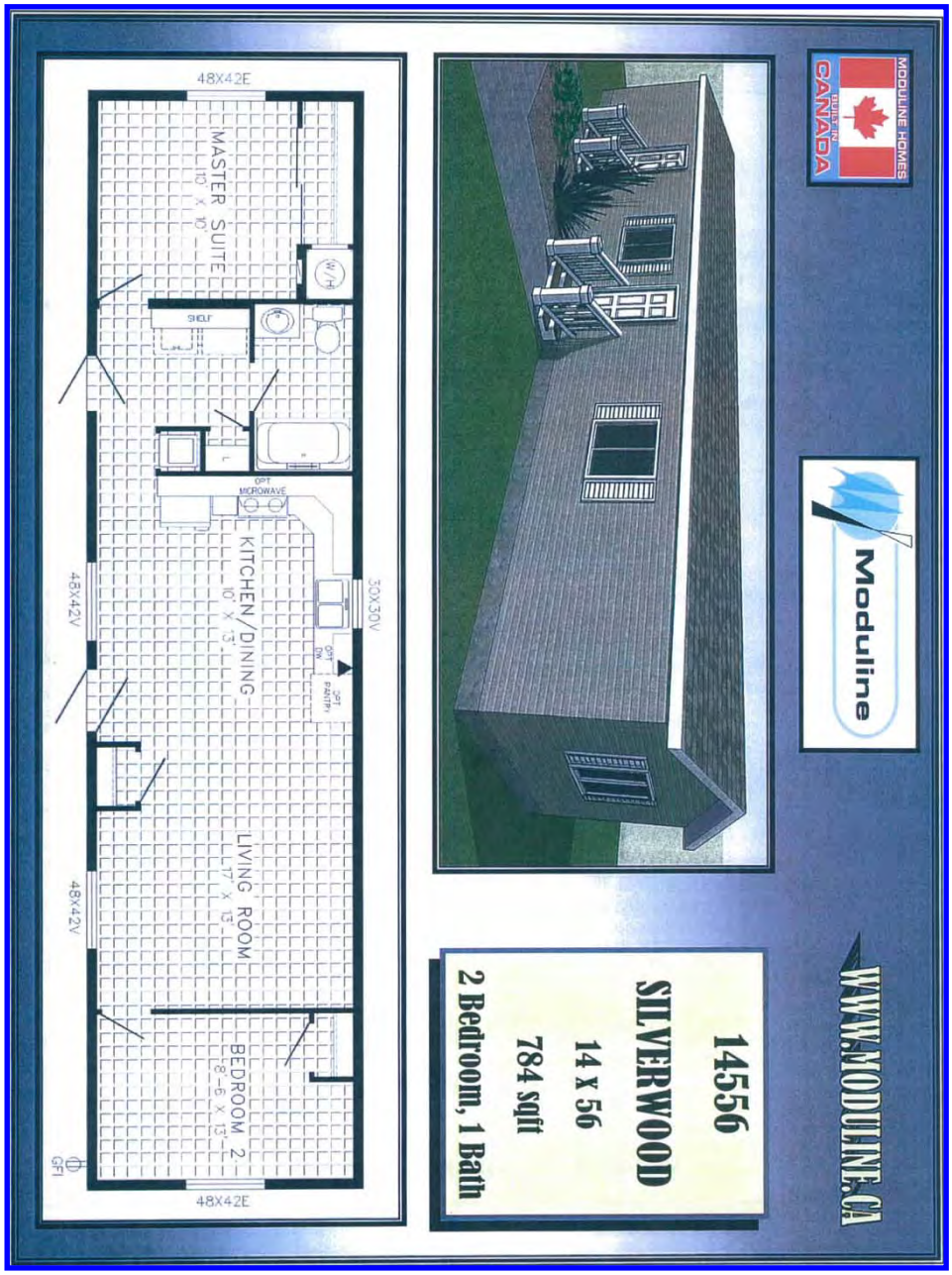


Figure Nine – Example of suitable Manufactured Home.

5.4 Ownership Options

The Club has the option to purchase and install a new or used module / manufactured home on site, or provide a serviced pad site where a custodian could move their own unit onto site.

The advantage of the club purchasing and installing a module / manufactured home is the ease of attracting custodial candidates who do not necessarily wish to own their own home nor have the financial means to purchase one, yet have the interests, skills and knowledge to fulfill the custodial duties and responsibilities. If the club continues to grow and prosper in the future, the Custodial Residence could become the home of a paid Club Manager who looks after all of the various aspects of club operations.

Conversely, the disadvantage of the club owning the residence is the additional annual maintenance and future capital costs for repairs. As with the Day Lodge, funding sources are available that might be able to offset future capital upgrades and expenditures on the residence.

5.5 Construction Costs

The table below is an estimation of the construction cost for a new manufactured home to be installed on site. The cost for a good quality used mobile home would be substantially cheaper (up to 50%). However, the cheaper the unit, the higher the cost of the renovations and upgrading that would be required. An old unit would not have an engineered roof to handle the snow load requirements of the site. Consequently an additional snow roof would in all probability have to be constructed over top of the unit. This cost (estimated at $13,000) coupled with the cost of interior renovation and the cost of the unit, brings the total cost closer to that of a new unit not requiring any additional work.

The cost of the site hook-up to the drinking water well, hydro electricity and septic tank have been covered in the Day Lodge budget projections. All cost estimates include all appropriate taxes.

Custodian Trailer	**Cost**
14 x 56 784 sq ft new unit	$64,500
Set up	$4,000
Deck / entry way	$15,000
Propane tank install	$500
Site preparation work	$2,725
Sub total	*$86,725*
Miscellaneous Contingency Expense 10%	$8,673
Total	***$95,398***

5.6 Annual Operating Costs

The following annual operating costs have been developed based upon the premise that the Custodian Residence will be a new building therefore requiring minimal addition maintenance costs for the first ten years. Any unforeseen substantial repair cost, would in all probability be covered by the Club applying for financial assistance from one to the funding sources outlined in Section 10 of this report. Failing success with this approach, other mechanisms would have to be examined such as the use of volunteers and donations to undertake subsequent repair and renovation work.

The annual cost for utilities would be covered by the Custodian. The Club would only cover the costs for insurance on the structure, and minor additional maintenance costs.

Custodian Residence	**Cost**
Hydro (lights)	$1,500
Propane	$2,000
Insurance	$590
Annual Maintenance	$500
Sub Total	*$4,590*
Less Custodian rental costs (hydro, propane)	$3,500
Total	***$1,090***

The additional monies required to cover the operating cost for the Custodian Residence, would result in a fee increase for adult and family annual club memberships (assuming a total membership of 174 Adult and 26 Family and a 70% and 30% portioning of costs) of the following amounts:

	Adult	**Family**
Custodian Residence	$4	$13

6.0 Maintenance Facility

The Revelstoke Nordic Ski Club would not have the top quality ski trails it has were it not for the expensive groomer and dedication of volunteer trail groomers to operate the machine. Presently, the groomer is stored out of doors on an adjoining property across Hwy 23S about 1 kilometer from the trail head parking lot. This has some notable limitations such as volunteers performing maintenance on the machine in a cold, wet environment, and lack of proper, covered and secure storage of the machine when not in use throughout the year.

A covered, secure maintenance storage facility has been a priority for the club for a number of years. The concept is to construct a new metal Maintenance Facility in close proximity to the Day Lodge and Custodian Residence. The clustering of the facilities in one area provides economies of scale in terms of the associated infrastructure (electrical, water, and sewer hook-ups) as well as security. Given the expensive value of a trailer groomer machine, safe, secure storage is of paramount concern to the club.

6.1 Site Preparation

The proposed location for the Maintenance Facility is south of the parking lot and stadium area just off of Mickey Olson Loop trail (Refer to Figure 2). This location is central to the other proposed facilities for economies of scale and security purposes. In addition, the facility must be easily assessable by road for replenishing the fuel storage tank for the groomer. This site is damp with surface water. As with the other proposed facilities, the area will have to be modified to level the site and remove the surface water.

6.2 Maintenance Facility Functions and Spatial Requirements

The Maintenance Facility must fulfill a number of functions associated with summer and winter trail maintenance activities, as well as other general club maintenance tasks. These functions include:

- Covered and secure storage for the trail groomer machine and other equipment;
- A covered dry location to perform maintenance tasks on the groomer and other machinery;
- A covered, dry workshop area;

- Access to electrical power and close proximity water and sewer services;
- Fuel storage;
- Covered dry storage for building supplies.

The spatial requirements for these functions are:

Function	Area required
Storage for a groomer and associated hardware	1000 sq. ft
Snowmobile and associated track setter hardware	100 sq. ft
Small equipment storage	50 sq. ft
Additional working space required to perform maintenance tasks	200 sq. ft
Workshop	300 sq ft.
Material storage (wood, culverts, etc)	100 sq. ft.

Therefore the total spatial requirements for a Maintenance Facility is approximately 1,750 square feet. Fuel storage cannot be within the confines of the Maintenance Facility but must be in close proximity to the site.

6.3 Design Criteria

The Maintenance Facility must be designed to withstand the rigors of the natural environment and climate of the area. The specific criteria include:

- Structurally designed to deal with 156.4 pound per square foot snow loads;
- Constructed of material that can withstand the harsh climatic conditions (heavy spring and fall rains, winter snows and cold temperatures) and not require significant annual maintenance;
- Large enough to be able to handle a wide range of maintenance tasks from machinery repairs to construction activities;
- Large storage spaces for equipment, materials and supplies;
- Ware resistant ground surface to deal with the metal tracks of a groomer;
- Longevity of life – not need to be replaced for many years;
- High security to prevent damage and vandalism to stored equipment, material and supplies.

The facility does not need to be insulated given that the facility will primarily be used as storage.

6.4 Structural Building Options

There are three main structural building options for the Maintenance Facility. These are either wooden framing and roof trusses with a metal roof, metal Quonset hut, or steel framing and trusses with a metal roof. Given the above mentioned design criteria, the recommended option is to have a steel / metal building. The advantages of a metal building are:

- Longevity and durability of construction materials;
- Low annual maintenance requirements;
- High security;
- Large clear roof spans which maximizes working floor space free of structural support posts;
- Reduced fire hazard.

The recommended size is 50 feet long by 40 feet wide and 18 feet high with a large overhead door, and side man door. Figure Ten below is an example of the typical design for a steel / metal building

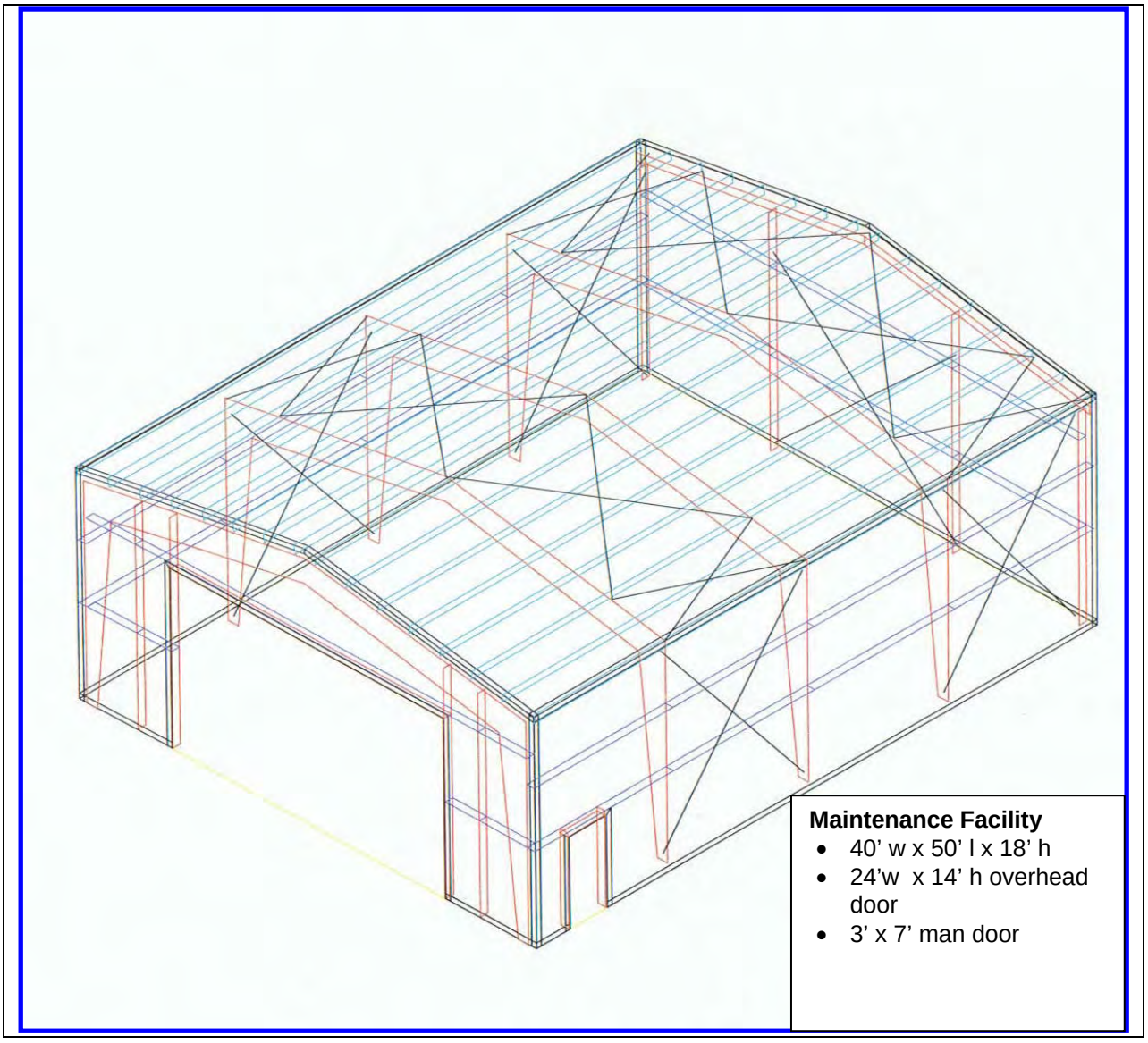


Figure Ten – Typical Steel / Metal Building Design

6.5 Construction Costs

The estimated construction cost for the proposed steel / metal building similar to the structure depicted in Figure Ten, is outlined in the table below. All figures include appropriate taxes.

Maintenance Building	Cost
Prefabricated building material	$49,700
Contractor to erect building	$11,400
Work crew (2)	$4,000
Ground preparation	$8,025
Cement footings & slab	$20,500
Labour costs footings/slab	$8,900
Electrical	$9,240
Overhead and Man doors installed	$12,388
Equipment rental	$1,750
Equipment fuel	$380
Sub total	*$126,283*
Miscellaneous Contingency Expense 15%	$18,942
Total	***$145,225***

6.6 Annual Operating Costs

The anticipated annual operating cost for the Maintenance Facility is the following:

Maintenance Building	Cost
Hydro (lights)	$500
Insurance	$840
Annual Maintenance	$500
Total	***$1,840***

The additional monies required to cover the operating cost for the Maintenance Facility, would result in a fee increase for adult and family annual club memberships (assuming a total membership of 174 Adult and 26 Family and a 70% and 30% portioning of costs) of the following amounts:

	Adult	Family
Maintenance Facility	$7	$21

7.0 Trail Lighting

The Club is investigating the potential to install a trail lighting system on the 3.5 km Mickey Olson Loop ski trail. This trail starts and at the parking lot opposite the proposed location of the Day Lodge and makes a circle back to this location

by connecting up with a short stretch of the Main Loop Trail (Please refer to Figure One). Trail lighting systems extend the number of hours in a day skiers can safely circumnavigate ski trails in an area. Given Revelstoke's northern latitude, in the height of the winter, day light hours can be as limited as from 8:00 AM to 4:00 PM. Extending the number of hours for skiing by installing a trail lighting system, can be a great advantage to skiers, especially those who cannot get away during the daytime for a ski.

7.1 Trail Lighting Criteria

The two key components of a trail lighting system that have a substantial bearing on capital and operating costs are the type of light fixtures that are use, and if the power supply lines are either installed above ground or below ground.

Light Fixtures

There is a wide variety of different light fixtures that are available on the market. There is a direct correlation between the price of a fixture and the annual operating costs for that fixture. Typically, the more expensive the light fixture, the less electricity it consumes and less maintenance required. Conversely, the lower the price of the fixture, the higher the amount of electricity consumed and higher maintenance costs.

Various light fixtures were examined. The most efficient fixtures were LED light systems. However the cost per fixture was prohibitive (over $300,000 alone for fixtures not including installation costs and wiring). The compromise fixture selected for this application is Metal Halide unit. It combines a reasonable electrical consumption rate with reasonable longevity and maintenance costs.

Wiring Installation

As noted in the survey results from other Nordic Ski Clubs that have trail lighting systems, above ground wiring can be very costly in terms of maintenance required to repair broken lines, and the increase frequency of down time when the lights are not working due to broken wires. However the cost of above ground wire installation is substantially less then underground wire installation. Though more expensive, it is recommended that below ground installation be undertaken for this project. The remote location of the trail lights would make it difficult for repairs to occur mid winter when rubber tired equipment would not be able to access the area.

7.2 Trail Lighting Design

The following trail lighting design is recommend for the 3.5 km loop.

- Wooden posts installed on a 165 foot interval;
- 2 lights mounted per post parallel to the ski trail;
- Use 138 - 400 Watt Metal Halide floodlights for an average light pattern of 2.6 foot candles;
- Lights mounted 25 feet above the ground;
- All wiring is buried 16 inches beneath the ground;
- Light system is on a manual start switch, with a timer that will automatically shut off at 10:00 PM.

7.3 Construction Costs

The estimated construction costs for the proposed trail lighting system for the 3.5 km loop trail is outlined below. All figures include appropriate taxes.

Trail Lights	**Cost**
138 - 400 MH floodlights installed	$147,000
Trenching and bedding wire in sand, backfill	$12,000
Installing 69 wooden posts	$7,000
Sub Total	*$159,000*
Miscellaneous Contingency Expense 15%	$23,850
Total	***$182,850***

7.4 Annual Operating Costs

The anticipated annual operating cost for the Trail Lighting System is the following:

Trail Lighting System	**Cost**
Hydro	$3,500
Annual Maintenance	$500
Insurance	$2,500
Total	**$6,500**

The additional monies required to cover the operating cost for the Trail Lighting System, would result in a fee increase for adult and family annual club memberships (assuming a total membership of 174 Adult and 26 Family and a 70% and 30% portioning of costs) of the following amounts:

	Adult	Family
Trail Lighting System	$26	$75

8.0 Mini Hydro IPP

The Revelstoke Nordic Ski Club is a registered non profit organization. Monies generated by the club are used to help cover operating expenses. The proposed mini hydro Independent Power Project (IPP) would provide a mechanism for the club to generate electricity to cover its own electrical requirements, as well as additional revenues by selling the excess electrical power to BC Hydro. For all of the proposed infrastructure improvements, the Nordic Club's largest single annual operating cost budget item will be electricity. Additional revenues generated from power sales would be used to cover the club's annual operational costs as well as set aside for future club requirements (purchase of new groomer, purchase of private land, trail improvements).

The proposed location of the IPP is on the un-named creek that runs through the middle of Mickey Olson Loop ski trail (Refer to Figure Eleven below). This is a small creek whose headwaters are the beaver ponds off of the back side of the Main Loop Trail. The creek crosses the Mickey Olson Loop ski trail at two locations. The proposed IPP would require the installation of a number of 6 inches metal pipes running parallel to the creek but buried beneath the ground, from the beaver pond headwaters down to where a small powerhouse would be located by the lower bridge crossing. This is a drop of approximately 85 meters over an estimated distance of 1000 meters.

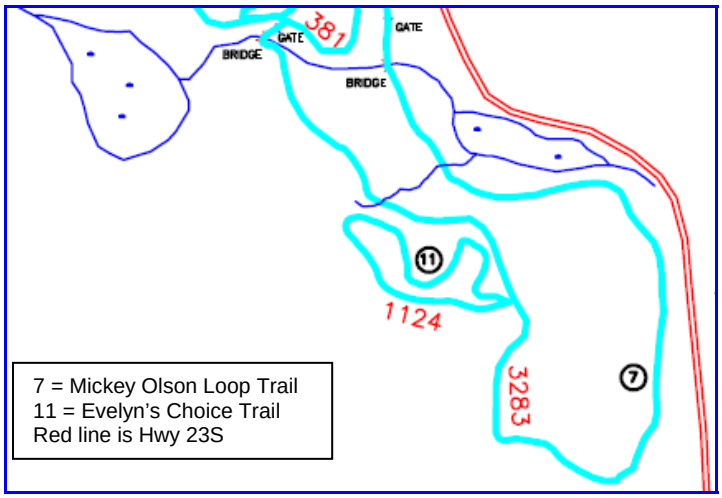


Figure Eleven - IPP location

This unnamed creek is a very small; less than 1.5 meters wide. A small portion of this creek would be diverted into the metal penstock pipes by a weir install at the beaver ponds. The penstock pipes would direct the flow down slope creating the head required to turn a small turbine to generate electricity. The water would return to the creek after it passes through the turbine. The turbine would be inside a small building (6 feet x 6 feet) located adjacent to the lower bridge on the Mickey Olson Loop Trail. It is estimated that on average, the IPP would use 20% of the creeks water flows. For about 2 to 3 weeks a year during winter low flow periods, the usage would go up to 75%. The IPP would be operating at full capacity 69% of the year. The typical IPP average is about 50%.

The electricity generated would flow in buried electrical cables up the trail to the parking lot. At this point, the wires would join the power line connecting the Day Lodge, Maintenance and Custodian Facilities to the power grid on HWY 23S.

The IPP would generate a maximum of 50 kilowatts of electricity an hour depending upon the time of year with varying stream flows. In relation to other local IPPs (Akokolux is a 10 megawatt plant – this project would be 220 times smaller then that plant) this is a very small scale project. The revenue generated by the sale of the electricity to BC Hydro through their *Net Metering Program*, would be in the range of $30,000 each year.

8.1 Regulatory Approval

In BC, all proposed IPPs must go through an extensive regulatory application and review process. As part of the application process, numerous studies (fisheries, wildlife, geotechnical, recreation, geomorphological studies) and assessments are required. There is also a comprehensive public review

component where local residents and stakeholders can comment upon the proposed project. This process takes a number of years to complete and is also very costly. It is estimated that the cost of the planning and environmental assessment phase of the project will be in the range of $70,000 to $80,000.

8.2 Construction Costs

As a rule for construction of IPPs, for every 1 kilowatt of plant capacity, the cost for construction (including all construction cost aspects from weir, to penstock to power plant (turbine) and the associated building and wiring), is approximately $3,500. Therefore a 50 kilowatt power plant will cost approximately $175,000.

Mini Hydro IPP	**Cost**
50 kilowatt @ $3500 per kilowatt	$175,000
Application Process studies	$80,000
Sub Total	$255,000
Miscellaneous Contingency Expense 15%	$38,250
Total	***$293,250***

8.3 Annual Operating Costs

The annual operating cost for small scale IPPs are very reasonable. Any monitoring of the power plant is done remotely from a computer. The most expense aspect of the annual costs is insurance. Rarely do the systems have mechanical or technical break downs. For the most part, small scale IPPs are maintenance free.

Mini Hydro IPP	**Cost**
Insurance	$5,000
Plant maintenance	$2,000
Water License rent	$750
Total	**$7,750**

All of the annual operating costs would be completely recovered through the sale of electricity to BC Hydro (estimated at $30,000 per year).

9.0 Complete Project Budget Requirements

The breadth and scope of these proposed projects will be quite an undertaking for a relatively small club. However, if the interest and support is there from the club membership, much can be achieved. As stated in the beginning of the report, it is suggested that these projects be phased in over a number of years. The proposed phases are the following:

Year One	• Day Lodge and Custodian Residence,
Year Two	• Maintenance facility
Year Three	• Trail lighting and Mini Hydro power plant

The timing of any given project could be brought forward or delayed depending upon available funding.

The estimated value to complete all of these projects is approximately $1,083,411 to $1,197,780 depending upon which Day Lodge option is chosen. All capital costs would come from one of the funding sources outlined in Section 10 below. The Club membership would be responsible for covering the annual operating expenses for the proposed facilities.

Summary Costs				
			Fee Increase[1]	
Day Lodge	**Capital Cost**	**O&M Cost**	**Adult**	**Family**
Option 1(600 sq ft Model)	$366,688	$3,350	$13	$39
Option 2 (816 sq ft Model)	$418,594	$4,200	$17	$48
Option 3 (1120 sq ft model)	$481,057	$5,400	$22	$62
Custodian Residence	$95,398	$1,090	$4	$13
Maintenance Building	$145,225	$1,840	$7	$21
Trail Lights	$182,850	$6,500	$26	$75
IPP	$293,250	$7,750	$31	$89
Option 1 plus Custodian Res., Maint Bldg, Trail Lights	$790,161	$12,780	$51	$147
Option 2 plus Custodian Res., Maint Bldg, Trail Lights	$842,067	$13,630	$55	$157
Option 3 plus Custodian Res., Maint Bldg, Trail Lights	$904,530	$14,830	$60	$171
Option 1 above plus IPP	$1,083,411	$20,530	$0	
Option 2 above plus IPP	$1,135,317	$21,380	$0	
Option 3 above plus IPP	$1,197,780	$22,580	$0	
Potential IPP Revenue		$30,000		
Potential Net Annaul Revenue on Option 1 Package		$9,470	$0	
Potential Net Annaul Revenue on Option 2 Package		$8,620	$0	
Potential Net Annaul Revenue on Option 3 Package		$7,420	$0	

[1] Based on a total club membership of 174 Adult members and 26 Family members and a 70% and 30% portioning of costs.

If the Club Membership decides on pursuing the proposed Day Lodge, Custodian Residence, Maintenance Building and Trail Lighting plans but *excluding the IPP*, depending upon which Day Lodge option is chosen, the Adult annual membership fee increase would range from $51 to $60, and Family annual membership fee increase would range form $147 to $171. This assumes that the club does not make any income from the rental of the Day Lodge on an annual

basis and that the total number of club members stays the same and does not either increase nor decrease.

The new membership fee rates would be similar to the membership rates charged at other Nordic ski clubs with commensurate facilities.

Club Name	Facilities Provided	Average Adult Rate	Average Family Rate
Larch Hills (Salmon Arm)	Day Lodge, Groomed trails, Maintenance facility	$70	$140
Telemark (Kelowna)	Day Lodge, Groomed trails, Trail Lighting Maintenance facility	$120	$280
Overlander (Kamloops)	Day Lodge, Groomed trails, Trail Lighting Maintenance facility	$110	$277.50
Sovereign Lakes (Vernon)	Day Lodge, Groomed trails, Trail Lighting Maintenance facility	$160	$340
Revelstoke Nordic	Day Lodge, Groomed trails, Trail Lighting Maintenance facility Custodian Residence	$121 to $130 depending on which lodge design is selected	$297 to $321 depending on which lodge design is selected

However, if the Club membership votes in favour of pursuing ***all*** proposed development plans (including IPP), there will be **no** annual membership fee increases. Rather, the Club will make a **profit** of approximately $8,420 to $10,470 each year, depending upon which option of the Day Lodge is built.

10.0 Potential Funding Sources

There are four primary sources of potential funding for this project. These are:

- Columbia Basin Trust (CBT);
- City of Revelstoke's Tourism Infrastructure Funding;
- CSRD Economic Opportunities Fund;
- Local Service Groups and Private Donations;
- Revelstoke Nordic Ski Club.

Columbia Basin Trust

CBT – Local Initiatives Program

The Local Initiatives Program is a community-based granting program that incorporates residents' input in the adjudication process. Funds for this program are allocated on a per capita plus a base value per Affected Area funding formula. The Local Initiatives Program is delivered on behalf of Columbia Basin Trust by the Regional Districts of East Kootenay, Central Kootenay, City of Revelstoke, Town of Golden and Village of Valemount.

CBT- Community Development Program

The Community Development Program has both a large (over $10,000) and small (under $10,000) granting stream. It is designed as a way to assist CBT working in partnership with communities to develop projects and/or initiatives which build on a shared community vision for the future. It is not a grants program in the normal sense of the word. The criteria are purposefully left open and flexible to accommodate the broad range of ideas and projects which come from working with communities in moving towards their goals. CBT can bring a range of resources to the partnerships with money being only one contribution. The funds available through the Community Development Program are meant to assist communities in building on existing strengths.

Both of these programs can provide a substantial financial contribution to this project. To access these funding sources, an application has to be made to each program.

City of Revelstoke – Tourism Infrastructure Funding

The City of Revelstoke has been designated a "Resort Community" since May of 2008. One of the benefits of this designation is that the Province returns 3% of the provincial room tax that is charged on all hotel/motel nightly accommodation charges within city limits. This funding is administered by the City of Revelstoke and must be spent on items that enhance the tourism infrastructure of the city and immediate surrounding region. Projects are reviewed by a local advisory Tourism Infrastructure Committee which makes recommendations to city council. The final approval for funding is by City Council.

It is projected that this program will generate $2.5 million dollars over the next five years that is available for investment on tourism infrastructure.

CSRD Economic Opportunity Fund

The EOF was created by the CSRD as a means of compensating for the loss of economic opportunities on those lands affected by the dams and reservoirs and the resultant economic impacts within Rural Area B and the City of Revelstoke. A grant in lieu of taxes from B.C. Hydro is distributed annually and monthly interest is accrued on the fund balance. The grant amount for 2008 was $181,602.

The EOF is to provide funding assistance for projects deemed by the City of Revelstoke and the Regional Director for Area B, and ratified by the corporate Board of the Columbia Shuswap Regional District (CSRD), to be worthy of support in an effort to stimulate economic development within the City and rural areas.

Local Service Groups and Private Donations

The community of Revelstoke has numerous service groups such as the Rotary Club, Lions Club, Kokanee Ball Tournament Society that actively raise funds to be disseminated to worthy local projects. The Nordic Club could submit a funding application to these clubs. In addition, private and corporate donations (services in kind) could be sought from individuals and business in the community.

Revelstoke Nordic Ski Club

The Revelstoke Nordic Ski Club has approximately $80,000 set aside in GIC's for future club use. It would seem appropriate that some of these monies be used as seed funding for one or more of the proposed projects.

11.0 Summary

The proposed projects outlined in this report provide the Revelstoke Nordic Ski Club with the opportunity to expand the variety of services and facilities it provides to its membership, local residents and visitors. The proposed facilities would also become a tremendous tourism asset for the community at large.

The Mount MacPherson area could become a premier destination for outdoor enthusiasts throughout the year. The Day Lodge would be extensively used during the winter months by cross country skiers. The Club would be able to hold local, regional and provincial level race events that would result in tourism

dollars being spent in the community. In addition, the facilities would be used by other winter sport user groups such as ski tourers, snow shoers (using the mountain biking trails for hiking) and members of the public who may rent the facility for special events.

During the summer months, the facility could be used by the local mountain bike club to hold events and races. The Day Lodge would be a beautiful location for management retreats, wedding receptions, group picnics, and family reunions. The potential use and enjoyment of the facilities and area are endless. The only limitation is the drive and determination of club members to grasp this exciting vision and make it become a reality.

Appendices

Appendix One – Questionnaire

REVELSTOKE NORDIC SKI CLUB
CAPITAL CONSTRUCTION PROJECT
QUESTIONNAIRE

The Revelstoke Nordic Ski Club is investigating the options to construct a day use warming lodge, a maintenance / storage facility for the groomer, a custodian residence and installation of lights on a 5 km trail loop for night skiing. As part of our research, we are in the process of contacting other Nordic facilities throughout BC to learn by their experience with respect to the construction and maintenance of these types of facilities. We want to know what has worked in the past, what does not work, what clubs would do differently were they to build such facilities again. Your assistance in completing this questionnaire will greatly assist our club in moving forward with our goal to build these facilities for the use and enjoyment of local skiers and visitors alike. The questionnaire will only take 10 minutes! We would greatly appreciate your help!

Please forward this questionnaire to the person(s) in your club who can best answer questions around the construction and maintenance of these types of facilities.

Once complete, please save and email back the completed questionnaire to the following email address: wildland@telus.net
You may also fax it to 1-250-837-5764
or mail to:
Dave Kaegi, P.O. Box 2569, Revelstoke, BC, V0E 2S0

Thank you for taking the time to answer this questionnaire. Hopefully in the near future you will be able to come and visit our club, ski our trails and warm yourself in a new day lodge!

Thanks

Dave Kaegi
Director – Facility Development
Revelstoke Nordic Ski Club
250-837-5784
wildland@telus.net

REVELSTOKE NORDIC SKI CLUB
CAPITAL CONSTRUCTION PROJECT
QUESTIONNAIRE

Please complete the questionnaire by entering answers in the grey area or check boxes with an "X".

Club Name:

Contact Person:

Contact Information: Phone: Email:

Number of club members:

Number of club members by category: Family: Rate/ person ($):

Adult: Rate/ person ($):

Junior: Rate/ person ($):

Senior: Rate/ person ($):

Student: Rate/ person ($):

Other (specify): Rate/ person ($):

Visitation Percentage: By Club Members: % By Visitors: %

What type of facilities does your Nordic center have (please check appropriate boxes)?

Day Lodge (by main vehicle parking facility) ☐

Maintenance Facility (groomer storage) ☐

Trail warming Huts/cabins ☐

Custodian Accommodations ☐

Lit trails for night skiing ☐ # of Kms of lit groomed trails: km

Groomed trails ☐ # of Kms of groomed trails: km

For each box checked above, please complete the corresponding section below.

Day Lodge Facility:

Age of the facility: yrs Location (e.g by parking lot, on trail)

Dimensions of Facility: Length: Width:

Total Sq. Ft. Main floor: sq. ft. Basement: sq. ft. Loft: sq. ft.

Construction Type: Wood frame ☐ Log ☐ Post & Beam ☐ Other :

Built on a ... Cement slab ☐ Crawl space ☐ Full Basement ☐ Other:

Heated Facility: Yes ☐ No ☐ Electricity: Yes ☐ No ☐ Running water: Yes ☐ No ☐

Source of heat: Wood ☐ Propane/gas ☐ Electric ☐ Oil ☐ Other

Capital cost for construction: $ Annual Operations & Maintenance $

# of hours the facility is open daily: hrs # of days per week facility is open

Is your facility staffed? Yes ☐ No ☐ If yes, number of hours/day

Services provided in facility: Washrooms ☐ Kitchen ☐ Waxing room ☐

Storage ☐ Office ☐ Ticket booth ☐

Open Deck ☐ Covered deck ☐ Other

Are there any special or unique features of your Day Lodge facility? No ☐ Yes ☐

If Yes, what are they?

What changes, if any, would you make to your Day Lodge facility?

What recommendations would you make to our club with respect to the construction of a new Day Lodge facility?

Were you able to access grants / special sources of funding to assist in the construction costs?
Yes ☐ No ☐

If Yes, what was your source and what % of project capital costs did they cover? / %

/ %

/ %

Maintenance Facility:

Age of the facility: yrs Location (e.g by parking lot, on trail)

Dimensions of Facility: Length: Width: Height:

Total Sq. Ft. workshop: sq. ft. Loft: sq. ft.

Construction Type: Wood frame ☐ Metal Frame ☐ Quonset : ☐ Other

Built on a ... Cement slab ☐ Cement footings / gravel floor ☐ Other:

Heated Facility: Yes ☐ No ☐ Electricity: Yes ☐ No ☐ Running water: Yes ☐ No ☐

Source of heat: Wood ☐ Propane/gas ☐ Electric ☐ Oil ☐ Other

Capital cost for construction: $ Annual Operations & Maintenance $

Services provided in facility: Washrooms ☐ Kitchen ☐ workshop ☐

Storage ☐ Office ☐ Fuel storage ☐

Other

Are there any special or unique features of your maintenance facility? No ☐ Yes ☐

If Yes, what are they?

What changes, if any, would you make to your maintenance facility?

What recommendations would you make to our club with respect to the construction of a new Maintenance facility?

Were you able to access grants / special sources of funding to assist in the construction costs?
Yes ☐ No ☐

If Yes, what was your source and what % of project capital costs did they cover? / %

/ %

/ %

Custodian Facility:

Age of the facility: yrs Location (e.g by parking lot, in day lodge)

Dimensions of Facility: Length: Width:

Total Sq. Ft. Main floor: sq. ft. Basement: sq. ft. 2nd fl/loft: sq. ft.

Construction Type: Wood frame ☐ Log ☐ Mobile home ☐ Other :

Built on a ... Cement slab ☐ Crawl space ☐ Full Basement ☐ Other:

Source of heat: Wood ☐ Propane/gas ☐ Electric ☐ Oil ☐ Other

Capital cost for construction: $ Annual Operations & Maintenance $

Do you charge rent? Yes ☐ No ☐ If Yes, at what amount $ per

What services/activities do you require of the custodian?

Does the custodian reside onsite year round? Yes ☐ No ☐

If no, number of months/year : and which months to

Services provided in facility: # of Washrooms ☐ Kitchen ☐ # of bedrooms ☐

Living room ☐ Dining room ☐ Garage ☐

Ticket booth ☐ Office ☐ Other

Are there any special or unique features of your custodian facility? No ☐ Yes ☐

If Yes, what are they?

What changes, if any, would you make to your custodian facility?

What recommendations would you make to our club with respect to the construction of a new custodian facility?

Were you able to access grants / special sources of funding to assist in the construction costs? Yes ☐ No ☐

If Yes, what was your source and what % of project capital costs did they cover? / %

/ %

Ski Trail Lighting System:

Length of lit trails: Km Approximate distance between light standards metres

Does the wiring for lights run.. Above ground: ☐ Below ground: ☐

What is the voltage of line used on trail lighting?

What type of light bulbs do you use?

What wattage of bulbs do you use?

Source of electricity: From the power grid ☐ Wind generated power ☐ Generator ☐

Water generated power ☐ Solar ☐ Other (specify)

Type of light standard Wood pole ☐ Metal pole ☐ Other:

Capital cost for construction: $ Annual Operations & Maintenance $

# of hours per day the lights are on: Time of day lights are on hr to hr

How are your lights activated? Automatic pre-programmed Timer ☐ Manual on/off ☐

Minimum duration set timer ☐ Light sensors: ☐ Other:

Are there any special or unique features of your trail lighting system? No ☐ Yes ☐

If Yes, what are they?

What changes, if any, would you make to your trail lighting system?

What recommendations would you make to our club with respect to the construction of a new trail lighting system?

Were you able to access grants / special sources of funding to assist in the construction costs?
Yes ☐ No ☐

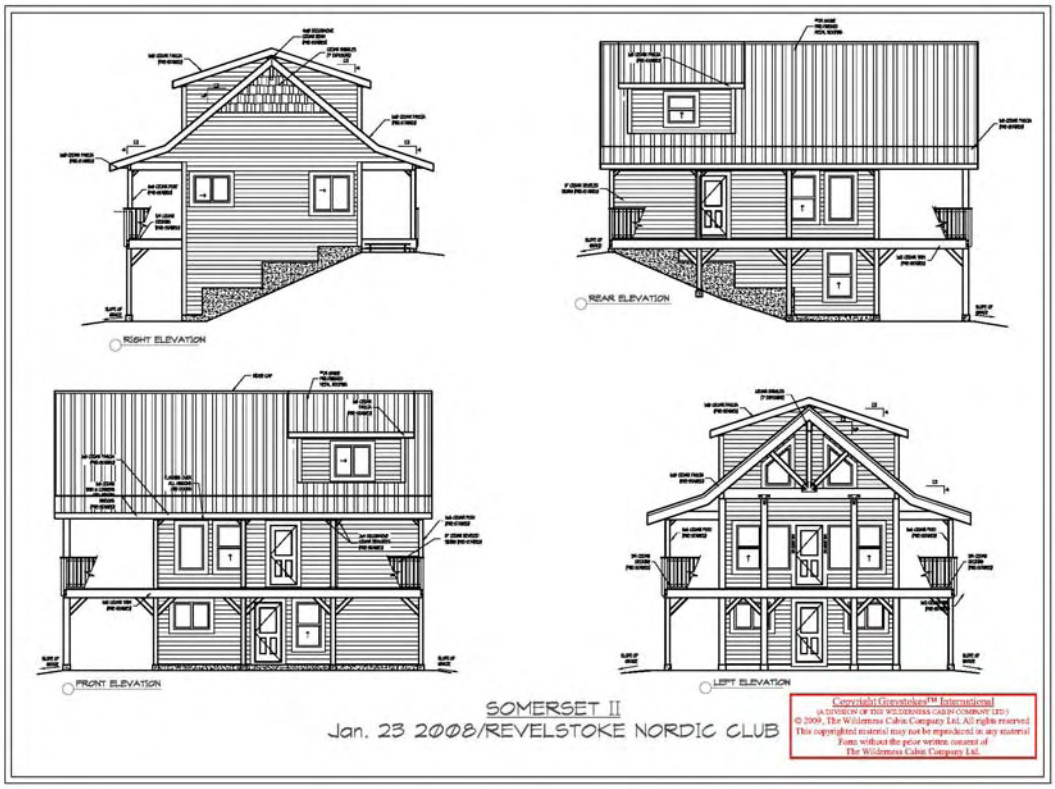
If Yes, what was your source and what % of project capital costs did they cover? / %

/ %

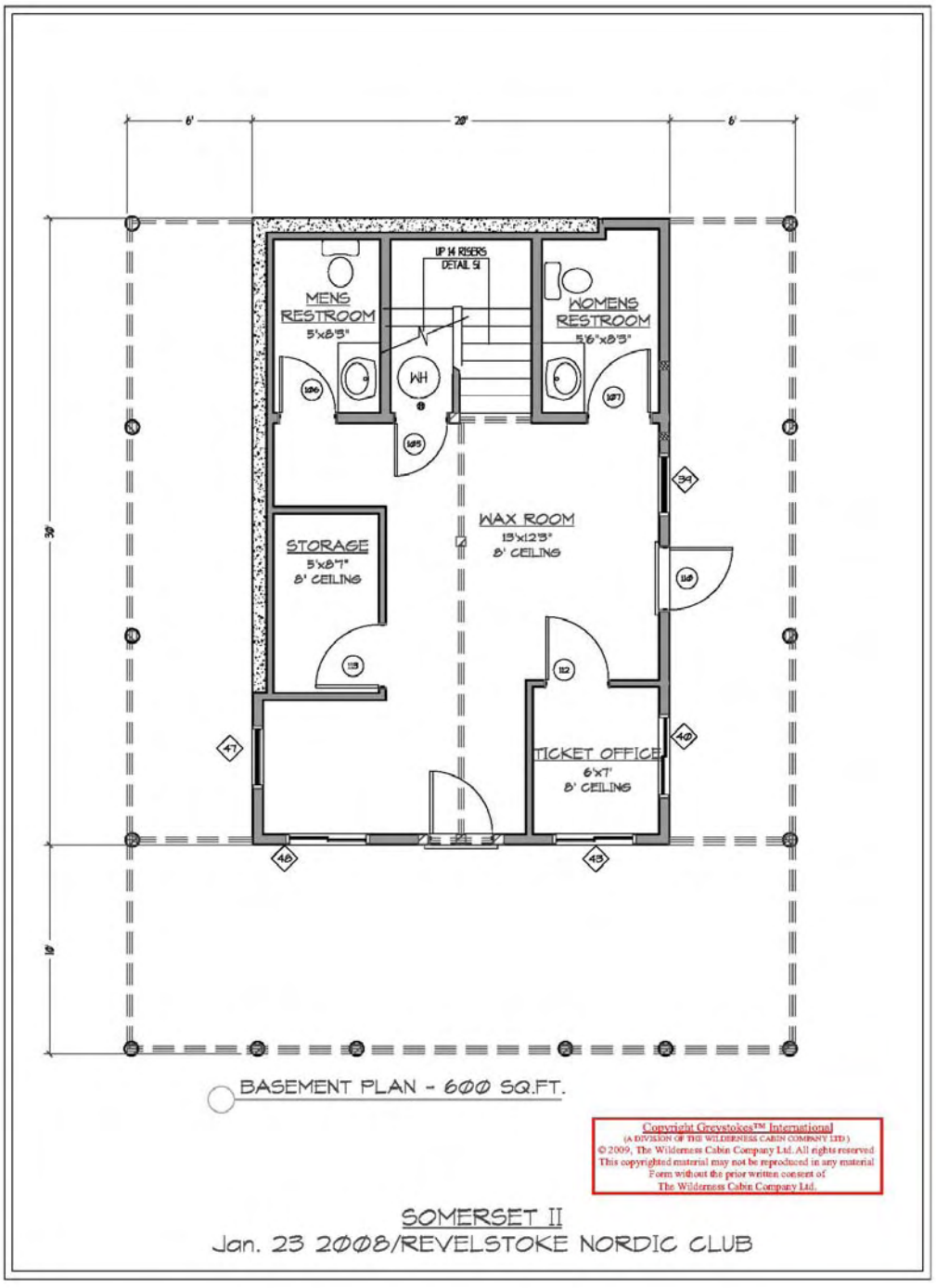
/ %

Thanks for taking the time to complete this questionnaire!

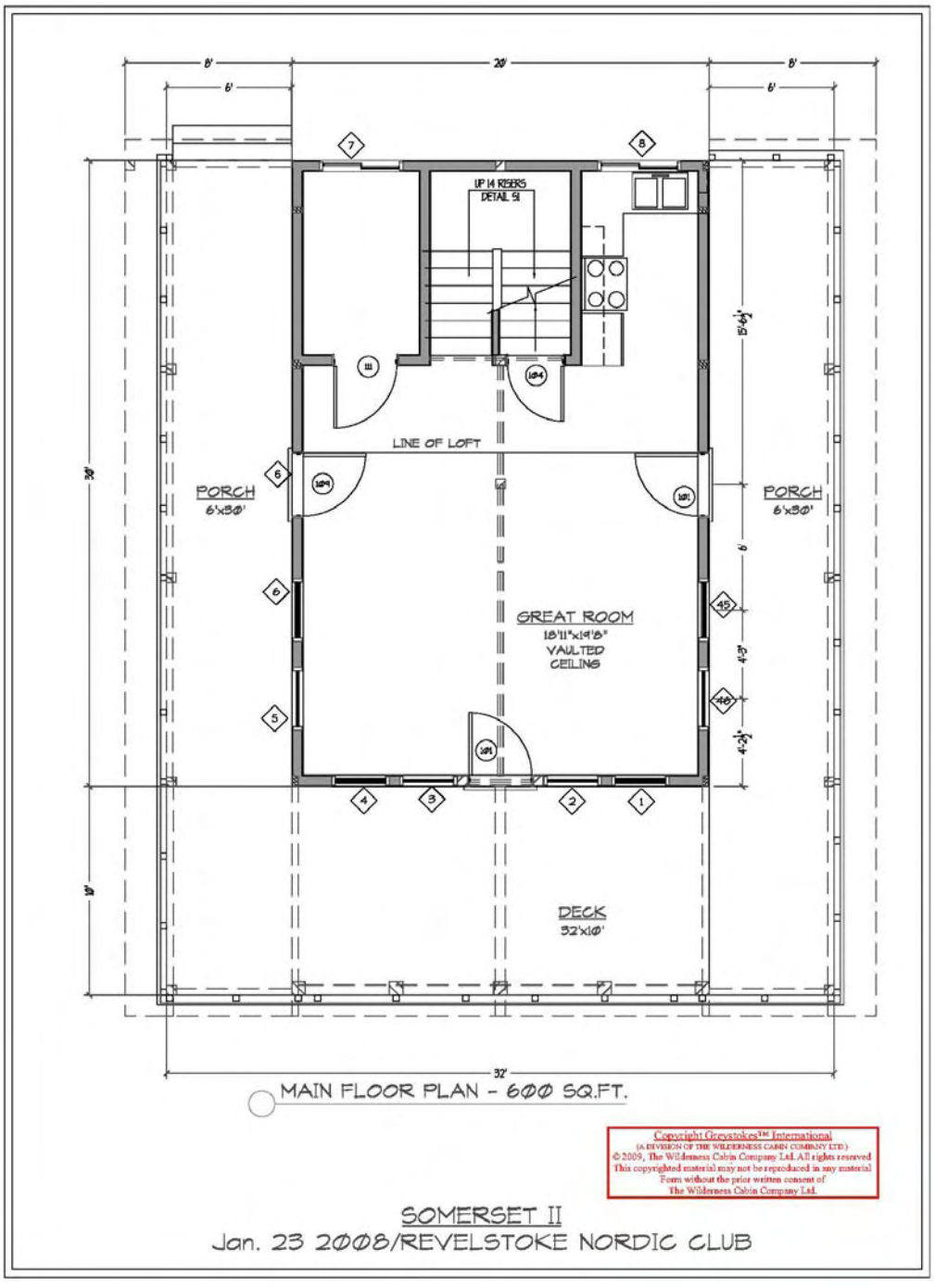
Appendix Two: Greystoke - Wilderness Cabin Designs 600 and 816 sq ft models



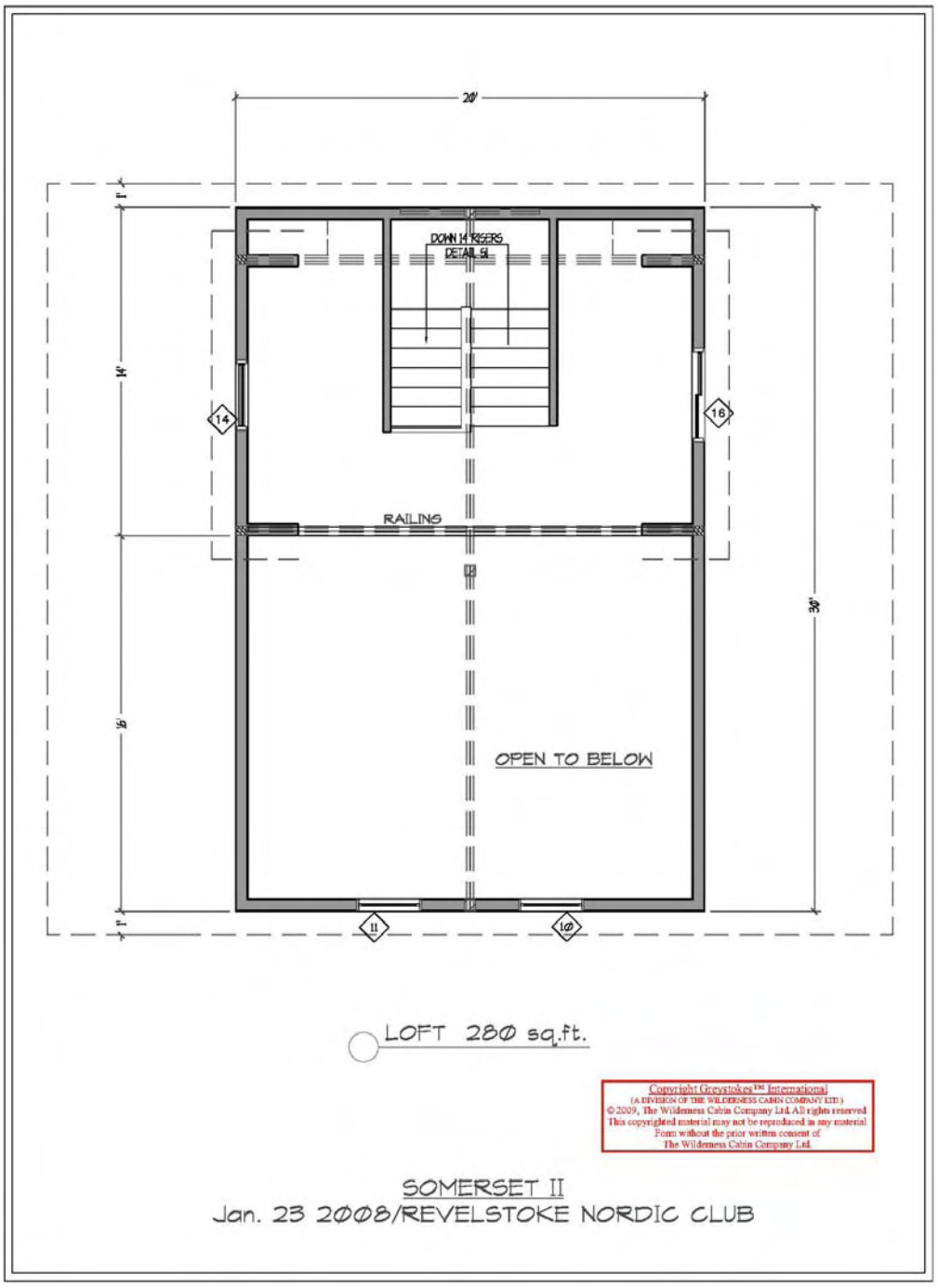
Elevation views of 600 sq foot design



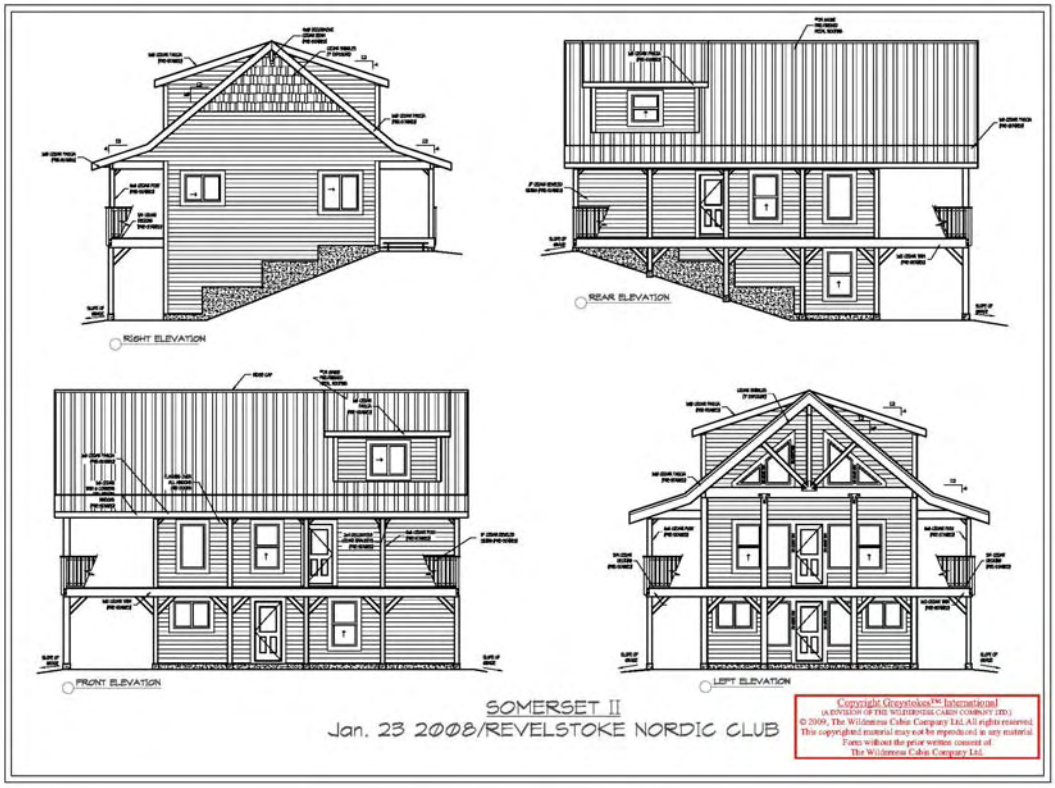
Basement Layout



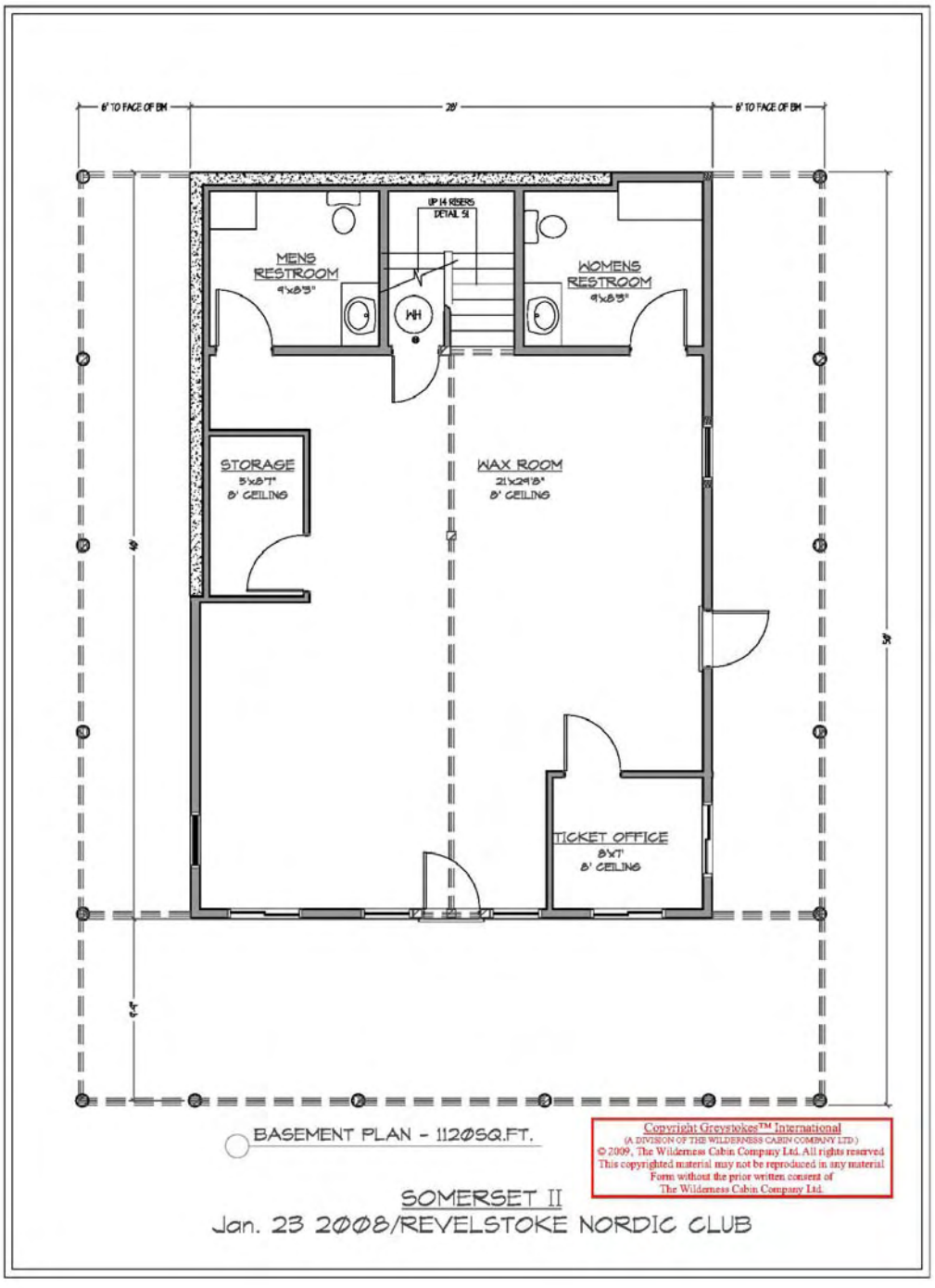
Main Floor Layout



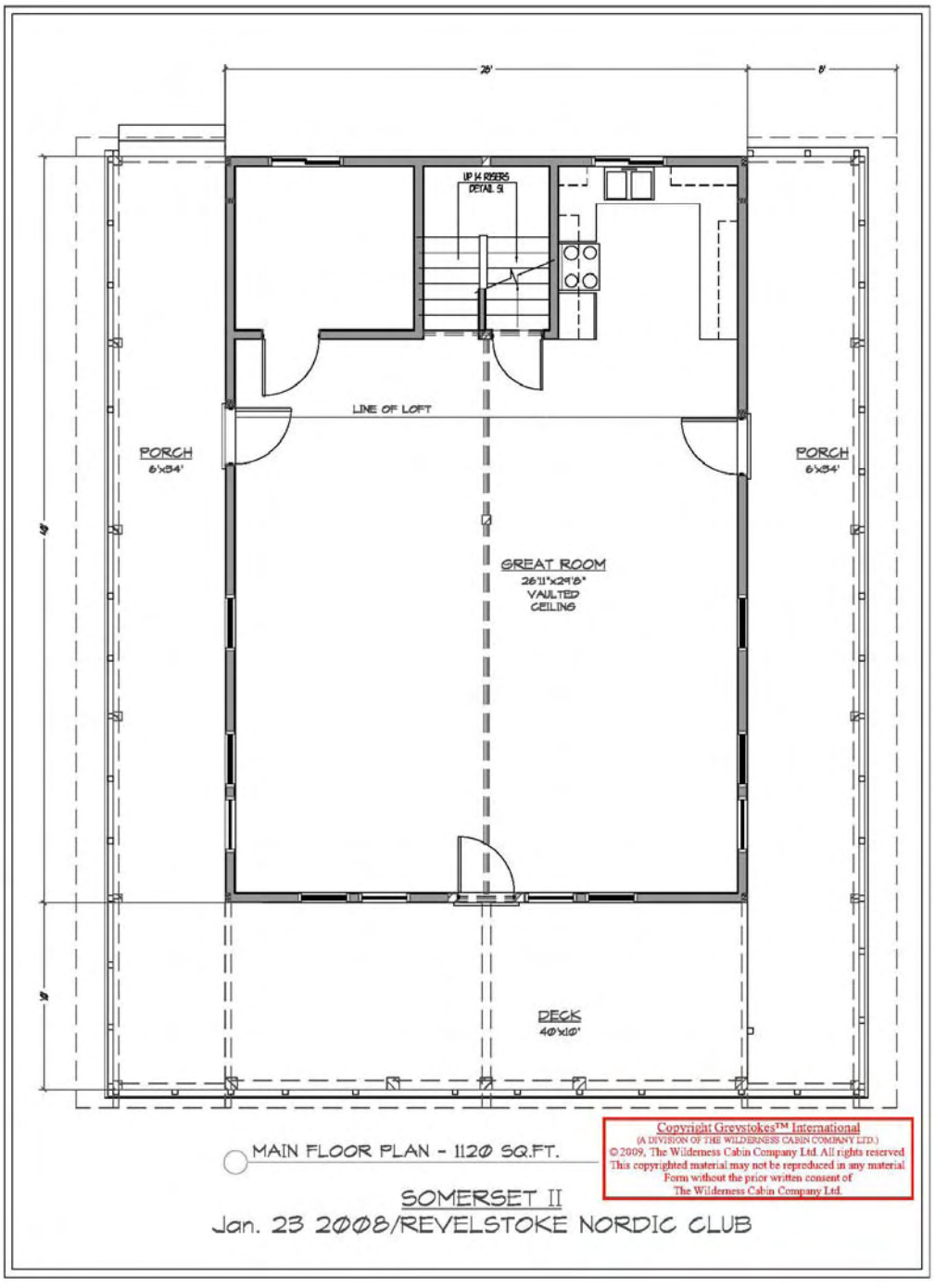
2nd Floor / Loft Layout



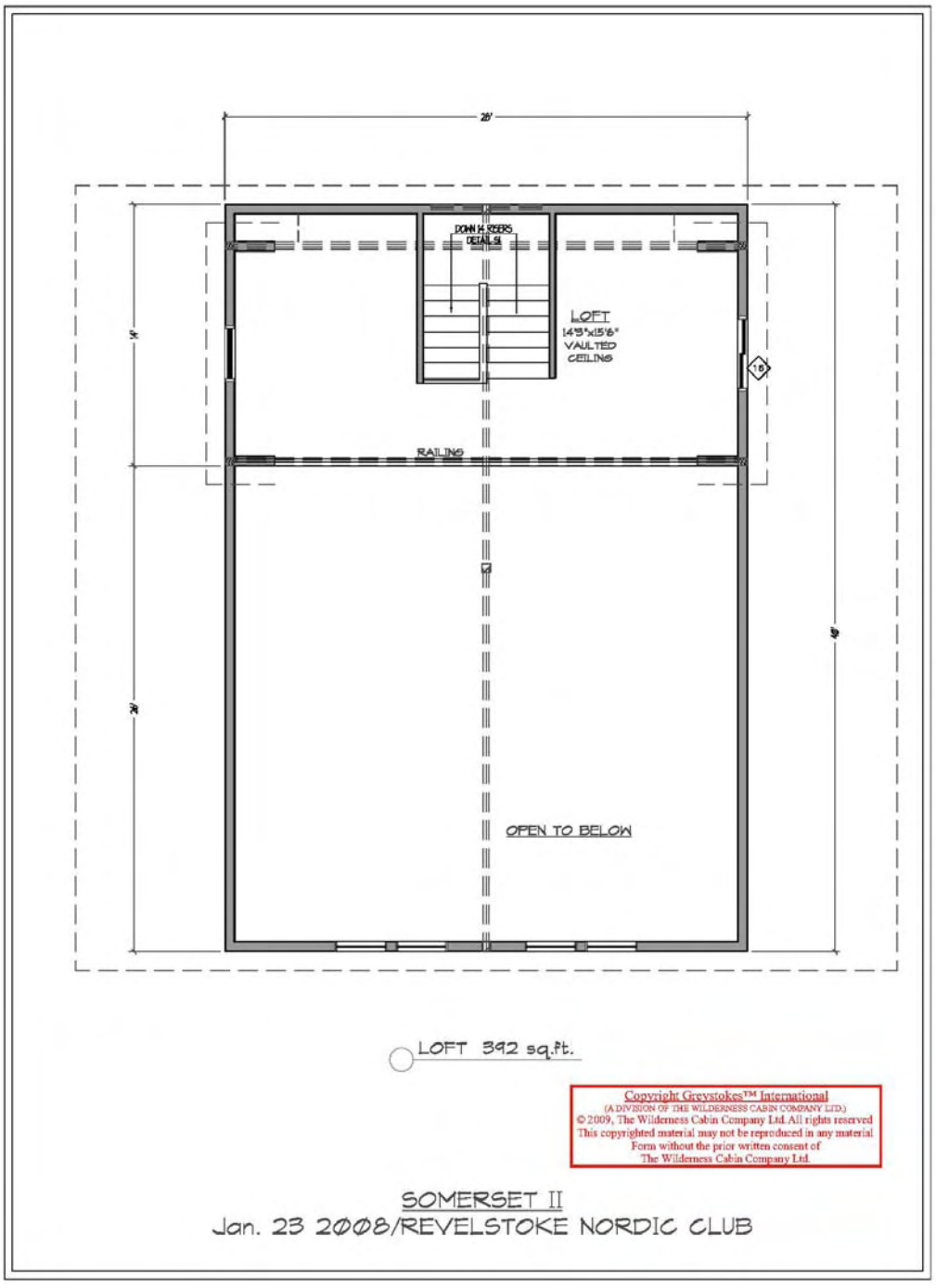
Elevation views of 816 sq foot design



Basement Layout



Main Floor Layout



2nd Floor / Loft Layout