GENERAL CONDITION ASSESSMENT REPORT

LILLOOET MUSEUM & VISITOR CENTRE

790 MAIN STREET
LILLOOET, BC

Prepared by:

Stantec Architecture Ltd.
300 – 175 2nd Avenue
Kamloops, BC V2C 5W1

Date: October 30, 2009
Project No. 1446-09009

1 EXECUTIVE SUMMARY

Architectural

Extensive renovations need to be undertaken to the building's interior & exterior as many finishes are at or near the end of their lifespan.

At the present time, this building is not accessible to persons with disabilities. If renovations are to be undertaken, the facility will need to be upgraded to the current building code accessibility standards.

Generally, the building needs to be repainted and the rotting wood finishes around the building should be replaced.

Doors and windows are original to the building and are in substandard conditions. They are not up to current efficiency standards and it is critical that they be replaced as soon as possible.

It appears the building is under sized for its intended use, and, in its current state, is not suitable to be a museum. The damp, unheated and musty conditions observed on site are a detriment to the valuable historic artifacts currently stored at this facility. The building will not survive the test of time if proper climate controls and building envelope improvements are not put in place. The Lillooet Museum should be moved to a more appropriate location if major improvements are not done to the facility.

If upgrades and proper maintenance is conducted on this building it is assumed it should last another 40 years.

Future expansion of the facility with accessible washrooms, electrical room and storage area is possible and could be located on the east side of the building, utilizing the access ramp foundation. Values for this work are covered in section 7. Refer to Appendix C for Future Expansion Plan.

Structural

A more thorough structural analysis should be done on the roof system, main floor and exterior walls. All these elements appear to require considerable upgrades. The overloading of floor structure will need to be addressed immediately.

Mechanical

The building HVAC systems appear to be at, or nearing the end of their useful lives.

The HVAC system is not suited for the current use of the building. The sensitive climate control issues associated with archive and artifact storage can not be addressed by the current system.

The building currently has an old, inefficient oil fired furnace that does not appear to be operational. This is in combination with supplemental electric heat.

The bathroom plumbing in the basement appears to be recently installed and in good working order.

The facility is currently not protected by a fire sprinkler system. The current water supply to the building is likely too small to support a fire sprinkler system.

Electrical

The electrical elements are in reasonable condition considering the age of the building. A more detailed review of the overall power consumption is required should any building additions or exterior power be required.

The current light fixtures are a mixture of inefficient incandescent bulbs and T12 fluorescent lamps. These must be replaced with more efficient fixtures and additional lighting will be required.

The district of Lillooet has noted there are problems with loose fixtures and wiring connections. These issues will need to be addressed immediately.

There is presently no fire alarm system in the building and the emergency and exit lighting must be updated to meet current code standards.

2 INTRODUCTION

As requested by the District of Lillooet, Stantec Architecture Ltd. and Stantec Consulting Ltd. performed a walk through visual inspection and general Architectural, Mechanical, and Electrical condition assessment at the Lillooet Museum and Visitor Centre, 790 Main Street, Lillooet, BC, on February 26, 2009.

The following individuals conducted the assessment for their respective disciplines.

Architectural

- Robert Hajdasz – Architectural Technologist
- German Herrera – Architectural Designer

Structural

- Ely Kazakoff – Structural Engineer

Mechanical

- Kirby Robillard – Mechanical Technologist

Electrical

- Brad Boyes – Principal
- Rav Deol – Engineer in Training

Additional information was provided by the owner during our site inspection.

The results of the general condition assessment are presented in this report.

3 SCOPE AND METHODOLOGY

The purpose of this assessment was to visually examine the interior and exterior of the building and evaluate its present condition.

The evaluation of this building and its Architectural and Structural elements were based on a visual assessment of the visible components of the building. The walls, floor framing, roof and ceilings of the building were visually assessed where possible to determine if each of these elements were in a satisfactory condition or if deteriorations or defects were observed. Mechanical and Electrical systems were also visually assessed. No physical or destructive testing was conducted during the assessment. Removal of architectural finishes did not occur to validate the observations made.

No original drawings of the building were on record at the Municipal Hall.

The building was constructed under a previous version of the building code. All future work will be required to conform to the current edition of the British Columbia Building Code.

The scope of this report includes the following:

- Status of Compliance with the current BC Building Code
- Condition Report of interior and exterior building components
- Building Fire & Life Safety concerns
- List of Recommendations for repairs or upgrades to maintain the building in a functional condition
- Building Envelope Assessment
- Building Energy Efficiency Assessment
- Inventory and Condition Report of all structural, mechanical, plumbing, and electrical systems
- Cost Estimates for recommended repairs and building upgrades.

The opinions of probable costs outlined in this report are based on the site conditions encountered and observations made during the site investigation. **Item repair or replacement costs are approximate only.** Specific quotations from qualified contractors should be obtained for any specific item to be addressed.

4 EXISTING BUILDING DESCRIPTION

4.1 BUILDING SITE

The building is located at 790 Main Street, Lillooet BC on the corner of 8th Avenue and Main Street, within the Central Business District of Lillooet. The building entrance faces North onto the Jade Plaza and Main Street. The East side of the building faces the community park and information kiosk. The West side of the building has a static display of historic artifacts and information board. The South side of the building faces onto 8th Avenue. (See Appendix B – Site Plan)

The site slopes gently from West to East, with the finish grade at approximately 4'-0" (1200mm) below the main floor level.

Parking is located on the South side of the facility off 8th Avenue with approximately 10 spaces. Tour bus parking is designated along Main Street and Fraserview Street.

4.2 ARCHITECTURAL

The building is one story tall and was constructed in the early 1960's. It was an Anglican Church for many years until the early 1970's, when it became the local museum. The building sits on the former site of the 'St. Mary the Virgin Church.'

The main entry to the building is North off of Main Street and leads directly into the museum. A second main floor entry is located along the East building face and leads directly into a small office/storage area. The basement area is serviced with two entries/exits. The loading entry has a set of double doors and a very steep ramp which is too steep for access. The second exit is a single door with a covered stair well.

The building measures approximately 70'-0" (21.34m) in length and 36'-0" (10.97m) in width. The main footprint area has been calculated to be approximately 2520 sq. ft. (234.0 sq. m.).

The main floor level consists of an open display area and a small office/storage area located at the South end of the facility. The basement floor level consists of an open display area in the central core, with the mechanical room and washrooms located at the South end. There are several storage rooms located at the North end of this level.

The following is a description of the various construction methods and finishes observed in this building:

4.2.1 Foundations

The foundation walls are assumed to be reinforced cast-in-place concrete with vertical wood furring cast-in-place (See image A30). The foundation walls are assumed to be founded on cast-in-place concrete footings, size unknown. The basement walls are finished with wood paneling. Insulation does not appear to be present on the basement walls. The east side exterior foundation wall has experienced severe displacement by roots of a large tree which has been removed. The structural review will discuss this issue in more detail.

4.2.2 Floor Structure

The basement floor is assumed to be a reinforced concrete slab on grade with 12”x12” (305mm x 305mm) vinyl composite floor tile finish. The basement floor slab appears to be in good condition.

The main floor has three clearly defined levels. The main floor structure is assumed to be 2”x10” (38mmx235mm) floor joints with ¾” (19mm) plywood sheathing on a wood beam support structure, with a 12”x12” (305mm x 305mm) vinyl composite floor tile finish. A steel rod tie system has been incorporated into the floor system to help in retaining the structure out on itself. The steel rods were not accessible for this inspection.

4.2.3 Exterior Walls

The above grade exterior walls of the main building are assumed to be of wood frame construction.

The supporting structure is an “A” frame design with wood columns and lateral brace beams. The North and South walls are framed full height. The wall framing at all exterior walls is assumed to be of 2”x6” (38mmx140mm) wood construction. The exterior finish on all walls is vertical wood siding.

The interior finish of the exterior walls is painted drywall and stained wood paneling fastened to the wood stud framing. The presence of insulation in the exterior walls was not confirmed during the site investigation.

There appeared to be problems with the structural integrity of the walls along the West and East walls. Additional structure has been put in place do deal with loading from the roof, which transfers loads to the exterior walls. It was unclear when this framing was put in place. The structural review in this report will discuss this issue in more detail.

4.2.4 Exterior Windows and Doors

The exterior windows on the East and West sides of the building have been removed and replaced with plywood panels (See images A03, A10 and A26). The stain glass windows on the North and South faces appear to be original to the building. The stain glass window on the North face appears to have no structural mullions. It was noted that during strong wind storms, the windows and walls on the North shake violently. All glazing in these windows is single pane. The exterior doors are solid core wood doors in wood frames and appear to be original to the building.

4.2.5 Roofs

The main roof structure appears to be metal roof cladding on wood decking, spanning between the steep “A” frame support structure. It is assumed that the roof is not insulated. There are no rainwater leaders or snow retention brackets installed on the current roof structure. The steel support structure that has been

put in place along the West and East walls indicates there are some underlying structural support issues with the roof and wall framing.

4.2.6 Interior Doors

Interior doors are hollow core wood doors in wood frames: sizes of doors and finish vary depending on location and use. All doors appear to be original to the building.

4.2.7 Interior Finishes

The interior walls are assumed to be of 2”x4” (38mmx89mm) wood stud framing. The walls are generally finished with wood paneling and gypsum wall board.

The floor finish through most of the building is 12”x12” (305mm x 305mm) vinyl composite floor tiles. The floor finish in the mechanical room is bare concrete.

The public washrooms in the basement have newer finishes and a suspended T-bar ceiling system.

The ceiling finish on the main floor is exposed wood decking. The ceiling finish in the basement is 24”x12” (610mm x 305mm) acoustical tile fastened to the underside of floor structure.

4.3 STRUCTURAL

4.3.1 Foundations and Superstructure

The perimeter foundation walls, where visible, appear to be sound.

The foundation wall (on the East side, where the “tree roots” had pushed in the foundation wall) should be removed and replaced with a new engineered wall.

The main floor system is tied together with steel rods which are anchored to the exterior steel structure. This structure is not original to the building and was put in place to deal with structural problems associated with the roof/wall systems. Further analysis of this remedial measure is required to determine if there are any further underlying problems.

“Plywood-sheathed windows” on the exterior basement walls should be infilled and waterproofed.

Additional columns and footings should be installed at various locations, (in the basement), to support the main floor, as there is presently heavy floor loading and the floor appears to be sagging at various locations.

The basement slab on grade (tiled floor) appeared to be sound.

4.4 MECHANICAL

The main floor of the building is served by an electric furnace that has been installed in the office near the back of the building. The furnace supplies air through a single grille located in the wall. The main floor also has an electric wall/window mounted air conditioning unit. The air conditioning unit has either been covered up by displays, or has been boarded up for the winter to stop drafts. It was not clear which of these was the case.

The basement level has a vintage oil fired furnace in the back room. Which does not appear to be in use any more. The oil furnace delivered heat via forced air ductwork that supplied both the main floor and the basement.

The location of the oil tank for this furnace is unknown. Further investigative work should be conducted to locate and determine if the tank poses any environmental contamination issues.

Supplemental electric baseboard heaters were located in each of the washrooms on the basement level. It appeared that this was the only form of heat remaining for the entire basement, as they were the only rooms that were warm.

Ventilation air for the building is achieved through a trap door near the ceiling on the upper floor and by opening the front doors. This system relies on someone being in the building to manually open the trap door and the front doors. There are ceiling fans on the main floor that circulate air in the space.

The plumbing system is made up of a small electric water heater serving two washrooms. The washrooms consist of a lavatory and a water closet. The men's washroom also contains a urinal. It appears as if the washrooms are not used frequently, as the water in the toilets had completely dried up, allowing sewer gases to enter the facility.

Currently, there is no fire sprinkler system installed in this building.

4.5 ELECTRICAL

4.5.1 Power

The museum is fed from a 37.5kVA, 7.2kV/120-240V transformer. The transformer is pole mounted and feeds a Wellness Centre, a restaurant, two residential houses as well as streetlights in the area. Three-phase power is not available. (See image E01).

The power is fed to a 120/240V single phase, 200A, 40-circuit panel with a 200A main breaker panel. The panel is located in the men's washroom (See image E02). The panel feeds all the lighting, both indoor and outdoor, a security system, a 15kW electric furnace, washroom baseboard heaters, a 1.5kW hot water tank, and ceiling fans. The panel has many spare circuits available. There is an existing floor mounted electrical outlet in the middle of the walkway towards the back door. It is an unusual position (See image E06).

4.5.2 Heating and Cooling

The building contains an old 15kW electric furnace located on the main floor. This provides heating for the whole building. There is additional heating in the lower floor washrooms. The washrooms have newer baseboard heaters. There is also a 1.5kW hot water tank located in the washroom. The building also contains a plug-in window type air conditioner. We were informed that during the summer the building becomes very hot.

4.6 LIGHTING

4.6.1 Interior Lighting

The main floor has suspended incandescent lighting. In the lower floor, a combination of incandescent and T12 fluorescent lighting is used. The basement does not have a uniform grid of fixtures but are just placed randomly throughout the area. The average illumination was quite low and had uneven distribution throughout the building. The stairs leading to the lower floor lacked sufficient lighting, and could pose a potential life safety and litigation issue (See image E03)

4.6.2 Exterior Lighting

The exterior lighting fixtures are unclean and dated. They appear to be high-pressure sodium or metal halide fixtures. (See image E04). The district of Lillooet has indicated that the exterior lights flicker when the entry doors are closed.

5 BUILDING FIRE AND LIFE SAFETY

In its present state this building is existing, non-conforming.

5.1 CODE SUMMARY

Address:	790 Main Street
Legal Description:	Pcl A , Plan DD220180F
Building Area (footprint):	234.0 sq. m (2520 sq. ft.) Approx.
Building Area (including basement):	468.0 sq.m. (5040 sq. ft) Approx.
Number of Streets Facing:	2
Height in Storeys:	1
Major Occupancy Classifications:	Group A, Div. 2 One storey (3.2.2.28)
Sprinklered or Unsprinklered:	Unsprinklered

At the present time, this building is not accessible to persons with disabilities. If renovations are to be undertaken the facility will need to be upgraded to the current building code accessibility standards.

The current facility does not have a sprinkler system in place.

Occupancy calculations, travel distances and accessibility should all be re-evaluated as part of any redesign of this building. A comprehensive code study should be undertaken to ensure that any new design is compliant with all current building code requirements.

5.1.1 Architectural

Interior

- Fire resistant drywall and fire stopping was not observed in the existing mechanical room. Under the current building code mechanical rooms are required to have a 1-hour fire resistance rating, and all penetrations through these rated wall assemblies are to be fire stopped, **see BCBC Section 3.6.2.1**. It is recommended that if this room is to be used as a mechanical room, it is to be renovated to meet a 1-hour fire resistance rating.
  Opinion of probable cost: $1000.00

- The door and fames into the mechanical room are not fire rated. Under the present code a 1hr. rated door and frame are required, **see BCBC Section 3.1.8.4**. It is recommended that if this room is to be used as a mechanical room, a new fire rated door and frame are to be installed.
  Opinion of probable cost: $700.00

- Currently the washrooms in this facility are located in the basement, and are not accessible. **See BCBC Section 3.7 Health Requirements**. It is recommended that an accessible washroom be constructed on the main floor level. Consideration to future expansion should be considered.
  Opinion of probable cost: $10,000.00

- The main entry door requires proper exiting hardware. A finished 2x6 and brackets is not code compliant exiting devices, **see BCBC 3.3.1.13**. (See image A19). New existing hardware is recommended.
  Opinion of probable cost: $700.00

- The interior stair handrail is not continuous and does not meet current building code standards. It is recommended that a new code complaint handrail be installed, **see BCBC 3.4.6.4**.
  Opinion of probable cost: $700.00

- The interior vestibule has no access ramp at the interior stair leading to the main display area. It is recommended that a new code compliant ramp be constructed to provide access for people with disabilities.
  Opinion of probable cost: $3000.00

- Install all new fire extinguishers through out facility.
  Opinion of probable cost: $350.00

Exterior

- The main entrance to the facility does not have a ramp for persons with disabilities. It is recommended that a ramp be constructed to provide access for people with disabilities. (See image A02)
  Opinion of probable cost: $15,000.00

- The stair handrails at both entrances to the main floor are not code compliant. It is recommended that new code compliant handrails be installed on these stairs, **see BCBC 3.4.6.4**.
  Opinion of probable cost: Main Entrance – Cost to be part of new ramp
  Opinion of probable cost: Rear Entrance - Cost to be part of new stair

- The exit stairwell at the West side of the building does not have handrails or code compliant guardrails (See image A10 and A15 and refer to **BCBC 3.4.6.5**). New guard rails and handrails need to be installed.
  Opinion of probable cost: $1,500.00

- The exterior and interior stairs do not have contrasting nosing or tactile warning. It is recommended that contrasting nosing and tactile warning be installed (**See BCBC 3.4.6.7**)
  Opinion of probable cost: $1,000.00

- The roof area above entry doors and side walks on the East and West side of the building do not have snow retention brackets. Given the steep slope of the roof, this is dangerous to visitors and pedestrians. It is recommended that snow retention brackets and clips be installed over these areas.
  Opinion of probable cost: $1,000.00

5.1.2 Structural

- It is recommended that new engineered foundations and columns within the basement be constructed in order to withstand floor loading, and the basement wall should be repaired.
  Opinion of probable cost: $20,000.00

5.1.3 Electrical

- There is no fire alarm system within the building. Due to tourists visiting the building, we recommend installing a fire alarm. Smoke detectors should be installed throughout both floors, as well as in the washrooms and utility room.
  Opinion of probable cost: $7,500.00

- The main floor has no exit signage. A fire extinguisher is located beside the doors. The main floor also lacks emergency lighting fixtures and/or emergency lighting heads. The lower floor has a newer emergency lighting pack and some old exit signs. The current exit signage does not light up. Life safety and the emergency lighting system must be upgraded and in good working order (**See BCBC 3.4.5.1**)
  Opinion of probable cost: $3,500.00

6 CONDITION AND RECOMMENDATIONS

6.1 ARCHITECTURAL

6.1.1 Exterior

General Observations

- The vertical wood siding in several areas is showing signs of rot. It is recommended that all damaged wood siding be replace prior to painting the building. (See image A05)
  Opinion of probable cost: $5,000.00 (Minor repairs)

- The paint finish on the vertical wood siding, fascias, soffits, trim and windows is peeling and blistering and needs to be completely refinished. (See image A04 to A06)
  Opinion of probable cost: $19,500.00

- The concrete stair at the rear entrance is crumbling and the hand rail is not code compliant. It is recommended that a new entrance stair be constructed. See image A11)
  Opinion of probable cost: $3,000.00

- The existing window wells are constructed of wood and are showing signs of severe deterioration. Several window wells which are fully open are a potential fall hazard. It is recommended that all of the window wells be reconstructed with a concrete curb and a protective cover be installed to prevent a possible fall hazard. (See image A04 and A05)
  Opinion of probable cost: $5,000.00

- The East foundation wall in the basement that was damaged by the tree roots should have the interior finishes removed and examined for damage. We recommend that the exterior of the wall below grade should be exposed and a detailed structural investigation conducted. We also recommend repairs to and waterproofing of the foundation cracks.
  Opinion of probable cost: $2,500.00 (Detailed Structural Investigation)
  Opinion of probable cost: $5,000.00 (Repair foundation wall)
  Opinion of probable cost: $500.00 (Repair interior finishes)

- The guard rail around the East side loading ramp area is not code compliant and should be replaced with a non-climbable structure. (See image A04 and A07) Consideration to future expansion should be considered.
  Opinion of probable cost: $1200.00

- The hose bib at the South end of the building is not vandal proof. Water leakage could enter the building through the window well directly below the tap. We recommend that a tamper proof house bib be installed and relocated if possible.
  Opinion of probable cost: $500.00

Site / Landscaping

- The existing sidewalk grading along the North and West sides of the building is sloped towards the building, causing water to build up against the West side of the building and the front entry stairs. It is recommended that the grading around the building be corrected to shed water away from the existing structure. This work may require existing sidewalks be redone and/or drains installed. This work could be part of the new ramp construction. (See image A01)
  Opinion of probable cost: $5,000.00

- The water shut off located in the sidewalk along the South end of the building is a tripping hazard. It is recommended that it be lowered to be flush with the sidewalk.
  Opinion of probable cost: $500.00

  Landscaping should be closely monitored and kept away from the building.

  East Side Loading Ramp

  The east side loading ramp is extremely steep and is not a practical loading area for this facility. The bottom of the ramp appears to have no drainage for water which accumulates during the year. It is recommended that this structure be included in any future redesign work to this facility. (See image A07) Refer to cost breakdown for future cost of an accessible washroom facility utilizing this loading ramp area.

  Main Roof

  The additional steel structure that has been put in place to support the roof structure along the east and west side of the building is of a concern to the integrity of the building. This issue is discussed in the structural review further in this section. (See image A03 and A09)

- The metal roof cladding has several missing screws that should be replaced.
  Opinion of probable cost: $500.00

6.1.2 Interior

General Observations

- The main floor structure appears to be loaded to capacity. The floor joists are sagging in the middle of the floor. We recommended that the large concentrated loads be removed from the floor and a detailed structural analysis be conducted to determine if the upper floor structure has been compromised. (See image A18)
  Opinion of probable cost: Refer to Structural (removal of existing finishes will be required.)

- Water damage was observed in many ceiling tiles in the basement washroom. We recommend further investigation be undertaken to determine the cause and

extent of the water damage and that all damaged ceiling tiles be replaced. (See image A31)
Opinion of probable cost: $500.00

- The raised floor level at the south end of the main floor is spongy and appears to be damaged internally. It is recommended that the floor be repaired and a handicap ramp be incorporated into the new design.
Opinion of probable cost: $3,000.00

No water damage was observed on the exiting wood deck ceiling.

Flooring

- 12”x12” vinyl tiles are present throughout this facility with much of the tile at the end of its life cycle. Many areas of tile are damaged, and lifting. The curling of the floor tile is a direct result from moisture from cleaning. Given the age of the facility, it is possible that these tiles may contain asbestos. We recommend that the flooring be tested for asbestos.
Opinion of probable cost: $100.00 (Asbestos testing floor sample)
Opinion of probable cost: $18,000.00 (Remove V/C if tests are positive for asbestos)
Opinion of probable cost: $12,700.00 (New V/C floor tile with new underlay on upper floor)

6.1.3 Doors and Windows

Doors

The existing doors in this facility are original and require immediate attention.

- The basement double doors leading to the loading area are damaged and do not work. It is recommended that these doors and frame and all associated framing be replace.
Opinion of probable cost: $1,200.00

- The main floor rear entry door frame and hardware is in poor condition and should be replaced.
Opinion of probable cost: $1,000.00

- Caulking around all exterior doors and windows should be replaced.
Opinion of probable cost: Cost covered in Building Energy Efficiency

It was observed that all doors in this facility do not have proper weather stripping. It is recommended that all doors be retrofitted with new weather stripping. Costs for this work are described in section 6.6: Building Energy Efficiency.

Windows

The existing windows in the building are original to the facility and appear to be of single pane construction. Given the historic nature of the building it may be

impractical to replace the stained glass units with more energy efficient units. (See image A01)

- The windows on the north face are original to the building and are in fair condition however it is recommended that a detailed structural review be conducted with respects to wind loading and the installation of structural mullions. (See image A01)
  Opinion of probable cost: Refer to Structural

6.2 STRUCTURAL

6.2.1 Exterior

- The exterior wall system should be structurally upgraded to prevent the walls from bowing out. The North wall, which has considerable amounts of glass, should be upgraded with structural mullions. The same should be done on the south wall which has the stained glass.
  Opinion of probable cost: $15,000.00

Foundations

Foundations should be upgraded as noted previously. Perimeter entrances (new concrete ramps and stairs) should be provided at various locations.

Perimeter exterior drainage should be upgraded to prevent water ingress at window well locations.

Main Roof

- A structural analysis should be done of the roof system and the roof should be structurally upgraded in conjunction with the exterior walls.
  Opinion of probable cost: $30,000.00

6.2.2 Interior

The basement walls should be upgraded with insulation and waterproofing. The ‘stale air’ condition in the basement should be addressed.

The building fire protection system should be addressed.

6.3 MECHANICAL

6.3.1 HVAC Systems

The facility appears to have originally been heated by oil fired forced air furnace that is located in the back corner of the basement. This furnace has ductwork supplying the main floor from the floor level as well as the basement from the ceiling level. It appears as if the furnace is no longer in operation and has been abandoned.

The only remaining source of heat for the building is an electric furnace located on the main floor in the back office. The electric furnace supplies and returns air though

a grille in the wall to the main room of the main floor. The furnace is a Nutron electric furnace, model number 21B15, and provides 15kW of heat. The age of the electric furnace was unknown, but it did look to be in reasonable or operational condition. With proper maintenance the furnace may continue to operate for years to come.

A proper load calculation for the space has not been completed. Should any improvements to the building HVAC system be considered, load calculations should be carried out to determine the amount of heating and cooling required for the building.

The washrooms in the building appear to be a fairly new addition. Each washroom is equipped with an electric baseboard heater. The baseboard heaters are controlled by wall mounted thermostats. The baseboard heaters appear to be almost new, and have many years of service left. The washrooms are also equipped with exhaust fans; these fans were operational and appeared to be in good condition.

There is a wall/window mounted air conditioner located near the front of the museum. Its exact location inside was not clear as it could not be located from the interior of the building; it was only visible from the exterior. The inside of the unit has either been boarded up for the winter to prevent drafts, or covered by one of the displays in the museum. The staff of the building have complained that it becomes uncomfortably warm in the museum in the summer months.

Ventilation air for the building is achieved in the summer months by opening the front doors and a trap door near the ceiling at the back of the building. This allows a breeze to blow through providing fresh air as well as minimal cooling. In the winter infiltration is the only means of fresh air.

6.3.2 Potable Water Systems

The plumbing system consists of a small electric hot water heater located in the men's washroom. The water heater has a capacity of 12 gallons and is heated by a 1500W electric element. The heater should be sufficient for the connected load of two lavatories. The heater was installed in June of 2003 and should have many years of useful life remaining.

The main water service to the building was not identified, but it is assumed to be only a ¾" main. Should fire sprinklers be deemed necessary, the building water service would need to be upgraded. It was also mentioned by the district staff, while on site, that future plans may include an expansion of the building to house public washrooms over top of the existing ramp area. If this was to occur, the water service may not be adequate. The hot water system would need to be upgraded as well.

It was also observed that the washrooms receive very little use this time of year, and perhaps all year round. This was evident by the water closets having completely dried up. This can cause sewer gases to make there way into the building through the toilets as well as allow the seals to dry up and fail.

Although the washrooms were equipped with some ADA compliant fixtures, there was no access for wheel chairs to the washrooms. Also not all fixtures appeared to be ADA compliant and the washrooms themselves do not meet building code requirements for accessibility. If the washrooms were to be made ADA compliant, some of the fixtures will need to be upgraded.

6.3.3 Fire Sprinklers

There is no fire sprinkler system in place in the building. Should one be deemed necessary, upgrades to the water main will be necessary.

6.3.4 General

The mechanical system in this building is not suited for the current use of the building. The building does not have adequate climate controls for the proper storage and preservation of archived materials and museum artifacts.

6.3.5 Controls

Each piece of equipment, excluding the air conditioner, has a wall mounted thermostat located with in the space served. Controls appeared operational.

6.4 ELECTRICAL

6.4.1 Power

- We recommend reviewing existing BC Hydro bills initially to determine the amount of average power used throughout the last few years. This will help verify whether additional power is needed for any future work.
  Opinion of probable cost: $1,500.00

- During our assessment, it was mentioned that the building could be used to power exterior washrooms. As well as power any local farm markets or local concerts. The BC Hydro power consumption must be reviewed before any provisions are made for future work. Additional power circuits and outlets will be required for future work.
  Opinion of probable cost: $3,500.00

- The floor mounted electrical outlet should be removed and proper patchwork should be completed.
  Opinion of probable cost: $500.00

6.4.2 Lighting

<u>Interior</u>

- If the building is continued to be used as a museum, then proper track lighting should be used to light existing displays. The track lighting should have a dimming rack. The existing suspended fixtures on the main floor should be re-

lamped with energy efficient compact fluorescent lamps (CFL's). By the Canadian Electrical Code and BC Building Code, the stairs leading to the basement require 10 to 20 foot candles of lighting.
Opinion of probable cost: $15,000.00

- In the basement, all lighting fixtures should be replaced with energy efficient bulbs and fixtures. We recommend surface mount T8 fixtures as well as some dimmable track lighting to highlight some key historic artifacts. The building should have emergency lighting by the way of either bodine ballasts or emergency battery packs with remote heads.
  Opinion of probable cost: $5,000.00

Exterior

- The exterior lighting needs to be updated and replaced with CFL's. We recommend landscape outlets for holiday lighting. We also recommend providing some light to the "The Museum Story" board.
  Opinion of probable cost: $2,000.00

- If the space is to be expanded in the future to include exterior washrooms, farm markets and local concerts, additional lighting will be needed. This could be in the form of vandal proof fixtures in the washrooms and pole mounted site lighting.
  Opinion of probable cost: $3,000.00

6.5 BUILDING ENVELOPE ASSESSMENT

Items discussed in this section are covered in detail in other areas of this report.

The existing building envelope appears to be in fair condition given the age of the facility; however there are several items which should be done to preserve the life of the structure.

Remedial work to the exterior wood siding and painted finishes should be under taken to prevent moisture from penetrating through the exterior wall system.

Investigation and remedial work on the east side foundation wall affected by the tree roots is required to prevent moisture from entering the building.

Remedial work to all window well locations should be undertaken to help prevent water from entering the building structure.

It was observed that head flashings have not been installed above doors and windows on the building. There appears to be no visible signs of water infiltration; however it is recommended that these flashings and a waterproof membrane be installed around these openings if the exterior siding improvements are considered.

No water damage was observed on the main floor wood deck ceiling.

All exterior penetrations should be caulked.

It is recommended that a regular maintenance program be put in place to help extend the life of this facility.

6.6 BUILDING ENERGY EFFICIENCY

6.6.1 Architectural

The following are recommendations to provide increased energy efficiency for this building:

The existing windows in the building are original to the facility and appear to be single pane. Given the historic nature of the building it may be impractical to replace the stained glass units with more energy efficient units.

- The exterior windows which were removed and replaced with plywood panels should be replaced with insulated panels.
  Opinion of probable cost: $1,500.00

- Confirmation of insulation levels of the main floor exterior walls and roof assemblies is recommended and should increase where possible.
  Opinion of probable cost: $1,500.00 (Insulation investigation)

- Install new weather stripping around all exterior doors.
  Opinion of probable cost: $500.00

- Replace all caulking around all exterior doors and windows.
  Opinion of probable cost: $500.00

- The basement walls appear to have no insulation. We recommend that rigid insulation be installed to all basement walls.
  Opinion of probable cost: $15,000.00 (New rigid insulation and installation of new wood paneling to match existing or reuse existing paneling if possible)

6.6.2 Mechanical

Building Energy Efficiency covered in Section 6.3.

6.6.3 Electrical

There is opportunity to improve energy efficiency by updating older inefficient lighting and making modifications to the lighting control strategies. Refer to ‘Lighting’ in the above section.

7 OPINION OF PROBABLE COST: BREAKDOWN

ARCHITECTURAL	
Upgrades for BC Building Code Compliance & Life Safety	Probable Cost
• Fire stopping	$1,000.00
• Fire rated door and frame – mechanical room	$700.00
• Construct handicap washroom on the main floor level	$10,000.00
• Main entry door exiting hardware	$700.00
• Install new code compliant handrail to interior stair	$700.00
• Construct handicap ramp at main vestibule (interior)	$3,000.00
• Construct handicap ramp for main entrance (exterior)	$15,000.00
• Install new code complaint handrail and guard rail to basement exit stair	$1,500.00
• Install new code compliant handrails at main and rear entrance	Cost included with ramp
• Snow retention brackets	$1,000.00
• Install contrasting nosing and tactile warning	$1,000.00
Recommended Upgrades	
• Repair damaged wood siding	$5,000.00
• Repaint exterior finishes	$19,500.00
• Construct new stair at east entrance	$3,000.00
• Reconstruct or remove window wells	$5,000.00
• Detailed structural investigation - East Foundation Wall	$2,500.00
• Repair foundation wall - East Foundation Wall	$5,000.00
• Repair interior finishes - East Foundation Wall	$500.00
• Replace guard rail at loading ramp	$1,200.00
• Install tamper proof hose bib	$500.00
• Revise grading around building perimeter	$5,000.00
• Lower water shut off cap in sidewalk	$500.00
• Replace missing roof cladding screws	$500.00
• Structural analysis of main floor structure	See Structural
• Investigate water damage in the basement washroom ceiling	$500.00
• Repair raised floor and install a handicap ramp – main floor	$3,000.00
• Reposition electrical outlet in floor	$200.00
• Asbestos testing of V/C tile	$100.00
• Removal of V/C tile if asbestos test positive	$18,000.00
• Install new V/C tile with new underlay on upper floor	$12,700.00
• Replace basement double doors	$1,200.00
• Replace caulking around all exterior doors and windows	$1,200.00
• Replace main floor rear entry door, frame and hardware	$1,000.00
• Conduct structural review of windows on the north face	See Structural
Building Energy Efficiency	
• Replace plywood in window openings with insulated panels	$1,500.00
• Insulation investigation – walls and roof	$1,500.00
• Install new weather stripping around all exterior doors	$500.00
• Replace all caulking around all exterior doors and windows	$500.00
• Install new rigid insulation to all basement walls and finish	$15,000.00
Architectural Total	**$139,700.00**

STRUCTURAL	
Recommended Upgrades	Probable Cost
• New foundations and columns and basement wall repair	$20,000.00
• New structural mullions	$15,000.00
• Structural analysis of roof and wall system	$30,000.00
Structural Total	**$65,000.00**

MECHANICAL	
Minimum Required Upgrades	Probable Cost
• Remove oil fired furnace	$1,000.00
• Install new high efficient forced air furnace c/w air conditioning	$6,500.00
• Programmable thermostats ($1,200 each unit)	$1,200.00
Recommended Upgrades	
• New HVAC system suited for the requirements of a museum with excellent climate controllability and ventilation.	TBD
• Fire sprinkler system (not including water main upgrade)	$10,000.00
• New Hot water system (for expanded washroom facilities, electric hot water tank)	$1,500.00
Mechanical Total	**$20,200.00**

ELECTRICAL	
Upgrades for BC Building Code Compliance	Probable Cost
• Installation of a Fire Alarm System	$7,500.00
• Installation of emergency lighting and exit signs	$3,500.00
Recommended Upgrades	
• Reviewing existing BC Hydro bills and finished report	$1,500.00
• Additional power circuits and outlets for future work	$3,500.00
• Removing floor mounted receptacle	$500.00
• Installation/Supply of track lighting, compact fluorescent lamps, stair lighting	$15,000.00
• Emergency lighting, battery packs, remote heads and T8 fixtures	$5,000.00
• Replace exterior lighting with CFL's, provide light fixture to board	$2,000.00
• Vandal proof fixtures in exterior washrooms,	$3,000.00
Electrical Total	**$41,500.00**

Grand Total	**$263,400.00**

FUTURE EXPANSION	
	Probable Cost
• Construct a 15x30 accessible washroom addition with upgraded electrical service and storage	$112,500

8 CONCLUSIONS

8.1 ARCHITECTURAL

The existing facility appears to be in fair condition; however, there are many items which require immediate attention.

The building will need to be brought up to current building code standards with regards to accessibility for people with disabilities. This work is to include a new entry ramp and accessible washroom facilities on the main floor level.

Fire separations and fire resistance ratings should be brought up to current building code standards.

The exterior building finishes require immediate attention. The building should be repainted and damaged siding should be repaired.

The exterior doors are original to the building and are in poor condition. Many need to be replaced with energy efficient units and/or upgraded with new weather stripping and hardware.

The windows are original to the building and are in fare condition; however, it is recommended that a detailed structural review be conducted with respect to wind loading and the installation of structural mullions on the North wall.

The interior floor finishes are at the end of their lifespan and should be replaced.

The building is under sized for its intended use. The concentrated loading of artifacts on the main floor is compromising the integrity of the floor system. We recommend that the overloading be removed immediately or structural improvements be made to the floor system.

The current state of the building is not suitable for a museum. The damp, unheated and musty conditions observed on site are a detriment to the valuable historic artifacts stored at the facility. The building will not survive the test of time if proper climate controls and building envelope improvements are not put in place. We recommend that a different facility be considered to house the Lillooet Museum if major improvements are not considered.

8.2 STRUCTURAL

A thorough structural analysis should be done and existing structural elements upgraded or new ones installed. If any major renovations are planned for this facility, the building will have to be brought up to current building code standards, with regards to seismic conditions.

The roof and wall system should also be reviewed in more detail.

8.3 MECHANICAL

Overall, the facility does not have a proper HVAC system for its current use. If the building is to continue being used as a museum, serious mechanical upgrades should be considered.

The entire HVAC system should be removed and replaced with a new system designed for conditioning a museum. The new system should have excellent controllability to maintain humidity levels, as well as temperatures required for the proper storage of archived materials and artifacts. With a proper HVAC system, the artifacts in the museum will be better preserved.

If the building should be converted for a different use, the HVAC system will need to be reviewed in detail and redesigned to suit the new occupant's requirements.

The hot water system currently meets the needs of the fixtures installed. However, if the proposed washroom expansion is to be undertaken, the water service and hot water system must be reviewed in greater detail to determine if they will satisfy the new additions.

Currently there is no fire sprinkler system in the building. If one is deemed necessary, the main water service will need to be upgraded to facilitate the installation of fire sprinklers.

8.4 ELECTRICAL

The building electrical is in reasonable condition considering the age of the building. A more detailed review of the overall power consumption is required should there be any building additions or exterior power added.

The current light fixtures need to be replaced as they are dated and inefficient. Three exterior light fixtures may have internal shorting. We recommend using compact fluorescent lamps and T8 fluorescent lamps along with new task oriented track lighting. This will help lower the energy consumption.

The building does not have an adequate fire alarm system or life safety system. The building will need a new fire alarm system complete with pull stations and fire alarm bells. Emergency lighting and exit signs must be updated to meet the current building code standards.

9 LIMITATIONS

The information presented in this report is based on direct visual observation. The findings cannot be extended to components of the building that were not reviewed or that were concealed or unavailable for direct observation at the time of the visit.

The conclusions detailed in this report are based upon the information available at the time of preparation of the report. No investigative method eliminates the possibility of obtaining inaccurate or incomplete information. Professional judgment was exercised in gathering and analyzing the information obtained and in the formulation of conclusions.

Stantec Architecture Ltd. and Stantec Consulting Ltd. prepared this report for the exclusive use by the District of Lillooet, acting as their agent, and may not be used in whole or in part by any third party. Any use which a third party makes of this report, any reliance placed on it, or decisions made based on it, are the responsibility of the third party.

Stantec Architecture Ltd. and Stantec Consulting Ltd. accept no responsibility for damages that may be suffered by any third party as the result of decisions made or action taken, based on this report.

10 APPENDIX A – GLOSSARY OF TERMS

A

Absorption: ability of material to retail moisture or absorb sound energy.
Adhesion: the ability of one material to stick to another.
Air-entrainment: the introduction of millions of microscopic air bubbles into concrete by the use of special effervescents.
Alligator cracking: a series of inter-connecting cracks on an asphalt surface caused by failure of the asphalt under repeated traffic loading.

B

Baluster: the small vertical supports in a balustrade.
Balustrade: a railing consisting of balusters and a top rail.

Baseboard: trim placed at the join of floor and wall planes.
Batten: a continuous piece of square-sawn lumber to which sheet metal panels can be attached; also, a wood of metal covering strip, to conceal joints from view and from weather.
Bearing plate: a flat plate, intended to spread load from a column to the foundation, to provide for fastening and to permit leveling of the column base.
Bleeding: the extrusion of adhesive, cement paste, creosote, or resins from building components.
Blisters: small rounded or elongated raised areas of roof membrane, which are filled with air.
Blocking: solid wood filling in between two adjacent members.
Bridging: blockings between joists used to distribute loads and stiffen frames.
Buckle: in structural terms, failure by deflection.

C

Caulk: to seal joints or cracks with mastic material.
Camber: the upward curve of a surface or beam, usually invoked to offset deflection or induce drainage.
Casing: wood trim around doors and windows.
Cell: the hollow core of a block or brick in masonry.
Chalking: oxidation of paint over time due to weather.
Chord: the upper or lower member of a truss, usually absorbing the primary forces of tension and comprehension.
Cladding: a non-load-bearing skin forming an exterior wall.
Clear span: horizontal unsupported distance between bearings.
Cohesive: to stick together.
Compression: the state of being pressed of condensed by forces.
Condensation: the formation of water out of moisture vapor because of reduced temperature.
Conductivity: the ability of any material to conduct energy.
Conduit: a metal or plastic tube that allows wires to be threaded through construction systems.
Corrugate: to bend sheet material into a series of parallel folds to produce a regular pattern of furrows and ridges.
Course: a horizontal row of masonry units.
Creep: deformation of a material under stress.

Cribbing: an assembly of heavy wooden members to retain earth.
Curtain wall: a non-load-bearing envelope wall hung on the external structural frame of a building.
Cutout: a piece removed to create a small opening.

D

Damp course: a horizontal layer of materials impervious to the passage of moisture.
Damp-proofing: the exclusion of water in its vaporized form.
Decking: system used to form a wood or metal horizontal platform.
Deflect: a natural or machining fault that detracts from the serviceability or appearance of a piece of material.
Deflection: downward displacement of a beam or truss because of loading.
Delamination: the separation of layers of glued or bonded materials.
Dry rot: a type of wood decay caused by a fungus.
Durability: characteristics of materials that determine how long they will last under expected conditions of service.

E

Efflorescent: a powdery grey-white salt residue brought to the surface of masonry by the action of moisture.
Esthetic (aesthetic): having primarily to do with appearance.
Expansion joint: a location where construction systems are interrupted to permit movement of the building.

F

Face: the surface exposed to view.
Fall: the slope or decline of a deck toward a drainage opening.
Fieldstone: naturally occurring uncut blocks of stone.
Fixture: anything that is attached to the building and thereby legally fixed to the real property.
Flagstone: large, thin, irregularly shaped pieces of slate or shale laid flat as paving stones.
Flange: the peripheral plates along the outermost edges of the central web of steel beam.
Flashing, base: that part of the flashing system that connects to the horizontal roof or waterproof membrane to the adjacent vertical wall or parapet.
Flashing, cap: a continuous piece of metal, snapped on to complete a weatherproof system that edges, ridges, or expansion joints in roof systems.
Flashing counter: that part of the flashing system that overlaps the base flashing.
Flue: a (usually) vertical duct or vent for hot gasses and smoke.
Flush: two components having surfaces lying within one plate.
Frieze: a decorative horizontal band on a building surface.
Frontage: the length of the property adjoining the street line.

G

Gable: the upper triangle area formed by the sloping roof at the end wall of a building.
Girder: a horizontal or slightly inclined to main beam.
Glazing: the process of securing glass panels into prepared door or window frames.
Grade beam: a horizontal foundation that transmits loads to vertical piles.

Grout: a mixture of cement, fine sand, and water used to fill minor voids in concrete or masonry work.

H

Hanger: a metal or plastic device used to suspend building components.
Header: a masonry unit laid horizontally with its length perpendicular to the wall plane; also, the horizontal frame member at the top of an opening.
Heel: the point where two chords of a truss meet.
Hip: the intersection of sloping planes at the top of a roof.

I

Insulation: any material that will not easily conduct energy in the form of heat, sound or electricity.

J

Jamb: the vertical side of any components.
Joint: the point of contact between two openings.
Joist: horizontal structural member supporting decks and floors.

L

Laminate: to apply a thin layer on top of another.
Landing: an intermediate rest platform in a flight of stairs
Lintel: a horizontal member used to distribute forces above an opening.
Longitudinal crack: a crack in an asphalt surface that runs parallel to the “laydown” direction.
Louver: a slatted ventilation opening.

M

Mastic: oil-or cement-based paste used to fill minor holes and cracks in building.
Membrane: a thin pliable sheet or layer of (usually waterproof) material used as a liner in parts of buildings.
Mildew: a whitish fungal coating, often appearing on damp paper or plaster surface.
Molding: trim or ornamental cover.

N

Newel: the end post in staircase balustrade.

O

Offset: a change in vertical plane.
Overhang. the distance a joist or chord extends beyond the bearing point.

P

Panel: a flat board, plate or pane inserted into a frame.
Parapet: a low wall projecting above the roof level.
Parging: a single application of masonry cement used to cover minor blemishes in concrete or masonry walls; also used to line brick chimney vents.

Parquet:	small wooden block flooring laid in basket-weave or other mosaic patterns.
Partition:	a non-load-bearing wall separating two areas of a building.
Peeling:	the separation of adhesive from glued surfaces.
Permeability:	ability to permit (or resist) the passage of water.
Pier:	a vertical portion of wall between openings, also a free-standing short or stubby column.
Pilaster:	a flat rectangular column projecting from but attached to a structural wall.
Pitch:	slope or angle.
Plate:	a flat horizontal member of a framed wall.
Plumb:	vertical.
Ponding:	the accumulation of water in low areas of normality flat roof decks or paved areas.
Popping:	the loosening of cover over concealed nail heads caused by thermal or moisture movement in framing.
Porous:	a surface permeable by water or air.
Potholes:	bowl shaped holes or various sized in an asphalt surface.
Precast units:	concrete formed, poured, and cured in a location other that its final location.

R

Rake:	a slope or incline.
Ramp:	an inclined plane.
Resistance:	the ability of any material to resist the passage of energy.
Ridge:	the uppermost edge of a roof plane, the upper apex between two adjoining roof planes.
Riser:	the vertical component of a step, intended to prevent the feel from slipping beyond the tread.
Rout:	to gouge with a cutting tool.

S

Scaling:	pitting of surfaces after repeated exposure to freezing and thawing.
Sealants:	products used to seal joints that have been packed with weatherproof materials.
Sealers:	waterproof products used to coat or prepare surfaces or areas to inhibit moisture penetration.
Shear:	the tendency of forces to cause a transverse fracture across a member.
Sheathing:	usually rough wood or plywood boarding used to enclose a space and impart structural integrity to a wood or metal frames, such as a floor wall or roof.
Shim:	a small wedge-shaped plate of wood or metal, used to finely align members secured to uneven members.
Siding:	overlapping long, narrow and thin boards of wood or metal attached horizontally or vertically to the outside of buildings to improve weather protection and appearance.
Sill:	the lowest horizontal part of an opening through the wall.
Skewed:	angled, oblique, off centre.
Soffit:	the exposed underside of any building surface.
Spalling:	breaking away of surface in flakes and chunks.
Splice:	a device to form a join between two components.
Splits:	tears that extend through roof membrane layers.
Storey:	the usable portion of a building between one floor and one above it.
Strength:	the characteristics of a material that determines its ability to resist or impart forces.
Substrate:	the surface beneath a finishing layer or coating.

T

Tension:	forces tending to stretch or elongate an object.
Terrazzo:	a mixture of cement paste and marble chips, ground and polished after curing.
Thermographic Scan:	an infrared survey carried out on a roof system to determine areas of heat loss and potential roof leaks.
Threshold:	see sill.
Topping:	a thin layer of fine concrete laid on top of and bonded to a thicker substrate of structural concrete.
Transverse Crack:	a crack in an asphalt surface that runs across (perpendicular or diagonal to) the “laydown” direction.
Tread:	the horizontal component of a step.
Trim:	long, narrow strips of shaped and finished wood, metal, or plastic used to conceal joints of building components.
Truss:	a structural framed, usually part of a roof structure.

V

Valley:	the line where two inclined planes of a roof surface meet, and to which water will be directed.
Veneer:	a thin layer of wood, masonry, or metal applied for primarily cosmetic effect.

W

Warp:	a significant and unwanted deviation from an intended true plane.
Waterproofing:	the exclusion of water in its liquid form.
Web:	the central vertical plate between outer beam flanges.
Weep holes:	small spaces left in mortar joints or concrete walls to permit moisture escape.
Wythe:	in masonry, width, usually the width of one brick, as is a wall or veneer one wythe thick.

11 APPENDIX B – SITE PLAN

Lillooet Museum and Visitor Centre Site Plan

12 APPENDIX C – FUTURE EXPANSION

13 APPENDIX D – PHOTOGRAPHS

Image - A01

Image - A02

Image - A03

Image - A04

Image - A05

Image - A06

Image - A07

Image - A08

Image - A09

Image - A10

Image - A11

Image - A12

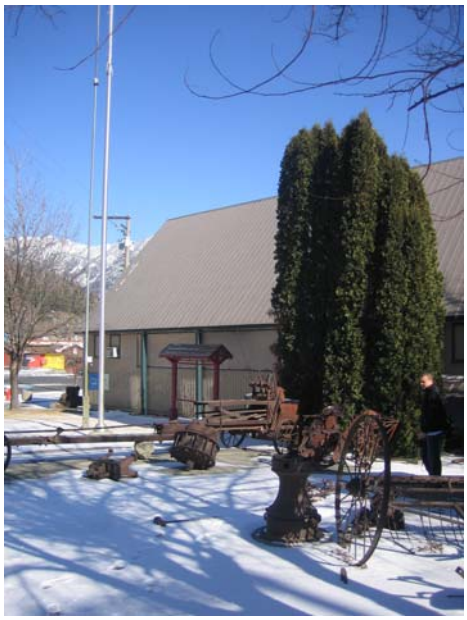

Image - A13

Image - A14

Image - A15

Image - A16

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Image - A22

Image - A23

Image - A24

Image - A25

Image - A26

Image - A27

Image - A28

Image - A29

Image - A30

Image - A31

Image - M01

Image - M02

Image - E01

Image - E02

Image - E03

Image - E04

Image - E05

Image - E06