

Building Condition Assessment

Port Alice / Doug Bondue Arena

05 November 2025



Prepared for:

Village of Port Alice

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1.0 Introduction

1.1 Building history and general description

The Doug Bondue Arena in Port Alice British Columbia was designed and fabricated by the Permasteel Engineering Ltd; a company still in existence today. The dates on the archival drawings place the construction in 1971. There have been some changes over the years. The Zamboni garage and the ice plant are not on the original architectural drawings but presumably were installed as part of the original construction in 1971. The mezzanine lounge and related level 2 exit structure may have come later. Archival drawings with dates in 1973 & 1974 show these elements. Currently there are maintenance sheds at the Northeast corner of the building, date of this construction is unknown. Dates are also unknown for a series of interior modifications, including a commercial kitchen at the mezzanine level.

The arena was used as designed, for curling and ice rink activities, until 2019 when the ice plant use was discontinued due to financial reasons. The facility has continued to be used for an assortment of general activities since the ice was removed. Current and recent uses have included community gatherings, recreational and sports activities.

1.2 Objectives

The condition assessment has two main goals: 1. To determine the current state of the building, with a review of architectural, structural, mechanical and electrical components, and 2. Provide a rough framework for determining, generally, what upgrades might be required for different proposed uses.

1.3 Methodology of Condition Assessment

A conventional building review approach has been undertaken to determine the existing condition of the Doug Bondue Arena building. The techniques include site review with visual observations and examination of existing drawings for the building and its systems. All observations were non-invasive; no samples were taken; no testing of materials was done. Observations were limited to areas accessible from the exterior and interior of the building. Concealed components, systems, and materials were not reviewed. Areas where access was not available, such as the rooftop, were not reviewed.

1.4 Determining Feasibility

The purpose of this report is to assist in determining how feasible future proposals are, based on a set of general criteria. Without knowing exactly what the future proposed use /re-use will be, determining the exact upgrades is not possible. But it is possible to provide a rough framework of potential upgrades levels. This is to allow a basic understanding of what level of upgrades would be required to achieve different levels of renovation/reconstruction/redesign/re-use. Some proposed uses will require significantly more upgrades than others. To assist in determining what upgrades might be necessary for various proposed re-use scenarios we've created 4 levels, each featuring a combination of potential changes. This framework is outlined in Appendix A.

2.0 Building Condition Assessment

Site visits were conducted on May 26th and 28th of 2025. Architectural, mechanical, electrical and structural consultants reviewed existing conditions and have documented their observations in this section.

2.1 Building Envelope / Enclosure

The arena building's enclosure has fared well and has provided the necessary resistance to the exterior weather. No water ingress issues were noted during the site review. A visual review was performed from the interior, and all accessible areas of the building were observed. Access to the rooftop surface was not available and was not included in the review. The exterior primary weather resistance barrier for both the roof and wall siding is corrugated sheet metal panel. The wall cladding utilizes exposed fasteners. Exterior siding is performing well; no deficiencies were observed.

There are two different approaches to roof insulation. Most of the facility has an insulating layer installed above the structural purlins and below the sheet metal roofing. This insulation layer is a blanket type, with a poly surface facing the interior.



Figure 1: Roof insulation, blanket type

In the rink section of the arena there is an additional layer of insulation attached below the steel roof beams. This continuous layer of insulation conceals the roof structure and was likely not a component of the original construction. This appears to be a layer of reflective foil-faced bubble wrap type insulation. It is possible that some form of spray foam insulation is above the foil faced insulation, though none was observed due to the continuous nature of the foil faced insulation layer.



Figure 2: Roof insulation, bubble wrap type



Figure 3: Roof insulation, bubble wrap type

The thermal resistance of each of these layers is minimal. I would estimate the R-value of the combined system to be less than R-5.

The arena's exterior walls are composed of corrugated sheet metal panel, wood stud infill between steel primary structure, with plywood interior surface. Insulation was not observed, but review of the original drawings shows 2" of insulation placed against the inside surface of the siding.

The thermal resistance of the exterior walls is minimal. I would estimate the R-value to be less than R-5.



Figure 4: Exterior corrugated metal siding



Figure 5: Gutter & Downspout

The rainwater management system, including gutters, down spouts and connection to below grade drainage appears fully intact and functional.

Recommendation:

- Inspect the cavity between the foil faced bubble wrap insulation and the above purlins to confirm moisture levels are not increased in this area.
- Provide a level of heating and ventilation suitable to prevent interior moisture damage.
- Monitor rainwater management system to ensure continued functionality.
- Adding insulation to the roof and walls could be considered if a change of use requires a heated space (higher level of space conditioning).

2.2 Building Interiors

The building's interior is generally in good condition. Some water intrusion was noted near the skate rental shop and the primary bathrooms. There was no evidence of this water coming from the exterior of the building. It's likely the water noted is resulting from a leak in the plumbing system.

The building is well situated for bathrooms with 15 toilet fixtures. Primary Men's and Women's bathrooms are located off the lobby and include 7 fixtures. Each change room features a toilet, sink and shower. Single occupancy M&W located in the Level 1 curling viewing area, and single occupancy M&W in the Level 2 lounge area. It was noted the Men's and Women's bathroom in the Level 2 lounge area were not functioning.

There are also shower fixtures in the retrofit women's change room at the concourse level of the rink.

It was noted that several interior layout changes have been made after the building was constructed. Specifically, there are five enclosed spaces that have been created within the building, listed below:

1. Storage room at the skating rink concourse level, west side.
2. Storage room and music booth at the Northwest corner of the skating rink, concourse level.
3. Storage room at the Northwest corner of the skating rink, rink surface level.
4. Women's change room at the skating rink concourse level.
5. PA / Announcer's booth, located at the concourse level.



Figure 6: Concourse Storage Area



Figure 7: Music Booth & Storage



Figure 8: Concourse Change Room



Figure 9: Announcers Booth

It appears these additions have not been built according to building code requirements and seems unlikely they were approved by the regional building inspector.

Recommendation:

- Resolve water intrusion issues near skate shop.
- Ensure all bathrooms are operational.
- Remove unpermitted layout changes that create additional enclosed spaces within the building. As an alternative to removal, these enclosed spaces could be upgraded and reviewed/approved by the building inspector / Authority Having Jurisdiction.

2.3 Demising wall

An interior demising fire wall divides the arena building roughly in half. Running north / south and located on the east side of the curling surface, it jogs near the south end to include the lobby and the rink main access ramp. It separates the lobby, offices, curling lounge, curling surfaces; from the skating rink, rink concourse, and change rooms. This vertical fire separation is constructed of concrete block (CMU). Openings in this wall should be protected with the appropriate doors and automatic closers. Service penetrations should be appropriately sealed.



Figure 10: CMU fire wall

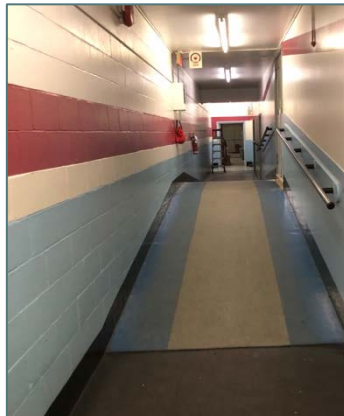


Figure 11: CMU fire wall

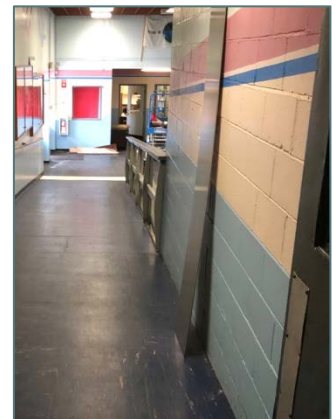


Figure 12: CMU fire wall

There are six doors penetrating this fire wall. These doors are required to be rated for the fire wall assembly which they penetrate, and they must have operational automatic door closers.

The six door openings penetrating the fire wall are located:

1. Double swing door, top of lobby ramp, entering rink.
2. Double swing door, between lobby and change room corridor.
3. Single swing door at curling surface to change room corridor.
4. Single swing door from lounge to rink concourse.
5. Single swing door into the primary women's bathroom.
6. Single swing door into the primary men's bathroom.

Recommendation:

- Review requirements for doors in fire wall. Replace if non-conforming.
- Confirm doors in fire wall have operational automatic door closers.

2.4 Exits & Egress Routes

A visual and manual inspection of exiting revealed many of the exit doors are marginally functional or non-functional. Each exit door will need to be reviewed for full functionality, including panic hardware, free swinging operations, and re-latching after opening. Required signage and emergency lighting also need to be reviewed. This is covered in the Electrical Systems Assessment section.

In the site visit and review of the building it was noted that some portions of the building were being used for storage. The use as a general storage facility is not acceptable under the current Assembly use, except for rooms or spaces specifically designed for this purpose. Also noted was stored items in on egress routes hindering access to exits.



Figure 13: Exit



Figure 14: Exit w/storage



Figure 15: Exit

Recommendation:

- Post Maximum Occupant Load signage in conspicuous locations near entrances.
- Ensure all exit doors are fully functional, including panic hardware, free swinging operation, and latching.
- Relocate or remove items stored around the rink surfaces and other areas where storage is not the designated use.

2.5 Interior & Exterior Glazing

The building features considerable interior glazing and a small amount of exterior glazing. Exterior glazing is limited to the entrance lobby (doors and windows), the ticket booth and one office. Windows are aluminum frame double glazed and appear to be in fair condition, except two of the four glass panes in the office window have been replaced wood infill panels. There is no evidence of water intrusion at the windows.

Exterior aluminum and glass entry doors at the lobby were observed to be glazed with safety glass.



Figure 16: Glazed Entrance Doors



Figure 17: Tempered Glass Marking

Interior glazing can be found between the curling surface and the adjacent viewing area; and at level two in the lounge, overlooking the curling surface. Both locations require safety glass. The glass panels observed did not have the glazing type noted.



Figure 18: Glazing at Lounge Viewing



Figure 19: Glazing at Curling Surface

Other interior glazing can be found at interior double swing doors. These areas also require safety glass. It was observed that some doors had glass and some had plexi-glass or other type of transparent acrylic product.

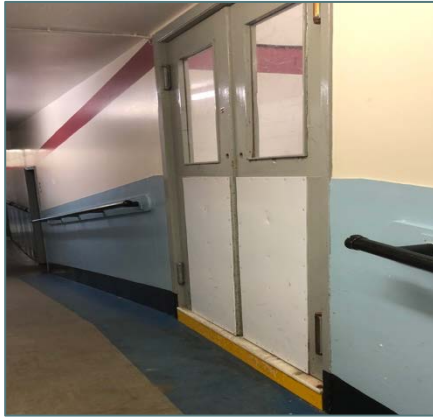


Figure 20: Glazing at interior doors



Figure 21: Glazing at interior doors

Additional glazing was noted in the P.A. / announcer's booth, and the music booth in the rink area.

Recommendation:

- Professional testing of interior existing glass panels to confirm they meet building code requirements for safety glass.
- Remove glazing in the rink announcer's booth and the music booth if it doesn't meet building code requirements. It has been recommended earlier in this assessment that these additions be removed entirely. The glazing could be included in this removal.

2.6 Hazardous Materials

This report does not include review of the building for hazardous materials. If proposed work to the building includes selective demolition and/or potential exposure of hazardous materials it is recommended that a qualified professional be engaged.

It was noted in a review of the original architectural drawings that vermiculite insulation is contained within the concrete masonry units of the fire wall.

Recommendation:

- Engage a qualified professional for hazardous material testing if changes are proposed to the building that would include selective demolition and/or exposure of potentially hazardous construction materials.

2.7 Repairs & Upgrades

Mandatory repairs to keep arena building from deteriorating:

- Resolve water intrusion issues near skate shop.
- Inspect the cavity between the foil faced bubble wrap insulation and the insulation above purlins to confirm moisture levels are not increased in this area.
- Provide a level of heating and ventilation suitable to prevent interior moisture damage.
- Monitor rainwater management system to ensure continued functionality.

Recommended upgrades to keep building functioning:

- Repairs noted above, plus:
- Post Maximum Occupant Load signage in conspicuous locations near entrances.
- Ensure all exit doors are fully functional, including signage, panic hardware, free swinging operation, and latching.
- Ensure all bathrooms are operational.
- Confirm doors in fire wall are fully functional, with free swinging operation and automatic closers.
- Remove interior additions that create unpermitted enclosed spaces within the building. As an alternative to removal, these enclosed spaces could be upgraded and reviewed/approved by the building inspector / Authority Having Jurisdiction.
- Professional testing of interior existing glass panels to confirm they meet building code requirements for safety glass.

Recommended and required upgrades for changes by redevelopment level:

Level 1: No change to occupancy / No envelope or changes to conditioned space.

- Mandatory and recommended upgrades listed above.

Level 2: No change to occupancy / Upgrade envelope and conditioned space.

- Mandatory and recommended upgrades listed above, plus:
- Upgrade roof insulation in coordination with heating and cooling system design.
- Upgrade wall insulation in coordination with heating and cooling system design.
- Review air and vapour barrier approach, consider installing smart vapour barrier on interior side of exterior walls.
- Engage a qualified professional for hazardous material testing if changes are proposed to the building that would include selective demolition and/or exposure of potentially hazardous construction materials.

Level 3: Change to industrial occupancy / no envelope or conditioned space upgrades.

- Mandatory and recommended upgrades listed above.
- Install sprinkler system – could potentially be only in areas where use is changed.
- Engage a qualified professional for hazardous material testing if changes are proposed to the building that would include selective demolition and/or exposure of potentially hazardous construction materials.

Level 4: Change to Community Centre / retail use / full upgrade

- Mandatory and recommended upgrades listed above.
- Upgrade roof insulation in coordination with heating and cooling system design.
- Upgrade wall insulation in coordination with heating and cooling system design.
- Review air and vapour barrier approach, consider installing smart vapour barrier on interior side of exterior walls.
- Engage a qualified professional for hazardous material testing if changes are proposed to the building that would include selective demolition and/or exposure of potentially hazardous construction materials.
- Install a sprinkler system.
- Additional fire separations or fire walls may be required depending on occupancy type and mix of occupancy types.
- Review of interior combustible surfaces (plywood finishes on interiors may require replacement with non-combustible gypsum wallboard).
- If interior spaces are divided or created a review of current building code requirements for fire safety within floor areas and exiting would be necessary.
- Accessibility would need to meet current code requirements: This would include an elevator if the curling lounge was maintained as occupiable space. Changes to existing ramp slopes would be required.
- Washrooms would need to meet accessibility requirements.

2.8 Building Code

The design, construction and occupancy of the Doug Bondue Arena is governed by the British Columbia Building Code (BCBC).

Occupancy Classification governed by:

BCBC 3.1.2 Classification of Buildings or Parts of Buildings by Major Occupancy.

The Doug Bondue Arena is classified as a Group A, Division 3 Occupancy (Assembly occupancies of the arena type). An assembly occupancy allows for the gathering of persons for civic, political, travel religious, social, educational, recreational or like purposes, or for the consumption of food or drink.

The arena building has separate occupancy load calculations and limits for different spaces within the building. Please see below.

- Skating rink seating/viewing area: Maximum occupancy 600 persons.

- Skating rink surface/open area for recreational activities and gatherings: Maximum occupancy 800 persons.
- Curling rink lounge (level 2): Maximum occupancy 220 persons

Please refer to Appendix C for more information on occupancy loads.

Building Fire Safety governed by:

BCBC 3.2 Building Fire Safety, BCBC 3.3 Safety within floor areas & BCBC 3.4 Exits

The arena building is categorized as Group A, Division 3, up to 2 storeys and falls under section 3.2.2.30 of the BCBC. To meet Building Area requirements, the building is divided into two "buildings", separated by a firewall.

Accessibility governed by:

BCBC 3.8 Accessibility

2.9 Zoning By-law

The parcel of land occupied by the Doug Bondue Arena is Zoned PI (Public & Institutional). This allows for the current use as a recreational facility.

It also allows for other uses to be considered. Acceptable within the current zoning: Assembly facility; Farmers Market; Outdoor Recreation; Public Uses; Public Works; Recycling Depot.

The zoning also allows for more intensive uses that would require significant upgrades to the existing building: Daycare Centre, Educational Facility, Museum, Tourist Services.

The zoning also allows for uses that would require a new facility be constructed: Health and Medical Services, Hospital, Senior Citizen Housing.

Potential uses that would require a re-zone to the property would be:

- Retail uses would require a re-zone to C-1 or C-2 (Commercial uses)
- Manufacturing uses would require a re-zone to M-1 (Industrial)

Recommendation:

- The existing zoning allows for multiple different re-purposing uses that are being considered. Working within this list of uses would not require a re-zoning. If uses outside the current zoning were contemplated, the rezone would need to be approved by Council.

**PORT ALICE DOUG BONDUE ARENA
FACILITY CONDITION ASSESSMENT
ELECTRICAL**



June 19, 2025

Overview

RB Engineering Ltd. has been retained by The Village of Port Alice, via Michael Lemon Architect, to provide an assessment report on the existing electrical infrastructure at Doug Bondue Arena, located at 1061 Marine Drive, Port Alice, BC V0N 2N0. In addition to the assessment of electrical condition, recommendations for any repairs and upgrades will be provided, which will reference the re-use scenarios (Levels 1 – 4) as per the document at Appendix A, provided by Michael Lemon Architect.

Although the facility closed its doors in 2019, Doug Bondue Arena is a multi-use facility, originally constructed around 1970, and comprises a hockey rink, curling slab, changerooms, lobby, concession and curling lounge, as well as office areas.

This report includes information on the following electrical systems:

- Power Distribution
- Lighting
- Emergency Lighting & Exit Signage
- Fire Alarm System
- Telephone & Data
- Security
- Public Address (PA) System

The following system descriptions are based on a site visit on May 26, 2025. The report will consider the following:

- Canadian Electrical Code (CEC)
- British Columbia Building Code (BCBC)
- Building Owners' and Managers' Association of BC (BOMA)
- Illuminating Engineers Society (IES)
- Telecommunications Industry Association (TIA/EIA)
- Visual inspection of existing conditions

PORT ALICE DOUG BONDUE ARENA FACILITY CONDITION ASSESSMENT ELECTRICAL

1. Power Distribution

The facility is serviced via an underground BC Hydro 1200 Amp, 120/208 Volt, three phase service from a BC Hydro pole on the opposite side of Marine Drive, via a BC Hydro Padmount Transformer (size unknown). The Mechanical/Electrical Room houses the service entry and main switchboard, which comprises of a 1200 Amp main breaker, which then splits off to two smaller breakers: 800 Amp for the Lighting Sub-Panel & 400 Amp for the Heating Sub-Panel, both of which are part of the main switchboard (see Figure 1). The main switchboard and sub-panels are all Canadian General Electric. There is a BC Hydro Meter & C/T for each of these two sub-feeds.



Figure 1: Canadian General Electric 1200 Amp Main Switchboard, 800 Amp Lighting Sub Panel & 400 Amp Heating Sub Panel

The two sub-panels provide feeds to several distribution panels throughout the facility, which are mostly Canadian General Electric, with a couple of Square D panels (see Figure 2). Most appear to be in reasonable condition, except for some rusting noted on several of them, and most are physically full.

The Canadian General Electric main switchboard and panels are legacy equipment and have exceeded their BOMA recommended life cycle of 30 years. Sourcing new breakers for this equipment could be an issue.

It was not possible to ascertain the age of the Square D panels; however, these were more recent additions. Sourcing new breakers for these panels is not an issue.



Figure 2: Examples of Distribution Panels; Evidence of Rusting

2. Lighting

The interior lighting fixtures are a mixture of LED and fluorescent fixtures, with evidence of retrofit LED lamp installations throughout (see Figure 3). Lighting controls consist primarily of local toggle switches, along with some dimming and motion switches. Motion switches were found to be installed in each of the washrooms and changerooms, however, there were several examples where the motion switch was not operating, and hence, the light fixtures did not function. Corridor lighting is controlled by toggle switches.

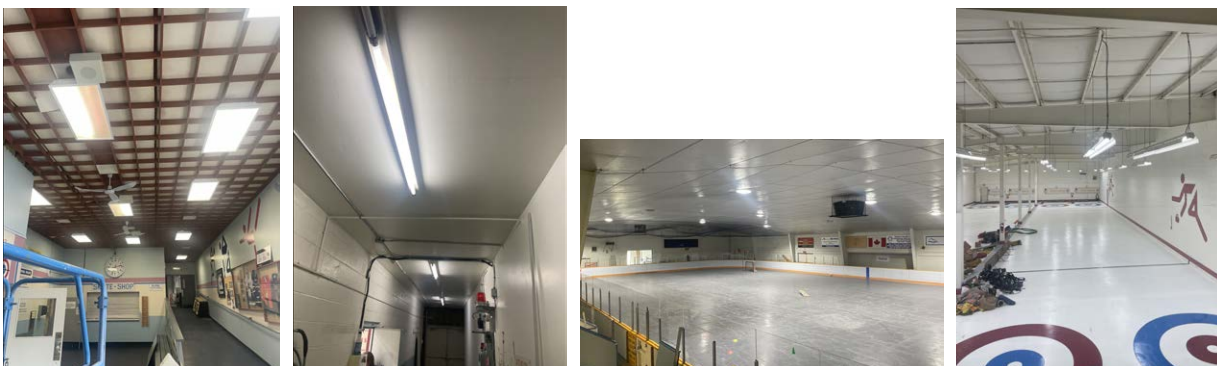


Figure 3: Examples of Interior Light Fixtures

Exterior lighting consists of incandescent perimeter lighting and LED canopy fixtures (see Figure 4). Exterior lighting controls is by photocell.

PORT ALICE DOUG BONDUE ARENA FACILITY CONDITION ASSESSMENT ELECTRICAL

June 19, 2025



Figure 4: Examples of External Light Fixtures & Photocell

3. Emergency Lighting & Exit Signage

Emergency lighting consists of double-head incandescent fixtures complete with battery pack, supplemented by double head incandescent remote fixtures (see Figure 5). The last test of the devices was in 2018. Coverage throughout the facility was observed to be inadequate, and therefore, not compliant with the latest BCBC emergency lighting requirements. None of the washrooms or changerooms had emergency lighting installed, and areas such as the main entrance did not have any installed.



Figure 5: Examples of Emergency Lighting

All the exit signs throughout the facility are the old-style red lettering (see Figure 6) and not the green running man signs as per the latest edition of the BCBC. Coverage throughout the facility was observed to be inadequate as per the latest BCBC emergency lighting requirements.



PORT ALICE DOUG BONDUE ARENA FACILITY CONDITION ASSESSMENT ELECTRICAL

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Figure 6: Examples of Exit Signs

4. Fire Alarm System

The existing fire alarm system is Edwards 2280, which comprises a fire alarm panel (no separate annunciator), manual pull stations, smoke detectors, heat detectors, and bells (see Figure 7). The height of all the manual pull stations does not comply with the latest BCBC requirements. Coverage of the fire alarm bells throughout the facility is inadequate, as per the latest BCBC requirements. It was also noted that there were no fire alarm strobes installed in any of the public corridors, washrooms and changerooms, as per the latest BCBC requirements.



Figure 7: Fire Alarm Panel & Examples of Fire Alarm Devices

5. Telephone & Data

The telephone and data service for the facility is an overhead & underground Telus service terminating in the Mechanical / Electrical Room. There are wall mounted data outlets in the office and skate rental areas, which run back to the tie-in location (see Figure 8).

PORT ALICE DOUG BONDUE ARENA FACILITY CONDITION ASSESSMENT ELECTRICAL

June 19, 2025



Figure 8: Telus Demarcation, Telephone / Data Tie In, & Telephone / Data Outlet Examples

6. Security

Security comprises of an intrusion detection system, of which there is a main panel, along with a keypad by the front entrance and PIR's located throughout the facility. Only one horn was spotted, which is located by the front entrance (see Figure 9).



Figure 9: Intrusion Detection System

7. Public Address (PA) System

There are several locations where stand-alone PA systems have been installed complete with head end equipment (e.g. amplifiers), with each supported by different vintage speakers (see Figure 10). The functionality of this equipment was not verified at the time of site review; however, they appeared to be in reasonable condition. Speaker coverage appeared to be inadequate across the whole facility.

**PORT ALICE DOUG BONDUE ARENA
FACILITY CONDITION ASSESSMENT
ELECTRICAL**

June 19, 2025



Figure 10: Examples of PA System Components

8. Recommendations

Power Distribution (required for Levels 1 – 4 as per Appendix A)

- Replacement of those electrical panels where rusting is an issue.
- Replacement of Canadian General Electric main switchboard and panels, if sourcing new breakers is not possible.
- Provide lamicon label on all electrical panels to include panel name, voltage, amperage, and phase.

Lighting (required for Levels 1 – 4 as per Appendix A)

- Replace the remaining interior fluorescent lights with LED.
- Replace existing exterior incandescent lights with LED.

Emergency Lighting & Exit Signage (required for Levels 1 – 4 as per Appendix A)

**PORT ALICE DOUG BONDUE ARENA
FACILITY CONDITION ASSESSMENT
ELECTRICAL**



June 19, 2025

- Replace existing emergency lighting with LED; add supplementary LED emergency lights throughout the facility to ensure coverage as per the latest BCBC requirements.
- Add emergency lights to all washrooms and changerooms.
- Replace exit signs throughout the facility with green running man; add supplementary exit signs throughout the facility to ensure coverage as per the latest BCBC requirements.

Fire Alarm System (required for Levels 1 – 4 as per Appendix A)

- Arrange for a fire alarm verification to be taken place, which will identify any deficiencies, including failed devices, coverage, along with recommendations.
- Lower the height of all manual pull stations as per the latest BCBC requirements.
- Addition of fire alarm bells throughout the facility to ensure coverage as per the latest BCBC requirements.
- Addition of fire alarm strobes to the public corridors, washrooms and changerooms, as per the latest BCBC requirements.

Telephone and Data (required for Levels 1 – 4 as per Appendix A)

- Any future telephone or data installations to comply with the latest TIA/EIA requirements.
- Remove redundant wiring.

Public Address (PA) System (required for Levels 1 – 4 as per Appendix A)

- Arrange for a test of the PA system(s) to ensure functionality of the head end equipment and speakers, which will identify any equipment deficiencies, as well as areas of the facility where speaker coverage is inadequate.

Feasibility Assessment Report

PORT ALICE DOUG BONDUE ARENA

1061 Marine Drive, Port Alice, BC V0N 2N0

Project No.:250272

October 16, 2025

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PROJECT BACKGROUND

Avalon Mechanical Consultants is working with Michael Lemon Architect to provide a feasibility assessment of the Bondué Arena in Port Alice, BC. The assessment is to determine the feasibility and scope of mechanical system and upgrades required for four potential options for reuse/repurposing of the building. This would also include mandatory repair recommendations to keep arena building from deteriorating and recommended upgrades to keep the building functioning.

RELEVANT CODES AND STANDARDS

All spaces of the building will be designed to meet the following codes, standards, and by-laws, as applicable:

- British Columbia Building Code
- National Energy Code of Canada for Buildings
- NFPA 13 Standard for the Installation of Sprinkler Systems
- NFPA 14 Standard for the Installation of Standpipe and Hose Systems
- ASHRAE 62.1 Ventilation for Acceptable Indoor Air Quality
- ASHRAE 90.1 Energy Standard for Building Except Low-Rise Residential Buildings
- CAN/CSA B64.10 Selection and Installation of Backflow Preventers
- CAN/CSA B149.1 Natural Gas and Propane Installation Code

REFERENCED DRAWINGS AND DESIGNS

The recommendations made are to suit the proposed uses for the building. These recommendations are not all encompassing or a design but rather a high-level overview of what would be required mechanically to suit the various use options.

The feasibility study presented will be based on the information above and options provided by the Architect, based on input from the Client. Coordination with all other consultants will take place during the detailed design.

INTRODUCTION

This report presents an assessment of the existing heating, ventilation, air conditioning (HVAC), and plumbing systems at the Port Alice Bondué Arena. The arena is a legacy facility originally constructed for ice-related sports, and its mechanical systems were designed to support that specific use.

As the community considers new uses for the facility, four redevelopment levels have been identified. This report documents the current condition of the HVAC and plumbing systems, evaluates their suitability for each redevelopment level, and provides recommendations for upgrades.

EXISTING CONDITIONS

HVAC Systems

- **Heating:**
 - A dedicated outdoor air system that uses a combination of desiccant dehumidification and direct expansion (DX) refrigeration to provide cost-effective pre-treatment for 100% makeup air serves the main arenas. It controls humidity and integrates energy recovery from exhaust air for reasonable efficiency. This unit has supplemental gas heat/desiccant drying and serves the ice arena and curling arenas for humidity control and also provides ventilation air.
 - Several electric heaters in spaces (offices, storage, locker rooms, entrances, lounge area).
- **Ventilation:**
 - Minimal fresh air provided via rooftop/wall exhaust fans and passive louvers.
 - Many spaces rely on exhaust fans to draw fresh air through the spaces.
- **Ice Plant:**
 - Chiller systems (ammonia Chiller with emergency exhaust system in mech room) and cooling tower (Baltimore Air Coil) serves two ice sheets and some unknown in-floor heating with waste heat.
- **Controls:**
 - Basic thermostats; no building automation system.
- **Condition:**
 - Most equipment is beyond typical service life expectancy.
 - Energy efficiency is poor by current standards.
 - Ventilation likely does not meet current ASHRAE 62.1 requirements for occupancy.

Plumbing Systems

- **Domestic Water:**
 - Building is served by a 50mm water line, assumed to be from the Port Alice Municipal System
 - Large capacity electric domestic hot water system; electric tanks (2 x 24kW w/ 120 gal storage) and large storage – (3 x 120 gal tanks) capacity serving washroom/locker rooms. Recirculating system.
 - Smaller electric hot water tank serving kitchen.
 - Copper piping with areas of corrosion and some patch repairs observed. Distribution is in reasonable shape and fully insulated.
- **Sanitary Drainage:**
 - Building is served by a 100mm sanitary main.
 - Cast iron mainlines, original to building. Some localized failures and repairs.
 - Cast iron below grade can corrode so camera review of piping should be performed before relying on it.

- **Fixtures:**
 - Change room showers, toilets, and sinks – mix of commercial grade and domestic, in reasonable condition but nearing end of life.
 - Janitor's sinks in utility rooms.
- **Zamboni Hot Water:**
 - One wall hung instantaneous hot water heater serves the Zamboni area.
- **Condition:**
 - Functional but aged. Fixtures are inefficient (high-flow toilets and showers).
 - Not compliant with current accessibility requirements in some areas.

Miscellaneous Systems

- Small kitchen facilities with large griddle areas, ovens and electric stovetop.
- Commercial kitchen hood and exhaust with hood fire suppression system.

MANDATORY REPAIRS TO KEEP ARENA BUILDING FROM DETERIORATING

Client should ensure existing heating systems (electric heaters typically) are functional and provide temporary heat as needed to ensure all portions of the building remain well above freezing level during the winter. This would be the minimum level of scope to keep the building from deteriorating. This would not provide ventilation air for occupancy.

RECOMMENDED UPGRADES TO KEEP BUILDING FUNCTIONING

Maintain current HVAC equipment in a functioning state. The main outdoor air system should be serviced and functional if the building is intended to be occupied as well as any heating equipment. If the building is intended to be fully occupied upgrades may include providing ventilation air to areas that currently do not have any, such as the small offices at the front of the building and the lounge area. This may be accomplished through the use of small local Heat Recovery Ventilators. If the kitchen is intended to be used it would require recertification of the exhaust hood and a source of make up air for the hood. This may be accomplished simply with a dedicated duct system from the outdoors to near the hood. Plumbing fixtures should be assessed for function and replace/repared as needed.

RECOMMENDED SCOPE ASSESSMENT BY REDEVELOPMENT LEVEL

Level 1 – No Change to Occupancy / No Envelope or Conditioning Upgrade

- **HVAC:**
 - Existing systems could be maintained with minor repairs. Would not re-instate chiller/ice making system.
 - Heating only; ventilation limited to ice sheet areas
 - No cooling for recreational/community events.

- **Plumbing:**
 - Existing washrooms and change rooms adequate with fixture replacements and basic level repairs.
 - Minimal upgrades needed aside from basic maintenance.
- **Fire Suppression**
 - None exists except in kitchen hood. No Changes anticipated.
- **Recommendation:**
 - Replace end-of-life heaters as needed. Likely the existing dedicated outdoor air system could be utilized for ventilation.
 - Upgrade fixtures to low-flow models to reduce water use.
 - Inspect and repair sanitary piping where necessary.

Level 2 – No Change to Occupancy / Envelope + Conditioning Upgrade

- **HVAC:**
 - Full system replacement recommended to align with new insulated envelope.
 - Add centralized air handling with energy recovery.
 - Introduce cooling for multi-purpose use in summer months.
 - Consider air-to-water heat pump for low-carbon solution.
- **Plumbing:**
 - Expand domestic hot water capacity if there is to be an upgraded kitchen.
 - Replace all aged fixtures with new low-flow models.
 - Modify drainage for kitchen grease interceptor.
- **Fire Suppression**
 - None exists except in kitchen hood. No Changes anticipated.
- **Recommendation:**
 - Install new HVAC system sized to reduced heating/cooling loads from envelope upgrades.
 - Integrate digital building automation controls for efficiency.
 - Upgrade plumbing infrastructure to meet code for expanded use.

Level 3 – Change to Industrial Occupancy / No Envelope or Conditioning Upgrade

- **HVAC:**
 - Minimal heating to maintain frost protection and limited comfort.

- Install dedicated exhaust for woodworking or brewery applications.
- Process ventilation will vary depending on tenant.
- **Plumbing:**
 - Add industrial-grade utility fixtures as needed.
 - Provide capacity for process water (brewery or light manufacturing) if required.
 - Consider installing oil/grease interceptors depending on use.
- **Fire Suppression**
 - With change of occupancy and higher risk use, a sprinkler system may be warranted for risk reduction.
- **Recommendation:**
 - Maintain simple heating with unit heaters; add ventilation or refurbish dedicated outdoor air unit as required by tenant processes.
 - Upgrade plumbing selectively for industrial users.
 - Keep costs low with targeted upgrades rather than full system replacement.

Level 4 – Change to Community Centre/Retail Use / Full Upgrade

- **HVAC:**
 - Complete mechanical retrofit with new zoned HVAC systems.
 - Dedicated ventilation with energy recovery and air quality monitoring.
 - Full heating and cooling to meet occupant comfort for retail and community use.
 - Potential for rooftop air-source heat pumps or VRF system for zoning flexibility.
- **Plumbing:**
 - Replace all piping and fixtures.
 - Expand plumbing distribution to support subdivided spaces.
 - Install accessible washrooms and sinks for studio use.
 - May need to upgrade hot water plant to commercial capacity or have tenants provide own hot water capacity as needed.
- **Fire Suppression**
 - With change of occupancy and use, a sprinkler system may be warranted for risk reduction.
- **Recommendation:**
 - Comprehensive modernization of all mechanical systems.
 - Design for flexibility to accommodate future tenant mix.

- Prioritize sustainability (low-carbon HVAC, low-flow plumbing, rainwater collection for non-potable use if feasible).

Comparative Summary Table

Criteria	Level 1 Recreation, no upgrades to envelope/conditioned space	Level 2 Recreation with envelope + conditioning upgrades	Level 3 Light industrial, no envelope/conditioning upgrades	Level 4 Retail/Studios/Community Centre, full upgrades
Occupancy	Recreational / community events (skating, pickleball, indoor courts, gatherings)	Same as Level 1 + upgraded kitchen and envelope	Light industrial (brewery, woodworking, prefab, storage)	Mixed-use (retail, artist studios, community centre)
HVAC – Upgrade Scope	• Replace aged unit heaters with high-efficiency models • Replace/repair rooftop units for dressing rooms • Maintain heating-only system • Add CO detectors & exhaust fans as needed	• Remove existing HVAC equipment • Install new high-efficiency heating/cooling system sized to upgraded envelope • Add dedicated air handling with ERV (energy recovery ventilation) • Integrate BAS (building automation system) for controls	• Retain basic heating (unit heaters/boilers) • Add process ventilation (dust collection, brewery exhaust) • Tenant-specific exhaust hoods as required • Minimal conditioning, heating for frost protection only	• Full HVAC retrofit with zoned systems (VRF or rooftop heat pumps) • Install high-efficiency heating & cooling • Provide dedicated outdoor air system with ERV • Design zoning for multi-tenant flexibility • Full BAS integration
Plumbing – Upgrade Scope	• Replace worn fixtures with low-flow models • Repair/reline sanitary lines as needed • Maintain concession plumbing	• Replace all plumbing fixtures with low-flow models • Upgrade domestic hot water (larger capacity) • Add grease interceptor for upgraded kitchen • Replace aging supply & drainage piping	• Add industrial-grade sinks & floor drains • Upgrade drainage to support process water • Install interceptors (oil/grease) depending on tenant • Retain basic washroom facilities	• Replace all plumbing distribution • Add accessible washrooms & studio sinks • Expand DHW system (commercial capacity) • Install new sanitary and venting systems • Consider non-potable water re-use (rainwater harvesting for flushing/irrigation)
Energy Efficiency	Low – retain existing systems	Moderate to high – envelope upgrades + efficient HVAC	Low – limited heating, no envelope upgrade	High – full mechanical modernization + sustainable design options

Relative Cost	\$ (Lowest – minimal upgrades)	\$\$ (Medium – major HVAC & kitchen work)	\$\$\$ (Medium – selective upgrades, tenant-specific)	\$\$\$\$ (Highest – full mechanical replacement)
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Recommendations

- The arena’s mechanical systems are at end-of-life and will require significant intervention for all but the most minimal reuse scenarios.
- **If pursuing Level 1:** Only minor upgrades are required, but systems will remain inefficient and costly to operate.
- **If pursuing Level 2 or 4:** Full HVAC replacement and plumbing renewal are strongly recommended to align with building upgrades.
- **If pursuing Level 3:** Maintain minimal systems but plan for tenant-specific ventilation and plumbing.
- **Overall:** The long-term vision for the facility should guide investment. A phased approach may allow immediate low-cost reuse while planning for larger capital upgrades.

CLOSURE

This report is for the use of the intended client only and was produced in accordance with good engineering practice. Avalon Mechanical Consultants Ltd. will not be responsible for any unauthorized third-party use of this report. The assessments and conclusions in this report are based on information gathered and provided by various methods, and should new or conflicting information arise, Avalon Mechanical Consultants Ltd. requests the opportunity to amend the report as required.

Report Prepared by:

AVALON MECHANICAL



Rob McLean, P.Eng.

Principal

Written:
File:250272 Port Alice Arena Feasibility Study - Avalon Mechanical - Final

PROJECT: Port Alice Doug Bondue Arena Community Centre - Condition Assessment
LOCATION: 951 Marine Dr, Port Alice, BC
PREPARED BY: Herold Engineering Limited, 3701 Shenton Road, Nanaimo, BC V9T 2H1
Project No. 2801-003
PREPARED FOR: Village of Port Alice
DATE: November 3, 2025
ATTENTION: Michael Lemon, Architect, Project Coordinator



The following report was prepared by Herold Engineering Limited, as per the request of Michael Lemon, Architect and Project Coordinator for the Village of Port Alice.

Herold Engineering has visually reviewed the structural systems in place at the Port Alice Doug Bondue Arena, located at 951 Marine Drive in Port Alice, British Columbia and notes the following.

1. **INTRODUCTION**

Herold Engineering attended site on May 28th, 2025, to complete a visual assessment of the building structural components of the arena complex. The assessment included visual review and a preliminary review with a metal detector to detect the presence of reinforcing in some of the masonry walls.

In addition, photographs of drawings for the facility were also reviewed to help support the recommendations and conclusions of this report.

The structural element review was limited due to accessibility and/or the presence of architectural finishes.

The following report summarizes the results of the structural assessment, as well as any relevant information provided in the reference documents. The report also provides commentary on the existing structure compliance with current BCBC code.

Selected photographs from the site visit are appended to this report for reference.

2. **BACKGROUND**

Record drawings indicate that the construction of the Arena began circa 1971 which comprises a main ice rink for hockey and an adjacent curling rink separated by a masonry wall.

The primary structure comprises a pre-engineered steel building with metal cladding to the roof and walls. Interior partitions are typically of masonry or wood construction. Foundations are concrete pads and strip footings with slab thickenings under partition walls.

It is understood that the building is expensive to operate when used as a skating and curling facility and so the Village of Port Alice is investigating options for the building to be used for other more cost-effective purposes. The Arena structure is not considered a Post Disaster structure and is of "Normal" importance at the time of the assessment review.

3. **Methodology**

The structures were visually reviewed by Herold Engineering Limited (Herold Engineering).

The feasibility study was completed based on the requirements of BCBC 2024, the structural commentaries for the NBCC 2020 which contains best practices for seismic upgrading, as well as our previous experience with projects of this nature.

The structural drawing set for the community center, issued in 1970, shows the Arena as being rectangular on plan with the long axis orientated north south. The main ice rink is on the east side of the building, and the smaller curling area is on the west side of the building.



Fig. 2 – Project Location (Google Earth)

Most of the building is of single-storey construction, however in the southwest corner of the building is a two-storey section. The lower floor is where the main entrance lobby, curling changing and viewing area, washrooms and administration are located. On the upper floor is the curling club lounge and bar.

The main structural system for the building is a pre-engineered steel two bay portal frame spanning east west. The lateral system in the east west direction is the portal (moment) frame construction and in the north south direction the lateral loads are resisted by rod bracing on the east and west walls, and the masonry partition wall between the curling rink and main ice rink.

This two-storey section is built within the steel framing and comprises masonry walls up to the second floor, supporting a wood frame floor system.

The arena bleachers adjacent to the masonry fire wall separating the curling rink from the arena ice rink is also of wood frame construction.

Drawings indicate the foundations for the building are conventional strip and pad foundations.

6. **Structural Review and Condition Assessment Findings**

The overall building is in good condition however, some of the small storage and plant buildings attached to the north elevation of the main arena have cladding and gutters that are showing signs of rusting, guttering.

Without continued maintenance other areas of the building may also deteriorate, leading to some costly repairs to the building envelope. Note that with pre-engineered buildings the envelope is an integral part of the performance of the structural system.

Note the metal cladding provides restraint to the main structural elements ensuring they perform at their designed capacity. So, keeping it in good condition (including fastenings) is important.

The structure is currently 50+ years into its service life and is showing moderate signs of deterioration expected for a structure of this age.

The following items were noted during the site visit:

- There is some light rust to the fire escape framing to the second-floor curling lounge.
- There is some drywall cracking around an opening for a refrigerator on the second floor.
- There is some settlement/heave in the main rink slab at the north end. It is understood that the ice slab is still functional.
- The garage for the Zamboni at the north end of the arena has rusty cladding and guttering.
- Caulking at masonry joints to the exterior of the building is in poor condition.
- There is some vertical cracking to the foundations on the west side of the building, but they appear at regular intervals and are likely shrinkage related.
- On the interior masonry partition wall between the curling rink and main ice, there is stepped cracking running from the pre-engineered framing running through the walls. This is likely due to the masonry being tight to the flexible steel frames and movement in the frames has caused the cracking.
- It was noted that the masonry walls were inadequately reinforced for today's lateral loading requirements for in-plane and out-of-plane seismic forces. This was indicated on the drawings and checked on site with a small metal detector.
- It was noted that on the drawings that the masonry walls contain vermiculite.

As previously noted, our visual review indicated that the building is in good overall condition and has been well maintained. However, the finishes and building envelope are beginning to look tired (please refer to the Architectural report for further observations).

7. **Code Compliance Review**

We note the following:

- As the building was built in 1970 to the code of the day, the structure system is currently not in compliance with BCBC 2024.
- If the building is to remain the same occupancy, there should be no mandatory requirement to upgrade the facility.
- Over the 55-year history of the building, it would have sustained significant wind and snow events. Therefore, the performance of the building under those conditions has been adequate to date.
- Maintenance of the building to keep the structure in good condition should ensure that this level of performance continues well into the future.
- Although a seismic review of the building is outside of the scope of this report, the type of structure is very lightweight and should have reasonable seismic resistance.
- Historically these structures have been governed by wind loading, however with recent code changes this is less likely to be the case.
- Further study would be required to determine what the seismic risk level is.
- One seismic concern is the under-reinforced masonry walls. Consideration of upgrading those walls is highly recommended.

8. **Conclusions and Recommendations**

The following structural repairs are recommended for the gravity system:

- Complete the cosmetic repairs to the building envelope including the caulking joints etc. in the masonry.
- Create a movement joint around the steel frames passing through the firewall. Note the details will be needed to maintain fire protection.
- Address rust to fire escape.
- Review cracking at north end of ice rink.
- The lateral system is likely not designed for present seismic loading, however if the building function and occupancy is to remain the same, then a seismic upgrade should not be necessary.

- The building will have some reasonable seismic resistance based on its construction type and past performance under historical wind and snow loading however, determining that resistance and consequent seismic risk will require further study. Seismically upgrading the building to meet the current code will likely be expensive.
- We could also check the building against the Structural Commentaries of the 2020 National Building Code. These guidelines have less requirements than the BCBC 2024 to encourage seismic upgrading of buildings. This check could give some indication on the performance of the building relative to statistically more frequent but less intense earthquake loading.
- Irrespective of the need to seismic upgrade the building to meet current code or meet the lesser requirements of the guidelines of the Structural Commentaries of the 2020 National Building Code, we do recommend upgrading the masonry partition walls in the building for out of plane seismic loading.
- These walls are brittle/stiff when compared to the flexible steel structures. They are therefore not likely to be able to resist the large displacements the building will have under earthquake loading.
- This upgrading would involve reinforcing the walls or adding structural backing to ensure the walls remain vertical in the event of an earthquake.

We trust this meets your immediate needs. Please contact the undersigned should you have any comments, questions or require guidance with repair implementation.

Yours truly,

HEROLD ENGINEERING LIMITED

Prepared by:



PP 1000201

Lee Rowley, FEC, P.Eng, M.I.Struct.E.
Managing Principal

Reviewed by:

HEL PERMIT No.: 1000201



Sean Herold, P.Eng.
Principal

SITE PHOTOGRAPHS



Photograph 1: Light rust to fire escape.



Photograph 2: Light rust to fire escape.



Photograph 3: Drywall cracking above fridge.



Photograph 4: Crack in ice slab indicating possible settlement.



Photograph 5: Rust to roof cladding of shed.



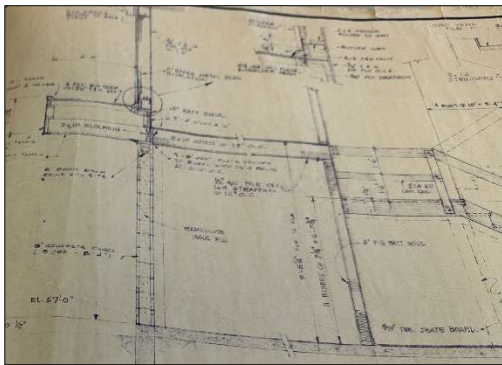
Photograph 6: Rust to shed cladding



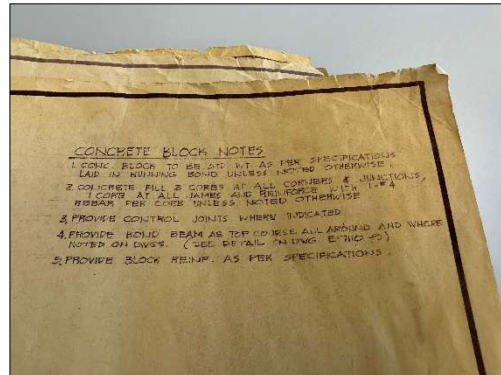
Photograph 7: Caulking missing at masonry foundation to north.



Photograph 8: Typical cracking to joints



Photograph 9: Note indicating vermiculite



Photograph 10: Reinforcing notes.



Photograph 11: Cracking to fire wall



Photograph 12: Cracking to fire wall.

3.0 Summary & Conclusions

The purpose of this assessment report is to identify and understand the current condition of the Doug Bondue Arena. This will allow informed decisions to be made regarding its future and potential re-use options.

Each section of the report identifies mandatory repairs to keep the building from deteriorating and recommend upgrades to keep the building functioning. Also noted are additional upgrades that would be required for various re-use options.

Overall, the condition of the arena is generally fair and without major deficiencies. However, it was identified that mandatory repairs and an elevated level of maintenance will be required to keep the arena functioning properly. Should the building receive regular maintenance and mandatory repairs it would be reasonable to expect it to provide years of future service.

It is also reasonable to conclude that re-purposing the arena would be viable. However, the range of upgrades potentially required for various re-use scenarios vary significantly. It is likely there is an upper limit, a threshold of investment in the structure that limits the range potential re-use options. This report identifies some of these thresholds, specifically: Changing the occupancy to something other than the current Assembly use would result in significant upgrades being required. There are several re-purposing opportunities within the current Assembly use.

The information in this report can be used to assist in formulating a long-range plan for the Port Alice Doug Bondue Arena. Such a plan could consider the existing condition of the building, potential upgrades, community needs and municipal resources.

Appendix A: Framework for upgrade levels

FRAMEWORK for UPGRADE LEVELS

To facilitate the analysis of potential re-use scenarios the consultant team has created a basic framework to identify 4 potential upgrade levels. This will allow the field of possibilities to be narrowed prior to investing time and effort into unfeasible options. This framework also intends to identify possible upgrade thresholds and or triggers.

Once a specific re-use is identified, it is expected that a more thorough review would be performed.

Repairs & Upgrades without changes:

- A. Mandatory repair to keep arena building from deteriorating.
- B. Recommended upgrades to keep the building functioning.

Level 1:

- 1. No change to occupancy
- 2. No upgrade to building's conditioned space
- 3. No upgrade to building envelope

Example: Recreational activities similar to skating, curling, hockey. Could be skate park (skateboarding), indoor BMX bike track, bike pump-track, indoor tennis courts, indoor pickleball courts. Could also include general purpose community event gathering space.

Level 2:

- 1. No change to occupancy
- 2. Yes, upgrade to building's conditioned space
- 3. Yes, upgrade to building envelope

Example: The same uses as Level 1, and upgrade mechanical, electrical and building envelope. Upgrade existing commercial kitchen for food production.

Level 3:

- 1. Yes, change of occupancy
- 2. No change to building's conditioned space
- 3. No change to building envelope

Example: Light industrial uses, such as brewery, woodworking, pre-fab home building. Indoor, semi -heated storage.

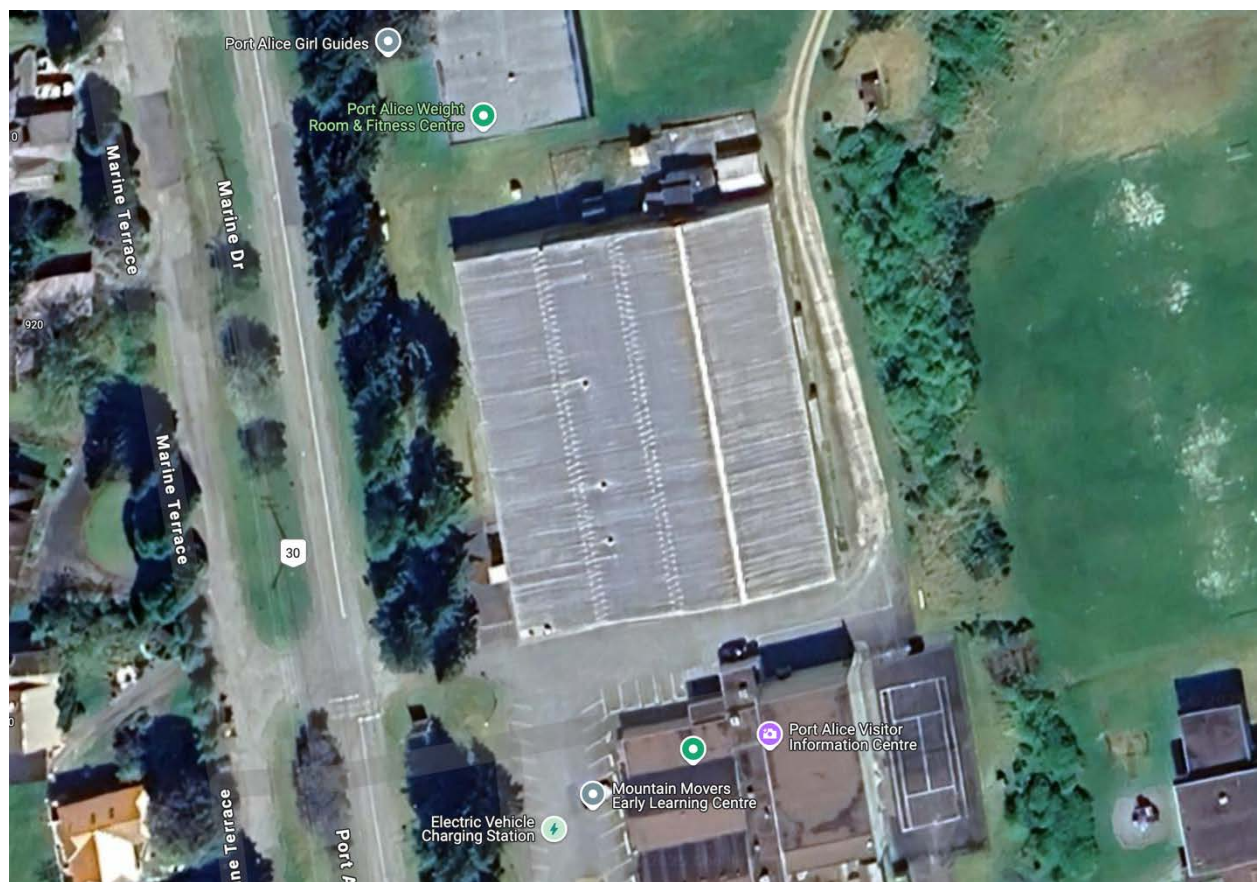
Level 4:

- 1. Yes, change to occupancy
- 2. Yes, upgrade to building's conditioned space
- 3. Yes, upgrade to building envelope

Example: Retail spaces, interior modifications into artist studios. Community centre type of facility.

Appendix B: Site Survey & Aerial Photo

(completed by others, provided by Village of Port Alice)



TOP OF PAGE IS NORTH

Appendix C: Occupancy Load Calculations

(completed by others, provided by Village of Port Alice)

Port Alice Arena Maximum Occupancy

Upper Curling Lounge

Density Calculation

Area (ft²)

688

777

Usage

non-fixed seats and tables = 10.7 ft²/person

standing space = 4.3 ft²/person

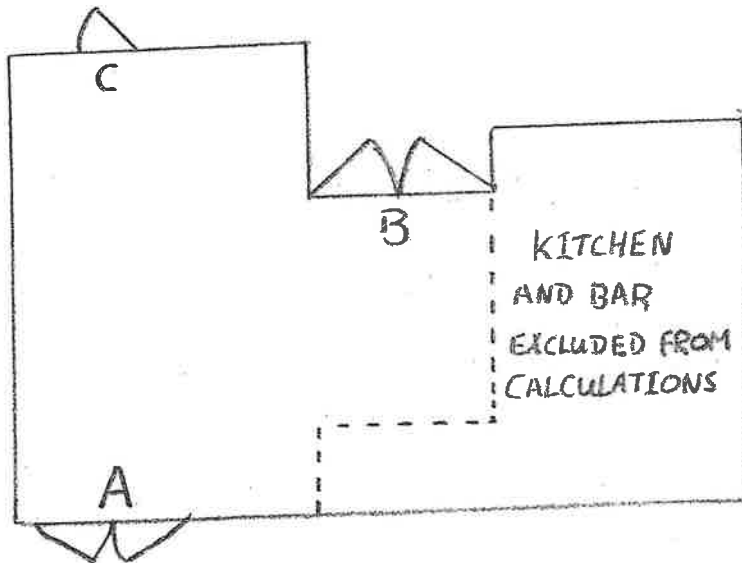
Max. Occ.

63

180

243

Egress Capacity



Egress size

A = 72"

B = 59"

C = 35"

Total = 94"

Egress Type

doorway leading to stairs = 0.31 in²/person

doorways = 0.24 in²/person

Max. Occ.

232

391

623

Maximum Occupant load determined by density calculations and conservatively set at 220 people.

Port Alice Arena Maximum Occupancy

Arena Viewing Area

Density Calculation

Area (ft²)

1300

1900

Usage

stadia and grandstands = 6.5 ft²/person

standing space = 4.3 ft²/person

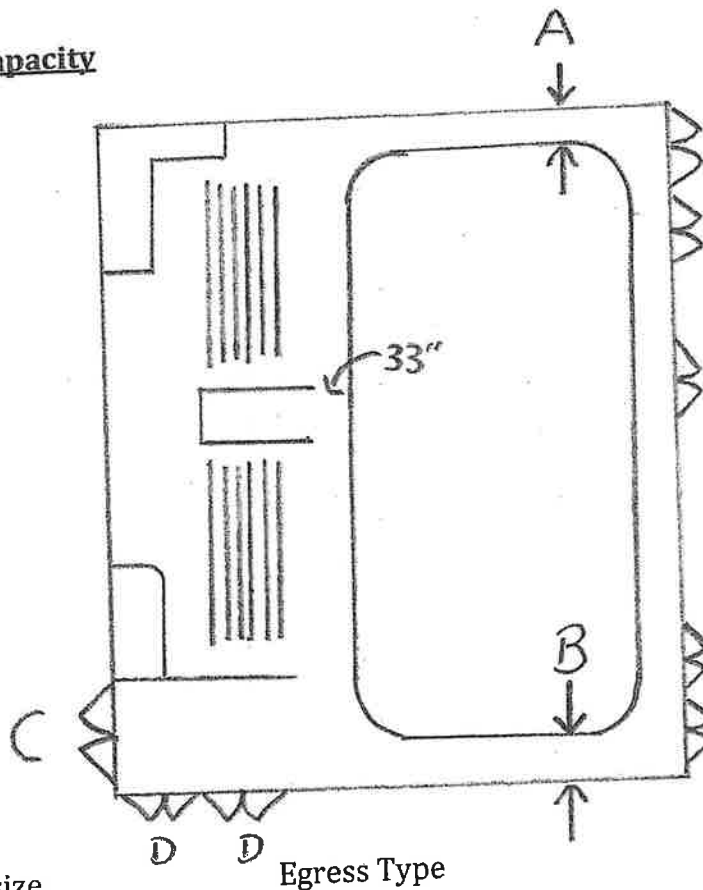
Max. Occ.

200

441

641

Egress Capacity



Egress size

A = 54"

B = 50"

C = 70"

2 x D = 94"

Total = 362"

Egress Type

doorways = 0.24 in²/person

Max. Occ.

1508

Maximum Occupant load for the facility determined by the Arena Viewing area Density Calculations, and conservatively set at 600 people.

Curling Rink

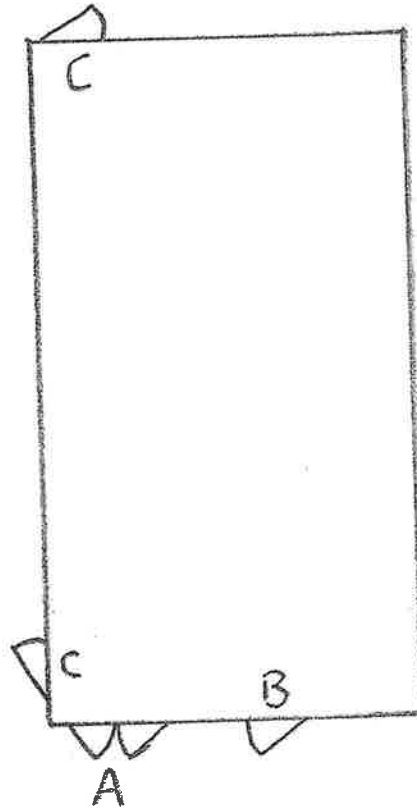
Density Calculation

Area (ft²)
5670

Usage
standing space = 4.3 ft²/person

Max. Occ.
1318

Egress Capacity



Egress size
A = 72"
B = 35"
2 x C = 34"
Total = 175"

Egress Type

doorways = 0.24 in²/person

Max. Occ.

729

Maximum Occupant load for the facility determined by the Arena Viewing area, and conservatively set at 600 people.

Port Alice Arena Maximum Occupancy

Arena Ice-Out functions

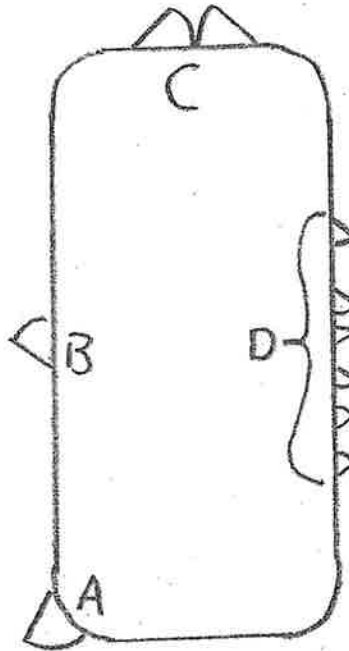
Density Calculation

Area (ft²)
15432

Usage
non-fixed seats and tables = 10.7 ft²/person

Max. Occ.
1442

Egress Capacity



Egress size

A = 46"

B = 31"

C = 121"

D = passage way too narrow

Total = 198"

Egress Type

doorways = 0.24 in²/person

Max. Occ.

825

Maximum Occupant load for ice out functions determined by Egress Capacity, and conservatively set at 800 people.

Appendix D: Select Original Drawings

(completed by others, provided by Village of Port Alice)

