



**SNC•LAVALIN**  
**Wiebe Forest Engineering**

# **Mount Baker Key Community Theatre**

## **ASSESSMENT REPORT**



**Prepared By:**

**Wiebe Forest Engineering  
Division of SNC-LAVALIN INC.**

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**WFE Project No: 11-15929**



# Mount Baker Key Community Theatre

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## Mount Baker Key Community Theatre

### EXECUTIVE SUMMARY

An assessment study of the existing Key City Theatre (Mount Baker Community Theatre) was carried out by the Wiebe Forest Engineering to review the feasibility and implication of converting the existing theatre into a standalone facility as the attached Mount Baker High School is contemplated to be demolished. The conversion will also require the theatre to provide satisfactory performance for the next 30 years.

This study indicated the conversion is feasible but will require extensive upgrading and modification in order to be functional and meets the current code requirements. Highlights of the upgrading and associated costs include the followings:

<b>Architectural</b>	
.1 Code Upgrades	\$ 200,000
.2 Roof Upgrades	\$ 150,000
.3 West Wall – South section, stucco replacement	\$ 190,000
.4 West Wall – North section, stucco & wood cladding improvement	\$ 90,000
.5 East Wall – insulation upgrade	\$ 40,000
.6 South Wall – modification after removal of school	\$ 240,000
.7 Fenestration	\$ 210,000
.8 Interior public areas improvement	\$ 200,000
.9 Auditorium light upgrade & elevator for handicap access	\$ 120,000
.10 Addition of a 500 s.f. utility room on the east side	\$ 120,000
.11 Function driven changes	<u>\$ 125,000</u>
<b>Total architectural upgrading cost</b>	<b>\$1,705,000</b>



## Mount Baker Key Community Theatre

<b>Electrical</b>	
.1 Electrical Services	\$ 85,000
.2 Power Distribution	\$ 95,000
.3 Lighting	\$ 260,000
.4 Life Safety	<u>\$ 50,000</u>
<b>Total estimated electrical cost</b>	<b>\$ 490,000</b>
<b>Mechanical</b>	
.1 Services (water, sanitary sewer, storm sewer and natural gas)	\$ 85,000
.2 Plumbing fixtures, domestic water, domestic hot water heating system	\$ 35,000
.3 Heating system	\$ 450,000
.4 Ventilation, air conditioning system	\$ 500,000
.5 Fire sprinkler upgrade	\$ 30,000
.6 Control System	<u>\$ 85,000</u>
<b>Total estimated mechanical cost</b>	<b>\$1,185,000</b>
<b>Electrical</b>	
.1 Electrical Services	\$ 85,000
.2 Power Distribution	\$ 95,000
.3 Lighting	\$ 260,000
.4 Life Safety	<u>\$ 50,000</u>
<b>Total estimated electrical cost</b>	<b>\$ 490,000</b>



## Mount Baker Key Community Theatre

<b>Structural</b>	
.1 Strengthening of the remainder of the timber trusses in the auditorium.	\$ 50,000
.2 Addition of a 500 s.f. utility room on the east side.	\$ 30,000
.3 Allowance for structural costs associated with modification and upgrading of the existing building.	\$ 220,000
<b>Total estimated structural cost</b>	<b>\$ 300,000</b>
<b>GRAND TOTAL OF CONVERSION COST TO A STANDALONE FACILITY</b>	<b>\$3,680,000</b>

The above is a 'scale of magnitude' estimated hard construction cost at today's dollar directly associated with conversion of the theatre building section to a standalone complex. This cost does not include other costs such as subdivision of the property, City and utility company charges, professional and legal fees, as well as site improvement cost that might be required upon demolition of the school building sections.

For preliminary comparison purpose we estimated the cost of a new theatre complex of similar size and level of finish and fit-ups is approximately \$15.4M.



## Mount Baker Key Community Theatre

### INTRODUCTION

The theatre auditorium was converted from a gymnasium of the attached Mount Baker High School, which was originally constructed in the 1950's and is currently being contemplated to be demolished.

There were many building upgrading and additions took place over the years on the Theatre. Such major works include:

- A two storey Actors Wing was added on the east side in the 1970's.
- A major upgrading and building modification carried out in 1990 including new stage with an orchestra pit, sloped seating, a 2 storey expansion in the north for the new lobby and entrance, a lounge and control booth in the second level, as well as several mezzanines and catwalks.

The purpose of this study is to review the feasibility and implication of converting the Theatre into a standalone facility after the school was demolished. In addition this study was also to review any upgrading required to extend the life of the Theatre for another 30 years. As such this review was focused on the followings:

- Existing interconnecting walls with the school on the south side.
- Structural stability of the Theatre as a standalone building.
- Building egress and exits.
- Mechanical and electrical building services.
- Life safety systems as a standalone facility.
- Major deficiencies with current building codes.
- Functional issues.
- Architectural upgrading.
- Life expectance of building components.

This study was primarily based on our visual review of the exposed building components. A set of record drawings of the 1990 building modification was provided for our reference. No material or performance testing of the building systems was performed for the purpose of this study. Scale of magnitude estimate costs to convert the building to a standalone facility as well as construction of a similar size new theatre complex were provided for comparison and intent to assist in initial budgeting purpose only. Further costing exercise for firm budgeting will be required upon completion of preliminary and detail design stages.

Furthermore, for comparison purpose the rough cost for a new theatre complex of similar size and finish will be approximately \$400/square feet at today's dollar and construction. Therefore for a 35,000 square feet theatre and adding 10% for soft cost will be approximately \$15.4M.



## Mount Baker Key Community Theatre

This study was carried out by the follow personnel from Wiebe Forest Engineering and Kasian Architecture, and was assisted by Mr. Tom Walkley of the Southeast Kootenay School District No. 5:

- Structural - Stuart Ng, P. Eng.
- Mechanical - Rocco Raimondi, R.E.T.
- Electrical - Paul Fritz, P. Eng.
- Architectural - Tom Hardjowirogo, AAA






## Mount Baker Key Community Theatre

### ARCHITECTURAL REPORT

#### A-1 ARCHITECTURAL ASSESSMENT REPORT EXISTING FACILITY REVIEW

<b>A. HISTORICAL BACKGROUND</b>	
<ul style="list-style-type: none"><li>• <u>Construction of the Theatre</u> Mount Baker Secondary School was built in the 1960's, including the gymnasium which was since converted into Key City Theatre in 1990.</li></ul>	
<ul style="list-style-type: none"><li>• <u>Original Structure</u> Most of the original gym structure was retained, with newer sections added to accommodate the program requirements and other support functions of the theatre.</li></ul>	
<ul style="list-style-type: none"><li>• <u>Fire Wall Separation</u> A reinforced 8" thick masonry fire wall separates the footprint of the theatre from the remainder of the school.</li></ul>	
<ul style="list-style-type: none"><li>• <u>Remaining Connection</u> There are a couple of sets of doors connecting the theatre from the school set into fire wall facilities. These doors appear to be kept closed most of the time.</li></ul>	
<ul style="list-style-type: none"><li>• <u>Primary Services</u> All primary services to the theatre, including the sprinkler service, are presently located and housed in the main Mechanical and Electrical spaces of the school. Refer to Mechanical Portion of this report for details.</li></ul>	



## Mount Baker Key Community Theatre

- **Outline Recommendations**

The intent to separate Key City Theatre into a stand-alone facility , and to extend its life by a further 30 years, would involve the following steps to be implemented.

- a. Disconnection of services, and reconnection of same directly from municipal sources.
- b. Construction of new mechanical / electrical room[s].
- c. Implementation of selective upgrades to bring the Theatre in compliance with the current Codes.
- d. Implementation of some physical upgrades to the facility to provide improvements to its functionality, and extend its expected life by a further 30 years.
- e. To provide estimated probable costs [EPC] for the various upgrades, and compare these with the costs for constructing a new theatre.

### **B. TYPES OF CONSTRUCTION**

- **Structurally**

The theatre was built of combustible construction – combining heavy timber trusses over the theatre space, and conventional wood framing construction over the remainder of the building.

Please refer to Structural portion of the report for detailed analysis of the condition of the overall structural system.



- **Architecturally**

Masonry cladding and glazed aluminum windows were used on the 1990 theatre addition on the north side.


The west side of the building is clad with a combination of stucco over wood studs.

The east side of the building is constructed of insulated single withed concrete block in 'stack bond.





## Mount Baker Key Community Theatre

<ul style="list-style-type: none"> <li>• <b><u>Mechanically &amp; Electrically</u></b> Refer to M&amp;E portion of the report.</li> </ul>	
<p><b>C CODE COMPLIANCE</b> Please also refer to the Code Review as appended at the end of this Report</p>	
<ul style="list-style-type: none"> <li>• <b><u>Code Compliance Basis - Original</u></b> The theatre was constructed in compliance with the requirement of the 1990 BC Building Code Group 'A' Division 2 – 1 &amp; 2 Storeys, Sprinklered and Facing One Street.</li> </ul>	<ul style="list-style-type: none"> <li>• <b><u>Code Compliance Basis – Current Code</u></b> Based on the building areas, as well as other parameters from the original Code analysis, the current Building Code would classify this building under Section 3.2.2.21 Group 'A', Div.1 One Storey Limited Area, Fully Sprinklered</li> </ul>
<ul style="list-style-type: none"> <li>• <b><u>Existing Footprint</u></b> 1765M2</li> </ul>	<ul style="list-style-type: none"> <li>• <b><u>New Footprint</u></b> 1815 M2 (Including new 50M2 Mechanical Room)</li> </ul>
<ul style="list-style-type: none"> <li>• <b><u>Accessibility –Existing Building</u></b> The Main Floor of the building, including the washrooms meets minimum handicapped accessible. No handicapped access is available to the 2<sup>nd</sup> Floor.</li> </ul>	<ul style="list-style-type: none"> <li>• <b><u>Accessibility - to Meet Current Code</u></b> Access shall be provided to all parts of the building in compliance with currently applicable accessible guidelines. New Elevator must be provided to facilitate access to the second floor.</li> </ul>



## Mount Baker Key Community Theatre

<ul style="list-style-type: none"> <li>• <b><u>Additional Code Compliance Requirements</u></b> The following additional requirements should be noted :             <ul style="list-style-type: none"> <li>a. Confirmation of compliance to 45 Min. FRR for all floor assemblies, mezzanines, as well as all load bearing structures – walls, arches, columns etc..</li> <li>b. Confirmation of exiting distances and fire separations for compliance to Current Code.</li> <li>c. Verification and confirmation of associated door hardware.</li> <li>d. Confirmation of fire safety measures – fire alarm etc. - Refer to Mechanical and Electrical portions of the report.</li> </ul> </li> <li>• Refer to EPC # 1 Estimated Probable Costs appended at the end of the report for the costs of providing a new elevator, and for general Code Driven upgrades</li> </ul>	
<b>D. REQUIRED UPGRADES</b>	
<b>D1 PHYSICAL UPGRADES</b>	
<b>a) Roof</b>	
<ul style="list-style-type: none"> <li>• The roof over the Theatre is comprised of 4 [Four Sections] The High Roof Over the Theatre, the Lower Roofs over the North , and the East and West additions.</li> <li>• There was a mention of a collapse of a section of the high roof over the theatre. This had been appropriately repaired since – refer also to the Structural report.</li> <li>• Although the roof is generally good shape, replacement strategy should be considered in order to extend the life of the building by another 30[thirty] years.</li> <li>• The use of the same or similar roofing system is probably recommended from compatibility and maintenance perspectives.</li> <li>• Refer to EPC # 2 Estimated Probable Costs as appended at the end of the report.</li> </ul>	
<b>b) Exterior Walls</b>	
<ul style="list-style-type: none"> <li>• <b><u>West Wall / South Section</u></b> Sections of the existing stucco walls on the west side of the building are badly worn and weather damaged. Replacement of overall stucco is recommended . Refer to EPC # 3 Estimated Probable Costs as appended at the end of the report.</li> </ul>	



## Mount Baker Key Community Theatre

- **West Wall / North Section**

Most of the west wall are primarily stucco clad wood frame, with its lower portions clad with vertical wood siding. We noted that these walls, as well as the wood windows there are badly weathered and worn. Replacement and improvement are recommended, Refer to EPC # 4 Estimated Probable Costs as appended at the end of the report.



- **North Wall**

The existing glazed wall - with sealed double glazed units in aluminum frame is in reasonably good shape. Similarly with the brick clad portions of the wall. To improve energy usage both in winter and during the summer, replacement of all the windows with thermally broken aluminum sections and new high performance glazing would be highly recommended. (Refer to EPC # 6 for costing, as appended at the end of the report).







## Mount Baker Key Community Theatre

- **East Wall**

The existing single wythed concrete blocks is insulated from the inside using batt insulation, wood strapping and poly vapour barrier , and finished with drywall. From our observation, there doesn't appear to be any visual indications of failure on this wall construction which would warrant immediate repairs.



It is recommended that a probe test be done to confirm whether the wall cavities are filled with 'Zonolite' insulation.

Thermal scan should also be done to help determine whether there is any air leak which may need to be addressed.

Refer to EPC# 5 as appended at the end of the report.

- **South Wall**

The south wall of the theatre is comprised both of 2hr concrete block fire wall, flanked by stucco clad masonry walls of the east and the west additions.

In order to make the theatre into a standalone structure, this area will be rebuilt to facilitate the required service entries , as well as to house new Mechanical and Electrical rooms for the functioning of the theatre.



**The required modifications to this area of the building would comprise of**

- a. Demolition of the connecting link to the school
  - b. Construction of new services into the building.
  - c. Construction of new 50 M2 mechanical / electrical space to house these functions.
- Refer to EPC #6 as appended at the end of the report.



## Mount Baker Key Community Theatre

- **Exterior Fenestrations**

The exterior windows of the building are comprised of the following types :

- a. Glazed Aluminum Sections on the North face
- b. Wood Windows at the west side of the building
- c. A handful of aluminum 'punched' windows on the east wall.
- d. All the glazing are sealed double glazed units.



As suggested improvements, replacement of all the windows with thermally broken aluminum sections and new high performance glazing is recommended, in order to improve energy usage both in winter and in the summer.

Refer to EPC # 7 as appended at the end of the report.

- c) **Interior Finishes**

- **Public Area**

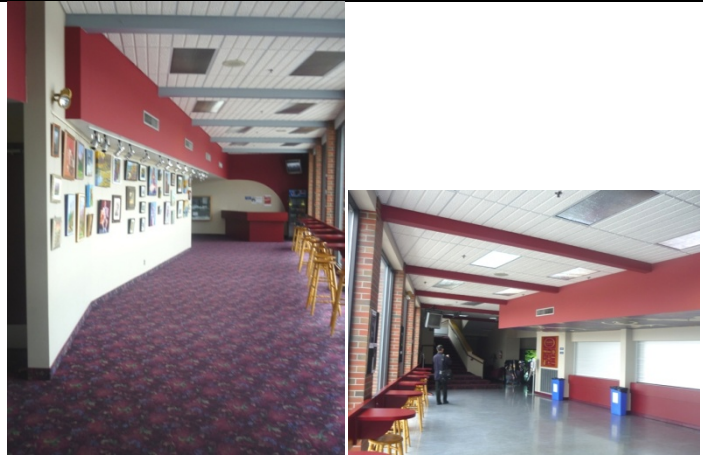
All public and front of house areas of the Theatre are in relatively good condition, and appear to be well maintained. Albeit slightly dated, the floor, wall and ceiling treatments in the building are fairly pleasant. Lighting levels and types of illumination used are typical for the early '90s period, and appears to be fairly functional.



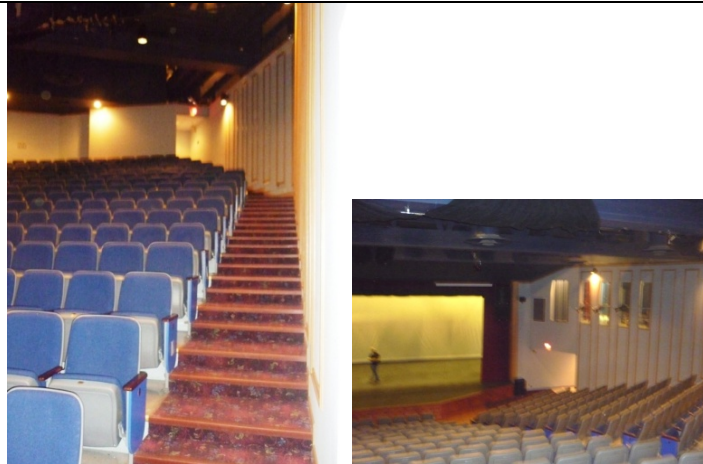


## Mount Baker Key Community Theatre

- a. Some minor areas of wear were noted, and at a minimum, these shall be repaired and refinished.
- b. Globally however, if the life of the Theatre is to be further extended by 30 years, we would recommend updating the finishes – from the flooring, to wall and ceiling treatments, as well as use of energy efficient light fixtures.  
Refer to EPC #8 as appended to the report




- **Theatre Space**  
As with the public space and front of house spaces, the Theatre space is in very good condition.  
The 'raked' seating meant that handicapped seating are only available at the level front row of the Theatre. This would be improved if elevator access could be provided to the second floor.  
The finishes and general lighting in the Theatre will probably need to be upgraded to provide a more current ambience.  
  
Refer to EPC #9







## Mount Baker Key Community Theatre

<ul style="list-style-type: none"> <li>• <b><u>Back of House Areas</u></b>          The back of house areas comprised of the following spaces :         <ol style="list-style-type: none"> <li>a. The stage and the scenery dock</li> <li>b. Dressing, showers and change rooms.</li> <li>c. Preparation and work spaces.</li> <li>d. Mechanical / Electrical spaces.</li> <li>e. Storage spaces.</li> <li>f. Refer to functionally driven upgraded Item D3</li> </ol> </li> </ul>	
<p><b>D2    <u>Code Driven Upgrades</u></b></p>	
<p>Additional Code Compliance Requirements          The following additional requirements should be noted :</p> <ol style="list-style-type: none"> <li>a. Confirmation of compliance to 45 Min. FRR for all floor assemblies, mezzanines, as well as all load bearing structures – walls, arches, columns etc..</li> <li>b. Confirmation of exiting distances and fire separations for compliance to Current Code.</li> <li>c. Verification and confirmation of associated door hardware</li> <li>d. Confirmation of fire safety measures – fire alarm etc. - Refer to Mechanical and Electrical portions of the report.</li> </ol> <p>Refer to EPC #1 for estimated probable costs.</p>	
<p><b>D3    <u>Functionally Driven Upgrades</u></b></p>	
<p>The following functions are deemed to be critical for being able to achieve the noted objectives of creating a standalone building, and extending the life of the building by 30 years.</p> <ol style="list-style-type: none"> <li>a. Upgrade the servicing strategy for the catwalks.</li> <li>b. Upgrading the operation of the Scenery Dock 'Fly System'</li> <li>c. General back of house re-planning</li> </ol> <p>Refer to EPC 10 as appended at the end of the report.</p>	



## Mount Baker Key Community Theatre

APPENDIX 'A' – Costs Summary & Recommendation	
<b>A.1 Upgrades</b>	<b>Estimated Probable Costs</b>
• EPC # 1 / Code Upgrades	\$ 220,000.00
• EPC # 2 / Roof Upgrades	\$ 150,000.00
• EPC # 3 / West Wall - South	\$ 190,000.00
• EPC # 4 / West Wall - North	\$ 90,000.00
• EPC # 5 / East Wall	\$ 40,000.00
• EPC # 6 / South Wall	\$ 240,000.00
• EPC # 7 / Fenestration	\$ 210,000.00
• EPC # 8 / Interior – Public Areas	\$ 200,000.00
• EPC #9 / Theatre Space – Shell Only	\$ 120,000.00
• <u>EPC # 10 / Functionally Driven Changes</u>	\$ 125,000.00
• Construction Costs - Architectural	\$ 1,585,000.00
• <u>Structural/ Mechanical/Electrical Costs</u>	Refer to respective report for costs
<b>A.2 New Building</b>	<b>Estimated Probable Costs</b>
• Construction Costs	Refer to Executive Summary
<b>A.3 Fit Up and Equipment Allowances</b>	<b>To be carried by Owner</b>
• Miscellaneous Fit Up Costs	\$ 700,000.00 [ See Note # 2 below]
• Theatre Equipment Costs	\$ 1,000,000.00 [See Note # 3 below]
<b>A.4 Design Fees, Commissioning &amp; Other Soft Costs</b>	<b>To be proposed separately</b>
<b>Notes</b>	
1. The above costs are shown as Class 'D' estimate in current dollars with 25 % margin of variance. They exclude Structural, Mechanical and Electrical costs forming part of their respective reports.	
2. Miscellaneous Fit Up Costs are allowances to be carried for upgrading of loose items, furnishing , interior signage etc.	
3. Theatre equipment vary widely in sophistication and costs, and an Allowance therefore shall be set up against purchases of necessary items to upgrade the current and possibly outdated equipment. [Coordination fee would be applied against the purchase costs of equipment]	
4. Fees for the project would be based on Fee Guidelines for the type of project, as outlined in the RAIC and APPEGA Documents	
5. The above outlined costs are exclusive of applicable taxes	



## Mount Baker Key Community Theatre

<b>RECOMMENDATIONS</b>
<p>For the best value for investment, anticipating 30 years of additional use of the existing structure, we would recommend simply upgrading the facility, incorporating the construction of new Mechanical / Electrical room.</p>



## Mount Baker Key Community Theatre

### APPENDIX 'B'

Code Review  
Proposed Renovations To Key City Theatre  
Cranbrook, BC

Key City Theatre in Cranbrook BC was constructed in 1990 using 1985 BC Building Code and was converted from the existing gym of Mount Baker High School.

The original occupancy classification for the construction in 1990 was

**Group A Occupancy – Division 2 , 1 & 2 Storeys**

### **COMPARATIVE CODE REVIEW BASED ON 2006 BUILDING CODE**

#### **3.2.2.21 Group A, Division 1, One Storey, Limited Area, Sprinklered.**

- 1) A building classified as Group A, Division 1 is permitted to conform to Sentence (2) provided
  - a) Except as permitted by Sentences 3.2.2.7(1) and 3.2.2.18(2), the building is sprinklered throughout.
  - b) It is no more than 1 storey in building height.
  - c) It has less than 40% of the area of the building as 2 storeys for the purposes of :
    - i) Development of productions, including preparation of scenery and costumes and rehearsal of performers.
    - ii) Organization of performers , scenery and sound equipment.
    - iii) Preparation by performers for performance.
    - iv) Managerial functions, or
    - v) Toilets, rest rooms and similar public facilities.
  - d) It has no occupancy above or below the auditorium other than one which serves it or dependent on it.
  - e) It is no more than 600 m<sup>2</sup> in building area , and
  - f) The occupant is no more than 600.
  
- 2) The building referred to in Sentence (1) is permitted to be of heavy timber construction or non combustible construction, used singly or in combination, and
  - a) Floor assemblies shall be fire separations
    - i) With fire resistance rating not less than 45 min. or
    - ii) Of heavy timber construction, and



## Mount Baker Key Community Theatre

- b) Load bearing walls, columns and arches shall
  - i) Have a fire resistance rating not less than that required for the supported assembly, or
  - ii) Be of heavy timber construction.

### **EXISTING CONSTRUCTION**

The existing super structure of the existing gym, comprising of heavy timber trusses supported on masonry walls and other structures were retained. Additional theatre support spaces including the main lobby, offices, multi purpose rooms, lockers and washrooms, were added to the east, west and north sides of the gym, to make up the present footprint of the theatre. A second level was also added to the building to provide a second foyer for the upper part of the theatre, along with other support functions to the theatre.

### **CODE REVIEW**

Based on our review of the existing building to bring it in compliance with the requirements of the 2006 Building Code, we noted that the existing building is in compliance with the requirements of the 2006 Building Code, with some exceptions as outlined below :

#### **1. HEAVY TIMBER & NON COMBUSTIBLE CONSTRUCTION**

The 2006 Code allows the building **to be constructed of heavy timber or non-combustible construction, used singly or in combination.**

#### **2. SPRINKLER PROVISION**

The existing building is **fully sprinklered**

#### **3. REQUIRED SEPARATIONS AND FIRE RESISTANCE RATINGS OF STRUCTURE**

The existing building **is provided with the required separations noted under Item 2 of Section 3.2.2.21.2**

#### **4. BUILDING FOOTPRINT**

The overall footprint of the Building at the Ground Floor Level is approximately 17,650 Sq.Ft. or 1765 M<sup>2</sup>.

The Code stipulates that the maximum area for the Auditorium should not exceed 600M<sup>2</sup>, and as the actual area of auditorium of the Theatre is 520M<sup>2</sup> the current design is in compliance. The auditorium is currently separated from the remainder of the functions by 1 Hr Rated Separation

#### **5. SECOND STOREY**

The area making up the 2<sup>nd</sup> storey of the building of approximately 325M<sup>2</sup> is less than 40% of the overall building area and thus in compliance with the requirements noted under Section 3.2.2.21.1c.

#### **6. THEATRE OCCUPANCY**

The code stipulates that the maximum occupancy of the auditorium is 600. The current occupancy of the theatre is 602 which is slightly over.



## Mount Baker Key Community Theatre

### **7. COMPLIANCE STRATEGY FOR BARRIER FREE ACCESS AND OTHER VARIANCES.**

The building was originally constructed in compliance with the applicable Codes at the time in 1990, and some elements may not be able to be brought into compliance for variety of practical reasons.

In view of that, we'd suggest that beyond the findings outline above, that submission would be made to the Authority Having Jurisdiction to conduct a review on the noted variances, for formal recommendations to be outlined to bring these elements for acceptance as equivalence.



# Mount Baker Key Community Theatre

## ELECTRICAL REPORT

### E-1 SYSTEM DESCRIPTION

#### 1. General

##### 1. Basic Electrical Requirements

- .1 The following is provided as a concise review of the existing electrical installation at the Key City Theatre building in Cranbrook, and the potential issues regarding the renovation of this facility.
- .2 The design of any renovations and additions will be based upon the requirements of applicable codes, standards, and best practices of good engineering design.
- .3 Some of the codes and standards that relate to the entire design are as follows:
  - *Safety Codes Act*
  - *British Columbia Building Code 2006*
  - *Canadian Electrical Code, Part I, CSA C22.1-09 (21<sup>st</sup> edition)*
- .4 All electrical products will comply with a certification program established by the *Standards Council of Canada*. All electrical work will be done under permits obtained from the appropriate Authorities Having Jurisdiction..
- .5 Specific codes and standards that relate to individual design components are listed below in their respective sections.

##### 2. Site Services

- .1 The building is serviced from the adjoining school by two power feeds. One 120/208 V 800A amp feed provides power to the main Key City Theatre distribution board located on the second floor. A second 600V feed powers the chiller located on the level 1 roof.
- .2 Telephone is feed from the adjoining school via a 25 pair tie cable and is terminated on the communications backboard on the second floor. Routing of this incoming feed is not shown on the existing drawings and the site investigation could not conclusively identify which set of 25 pair originating in the school fed the theatre.
- .3 Cable TV service is provided overhead from 14<sup>th</sup> avenue directly to the Key City Theatre.



## Mount Baker Key Community Theatre

### 2. Power Distribution

#### 1. Line Voltage Distribution

- .1 A 120/208 V 3 Phase 4 wire 600 Amp main board with a 600A main breaker is located on the second floor and sub-feeds panel boards located throughout the building as well as the lighting dimming rack located adjacent to the main board.
- .2 Distribution throughout the rest of the building dates from original and appears to be functional and adequately sized..
- .3 All existing 208 V distribution equipment utilizes moulded case circuit breakers – no air circuit breakers exist in the facility.
- .4 No surge suppression is present on the power distribution system main board or panel boards. Only single plugs having standalone surge suppressors are located at select receptacles.
- .5 Power outlets at rear of stage comprise of a three phase feed that sub feeds several single phase plugs. This arrangement is configured so that either the three phase feed or the single phase plugs is used. If both are in use the single phase loads draw down two of the legs of the three phase feed.



**Main Distribution**





## Mount Baker Key Community Theatre

### **2. Motor Control**

- .1 Existing motor control dates back to date of motor installation in the building and appears to be adequate.
- .2 New motor control will be provided for any new motors required.

### **3. Grounding**

- .1 A proper grounding system is required to provide a low impedance path for electrical system faults and reduction of potential shock hazard, and a clean ground reference point for the proper operation of communication and data networks.
- .2 The condition of the existing grounding system is unknown, and it is recommended this be reviewed during time of detailed design, and corrective action taken as necessary.
- .3 Ground fault system protection will be required by code to be provided on the upgraded main electrical services.
- .4 No lightning protection system currently exists. The risk hazard assessment of this facility is considered light to moderate.

### **4. Emergency Power**

- .1 There is no emergency power system in the building.

### **5. Uninterruptible Power**

- .1 No centralized uninterruptible power supply (UPS) is provided in the building at present.
- .2 No centralized UPS power system is intended to be added.

### **6. Power Quality**

- .1 Power quality involves many aspects regarding the electrical power in a facility, and generally concentrates on harmonics, power factor or other anomalies. Information on harmonics on this building is not currently available, but is assumed to be typical for a Theatre building with dimming capability installed but no variable frequency drives installed. As a standalone facility, harmonic mitigation will be required, primarily taking the place of harmonic mitigating phase-shifting transformers.



## Mount Baker Key Community Theatre

- .2 Harmonics result in a facility from electronic devices (that cause a portion of the electrical waveform to include higher frequency components than the fundamental 60 Hz. The electrical design will address the issue of harmonics, and include corrective equipment to reduce harmonics at the service entrance of the building, to levels recommended in ANSI/IEEE 519-1992 *IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems*.
- .3 Other power quality anomalies include brownouts, voltage transients (spikes and sags), and other externally and internally induced situations that affect optimum system performance.

### 3. Lighting

#### 1. Interior Lighting

- .1 Existing interior lighting in the building primarily consists of incandescent and fluorescent lighting, dating back to the original construction. This lighting still use T12 34W lights. Lighting within the building operates at 120 V.
- .2 Lighting control in individual rooms around the theatre perimeter typically consists of line voltage switches for manual control. It is proposed that occupancy sensors be considered, to turn off lighting during unoccupied periods in these rooms.
- .3 Within the theatre and supporting spaces a Douglas low-voltage relay system WE 1 with WR6221 relays controls the non theatrical lights throughout these spaces allowing switching control from several locations. The relay panels are original to the theatre development

#### 2. Exterior Lighting

- .1 Existing exterior lighting is minimal for the building, with HID canopy lights provided at exits. It is currently controlled automatically via a photocell

#### 3. Theatrical Lighting and Dimming system

- .1 The theatrical lights are predominantly incandescent and are controlled via a Lee Colour Tran ENR series 192 circuit dimming rack located in the second floor dimmer and electrical room. Parts for this dimming system are increasingly difficult to source. A series of pipe supports and receptacle connector strips are located above the stage and above the audiences seating area. Receptacles and pipe supports for side kits are located in the lighting galleries left and right. Examination of the drawings indicate that separate neutrals were provided to all the outlets on the side kits and connector kits.



## Mount Baker Key Community Theatre

- .2 The front of house connector strips and pipe grid area accessible via a cat walk system. Lighting on the catwalk system is incandescent keyless fixture with no wire guards. Lighting control is via the low voltage relay panel.
- .3 Above the stage the light pipe grids are fixed and house lights located above the grid are difficult to access.
- .4 Lighting and scene control is accomplished from the mixing board located in the lighting control booth at the rear of the theatre.



**Catwalk**

### **4. Life Safety Systems**

#### **1. Fire Alarm System**

- .1 The fire alarm system in the building dates back to the original construction and is an Edwards 6616 series system, parts for this product are difficult to source and will begin to be phased out soon.
- .2 The location of the main fire alarm panel at the entrance and there is a tie to the adjoining school.



## Mount Baker Key Community Theatre

.3 Device quantity and location appears to meet present code, however smoke detectors in particular are coming to the end of their life expectancy, and should be replaced.

.4 Signaling devices consist of bells. Coverage appears to be acceptable.

### 2. Emergency Lighting

.1 Emergency lighting is currently provided by battery packs and remote heads. It appears that existing emergency lighting does not fully meet current code requirements.

### 3. Exit Lighting

.1 Exit lights are provided in the building, date back to the original construction and appear to be adequate in quantity and location to adequately serve all exits.

## 5. Voice And Data Systems

### 1. Telephone System

.1 The theatre has its own telephone switch located in the second floor electrical room. The switch is an NED Electra Elite IPK and appears adequate for the facility



**Telephone and Security**



## Mount Baker Key Community Theatre

### 6. Other Systems

#### 1. Security Systems

- .1 Security System but not CCTV is installed in the building. The security system is an DSC Power 832 PC 5010 located in the second floor electrical room. A Key pad is located at the main door and motion sensors are located in the stairwells and general office.

#### 2. Sound system

- .1 Sound system and speakers provided within the theatre appear to be adequately sized for current needs and future expansion.

### E-2 EXISTING CONDITIONS

#### 1. Observations

Existing systems are approximately 20 years old and appear to have been maintained. Some electrical system components, namely fire alarm, emergency and exit lighting have reached the end of the life cycle and are in need of upgrading

#### 2. Comments

Most electrical services are provided from the existing Mount Baker High School. If the theatre is to operate as a standalone entity a new service entrance room should be provided. This could be collocated with mechanical services in a new addition.

### E-3 DISCUSSION

#### 1. Site Servicing

In order to operate as a standalone entity the theatre would require a new electrical service and telephone service. It is proposed to service the building at 600V 1200A 3 phase 4 wire and provide 50 pair copper to accommodate telephone along with empty raceway to accommodate any future fibre. An empty conduit will be provided to allow for increase in electrical servicing needs. This proposed servicing should allow the theatre adequate growth on the electrical servicing side for the next thirty years. The new distribution section would be located in the new combined mechanical new electrical room.



## Mount Baker Key Community Theatre

### 2. Power Distribution

It is proposed to provide a new 600 V 1600A 3 phase 4 wire main board complete with a solid state 1600 A main breaker (trip set to 1200A) and ground fault protection. This new 600V board would feed the chiller directly and sub feed the existing 600 A main board and the dimmer panel with new separate feeds and transformers. Due to the harmonics associated with the dimmer panel the 150 kVA transformer feeding the dimmer panel would be harmonic mitigating 30 degrees shifting. The transformer feeding the existing main board is proposed to be 150 kVA K13 rated.

New motor control will be provided for any new motors required

A new grounding grid and ground bus will need to be installed to accommodate the new electrical feed.

No new emergency power will be added.

It is proposed to include transient voltage surge suppression on the proposed new 347/600 V services, which will meet the new UL1449 third edition requirements for surge protection.

### 3. Lighting

It is proposed that a lighting retrofit be undertaken to replace the T12 technology with T8 Fluorescent. Incandescent lighting that is non dimmed should be retrofitted to compact fluorescent especially in light of the phasing out of incandescent lamp technologies over the coming years.

Additional exterior lighting will be added at new exterior doors that are being created.

To meet the needs of the next thirty year needs it is proposed to provide a new 192 dimming circuit dimming panel in the same location as the original. The current receptacle connector strips are serviceable and should continue to be so but do not have dmx control capability. Budget dependant consideration should be given to replacing new receptacle connector strips that incorporate the DMX communication protocol. Due to the difficulty in serving the theatrical lights and the house lights located above the pipe grids it is proposed that a pulley system to allow the pipe grids to be dropped be incorporated. This would allow easier set up and allow access to the house lights located above the pipe grid.



## Mount Baker Key Community Theatre

### 4. Life safety system

All fire alarm work will be designed and installed in accordance with current codes, primarily the *Alberta Building Code* and CAN/ULC-S524-04 *Standard for the Installation of Fire Alarm Systems*, and verified to CAN/ULC-S537-04 *Standard for the Verification of Fire Alarm Systems* by the system manufacturer.

A retrofit to the existing fire alarm system should be undertaken to replace the panel and aging detectors.

An upgrade and replacement of the existing emergency lighting system is recommended to replace original equipment and address code concerns. It is proposed to install new exit lights in accordance with building code requirements and CAN/CSA-C860-07 *Performance of Internally Lighted Exit Signs*. Exit lights will be LED type, with a rugged housing.

### 5. Voice systems

No upgrades to the voice systems are proposed.

### 6. Other systems

No upgrades to the security and sound systems are proposed.

## E-4 ELECTRICAL COST

1.	Electrical Services	\$85,000.00
2.	Power Distribution	\$95,000.00
3.	Lighting	260,000.00
4.	Life Safety	50,000.00
	<b>Total estimated electrical cost</b>	<b>\$490,000.00</b>



# Mount Baker Key Community Theatre

## MECHANICAL REPORT

### M-1 SYSTEMS DESCRIPTION

#### 1. Services

The theatre infrastructure has provision for domestic cold water, domestic hot water, domestic hot water recirc, fire sprinkler water supply, sanitary sewer and storm sewer drainage. All services are presently being provided from the Mount Baker High School facility services provided are as follows:

- 65 mm domestic cold water
- 50 mm domestic hot water
- 25 mm domestic hot water recirculation
- 100 mm fire sprinkler water supply
- 100 mm sanitary sewer (gravity)
- 150 mm storm sewer (gravity)

These services were extended into the theatre from the original school with the construction of the theatre in 1990.

#### 2. Plumbing Systems

##### a) Domestic Water

Domestic hot and cold water is being provided to all plumbing fixtures throughout the building. Domestic hot water recirculation is being provided at the most remote hot water fixture supply drawn back to its origin in the Mount Baker High School. All pipe material appears to be copper tubing and as previously indicated services originate in the Mount Baker High School.

##### b) Sanitary Sewer

All plumbing fixtures throughout the theatre are provided with a gravity drained sanitary and venting system that flows back to the Mount Baker High School and in course exits out to a municipal main located in the street.





## Mount Baker Key Community Theatre

### c) Storm Sewer

The building is equipped with roof drains located at various roof levels which are gathered into a central storm collection main in the crawlspace and below grade. The lower level (basement) is equipped with a 150 mm weeping tile piping system located around the basement foundation. This weeping tile system collects water into a sump which is equipped with submersible pumps, this water is then pumped into an existing 150 mm storm main which gravity flows back to the Mount Baker High School. This storm water exits the Mount Baker High School and ties into the municipal main in the street.

### 3. Fire Sprinkler System

The fire sprinkler system is a combination of pre 1990 and upgrades, modifications and partial replacement which were installed in the 1990 construction of the new theatre. The sprinkler system is a dry pipe system with the main valves and alarm valves originating in the Mount Baker High School main sprinkler alarm valve room and piped mains extending through the school into the theatre.

### 4. Heating System

The heating system throughout the facility is hot water heating with the following terminal units.

- Hot water heating coils (in air handling units)
- Hot water perimeter radiation in most areas except main theatre
- Hot water unit heaters and force flow heater in mechanical rooms and some entrances.
- Electric force flow units in entrance ways and stairwells

The main theatre ventilation unit is provided with both a preheat coil and a heating coil, all other ventilation units are provided with a heating coil only.

Source heating water is provided by boilers and pumping systems located in the Mount Baker High School central boiler room.

75 mm hot water heating supply and return lines are run in below floor chases from the existing school's central boiler room to the theatre.



## Mount Baker Key Community Theatre

### 5. Ventilation And Air Conditioning

Ventilation and air conditioning is being provided by two air handling units as follows (and ventilation only is provided by one additional unit).

1. Air handling unit number one provides ventilation, heating and air conditioning for the main theatre space. This unit is equipped with heating coils and cooling coils.



**Air Handler #1 And Piping To Heating And Cooling Coils**



**Heating And Chilled Water Piping Air Handling Unit #1**



## Mount Baker Key Community Theatre

2. Air handling unit number two provides ventilation, heating and air conditioning for the main entrance lobby, second floor foyer and main floor administration area.



**Chilled Water Piping – Air Handling Unit #2**



**Heating Piping Air Handling Unit #2**



## Mount Baker Key Community Theatre

3. Air handling unit number three provides ventilation for the upper floor dressing room, main floor multipurpose room and adjoining washrooms and storage room.

Air conditioning is provided only for air handling unit #1 and #2, a rooftop mounted air cooled chiller (R-22 refrigerant) provides chilled water to the cooling coils located in air handling unit #1 and #2.



**Roof Mounted Air Cooled Chiller**



**Glycol Tank, Chilled Water Pump and Piping for Chilled Water System**



## Mount Baker Key Community Theatre



**Chilled Water Piping, Valving and Components**

### 6. Control System

Controls for the heating system throughout the facility are pneumatic for all the air handling units and all terminal units (hot water radiation control, heating and chilled water coil controls etc).

Controls for entrance and stairwell heating are electric and all controls for the air conditioning chiller are electric. The compressor for the pneumatic controls is located in the second floor mechanical room (Fan room 302).



**Controls Compressor**



## Mount Baker Key Community Theatre

### M-2      **EXISTING CONDITIONS**

#### 1.      **Observations**

The existing system is approximately 20 years old and although it looks like it's well maintained it is still showing wear and age. There are some signs of leaks in both the heating and chilled water piping system and it should be noted that there are some components in the valving arrangements for both the heating and cooling three-way valve controllers that are piped in backwards (this should be addressed). The main theatre ventilation system is lacking volume control dampers on the return air system which is creating noise within the theatre next to the stage.

#### 2.      **Comments**

All services at present are being provided from the existing Mount Baker High School. If the theatre is to remain in the event the High School is demolished all new services will be required and tied into the municipal mains (water, sanitary sewer, storm sewer and natural gas).

Heating for the theatre will require provision of a new boiler room. This boiler room will require equipment (boilers pumps, expansion tanks and auxiliary equipment) for a full hot water heating and distribution system required for a standalone building. A new boiler room (space) will either be constructed or space found in the existing theatre.

The existing mechanical system installed in 1990-91 will be 20 years old and a system of this type has a life cycle of 25 to 30 years.

### M-3      **DISCUSSION**

#### a)      Code Issues

The existing system was designed in 1990-91 and code requirements for Acceptable Indoor Air Quality has changed with respect to ASHRAE Standard 62.1-2004. In order to upgrade this building for an additional 30 year cycle the ventilation systems will require full replacement to meet Indoor Air Quality standards.

#### b)      Demolition

The demolition of the existing High School as discussed in M-2.2 – Comments would require a new boiler room with new hot water heating equipment as well as all new mechanical services from the municipal main to this existing theatre.



## Mount Baker Key Community Theatre

### c) System Upgrades

System upgrades would be required for the domestic hot, cold water and recirculation system with fixtures to be added for handicap requirements and the addition of a new source water heater for domestic hot water.

System upgrades would be required for the sanitary and storm sewer to allow for internal changes as well as required municipal connects.

The fire sprinkler system will require upgrades with a new incoming services as well as new zone alarm valves to be located in the existing theatre. (Space will be required in new boiler room).

### d) New Installation

New ventilation and air conditioning systems would be required to meet (ventilation for acceptable Indoor Air Quality) standards. A new refrigeration system would be required to decommission the R-22 refrigerant system and provide a new 410 or 407 refrigerant system for the air conditioning requirements. This system would need to be replaced for a new 30 year cycle.

A new hot water heating system would be required since the existing system is being demolished with the High School. With new source equipment being provided it would be recommended that all the distribution system and terminal equipment be upgraded to a new high efficiency heating system for a new 30 year cycle.

## M-4 MECHANICAL COST

1. Services (water, sanitary sewer, storm sewer and natural gas)	\$85,000.00
2. Plumbing fixtures, domestic water, domestic hot water heating system	35,000.00
3. Heating system	450,000.00
4. Ventilation, air conditioning system	500,000.00
5. Fire sprinkler upgrade	30,000.00
6. Control System	<u>85,000.00</u>
<b>Total estimated mechanical cost</b>	<b>\$1,185,000.00</b>

NOTE: Contingencies and taxes not included in numbers.





# Mount Baker Key Community Theatre

## STRUCTURAL REPORT

### S-1 SYSTEM DESCRIPTION

#### .1 Foundation

Based on the record drawings foundation of the building consists primarily of continuous strip footings along the perimeter and interior bearing walls. Several spread footings were incorporated into the strip footings for the pilasters and columns. A number of small pad footings were also used for the columns supporting the sloped seating. Concrete foundation walls of 6" to 12" thick were used.

There is no basement level except a small area at the front of the stage constructed as an orchestra pit but apparently not being used and was filled in with wood framing on the ground level. Crawl spaces were found below Actors Wing on the east side and under the offices on the north-west corner adjacent to the entrance.

#### .2 Bearing Walls

Concrete block walls were used around the original gymnasium and the Actors Wing. Other areas in the north and west side, as well as many interior load-bearing walls were constructed using 2x6 wood framing.

#### .3 Ground Floor

Most of the Ground Level was constructed as slab-on-grade. Part of the slab was replaced under the sloped theatre seating to allow construction of new columns and foundation. The stepped seating was constructed using sloped glue-lam beams, glue-lam columns and 4x6 T&G wood decking (Photo no.1).

The stage was elevated above the ground level and was also constructed using glue-lam beams and 4x6 wood decking.



Photo no. 1 –  
Framing for stepped  
seating.





## Mount Baker Key Community Theatre

A small section of the ground level above the musician pit was filled in using wood framing (Photo no. 2 & 3).



Photo no. 2 – Floor framing for the in-filled musician pit.

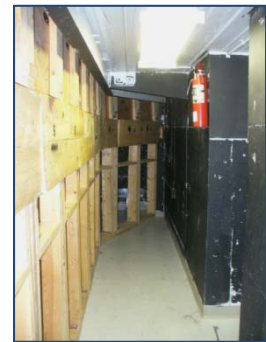


Photo no. 3 – 2x6 stud walls under the musician pit.

The floor of the 1970's Actors Wing was also constructed using wood framing above a crawl space.

### .4 Upper Levels

Several second level and mezzanine areas were added to the facility in different times and consisted of several different systems include the follow:

- .1 Electrical & Dimmer Room on the south-west corner – 2 x 10 wood joists on stud walls with plywood floor sheathing.
- .2 A third level mechanical, Fan Room, was constructed above the Dimmer Room with 2x10 dimensional lumber. 4" thick concrete housekeeping pad was cast for the mechanical unit.
- .3 Actors Wing Dressing Rooms on the east side – TjL trusses and plywood sheathing (Photo no. 4).
- .4 Lounge and Control Booths on the north side – glue-lam beams and columns and 4x6 wood decking with ½" plywood sheathing.
- .5 Two mezzanines were also constructed above east and west side of the Stage and were constructed with conventional wood framing with built-up 2x10 beams, 2x10 joists and plywood sheathing.



Photo no. 4 – TjL joists framing in the 2<sup>nd</sup> floor of Actors Wing.

### .5 Roof

There are many different roof sections with the Theatre facility reflecting varies building modification and additions over the years. The structural systems of these roof sections generally include the following:

- .1 The roof of the auditorium (original gymnasium) was constructed using the following elements:
  - Heavy timber trusses spanning east-west about 87' and at 17' spacing.



## Mount Baker Key Community Theatre

- Solid timber beams of 6"x14" and 4"x14" nominal sizes, spanning between trusses at each panel point of about 7'-3" apart.
  - 4x6 wood decking & ½" plywood sheathing.
- .2 The roof of the Actors Wing on the east was constructed with TJI wood joists and plywood sheathing.
  - .3 The roofs of the Office Wing on the west side were constructed using 2x10 dimensional lumber and wood decking.
  - .4 The roofs of the north end addition were constructed with 4x6 wood decking and plywood sheathing on glue-lam beams.
- .6 Auxiliary & other structures**

Series of catwalks and service platforms were constructed at the timber truss level above the theatre main hall. All these elements were constructed using conventional wood framing and are hanging from the trusses and timber beams using steel angles.

## S-2 EXISTING CONDITIONS

### .1 Observations & Comments

- .1 No major foundation movements and no significant cracking of the block walls or masonry cladding were noticed. Minor cracks in the block wall were expected but were likely covered over by repainting over the years.
- .2 Cracking and general deterioration of the stucco in the west wall of the auditorium was observed. These cracks in the stucco appeared to be due to filling of a wall opening in one location and possible cracks in the block wall that were telegraphing through (Photo no. 5).
- .3 It was noted that the second floor wood trusses of the Actors Wing was set into the exterior block wall where there were no insulation and vapour barrier. Condensation could easily occur and causing deterioration of the wood members. Signs of water stain in the wood chords and in the ceiling tiles were observed (Photos no. 6 & 7).



**Photo no. 5 – Cracking & general deterioration of stucco in the west wall.**



## Mount Baker Key Community Theatre



Photo no. 6 – Block wall section in joist space was un-insulated & in direct contact with the wood joists, which shows signs of water stain possibly from condensation.



Photo no. 7 – Water stain in ceiling tiles indicating possible leaks from above. Further investigation is required to determine cause.

- .4 According to the information given the roof of the auditorium (original gymnasium) has had a failure about 4 years ago. Details and exact mode of the failure was not available to us. However based on our observation the remedial work appeared to be primarily on the heavy timber trusses, some of which had been extensively reinforced. Such remedial work apparently included:
- Strengthening most of the truss panel point connections or retightening of the bolts (Photos no. 8 & 9).



Photo no. 8 – Truss panel point connection bolts had been retightened.

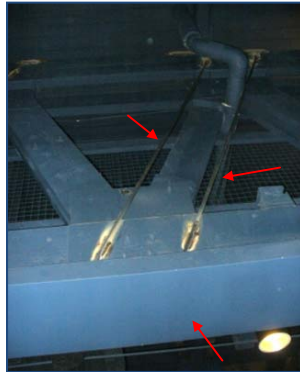


Photo no. 9 – Remedial work in strengthening truss top chord connections.



## Mount Baker Key Community Theatre

- Addition of steel tension rods in the first and second diagonal web members (Photo no. 10).



**Photo no. 10 – Truss web member reinforced with steel tension rods. Also noted bottom chord was reinforced with additional member.**



**Photo no. 11 – Timber truss not strengthened.**

- Installing additional wood member to the bottom chord of some trusses (Photo no. 10). Some trusses were not strengthened (Photo no. 11).

We have carried out computer analysis of the timber trusses and confirmed the following:

- .1 Original design snow load was about 50% less than the current building code requirement.
- .2 The design dead load has increased significantly due to increase in superimposed loads from the addition of service platforms and catwalks, lighting and acoustic equipments, and upgraded roofing assembly.
- .3 The combined maximum live and dead loads could cause failure of the original trusses with the failure mode initiating from the bottom chords and then the diagonal web members.
- .4 Provided the remedial work was completed properly the strengthened trusses should meet current code requirements. However we are concerned with the trusses that have not received reinforcing to its bottom chord. We believe such work is required for every truss.



## Mount Baker Key Community Theatre

- .5 The secondary framing members of the auditorium roof appeared performing satisfactorily. Many of the timber beams showed significant checking and warping due to drying and shrinkage that are typical for heavy timber and should not be cause for concern at the current state except where bolted connections intersecting the cracks where it should be monitored (Photo no.12).



**Photo no. 12 – Significant checking & warping of the secondary timber beams. Bolted connection of steel angle hangers through the crack**

### **.2 Conclusion**

The structure was generally in good condition for its age. With the exception of the timber roof trusses that had not received reinforcement work. No other major structural deficiencies were noticed.

## **S-3 DISCUSSION**

### **.1 Standalone Building**

From structural standpoint changing the Theatre into a standalone building is feasible with relatively little structural work required. There is currently a concrete block wall along the south side at the Theatre-School interface. Modification of the doorways and upgrading of the wall assembly in terms of insulation and finishing would be required when the adjacent school building is removed. Such modification would be covered under architectural upgrades.

Furthermore there will be a requirement for a 500 square feet addition on the south side to house new mechanical and electrical equipment and new utility services.

### **.2 Code Issues**

#### **.1 Loading**

- The minimum design snow load recommended in the current building code has been increased since construction of the original school and various additions of the Theatre.
- Additional superimposed dead loads from new roofing assemblies, service platforms and equipments.
- Increased importance factor under the current code for an assembly occupancy.



## Mount Baker Key Community Theatre

These loading increases have rendered the roof framing in the auditorium significantly under designed. Although some roof trusses had been strengthened following a failure but some have yet to be strengthened.

### .2 Fire Rating

Under the current building code the structural assemblies required fire rating of not less than 45 minutes or of heavy timber construction.

While the concrete block walls separating the major sections of the theatre complex, the interior wood framed load bearing walls, floors and roofs of the various additions did not meet such requirement and will require upgrading as part of the conversion to a standalone building. Further discussion of the fire rating issue will be included in the architectural section of the report.

### .3 New additions

According to the mechanical and electrical a new addition of about 500 square feet will be required to house the new mechanical and electrical equipments as well as the new building services. This new addition will likely locate on the east side and can be constructed with combustible or non-combustible construction.

## S-4 STRUCTURAL COST

The scale magnitude estimated structural costs to converting the theatre into a standalone complex are as follows:

.1	Strengthening of the remainder of the timber trusses in the auditorium.	\$ 50,000
.2	Addition of a 500 s.f. utility room on the east side.	\$ 30,000
.3	Allowance for structural costs associated with modification and upgrading of the existing building.	<u>\$220,000</u>
	<b>Total estimated structural cost</b>	<b>\$300,000</b>

Upgrading cost for fire rating would involve primarily installation of type-X gypsum fire guard and is covered in the architectural section.