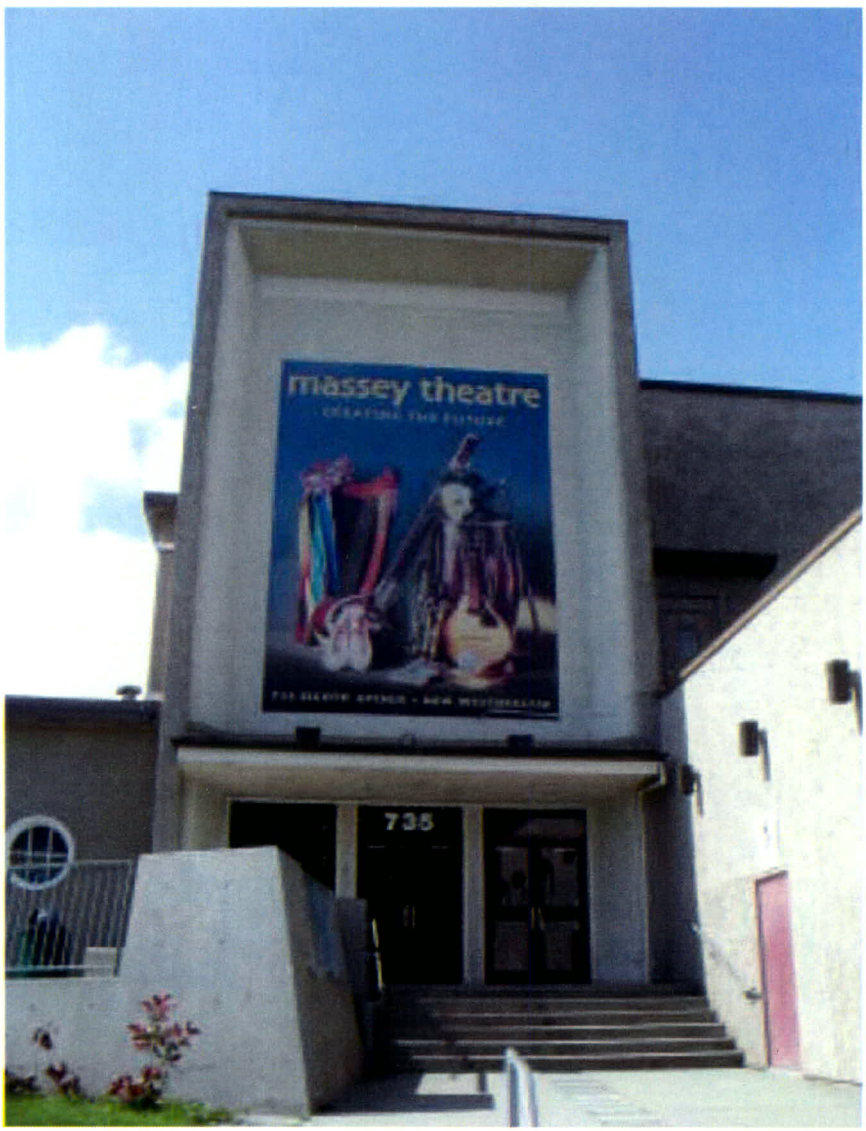
School District No. 40 (New Westminster)

Building Assessment Study
Massey Theatre

735 – 8th Avenue, New Westminster B.C.



Atelier Pacific Architecture Inc.
#109 - 131 Water Street
Vancouver, B.C. V6B 4M3
(t) 604-662-8689
(f) 604-662-8655

September 2009

TABLE OF CONTENTS

1.0 Introduction & Overview

1.1 Background

School District # 40 (New Westminster) required a Building Assessment Study for Massey Theatre to determine the feasibility and cost implications of retaining the theatre and its present operations.

1.2 Objectives

The objectives of this Study are to:

- Identify the possible scope of a Seismic and systems upgrade to provide a safe and effective facility as a School District and Community Facility that is comparable to a new facility.
- Identify opportunity to upgrade additional elements or components.
- Provide schematic cost estimates.

1.3 Study Team

The team visited the site during the month of May 2009
The consultant team assembled to undertake the Study included the following consultants:

Architect – Patrick R. May, MAIBC - Atelier Pacific Architecture Ltd.
Cost Consultant – Jim Bush & Associates Ltd.
Asbestos Consultant - Astech Consultants Ltd
Structural Consultant - Bush Bohlman Structural Consultants Ltd.
Mechanical Consultant - Rocky Point Mechanical Consultants
Electrical Consultant - Cobalt Engineering

1.4 Overview

The theatre building is reaching the end of its useful life expectancy and has major deficiencies in the following areas:

- **Structural** – Seismic resistance is poor and as low as 20% in some areas. New shear walls and reinforcing of existing walls, reinforcing of all floor and roof diaphragms, new footing and seismic anchors and a variety of connection upgrades between components.

- **Electrical** – New main electrical service and room required energy upgrade to majority of lighting, new exiting and emergency lighting, new security, communications service and 2 stage alarm system required.

- **Asbestos** - Astech provides a detailed report of the presence, location and removal procedures of asbestos containing building materials, PCB containing ballasts, lead, mercury and stored chemicals. These materials are prevalent throughout the majority of the facility and any renovation or demolition can be expected to include for their safe removal. No assessment has been made to the risk if no renovation occurs and these materials are left in place during continued use of the facility.

- **Mechanical** – The mechanical report identified replacements for many of the main mechanical components. A new rooftop air handling unit for the main theatre space, replacement of the smoke removal system above the stage area, a new ddc control system, replacement of the boilers and an option for a new solar wall on the south elevation. Also a review of the plumbing systems noted new fixtures throughout many of the washrooms but the cooper piping was reaching the end of its lifespan and pinhole leaks will create the need for replacement of the piping system.

- **Architectural** –a total refinishing of the lobby and public circulation areas would be warranted due to the extensive upgrades required by seismic and asbestos removal. New floor finishes are required in majority of spaces, refinishing at all structural/ seismic upgrade areas, new hardware and doors to theatre, possible seating replacement and building code upgrades. The existing exterior building envelope needs complete replacement and may require mold and mildew removal once the walls are opened for replacement.

- **Building Code** – Due to the scope of the necessary seismic upgrades & the associated refinishing required the building will be required to meet current building codes. The existing building structure is classified as Group A1 occupancy and there is no classification within the A1 group that would allow the building to be of combustible construction. The most likely scenario to accommodate the present use and possibly satisfy the local authority having jurisdiction would be to separate the theatre function from its adjacent two and three storey elements with a fire separation of 1 hour or 2 hours. This would require a review and upgrade of the two major walls that separate the theatre from these components. Additional layers of GWB, fire caulking of all penetrations, fire dampers and replacing all doors and hardware that penetrate the one hour separation would be required. The building code review in appendix E reviews the occupancy requirement and other issues that would affect the upgrade process and scope of work.

- **Fire Risk.** Although the building is sprinklered the structure does not meet the current fire safety standards for

public gathering facilitates.(Group A1 occupancy)

There are many stair and railing deficiencies that would impact the safe exiting for the occupants.

The fire separation between the lobby and seating area is deficient, including the doors and closures.

Combustible materials and structure will create a greater fire risk. (Building structure should be non-combustible)

The smoke removal system requires replacement. (Smoke is the biggest danger to persons existing)

The need for a further risk assessment is warranted should the building continue to operate as it now stands.

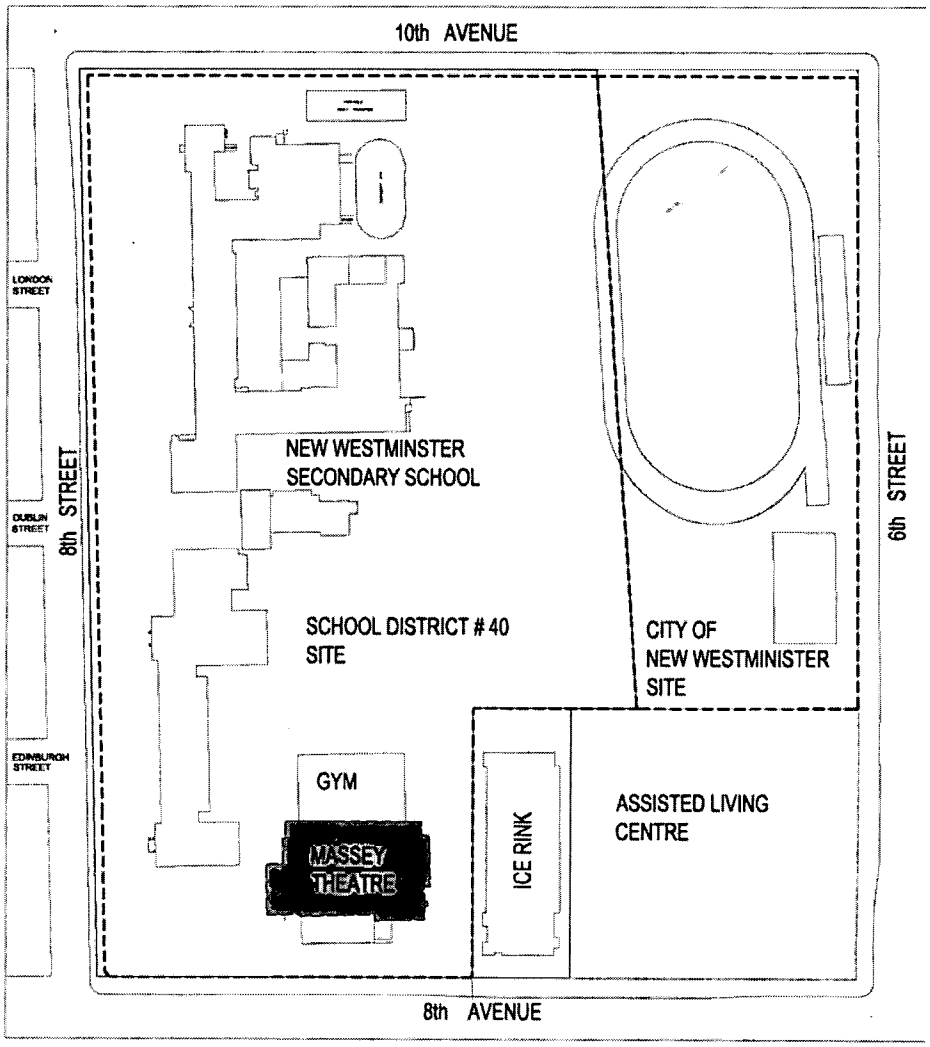
The scope of these upgrades to the facility would include all measures necessary to bring the theater close to the current standards of Building Codes and functioning Theatres. The cost of the upgrades including contingencies is identified as $ 18,226,000 in the Cost Estimate.

2.0 Context and Existing Facilities

The Massey Theatre is presently on School District property at the corner of 8th street and 8th Avenue in New Westminster. The 1200 seat theatre was completed in 1950 and has served as a theatre and meeting hall for both the Secondary school and the community for the last 60 years. The theatre is operated independently by The Massey Theatre Society as a community theatre. SD40 has reserved a number of booking days for the use of the theatre by the District and the Secondary School.

The theatre is part of a four block area that is presently occupied by New Westminster Secondary School, Mercer Stadium, a skateboard park, ice arena and a privately owned assisted living centre. SD40 is presently reviewing options for the redevelopment of the site to suit a new Secondary School.

The consultant's reports in the appendix identify and expand on the deficiencies and recommend upgrades that will offer a safe and effective facility to deliver School District and Community Programs. The appendix include
Structural, Mechanical, Electrical, Asbestos and Architectural / Building Code Reports.



RE-DEVELOPMENT SITE

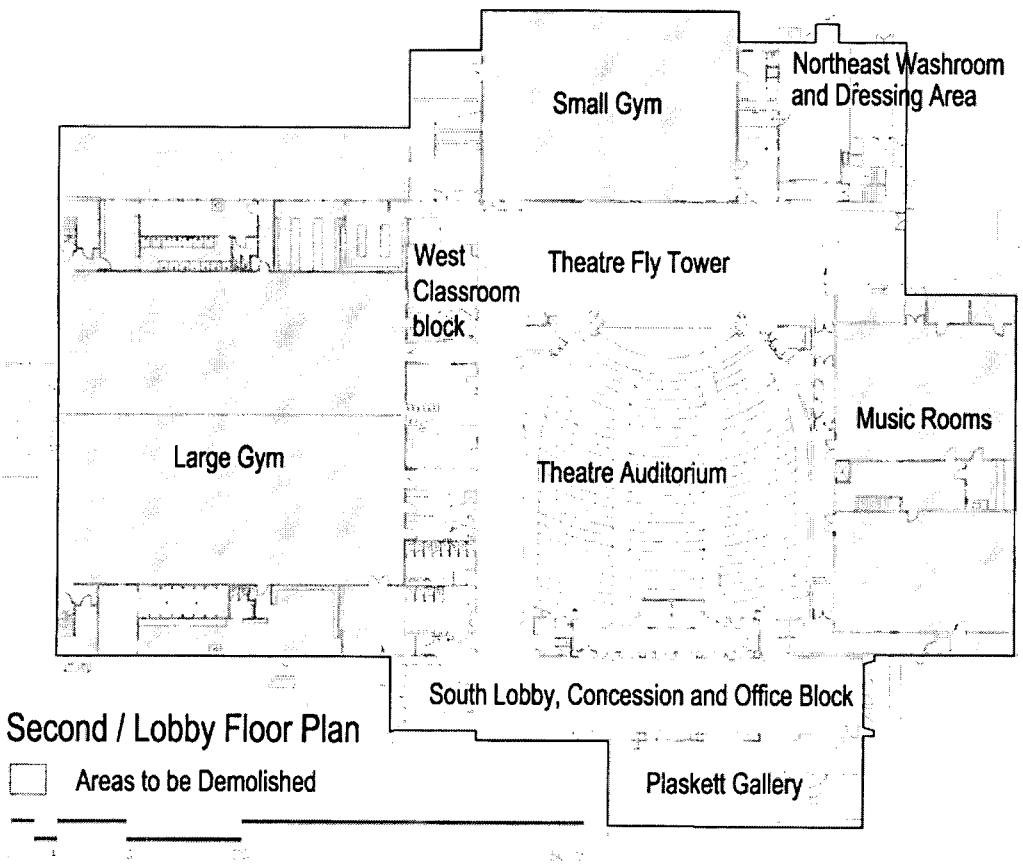
3.0 Redevelopment / Upgrade Synopsis

The redevelopment of the theatre to suit the various upgrades would require closure of the facility during the construction process. This would need to be coordinated with the Massey Theatre Society and their schedule of performances. A likely scenario would be for an extended period of closure of up to a year.

There are also several secondary school components presently attached to the Massey Theatre that would not be retained by SD40 in the redevelopment of the site. These components are shown on the attached diagram and include the following: The large gymnasium to the west, the small gymnasium with cafeteria below to the north and the music rooms to the east. Future users of the facility may wish to retain and upgrade these components for their own uses.

The Remaining areas of the Theatre would be upgraded and have been noted as 6 distinct areas in the Seismic and architectural reports.

- Theatre Fly Tower
- Theatre Auditorium
- West Classroom block
- South Lobby, Concession and Office Block
- Plaskett Gallery
- Northeast Washroom and Dressing Area



Second / Lobby Floor Plan

The demolition of several components attached to Massey Theatre will require new exterior walls and finishes to more than 65% of the building. We would recommend a new simple exterior rain screen exterior wall finish be applied to the entire building that will allow for a contiguous building envelope and a cohesive image to be developed. Mechanical is suggesting a solar wall on the south exposure of the Theatre, with air ducted to the Theatre AHU. This wall is subject to the demolition of the Music rooms and could easily accommodate a simple air cavity to accommodate the solar wall.
The main entry concrete walkway and paving should be retained.
New walkways and landscaped areas will need to be developed to suit the adjacent development.
The majority of roof areas requires a new plywood diaphragm and will require a new roofing membrane. A 2ply sbs roof is required as a standard used on most institutional building.
A new roof top mechanical unit is proposed and will need to be integrated into the roofing work.

Interior Finishes and Systems Integration

General:

Due to the scope of the necessary seismic upgrades & the associated refinishing required the building will be required to meet current building codes. The existing building structure is classified as Group A1 occupancy and there is no classification within the A1 group that would allow the building to be of combustible construction. The most likely scenario to accommodate the present use and possibly satisfy the local authority having jurisdiction would be to separate the theatre function from its adjacent two and three storey elements with a fire separation of 1 hour or 2 hours. This would require a review and upgrade of the two major walls that separate the theatre from these components. Additional layers of GWB, fire caulking of all penetrations, fire dampers and replacing all doors and hardware that penetrate the one hour separation would be required. The building code review in appendix E reviews the occupancy requirement and other issues that would affect the upgrade process and scope of work.

The general scope of work would also require a complete refurbishment of flooring and finishes in Lobby, gallery and public spaces. The remaining spaces could be refinished to suit only the necessary upgrades. The Electrical and Mechanical reports do not require as much intrusive upgrade to the existing building with the exception of the need for replacing the piping for the existing plumbing services. Access too much of this piping could be accommodated during the seismic upgrade of wall and floor diaphragms.

The building has been divided into 6 distinct sections

South Lobby, Concession and Office Block

-removal of all existing flooring and replacement with resilient flooring main second and third floors
-removal and replacement of wall finishes to suit seismic and code upgrades. Refinishing of surfaces to suit overall appearance of main lobby and public spaces. Lighting upgrades, exit signage

Plaskett Gallery

-removal of all existing flooring and replacement with resilient flooring main second and third floors
-removal and replacement of wall finishes to suit seismic and code upgrades. Refinishing of surfaces to suit overall appearance of main lobby and public spaces. Lighting upgrades, exit signage

West Classroom Block

-removal of all existing flooring and replacement with resilient flooring main second and third floors
-removal and replacement of wall finishes to suit seismic and code upgrades. Refinishing of surfaces to suit overall appearance of washrooms on second floor. Minimal upgrades to finishes on upper floor required. Lighting upgrades, exit signage

Theatre Fly Tower

-removal of all existing rigging and equipment before construction start and replacement after upgrade is complete.
-removal and replacement of wall finishes to suit seismic and code upgrades. New furring and finishing required at all concrete walls that receive FRP reinforcing as per structural report. Refinishing of surfaces to suit overall appearance of stage and fly-tower (black paint)

Theatre Auditorium

-removal of all existing rigging and equipment before construction start and replacement after upgrade is complete.
-seating may remain or be replaced depending on the budget.

Northeast Washroom and Dressing Area

-removal of all existing rigging and equipment before construction start and replacement after upgrade is complete.
-removal and replacement of wall finishes to suit seismic and code upgrades. New furring and finishing required at all concrete walls that receive FRP reinforcing as per structural report. Refinishing of surfaces to suit overall appearance of stage and fly-tower (black paint)

4.0 Cost Estimates

MASSEY THEATRE
PROJECT IDENTIFICATION REPORT - FACILITY UPGRADE
for SCHOOL DISTRICT #40 (New Westminster)
design by: ATELIER PACIFIC ARCHITECTURE INC.

June 25, 2009

SCHEDULE B - PROJECT BUDGET SUMMARY

	MASSEY THEATRE UPGRADE
Allowable Building Area (m2)	
Total Allowable Area	
Less: Previously Existing Space	4,090.0
Add: Area to be Demolished	
Area of NEW Space	
Allowable Area of Renovation	
Unit Rate for Construction ($/m2)	
New	
Renovations	**$3,195.18**
Maximum Allowable Budget	
Site Acquisition	**n/a**
Development Cost Charges	**$196,000**
Offsite Costs	**Not this Project**
Site Development	**$0**
Supplementary Site	
Construction - NEW BUILDING	
Construction - SEISMIC UPGRADE & RENOVATIONS	**$13,068,300**
Supplementary Building	
Fees	**$2,138,300**
Contingency - Design	
- Construction	**$1,336,400**
Equipment	**$0**
Other - DEMOLITION & HAZARDOUS MATERIALS	
Other - LEED GOLD DESIGN (3%) NEW CONSTRUCTION/SITE	**N/A**
Other - BURIED OIL TANK	**$100,000**
Other - PORTABLES	**$0**
Other - PROJECT INSURANCE	**$147,000**
Other - PROJECT PLANNING (1%)	**$132,000**
Other - FEASIBILITY - PIR COSTS	**$50,000**
Other -	
Other - ESCALATION	**Not included**
TOTAL PROJECT COST (CURRENT 2009 DOLLARS)	**$17,168,000**

RESERVE ITEMS - Identified Risks "Not to Exceed" contingencies	
Allowance for Demo & Hazardous Material remediation	**$100,000**
Unforseen Soils Issues	**N/A**
Unforseen City Non-Compliance reqmnts - traffic, site service, landscape	**$100,000**
ESCALATION to effective date of construction - Say 5%	**$858,000**
TOTAL RESERVE ITEMS	**$1,058,000**

TOTAL PROJECT COST including RESERVES & escalation	**$18,226,000**

FUNDING SOURCE	
Capital Plan - ABOVE THE LINE	17,168,000
Capital Plan - BELOW THE LINE	1,058,000
Capital Reserve	
Land Capital Reserve	
Local Capital Reserve	
Annual Capital Grant	
TOTAL FUNDING ENVELOPE INCLUDING RESERVES	**18,226,000**

MASSEY THEATRE
PROJECT IDENTIFICATION REPORT - FACILITY UPGRADE
for SCHOOL DISTRICT #40 (New Westminster)
design by: ATELIER PACIFIC ARCHITECTURE INC.

June 25, 2009

FEASIBILITY STAGE CONSTRUCTION ESTIMATE		ORDER OF MAGNITUDE ESTIMATE MASSEY THEATRE UPGRADE	
Development Cost Charges & Permits			**$196,000**
DCC's		Not Required	
Traffic Management Plan		Not Required	
DP / Bldg / City Permits	allow 1.5%	196,000	
Offsite Costs			**Not this Project**
Site Development			**$0**
Hard & Soft Landscaping, Paving, Sidewalks			
Site Utilities, Foundation Drains.			
RENOVATIONS & UPGRADES TO EXISTING		$3,195.18	**$13,068,300**
		4,090.0 m2	
Seismic Upgrade	4,090 m2	$1,433.13	**$5,861,500**
Structural Work & Seismic Upgrade		$918.56	$3,756,900
Selective Demolition, Earthwork		491,238	
Concrete Foundation Work, make good slab etc.		292,880	
GEWI Soil Anchors		56,900	
NEW Concrete Shearwalls & Columns		473,063	
Steel Brace Frames		388,125	
Glass Fibre Wrap Reinforcement		436,800	
Masonry Walls		93,750	
Wood Framed Walls, Floor Diaphragms etc.		309,600	
Roof Seismic Diaphragm		359,800	
Re/re roofing associated with seismic work		477,400	
Exterior Building Envelope Work		See Separate	
Interior Work - Re/re Specialties & Finishes due to Seismic		377,300	
Electrical Work			$216,800
• Electrical Work due to Seismic work		216,800	
Mechanical Work		$116.23	$475,400
• Mechanical re/re work due to Seismic		475,400	
Asbestos Removal			see Below
Site Specific PHASING COSTS			School Vacated
Maintain School Operations, School District Charges			School Vacated
Contractor Site Overheads & Markup			$795,600
Design Contingency & Unpsecified Risk			$524,500
Payable GST - 1.60%			$92,300
Exterior Envelope - Roof, Wall, Window Upgrade		$400.34	**$1,637,400**
Exterior Wall reinstatement where adj buildings removed		1,037,400	
Exterior Wall remedial work, repainting, caulking, cleaning etc.		150,000	
Roofing Replacement - Included with seismic where required		see SEISMIC	
Window Replacement - upgrade to double glazed		300,000	
Entrance Doors Replacement/upgrade, Auto Opener		150,000	
CODE & Accessibility & Exiting Upgrade		$232.27	**$950,000**
Accessible Washrooms / HC Stalls in washrooms		200,000	
Door Hardware to Accessible Lever type		40,000	
Upgrade Elevator		130,000	
Fire Separations - Audience Chamber to remainder		400,000	
Upgrade stair handrails, doors/vestibules for Fire Separation		180,000	
Electrical Upgrades:		$281.03	**$1,149,400**
Main Service Upgrade, refeed existing loads		400,000	
Performance Sound and Lighting - Electrical Infrastructure upgrade		200,000	
Fire Alarm Upgrade - Panel Replacement, New Annunciator Panel & Devices		78,900	
General Areas Lighting Upgrade		356,000	
Upgrade Bldg Systems - PA, Security		114,500	

MASSEY THEATRE
PROJECT IDENTIFICATION REPORT - FACILITY UPGRADE
for SCHOOL DISTRICT #40 (New Westminster)
design by: ATELIER PACIFIC ARCHITECTURE INC.

June 25, 2009

FEASIBILITY STAGE CONSTRUCTION ESTIMATE	ORDER OF MAGNITUDE ESTIMATE MASSEY THEATRE UPGRADE	
Mechanical Upgrades - Sprinklers & DDC	$466.01	**$1,906,000**
Plumbing Upgrades - replace piping, some fixtures	200,000	
Sprinkler Installation	see SEISMIC	
HVAC upgrade	1,456,000	
Smoke Exhaust	150,000	
Upgrade DDC controls	100,000	
General Upgrades & CODE Upgrades (not included in Seismic Work)	$298.66	**$1,221,500**
Seating - upgrade/ reupholster	306,000	
Millwork	250,000	
Flooring upgrades	243,800	
Ceilings upgrade	206,300	
Painting - All rooms	65,400	
Specialties - washrooms upgrade	150,000	
Infrastructure Separation (NWSS)	Allow	**$75,000**
Temporary works for Phasing & Occupancy During Seismic		**Not Required, Building Vacant**
Post Disaster Facility		**Not this Project**
• potable water storage tank		
• emergency generator plug-in, manual transf switch & sub-distribution		
• increase in structural elements to 1.5 design (5% increase on structure for addn)		
Building Demolition		**N/A**
Asbestos Removal		**$267,500**
Refer to Astech Report & Estimate	$267,500	
OTHER		**$100,000**
LEED GOLD DESIGN INITIATIVES		**N/A**
• LEED GOLD DESIGN - 3% Calculated on NEW ADDITION	N/A	
• LEED DESIGN FOR RENOVATIONS/SEISMIC UPGRADE	not included	
BURIED FUEL TANKS		**$100,000**
Remove buried underground fuel oil tank	$100,000	
SUB-TOTAL CONSTRUCTION (Including 1.60% GST)	$3,267.56	**$13,364,300**
Other - PORTABLES		**$0**
Equipment		**$0**
Design Fees (16% Renov)		**$2,138,300**
Contingency (10% Renov)		**$1,336,400**
Other - Project Insurance ($11/1000 for Wrap-up Policy, Renov)		**$147,000**
Other - Project Planning (1%)		**$132,000**
Other - Feasibility Study		**$50,000**
Other - ESCALATION from 2ND QTR 2009		**Included**
TOTAL PROJECT COST (Including 1.60% GST)	2nd QTR 2009	**$17,168,000**

Appendix A - Structural Systems - Seismic Strengthening Report

BUSH, BOHLMAN & PARTNERS consulting structural engineers

SUITE 1550 - 1500 WEST GEORGIA STREET, VANCOUVER, BC V6G 2Z6
Tel: (604) 688-9861 Fax: (604) 688-7039 E-Mail: info@bushbohlman.com

June 11, 2009

Project: 5133

Patrick May
Atelier Pacific Architecture Inc.
Suite 109 131 Water Street
Vancouver, B.C.
V6B 4M3

Sir,

MASSEY THEATRE SEISMIC STRENGTHENING
735 - 8TH AVENUE, NEW WESTMINSTER, B.C.

As part of the proposed renovation of the Massey Theatre, Bush, Bohlman & Partners has been retained to review and comment on the structure of the Massey Theatre and the construction required to upgrade the Theatre to meet current seismic forces in the British Columbia Building Code (BCBC) 2006. Our review has consisted of two site visits, on May 26th and June 2nd, 2009, a review of available drawings, calculations based on the available drawings as well as information obtained during the site visits.

Background on the Existing Building

The existing Theatre building and surrounding structure was built around 1950. The existing building consists of two parts, the Theatre portion, including the auditorium and fly tower, and the one, two and three storey structure surrounding the Theatre. The surrounding structure includes the lobby, concession, and offices, and the Plaskett Gallery to the south of the auditorium, as well as the classrooms to the west of the auditorium and stage area and the washrooms, storage areas and dressing rooms to the north-west of the stage.

Also surrounding and directly connected into the Theatre structure is a large gymnasium to the west of the Theatre and classrooms, and a small gymnasium to the north-west of the stage area, as well as the band rooms to the east of the auditorium. These portions of the building will be removed and have not been reviewed as part of this report.

See attached photos 1-7 for exterior views of the structure.

The Massey Theatre and surrounding structure is a roughly rectangular building with flat roofs at different levels. The building has an approximate length of 56m in the north-south direction and a width of 36m in the east-west direction.

cont'd.....2/

Three existing drawings were available for review. These drawings detailed, the reinforced concrete balcony support, the reinforced concrete proscenium arch drawing, and the truss above the auditorium.

Present Condition of Structure

The building is currently fully occupied. The Theatre is in operation with the lower basement areas used for storage. The two-storey block with attic and basement to the west of the auditorium is fully occupied as part of the school with classrooms. The west basement is used for storage. To the south of the Theatre is the main entry with the concession and lobby at the ground floor level, offices and the balcony entry at the second floor level and a partial third floor level housing the board room. South of the lobby and concession is the single storey Plaskett Gallery above a crawl space. The area to the north-west of the stage area is fully occupied with washrooms and dressing rooms in the basement and storage at the first floor level with a partial mezzanine below the roof.

The existing timber roof, floors, and walls as well as the load-bearing concrete and timber columns, and the infill masonry walls appear to be performing as intended for the loads presently imposed and imposed over the past years. There are no signs of structural distress including fire or sagging floors or cracking of the exterior stucco finish and interior sheathing. The timber trusses, joists, and studs are exposed in the attic space and this timber appears to be in good condition. The last re-roofing of the building was in the early 1990s (see photo 8).

The basements/crawl spaces are dry and no rot, deterioration, or structural distress were visible during the site visits. Building foundations appear to be performing well with no signs of excessive settlement.

Structural System

The structural system across the Theatre and surrounding structure is varied.

Inside the Theatre above the auditorium the roof structure consists of roofing over laminated 2"x 4" lumber spanning to 12"x 8" wood beams at 3.0m on centre. The 12"x 8" beams are supported by wood trusses with 12"x10" timber top and bottom chords and timber and steel rod web members (see photo 9). These roof trusses span in the east-west direction and are supported on the west wall line by wood columns and on the east wall line by 300mm deep x 400mm wide concrete pilasters/columns. Concrete pilasters/columns are supported at basement level by concrete foundations. The infill wall between the load bearing wood columns on the west wall is 2"x 6" at 400mm on centre to foundation level. The infill wall between the load-bearing concrete columns on the east wall is 200mm unreinforced masonry block to the foundation level. The south wall is 2"x 6" wood studs at 400mm on centre. At ground level in the auditorium there is concrete slab-on-grade. Concrete foundation walls enclosing the auditorium are supporting the above structure and also retaining the un-excavated area below the slab-on-grade from the adjacent crawl spaces.

The balcony structure was not visible on site but we expect the structure to consist of wood flooring spanning to wood joists supported by concrete beams. The concrete beams span to concrete columns

cont'd.....3/

and transfer loads into reinforced concrete footings. Existing architectural drawings show the balcony structure is supported by reinforced concrete cantilever beams at approximately 5.0m on centre in the north-south direction spanning to concrete columns on pad footings.

The Theatre fly tower structure is comprised of roofing over shiplap spanning to 3"x 8" wood joists at 400mm on centre supported by steel wide flange beams spanning in the north-south direction supported by 200mm reinforced concrete walls with 100mm x 400mm wide pilasters at beam locations (see photo 10). Concrete walls extend to foundation level and are supported by concrete foundation walls. The stage is wood construction.

Above the classroom block the roof structure consists of roofing above diagonal shiplap spanning to wood roof joists at 400mm on centre. Roof joists span in the east-west direction. The wood joists are supported by wood stud walls on each side. There is a partial attic floor above the corridor and consists of laminated 2"x 4" lumber spanning to the load-bearing wood stud corridor walls. We expect the second and ground floor structure consists of shiplap on wood joists spanning in the east-west direction to the load-bearing corridor, auditorium, and west gymnasium wood stud walls. Load-bearing wood stud walls are supported by concrete foundation walls on the east wall at ground floor level, and elsewhere in the block, wood stud walls extend through the crawl space/basement to foundation level and are supported by concrete footings. The classroom block is located over a basement/crawl space area.

The roof structure above the lobby, concession, and offices, and above the Plaskett Gallery was only visible above the board room. We expect the structure will consist of roofing over shiplap spanning to wood joists spanning in the north-south direction. We expect the ground floor level and second floor level to consist of shiplap spanning to wood joists. Wood joists will be supported by load-bearing wood stud walls or wood beams and columns supported by concrete walls or footings. The lobby, concession, and offices, and the Plaskett Gallery are located above a crawl space.

Due to the lack of existing drawings for both the Theatre and surrounding structures, a significant amount of investigation into the existing building structure will be required prior to preparing a seismic upgrade design and construction documents for the structure.

Review of Seismic System and Capacity

The seismic system within the structure consists of a number of different seismic load-resisting elements. Within the fly tower lateral loads at the roof level are transferred through shiplap into 200mm thick concrete walls. Lateral loads in the 200mm concrete walls are transferred through the wall into concrete foundations. The seismic system in the auditorium consists of a laminated 2"x 4" lumber roof deck which transfers lateral loads into each wall. Lateral loads are transferred from the roof deck into the reinforced concrete proscenium arch and 200mm thick reinforced concrete walls which form the south face of the fly tower. Lateral loads are transferred through the concrete wall into the concrete foundations. Along the south and the west wall of the auditorium, lateral loads from the roof deck are transferred into 2"x 6" wood stud walls. Walls are sheathed with shiplap and drywall however the sheathing is not continuous to the underside of the roof deck. Lateral loads are

cont'd.....4/

transferred through the wood stud walls into the concrete foundations. Along the east wall, lateral loads are transferred from the roof deck into 200mm thick unreinforced masonry block walls and into the below concrete foundation wall. The building has very little resistance in both the north-south and east-west directions. Lateral forces induced by the retaining of earth below the auditorium slab are transferred into the soils below by the reinforced concrete foundation walls surrounding the auditorium.

To the west of the Theatre, in the alongside two-storey classroom block, loads are transferred from the shiplap roof deck into drywall or shiplap sheathed wood stud walls and into the foundations below.

To the south of the Theatre portion of the building in the three-storey lobby, concession, office block and in the one-storey Plasket Gallery loads are transferred from the shiplap roof deck into sheathed wood stud walls and into the foundations below. At the second floor level, lateral forces are transferred through shiplap flooring and into the concrete beams and columns which form part of the balcony. These reinforced concrete beams and columns transfer a small amount of lateral force through moment-resisting beam column joints.

The sheathed wood stud walls resisting lateral forces in both the lobby, concession, office block, and in the classroom block are not located directly above one another and therefore lateral forces are not directly transferred from one level into the lower level. Forces are first transferred from the terminated sheathed wood stud wall through the floor diaphragm and into the below lateral force resisting elements.

To the north-west of the stage area in the single-storey with basement portion of the structure, housing washrooms, dressing rooms and storage areas, the structure was not visible during the site visit. We expect loads to be transferred from shiplap roof deck into sheathed wood stud walls and into the concrete foundations below.

The expected overall seismic performance of the building in its present state is very poor. The Theatre, including the auditorium and the fly tower will provide a combined lateral resistance of less than 60% of the seismic forces prescribed by the BCBC 2006 in the east-west direction, and less than 20% in the north-south direction. Due to the layout of the auditorium and fly tower, a large amount of torsion is introduced into the structure effectively reducing the overall lateral resistance of the building and specifically the resistance in the east-west direction.

The classroom block to the west of the auditorium will provide a lateral resistance of less than 20% of the seismic forces prescribed by the BCBC 2006.

The lobby, concession, office block to the south of the auditorium will provide a lateral resistance less than 20% of the seismic forces prescribed by the BCBC 2006.

cont'd.....5/

The Plaskett Gallery to the south of the lobby/concession/offices will provide a lateral resistance less than 30% of the seismic forces prescribed by the BCBC 2006.

Overall the structure is highly non-Code compliant with an effective seismic resistance of less than 20% current Code levels and is therefore a high risk building.

The existing roof and floor diaphragms within the structure are either shiplap, or 2"x 4" laminated lumber with no plywood. Neither of these systems is recognised by the BCBC 2006 as a suitable mechanism to transfer lateral forces. In the lobby, concession and office block, and in the classroom block, the shiplap floor diaphragms are incapable of transferring the shear carried by the terminated wood stud walls into the below lateral force resisting systems.

There are no existing drawings of the masonry wall along the east wall of the auditorium which we expect to be unreinforced. Unreinforced masonry walls are not permitted by the current Code. Typically unreinforced masonry, especially tall walls, have performed poorly under moderate to high seismic loading, with the masonry walls collapsing out-of-plane.

The connections between the roof and the masonry exterior wall and the reinforced concrete walls of the fly tower are not fully visible, however, typical connections between diaphragms and exterior walls in buildings of this vintage have performed poorly under seismic loading permitting the exterior masonry to fall away from the building and, in the case of the fly tower, a gap to form between the roof diaphragm and the reinforced concrete walls.

Proposed Upgrade and Affect on the Structure

We have reviewed the Massey Theatre and the specified surrounding structures to upgrade the structure to meet the current British Columbia Building Code 2006 requirements. We have split the review into the six portions of the structure; the Theatre Fly Tower, the Theatre Auditorium, the west Classroom Block, the south Lobby, Concession, Office Block, and the Plaskett Gallery. Refer to attached sketches SK1, SK2 and SK3 showing information on the proposed upgrade.

Theatre: Fly Tower

The following structural issues apply to the upgrade of the existing fly tower to meet current Code levels;

a) At the underside of the roof level a new roof diaphragm is to be provided. New steel angle cross-bracing is to be provided directly below the existing wood roof joists between the existing wide flange beams. A new perimeter steel member is to be provided around the reinforced concrete walls at the level of the cross-bracing.

b) Provide vertical and horizontal FRP reinforcing to all the existing 200mm reinforced concrete walls.

cont'd.....6/

Theatre: Auditorium

The following structural issues apply to the upgrade of the existing auditorium to meet current Code levels;

a) Above the existing 2"x4" laminated lumber roof deck a new roof diaphragm is to be provided. New steel plate cross-bracing is to be provided on the south, east, and west sides of the auditorium and bolted through the existing laminated lumber roof deck. New steel plate drag struts are to be provided across the roof deck. Connections are to be provided from the roof deck into the alongside lateral force resisting elements. At the north end of the auditorium, a steel angle is to be provided between the laminated lumber roof deck and the south concrete wall of the fly tower.

b) The masonry wall along the east side of the auditorium is to be upgraded. New vertical reinforcing is to be provided at 600mm on centre to improve out-of-plane performance. New horizontal FRP strips are to be provided to increase shear capacity. Existing concrete columns/pilasters are to be strengthened with a steel column from foundation to roof level. Horizontal steel girts are to be connected to the masonry wall and are to be provided at mid-height and roof level of the masonry wall. Girts will span between the strengthened concrete columns/pilasters.

c) Two new 250mm concrete shear walls are to be provided along the south wall of the auditorium between the existing concrete balcony supports. New foundations and soil anchors are to be provided below each wall.

d) A new blocked plywood diaphragm is to be provided above the reinforced concrete balcony structure and connections between the balcony and alongside walls upgraded.

e) A new H-block or concrete shear wall with new concrete foundations and soil anchors is to be provided along the west wall of the auditorium.

f) To restrain the earth below the auditorium slab-on-grade, concrete buttress walls retaining the existing concrete foundation walls may be required within the crawl space.

West Classroom Block

The following structural issues apply to the upgrade of the existing classroom block to meet current Code levels;

a) Above the existing shiplap roof deck provide a new blocked 12mm plywood diaphragm and steel strap drag struts.

cont'd.....7/

b) At the attic level, the connection of the 2"x 4" laminated floor in the corridor to the alongside wood stud wall is to be upgraded. Additional vertical framing members may be required if studs are not continuous through the attic level.

c) Above the existing shiplap floor deck at the ground and second floor levels a new 12mm blocked plywood diaphragm is to be provided.

d) Along the west wall the alongside gymnasium is to be removed. Provide plywood sheathing full length of the wall with new hold-downs and an upgraded connection to the below footing and with a new concrete foundation wall to the underside of the ground floor level.

e) Upgrade connections into the floor diaphragms at each level.

f) Along the east wall, provide a continuous steel angle drag strut along the full length of the floor to the new shear wall on the west side of the auditorium at each level.

g) In the east-west direction across the block, provide 12mm plywood sheathing to existing wood stud walls and block at the second floor level. Provide new parallam beams and columns to support the new plywood shear walls. At the ground floor level provide 12mm plywood sheathing to existing wood stud walls and block, extend plywood shear walls into the crawl space to the foundation level, provide 12mm plywood sheathing to new wood stud walls and block, provide new strip footings below shear walls.

South Lobby/Concession/Office Block

The following structural issues apply to the upgrade of the existing Lobby, Concession and Office block to meet current Code levels;

a) Above the existing shiplap roof deck provide new 12mm plywood sheathing and steel straps and block.

b) Along the north wall, provide a continuous steel angle drag strut along the full length of the floor to the new shear walls on the south wall of the auditorium at each level.

c) Above the existing shiplap floor deck at the ground, second and third floor levels provide 12mm plywood sheathing and block.

d) Upgrade connections between the floor diaphragm and the alongside wood stud walls at each level.

e) Between the foundation level and the balcony level, provide steel moment frames attached to the existing balcony concrete beams and columns. Provide new concrete foundations.

cont'd.....8/

f) At the east and west ends of the block, provide steel moment frames from foundation to roof level to restrain the existing stair well and the entry to the lobby.

g) In the north-south direction and the east-west direction, provide 12mm plywood sheathing to existing wood stud walls and block at the second and third floor levels. Provide new parallam beams and columns to support the new plywood shear walls in the north-south direction. At the ground floor level, provide 12mm plywood sheathing to existing wood stud walls and block; extend walls to the existing foundation walls. Upgrade connections to the existing foundation wall.

Plaskett Gallery

The following structural issues apply to the upgrade of the existing Plaskett Gallery to meet current Code levels;

a) Above the existing shiplap roof deck provide new 12mm plywood sheathing and steel straps.

b) Provide 12mm plywood sheathing to existing wood stud walls and block, upgrade connections to the above roof diaphragm and below concrete foundation walls

The North East Washroom/Storage/Dressing Area

The following structural issues apply to the upgrade of the existing north-east washroom/storage/dressing area to current Code levels;

a) Above the existing shiplap roof deck provide new 12mm plywood sheathing and steel straps and block.

b) Provide 12mm plywood sheathing to existing wood stud walls and block, upgrade connections to the above roof diaphragm and below concrete foundation walls.

c) At existing mezziane level, provide new 12mm plywood sheathing over existing floor deck. Upgrade connections into alongside wood stud walls.

Conclusion

We have visited the Massey Theatre and prepared a brief report on its present structural condition and issues related to its seismic upgrade. The existing structure has performed well for the historical loads imposed to the building.

Our brief review indicates the building is currently capable of resisting less than 20% of the seismic forces prescribed by the BCBC 2006 and has various structural issues including out-of-plane loading on masonry walls, insufficient floor and roof diaphragms, lack of lateral load resisting elements, and lack of connection between lateral load system components. The present building is expected to behave very poorly in even moderate seismic events.

cont'd.....9/

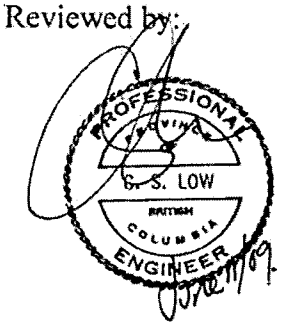
Our review has discussed how it is possible to upgrade the building to current Code level by upgrading existing lateral force resisting elements and diaphragms and by providing new lateral force resisting elements within the structure. The purpose of the upgrade concept is to demonstrate the magnitude of the upgrade problem for use in costing and further planning. We recommend further on-site investigation to determine more accurately the existing building structure, due to the lack of existing documentation, prior to developing final upgrade designs and documentation.

If you have more questions on the structure of this building please contact the undersigned.

Yours truly,

Justine O'Sullivan, E.I.T

Reviewed by:



Clint S. Low, P. Eng., Struct.Eng.
Partner

Encls. Photos

JOS/CSL/lb

Photo 1: East Entry to Massey Theatre
Description: East end of three storey lobby, concession and office area.
Issue: Moment frame to be provided to restrain east end of block.

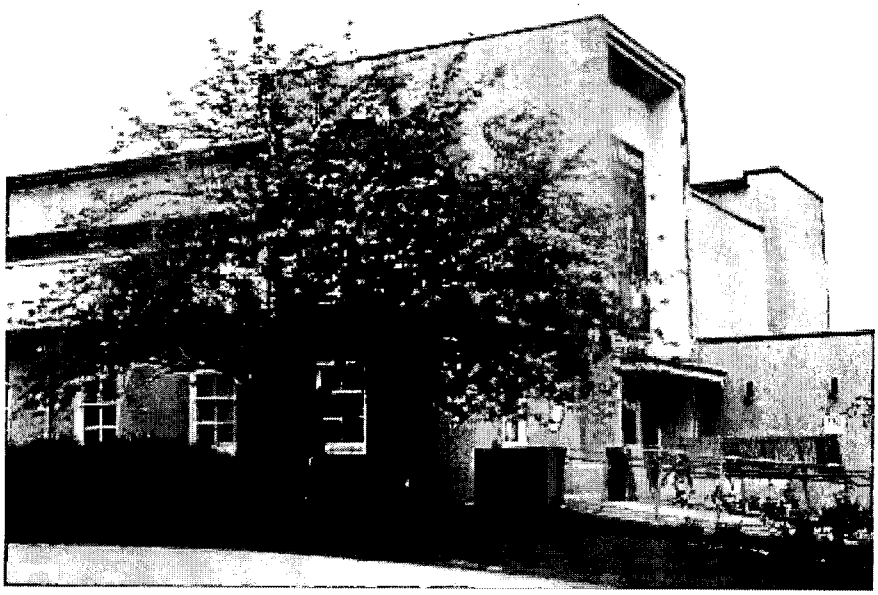


Photo 2: South East View of Theatre
Description: Single storey Plaskett Gallery, lobby, concession and office space and auditorium and fly tower visible. Band room to the lower right hand side of the photo.

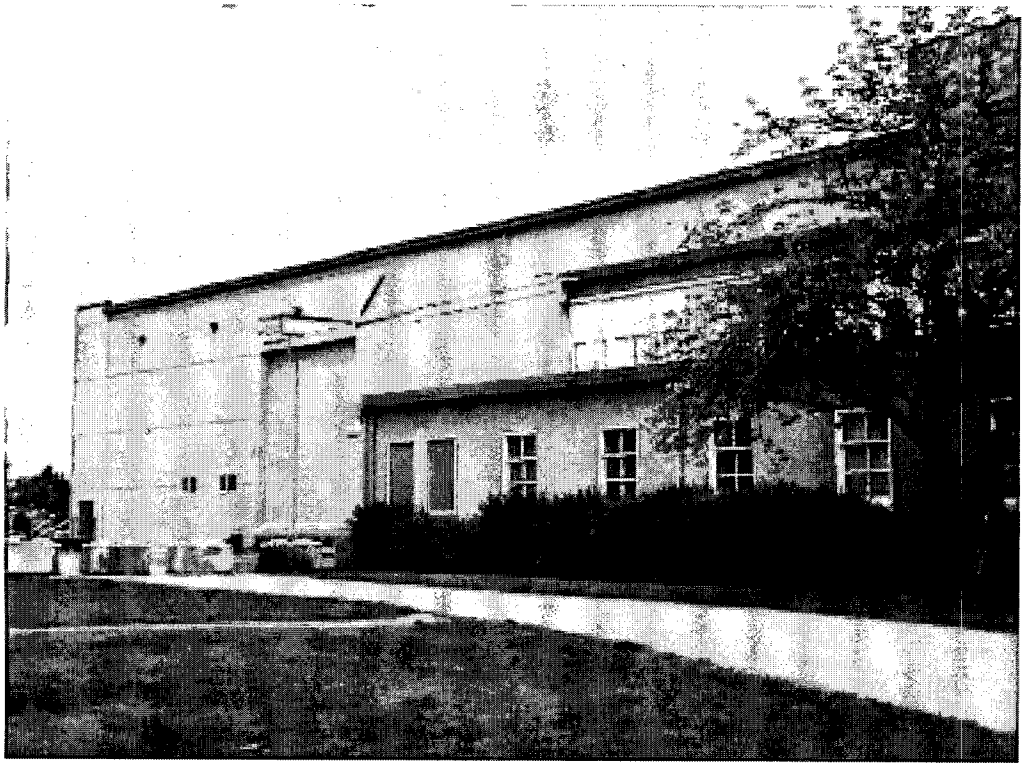


Photo 3: South View of Theatre)
Description: Plaskett Gallery, lobby, concession, offices and auditorium visible.
Issue: Gymnasium to the west of the auditorium to be removed. (Gymnasium located on the left hand side of the photo)

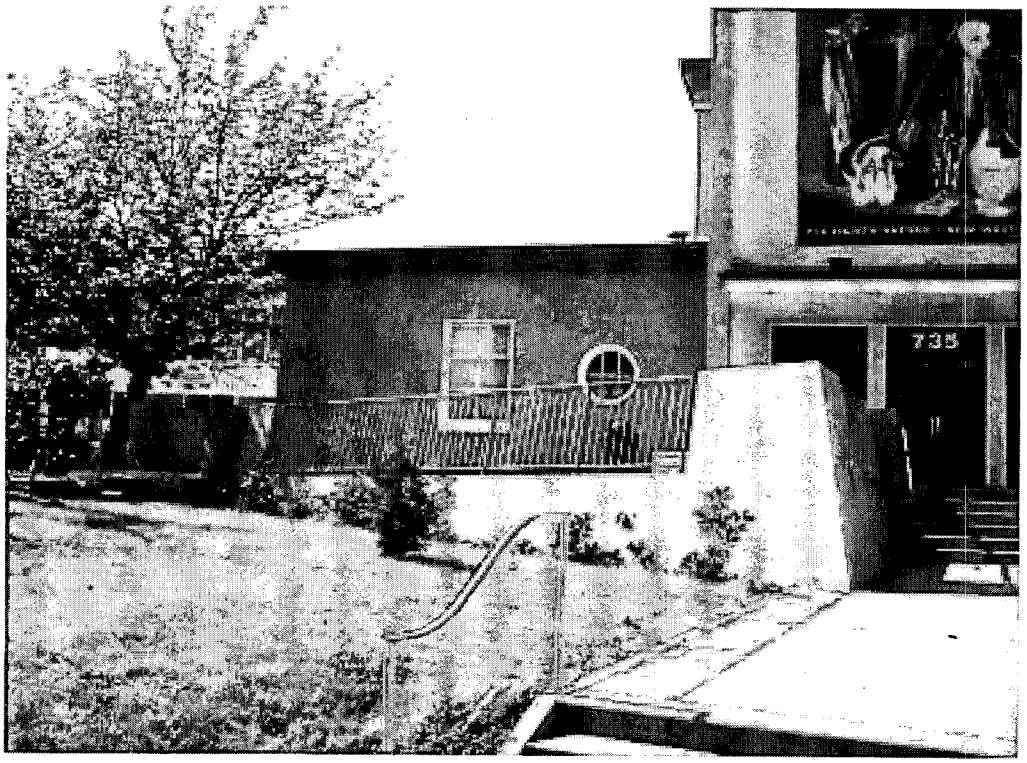


Photo 4: East View of Plaskett Gallery
Description: Single storey over crawl space Plaskett Gallery.
Issue: New plywood shear walls to east wall of Gallery required.

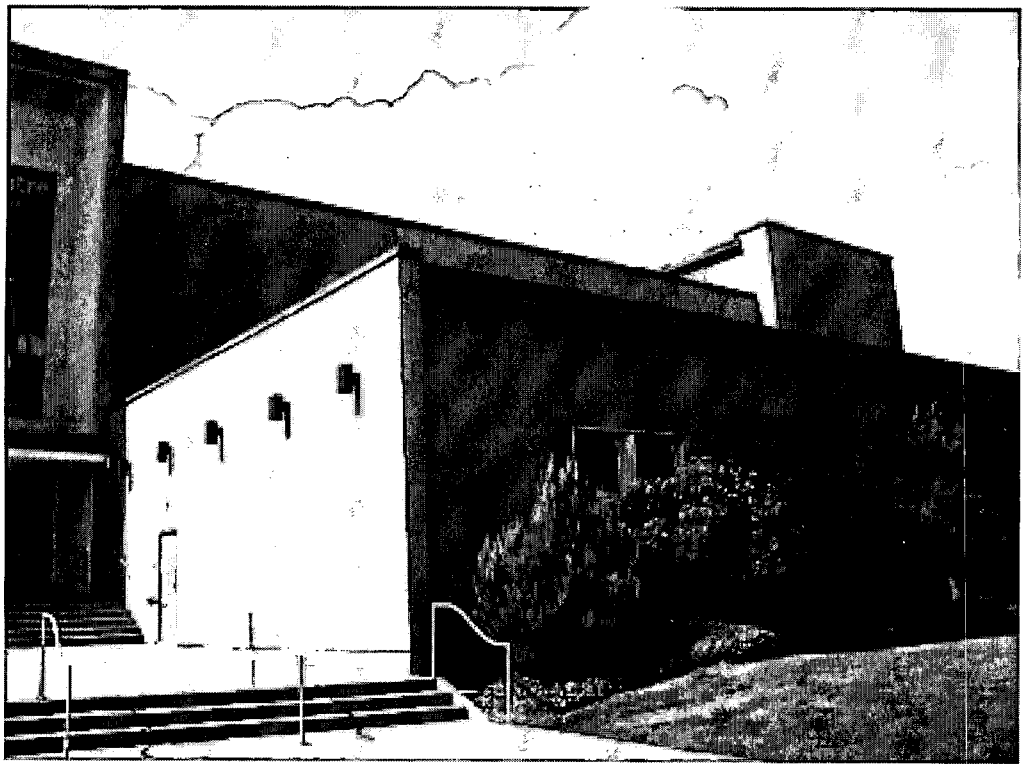


Photo 5: East View of Theatre
Description: Band room to the east of the structure with auditorium and fly tower in the background.
Issue: Band room to be removed and is not included in review.

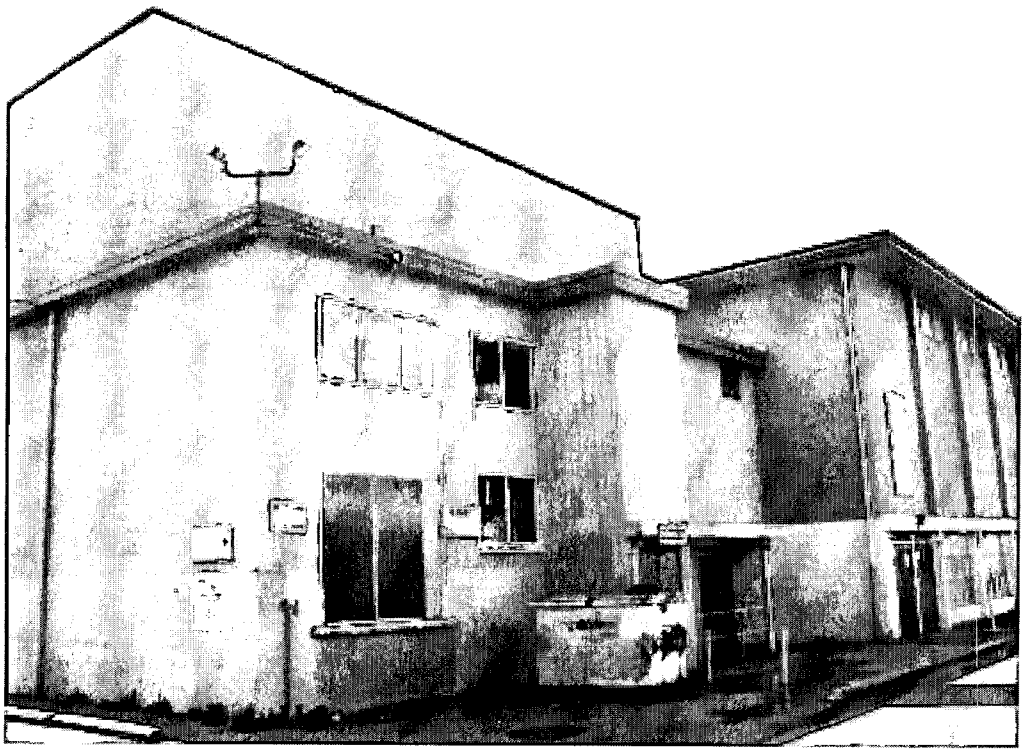


Photo 6: North East View of Theatre
Description: Shows storage, dressing rooms and washrooms to the north east of the stage area
Issue: Small gymnasium past block to be removed and was not reviewed.

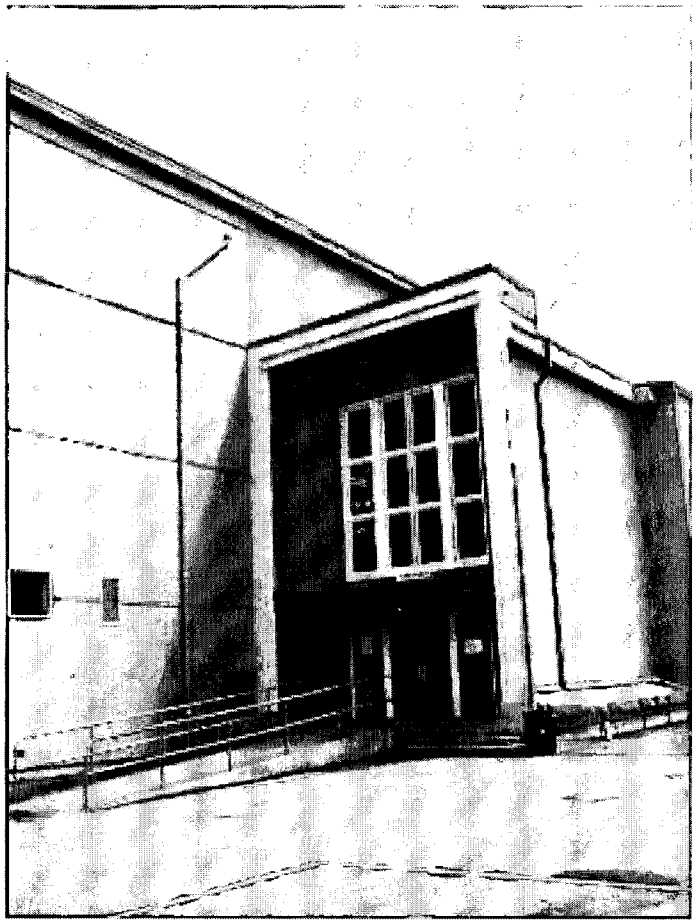


Photo 7: West View of Lobby
Description: West entry to lobby.
Issue: End of wall to be restrained by moment frame.

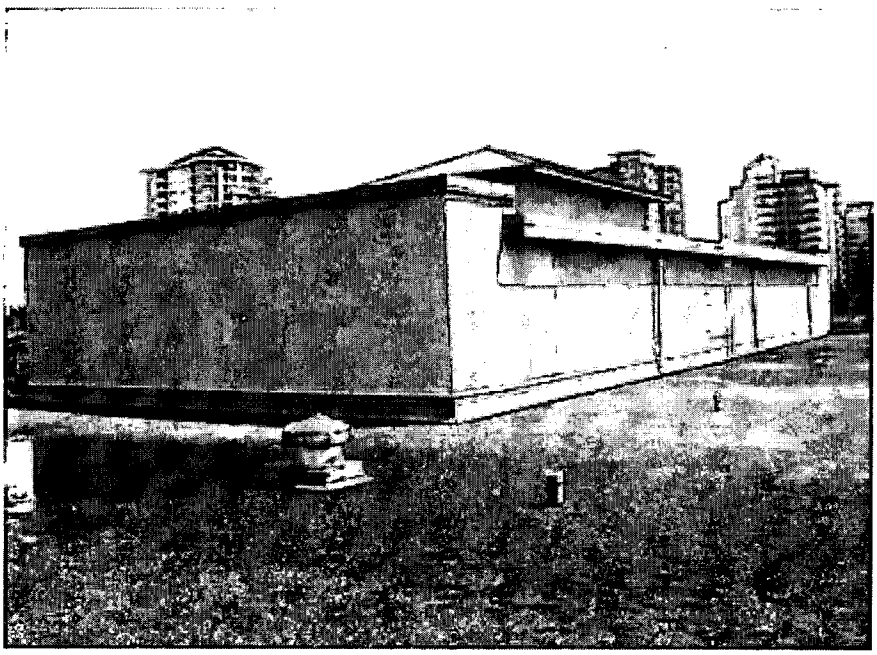


Photo 8: Auditorium Roof
Description: Existing roof including view of fly tower extending past auditorium roof.
Issue: New steel plate and plywood diaphragms to be provided at roof level.

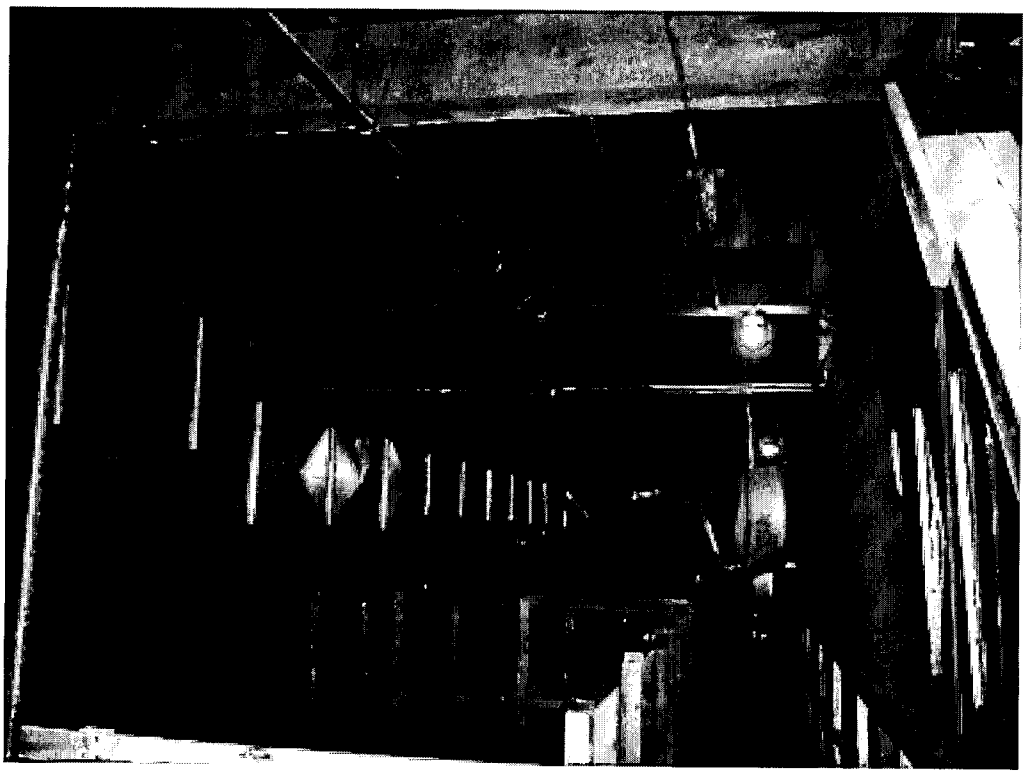


Photo 9: Auditorium Roof Space
Description: Laminated lumber roof deck and wood trusses
Issue: Laminated lumber roof deck non compliant with code.

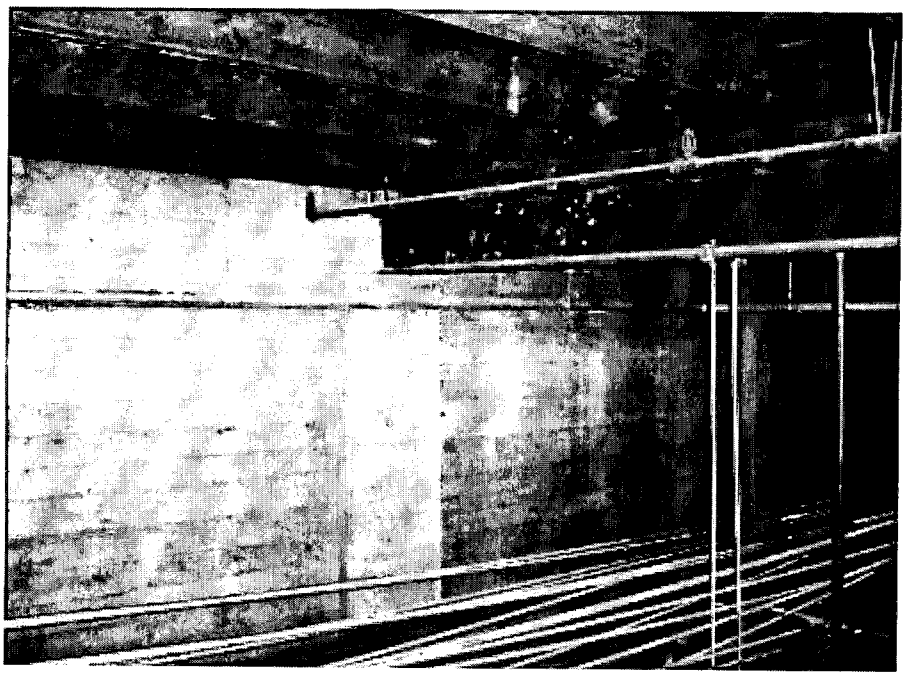
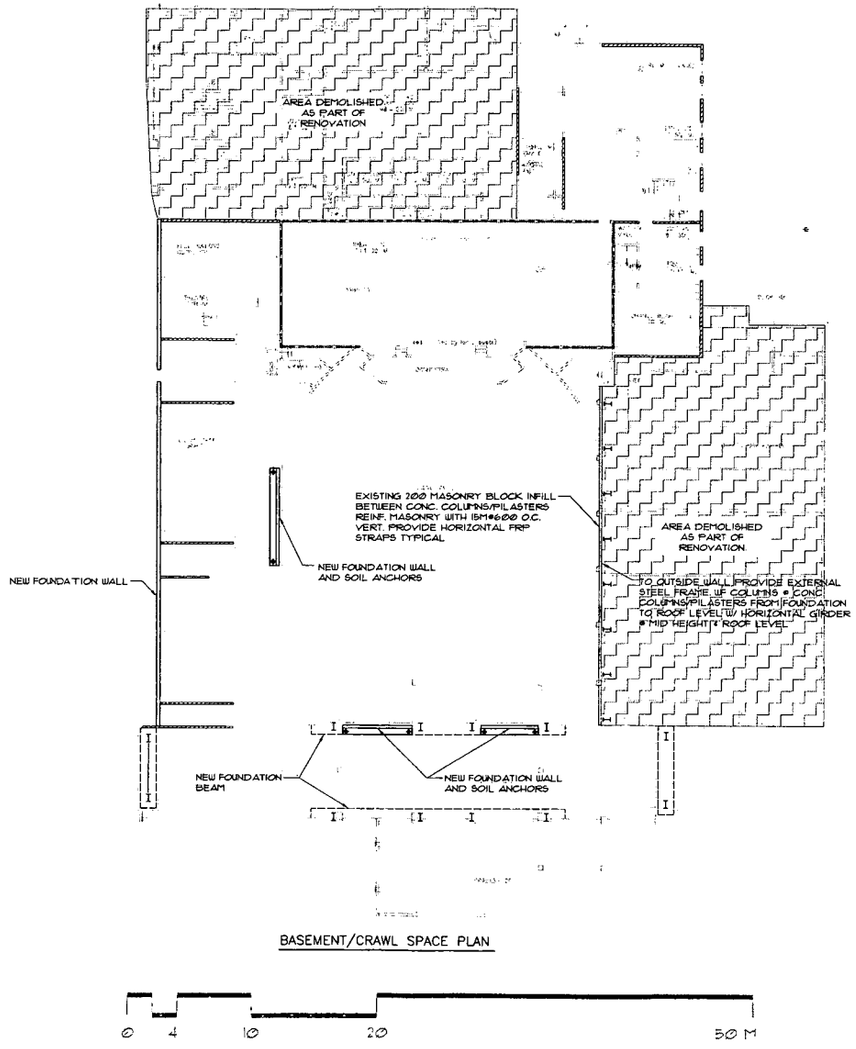
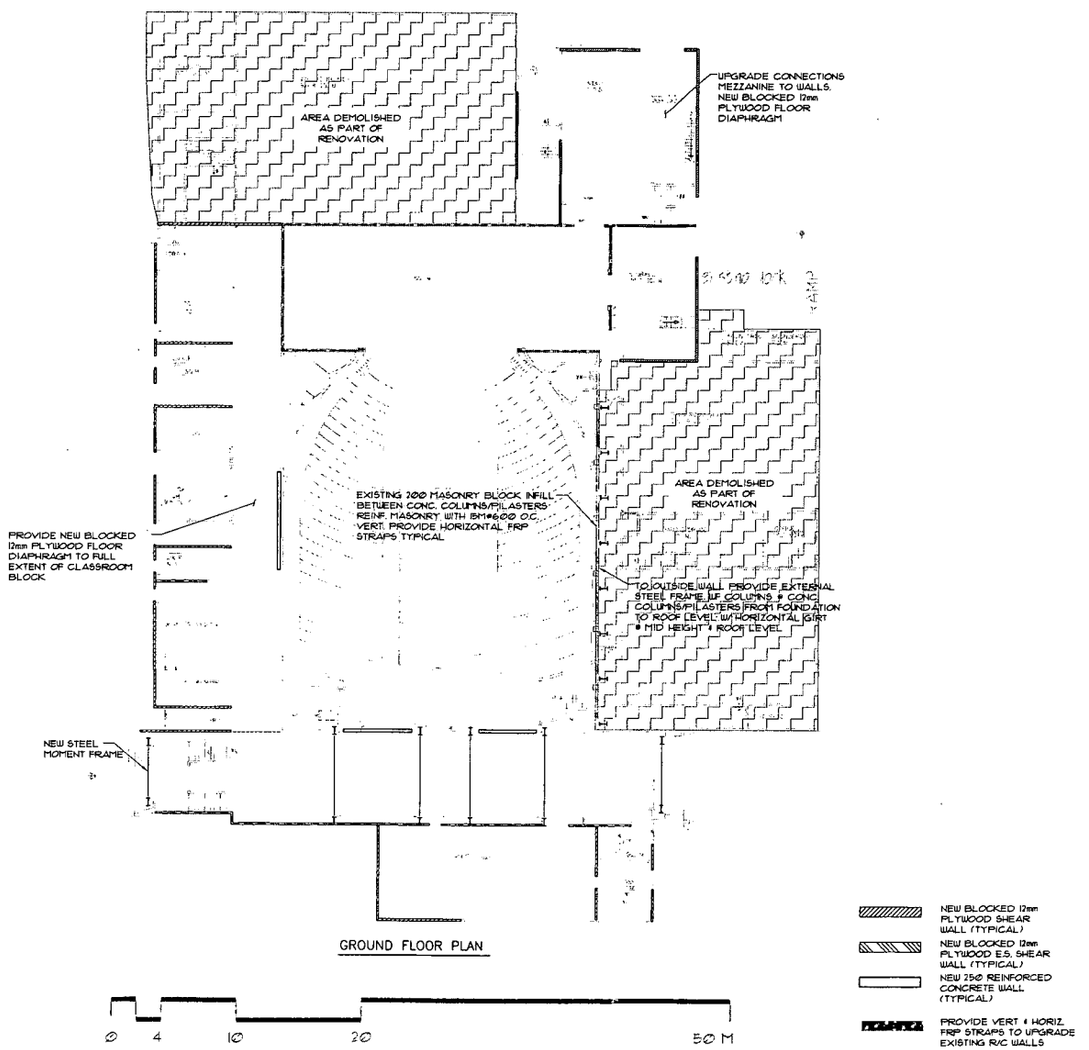


Photo 10: Fly Tower Roof Space
Description: Fly tower roof deck supported by wood joists, steel beams and reinforced concrete walls
Issue: Non compliant roof diaphragm and existing concrete walls to be upgraded.



BASEMENT/CRAWL SPACE PLAN



GROUND FLOOR PLAN

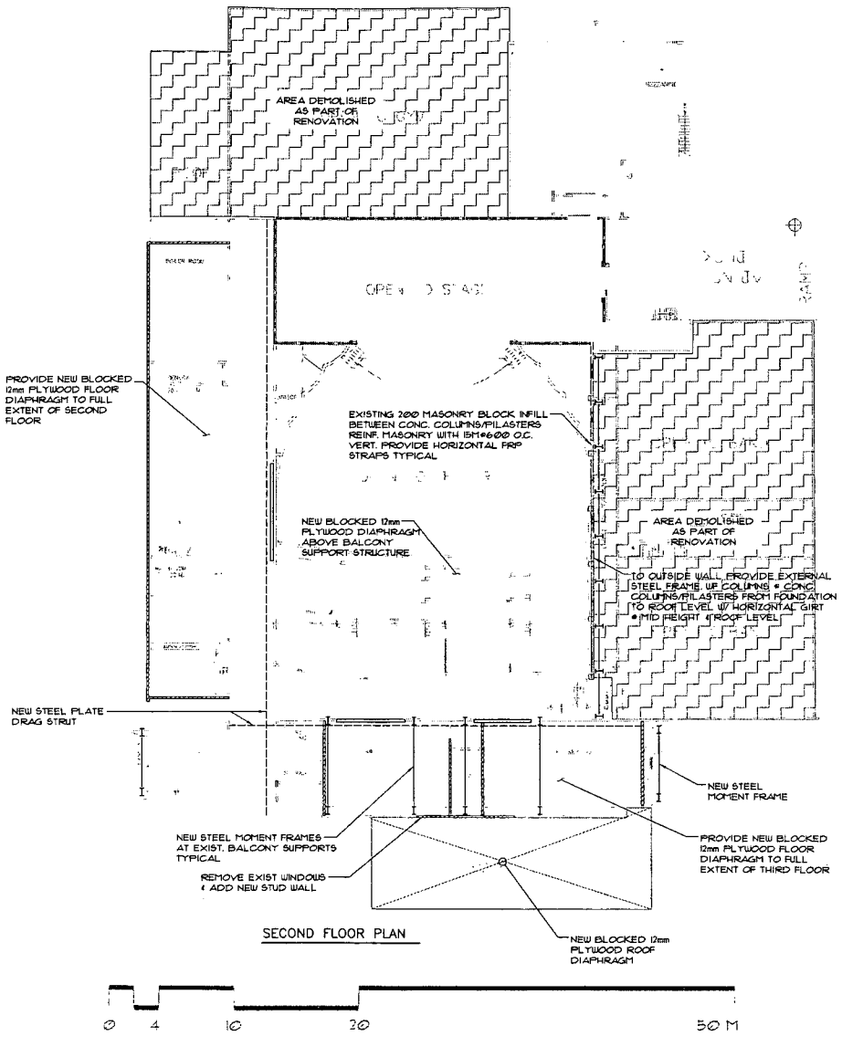
BUSH, BOHLMAN & PARTNERS
consulting structural engineers
SUITE 1550 – 1500 WEST GEORGIA STREET, VANCOUVER, BC V6G 2Z6
Tel:(604)688-9861 Fax:(604)688-7039 E-mail:info@bushbohlman.com

DATE	SCALE	DRN.	CH'D.	PROJECT No.
09/06/10	AS SHOWN	BS	JOS	BBP 5133

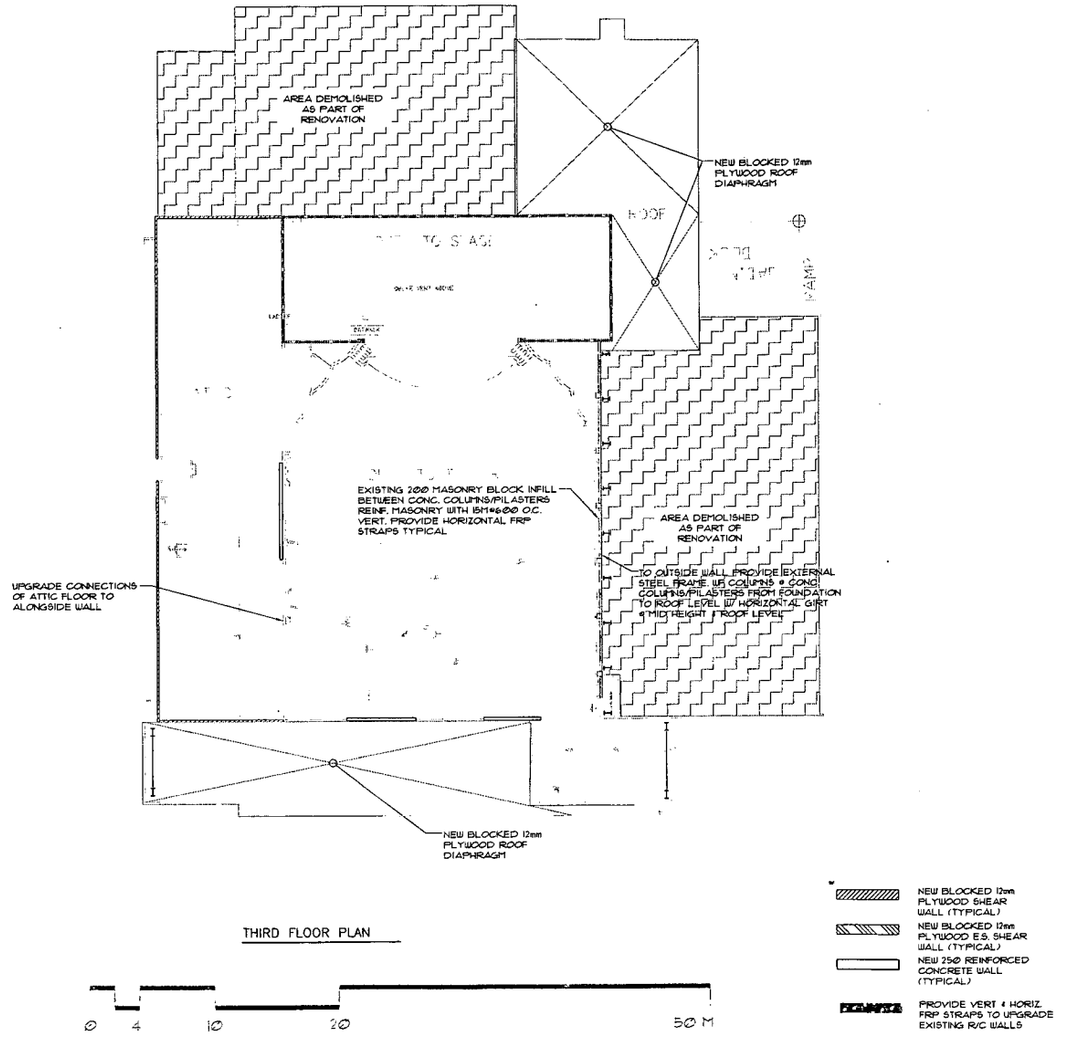
BASEMENT & GROUND FLOOR PLANS

SHEET No. S1

MASSEY THEATRE RENO & SIESMIC UPGRADE



SECOND FLOOR PLAN



THIRD FLOOR PLAN

NEW BLOCKED 12mm PLYWOOD SHEAR WALL (TYPICAL)

NEW BLOCKED 12mm PLYWOOD E.S. SHEAR WALL (TYPICAL)

NEW 250 REINFORCED CONCRETE WALL (TYPICAL)

PROVIDE VERT & HORIZ. FRP STRAPS TO UPGRADE EXISTING R/C WALLS

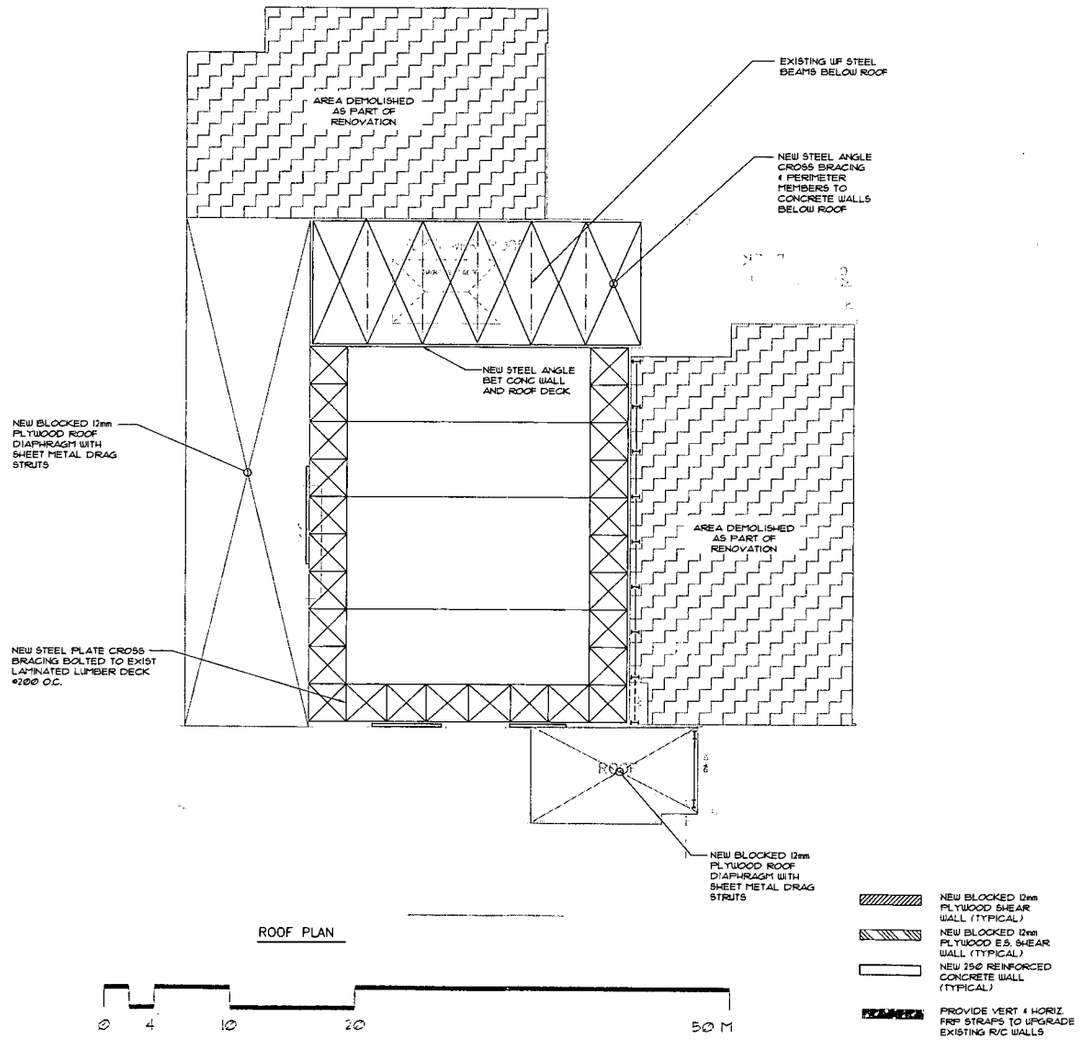
BUSH, BOHLMAN & PARTNERS
consulting structural engineers
SUITE 1550 - 1500 WEST GEORGIA STREET, VANCOUVER, BC V6G 2Z6
Tel:(604)688-9861 Fax:(604)688-7039 E-mail:info@bushbohlman.com

DATE	SCALE	DRN.	CH'D.	PROJECT No.
09/06/10	AS SHOWN	BS	JOS	BBP 5133

2nd & 3rd FLOOR PLANS

SHEET No. S2

MASSEY THEATRE RENO & SIESMIC UPGRADE



BUSH, BOHLMAN & PARTNERS
consulting structural engineers
SUITE 1550 – 1500 WEST GEORGIA STREET, VANCOUVER, BC V6G 2Z6
Tel:(604)688-9861 Fax:(604)688-7039 E-mail:info@bushbohlman.com

DATE	SCALE	DRN.	CH'D.	PROJECT No.
09/06/10	AS SHOWN	BS	JOS	BBP 5133

ROOF PLAN

SHEET No. S3

MASSEY THEATRE RENO & SIESMIC UPGRADE

- The Small Gymnasium is served by an AHU located in a roof access fan room, which is undersized in terms of airflow capacity and in very poor condition. It has recently been put back into service due to indoor air quality concerns but has been out of service for a number of years prior due to its poor condition.

- The lower floor Offices and Drama room Staff Room are served by an AHU located in the fan room adjacent to the Drama space. This unit is approximately 25 years old and in reasonable working condition. It has a heating coil but no cooling capacity.

- The Cafeteria is served by a packaged rooftop unit that is in poor condition

- The Massey Office is served by a packaged rooftop unit installed approximately five years ago, that is in good condition.

- A smoke removal system is situated in a penthouse above the Theatre Stage

- The boiler plant consists of a bank of older, cast iron, modular, atmospheric Hydrotherm boilers and a fairly new DeDietrich cast iron boiler. The atmospheric boilers are not particularly efficient, contributing to a poor carbon footprint for the facility. The DeDietrich boiler has a rated thermal efficiency of 85%, which is fairly reasonable.

EXISTING PLUMBING AND DRAINAGE

- Plumbing fixtures are generally newer and in good condition

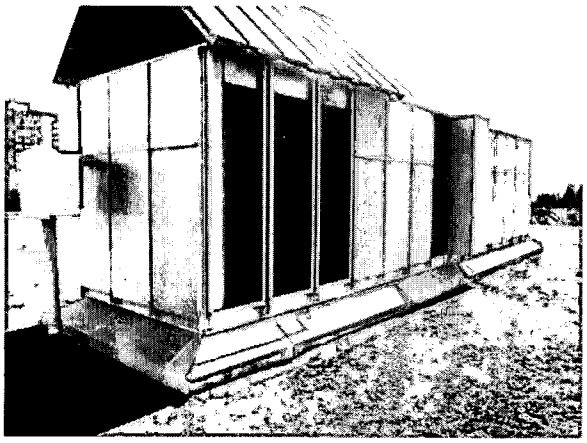
- Water closets are floor mounted, which are the best option for minimizing vandalism, and have flush valves

- Copper domestic water piping installed at the time of original construction is likely to exhibit some failure in the near future. Pinhole leakage in copper of this age is typical, occurring where impurities in the original manufacture result in deterioration of the pipe wall due to electrolytic action.

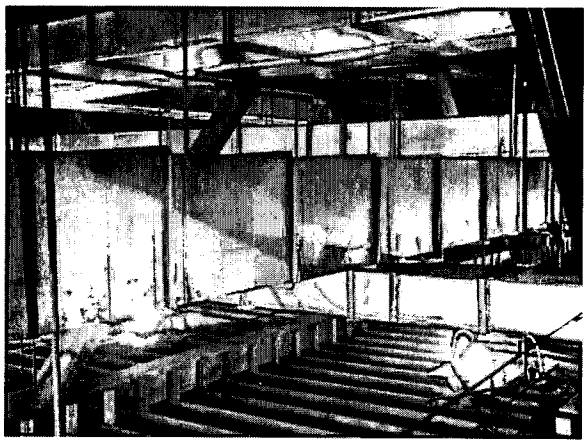
- No issues of concern relative to the storm or sanitary drainage were identified.

EXISTING FIRE PROTECTION

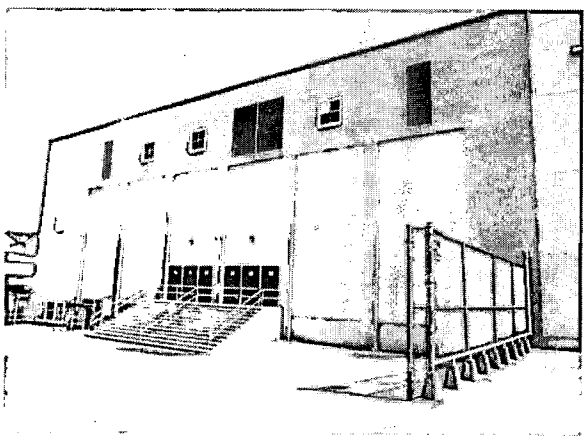
- The building is fully sprinklered



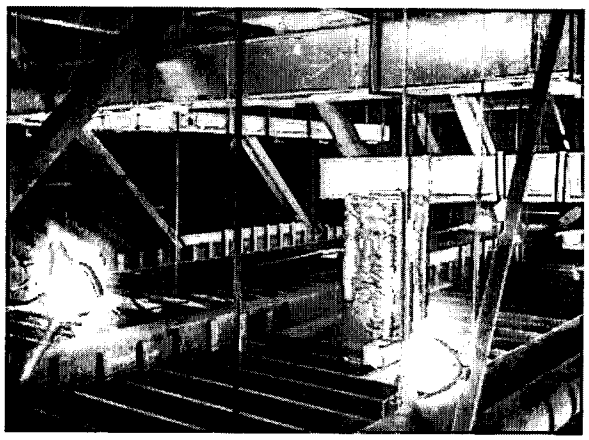
Theatre HVAC Unit, which should be replaced



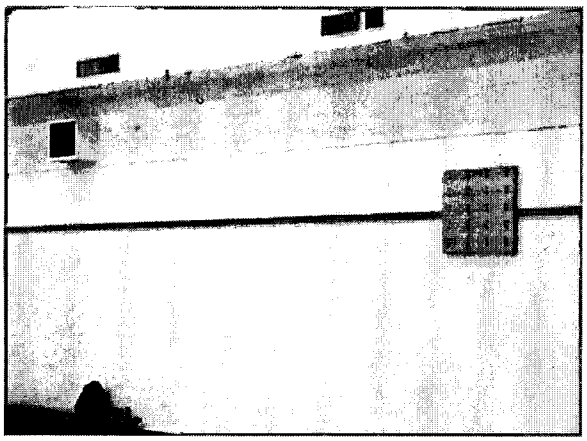
Supply air ductwork in the Theatre attic, which can be kept in service as part of a facility upgrade



Intake and relief air louvers serving the Hyack (large) Gymnasium. The large AHU serving the Gym is inside the attic

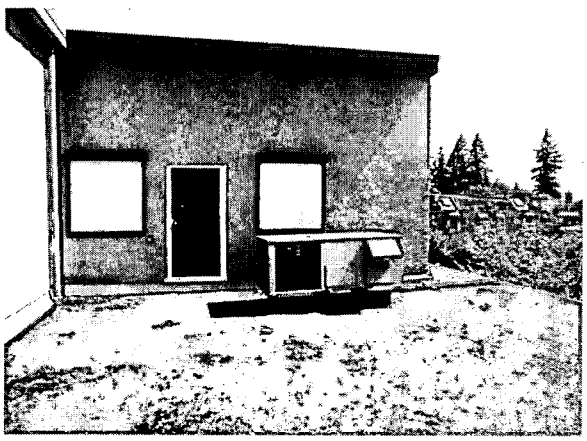


Supply air ductwork in the Hyack Gym attic.

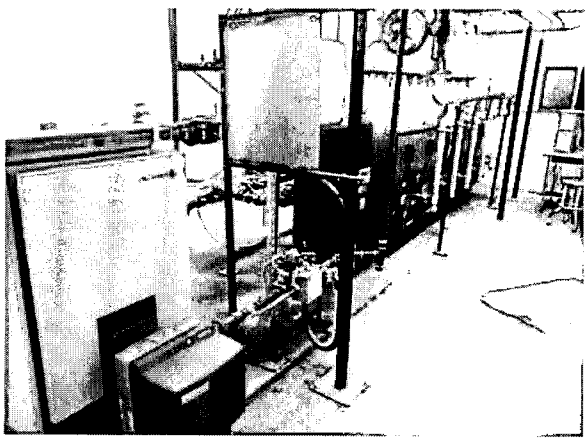


Supply ventilation grilles in the Small Gymnasium

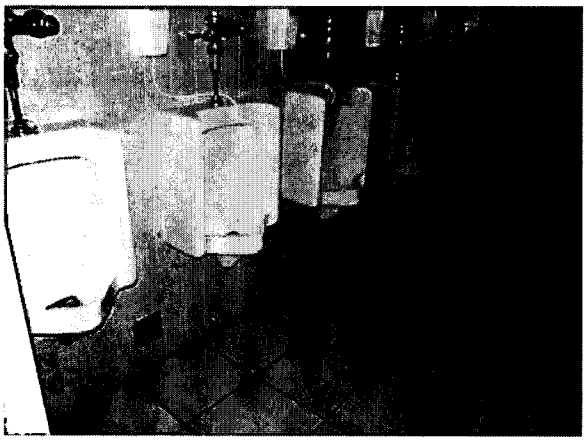
Cafeteria packaged rooftop unit



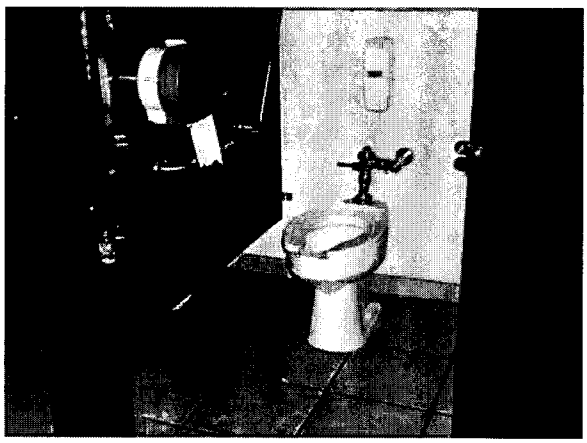
Massey Offices packaged rooftop unit, installed approximately 2004, and in good condition



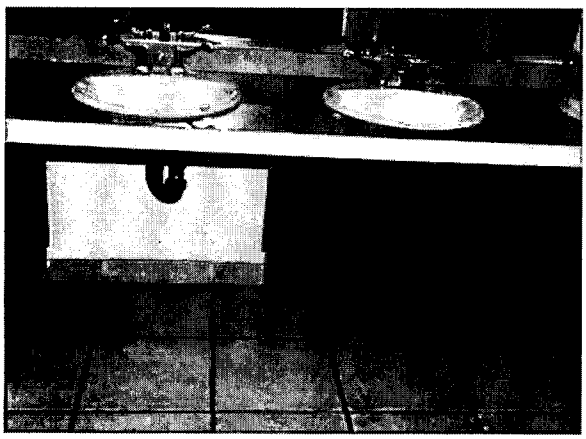
Heating boiler plant. In the foreground is the newer De Dietrich cast iron boiler with power burner and in the background the older Hydrotherm atmospheric boilers



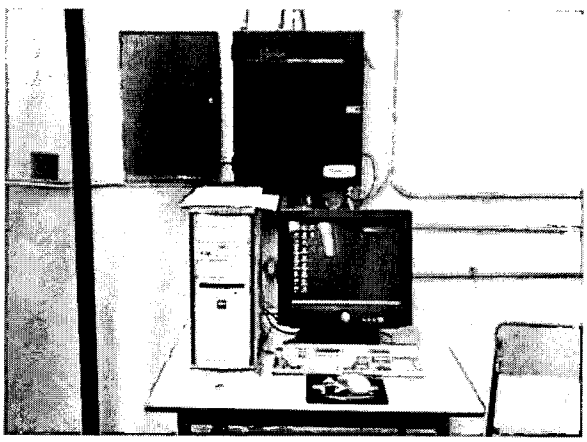
Wall mounted flush valve urinals are relatively new and in good condition



Floor mounted flush valve toilets are relatively new and in good condition



Vanity mounted sinks are relatively new and in good condition. The sink on the left is handicapped accessible.



Digital controls workstation in the boiler room. Barber Colman system in place for the boiler plant, but not the balance of HVAC equipment in the building

RECOMMENDED HVAC SYSTEM UPGRADES

The scope of this report is limited to required upgrades for the Theatre component of the building, along with the Instruction spaces, washrooms and boiler room on the west side of the building. The Gymnasiums, Music rooms and Cafeteria are not intended to be retained or upgraded. For the areas to potentially be kept in operation the following improvements are recommended

- The Theatre rooftop AHU should be replaced. At 35 years old it is past its period of expected useful service life. The replacement unit will provide 25,000 cubic feet per minute (CFM) of airflow and have a rated cooling capacity of 60 tons. Existing ductwork, located in the attic, can be kept in use but should be cleaned. Since the existing AHU is a multi-zone, which provides separate supply ducts to four zones, an alternative is to provide four separate new AHU's, although this would increase maintenance requirements.

- The Theatre smoke removal system fans should be replaced, and interfaced with the fire alarm system. Smoke removal capacity should be 25,000 CFM.

- The inefficient Hydotherm atmospheric boilers should be replaced. The recommended approach to upgrading the plant would utilize condensing boiler technology that will contribute to around 90-percent efficiency over the course of each annual heating cycle, improving operating efficiency and reducing greenhouse gas emissions. The plant will consist of a combination of condensing and traditional high temperature appliances, with an operating strategy utilizing the condensing boilers when possible, and firing the high temperature boiler only when absolutely necessary, during colder weather. Approximately 600,000 BTU per hour capacity condensing boilers will be required. The existing De Dietrich cast iron boiler can be kept in use as the high temperature boiler.

- From a sustainability perspective consideration could be given to a solar wall on the south exposure of the Theatre, with air ducted to the Theatre AHU.

- New digital controls should be provided for the upgraded boiler and ventilation systems described above, to maximize operating efficiencies by introducing the opportunity to implement strategies such as:

    - Demand control of outdoor air for ventilation
    - Heating water setback temperatures
    - Occupied / unoccupied operation of air handling equipment
    - Scheduling of heating water temperature
    - Building night / weekend / holiday setback temperatures

ROCKY POINT
ENGINEERING LTD.

RECOMMENDED PLUMBING SYSTEM UPGRADES

As indicated above it is fairly common for copper domestic water piping of the vintage of this facility to exhibit failure. It is therefore recommended that allowance be made to replace the domestic water pipe serving the washrooms that are to remain in use.

Plumbing fixtures in the washrooms are generally in good condition, and can be remain in use, either in the current locations, or re-installed in alternate locations if the washrooms are relocated.

If you have any questions regarding the above information, or require further clarification to the strategies described please give me a call to discuss

Yours very truly,

ROCKY POINT ENGINEERING LTD.

Stephen McNicholls, P.Eng., LEED® AP

SMcN:dt

\PROJ08 \ 09102-N078 \ REPORTS \MASSEY THEATRE_MECH CONDITION REPORT_15June2009

Appendix C - Electrical Systems - Upgrade Report

ELECTRICAL DUE DILIGENCE

REPORT

FOR

MASSEY THEATRE

AT

NEW WESTMINSTER SECONDARY SCHOOL
School District #40 (New Westminster)

Prepared By

Cobalt Engineering LLP
Suite 303 – 4180 Lougheed Highway
Burnaby, B.C. V5C 6A7

Atelier Pacific Architecture Inc.
Mr. Patrick May
#109 – 131 Water Street
Vancouver, B.C. V6B 4M3

PROJECT NO: 09-B037-E15 "F"

DATE: July 2009

Executive Summary

We were requested by Atelier Pacific Architecture Inc. to review the existing Massey Theatre Building and provided an assessment and recommendations for upgrading the building after the new Secondary School is completed and the existing gymnasium portion of the building removed. The following report outlines the processes used to evaluate the existing systems existing in the Massey Theatre. The systems reviewed and assessed include the power distribution system, the current lighting system, convenience receptacle locations, exit and emergency lighting, fire alarm system, security system, public address system, voice and data systems, and other related systems. The existing theatrical lighting and sound systems will not be included in the study. The energy consumption, capital and operating costs, maintenance requirements and feasibility considerations will be considered in making the recommendations.

A site walk through was carried out with the Architect, other Team Members and a School District representative on May 26, 2009.

TABLE OF CONTENTS

1.0 GLOSSARY OF TERMS

MDC The main power distribution centre consisting of the main breaker controlling the entire electrical system within the building, usually CT's and PT's for metering the amount of power consumed, and breakers protecting the panelboards and other major electrical loads within the facility..

Unit Substation: The main load break switches and transformers converting the incoming primary voltage from BC Hydro to a usable voltage for distribution throughout the facility.

Life Safety Systems: The various systems installed within the building designed to protect and guide the occupants to safety during an emergency situation such a as a fire or seismic event. These systems include the fire alarm system, the exit and emergency lighting system, the sprinkler system and the paging system.

2.0 INTRODUCTION

The intent of this report is to evaluate the existing electrical system installation and present design options and recommendations that best meets the overall performance and capital cost requirements of the project. This report describes the methodology used to evaluate the options, outlines system specifications and suitable equipment and provides a list of equipment that will assist in cost evaluation.

This report focuses mainly on major components of the building electrical systems that require a significant level of upgrade to meet the current codes including recommended energy consumption levels and other LEED recommended initiatives. These systems are required for proper building operation and they should be included in the final electrical system design.

This report will provide information to assist the cost consultant in providing a concept stage cost estimate of the proposed mechanical system.

3.0 PROJECT DESCRIPTION

The existing facility is a standalone structure containing a 1260 seat life arts Theatre with stage, off stage working areas, dressing rooms and other related spaces, one large Gymnasium, one small Gymnasium, the Music and Choral Rooms, small classrooms and various storage spaces. The facility used to be attached to the main school but was made standalone a few years ago in preparation for the construction of the proposed high school. Many of the systems are connected to the systems in the main high school building.

There is a unit substation located in the basement of the Main Gymnasium building. This unit substation provides power for this facility as well as the main school building. If and when the Gymnasium building is demolished, a new service will be required for this standalone facility, either from BC Hydro or from the new high school.

4.0 OBJECTIVES

The main objective is to provide a self sufficient energy efficient standalone facility for Massey Theatre Society and the New Westminster School District, meeting the following set of electrical system design and performance criteria:

1. Upgraded power and distribution system
2. Energy efficient lighting.
3. Review and upgrade the lighting control system.
4. Energy efficient emergency and exit lighting
5. Review and upgrade the convenience receptacle locations throughout the facility to ensure they meet the changing needs of the users.
6. Code complying fire alarm system.
7. Energy efficient operation and low operating cost.
8. Self sufficient sound and paging system throughout the building.
9. Upgrade and revamp the security system.

5.0 METHODOLOGY

A site visit was conducted on May 26, 2009. The consultants and architect carried out a tour of the facility with representatives of School District #41 to review the condition of and systems installed in the facility, expectations of the owners, and to develop the design concept.

A quantity surveyor will be retained to provide capital cost estimates based on the finding of the various reports prepared by the Design team.

6.0 APPLICABLE CODES

The electrical systems will be reviewed by following principles of good engineering practice and meeting or exceeding requirements of all applicable codes, including but not limited to the following list of codes, ordinances and guidelines:

BC Building Code
Canadian Electrical Code
ASHRAE 90.1, Energy Efficient Design of New Buildings
NFPA 13 – National Fire Protection Association
CSA/ULC S524 Installation of Fire Alarm Systems
CSA/ULC S527 Commissioning of Fire Alarm Systems

7.0 BUILDING DESCRIPTION

The existing building is mainly a wood frame building with a major wood column / joist system supporting the roof. There is basement / crawlspace area below the entire building. There is some concrete block construction in the area of the Music / Choral Room addition.

The Theatre portion of the building has a fly tower above the stage. There is a balcony with seating in the audience area of the Theatre. The existing control booth on the balcony level has been abandoned and replaced with a control booth on the main floor level.

The dressing rooms are located in the basement area of the facility below the stage.

8.0 SYSTEM DESCRIPTIONS

1. Power Distribution System

1. The existing unit substation located in the basement of the main gymnasium portion of the building is subfed from the main electrical vault located in the basement of the Library in the main School building. The distribution voltage in the Theatre portion of the building is 120/208 volts 3 phase 4 wire.
2. There is a distribution centre and some panels in the Massey Theatre electrical room. As well there are branch circuit panels located throughout the facility.
3. There is a relatively new distribution centre, panelboard and theatrical lighting dimmers in the dimmer room located below the stage.
4. There are some relatively new panelboards and control equipment located in the attic space above the main gymnasium. These panels feed some loads within the Massey Theatre facility. There is a time clock and contactor marked Massey Theatre located here as well.

2. Lighting Systems

1. The majority lighting fixture within the non Theatre areas of the facility are fluorescent fixtures. Because of the age of the building, the majority of the fixtures are lamped with 34 or 40 watt T12 lamps. The older fixtures are probably equipped with magnetic ballasts. Some of these ballasts may contain PCB's. The majority of the lighting is locally switched.
2. The theatre house lighting is incandescent and is controlled by the house lighting dimming system.
3. The corridors in the Lobby / Corridors of the Theatre have been upgraded recently. There are ceiling mounted recessed potlights and wall mounted fluorescent fixtures with T8 lamps. The lamps are concealed with perforated metal shrouds.
4. The corridors of the school areas are illuminated with recessed 24' x 48" fluorescent luminaires. These fixtures are older and probably lamped with 34 watt T12 lamps. The corridor in the Choral / Band room area is illuminated with a row of single lamps four foot surface mounted fixtures c/w acrylic lenses. Some of the lenses are not fitting properly and some are damaged.
5. The Choral / Music room addition is illuminated with recessed fluorescent fixtures. There are 24" x 48" luminaires along the east and west walls with 48" x 48" luminaires in the centre. The office area is illuminated with 24" x 48" surface mounted fluorescent fixtures.
6. There are surface mounted 48" long 2 lamp fluorescent luminaires installed in the basement area including the corridors, Change Rooms, and storage areas in the basement. As well, there are wall mounted incandescent porcelain lampholders with bare bulbs wired in wiremold raceways located above and beside the mirrors in the Change Rooms.
7. There is minimal incandescent lighting (porcelain lampholders) in the crawlspace areas of the facility.
8. The north exit route from the audience chamber to the northeast exit doors is illuminated with fluorescent fixtures.
9. There are some exterior lighting fixtures mounted on the perimeter of the building. The lamp source is not confirmed at this time. There is minimal lighting in the parking lots located on the west and north sides of the Building.

3. Exit Signs and Emergency Lighting

1. The existing exit signs are of various vintages varying from very old units with black glass faces and incandescent lamps to modern units with LED lamps sources. Some units have integral batteries and twin 12 volt emergency lighting heads. It is unlikely the older units are connected to an emergency battery source.
2. There is some emergency light heads located throughout the public spaces. Some units are relatively new and some units are very old. Some of the battery packs are old and may be nearing their expected life span. The coverage is not adequate and will need to be supplemented with additional battery packs and remote heads.

4. Fire Alarm System

1. There is an existing Simplex 4009 IDNET NE6 Extender Panel located in a storage room on the Lower floor (basement area) on the north side of the auditorium off the exit route. This is connected to the main Simplex addressable fire alarm control panel located in the main school building. The Zones listed are as follows:

Massey Gyms Basement Alarm	Massey Gyms Basement Trouble
Massey Gyms Drama / Café Alarm	Massey Gyms Drama / Café Trouble
Massey Gyms Auditorium Alarm	Massey Gyms Auditorium Trouble
Massey Gyms Spkr Zone 10 Alarm	Massey Gyms Spkr Zone 10 Trouble
Massey Gyms Spkr Zone 11 Alarm	Massey Gyms Spkr Zone 11 Trouble
SW Sec Main Bldg. Alarm	

2. There is an LED type annunciator located adjacent to the south entrance door in the Lobby on the main floor of the building.
3. There are pull stations located at various exit doors within the facility.
4. There are F/A gongs located in the corridors and auditorium area. There are gongs located in the back stage area and in the basement area of the facility.
5. There are no strobe lights located in the Music Room, Choral Room or the Practice rooms located off the Music Room.
6. There are no smoke detectors installed within the corridors. There are some fire detectors located in the Band Room/Music Room corridor.
7. There are door hold open devices installed on the doors leading to the main floor audience chamber and the balcony audience chamber.
8. There is a sprinkler system installed throughout the facility.

5. Communications

1. In the crawlspace area of the north side of the building there is a telephone termination panel with BIX blocks for terminating the telephone cable. The main incoming telephone service cable comes from the main school building.
2. There are voice data and outlets installed throughout the school portion of the building. These outlets are tied into the main School telephone and data systems.
3. There are speakers and digital clocks located in the Classrooms and corridors of the facility. These are tied into the main P/A system and master clock system in the main school building.
4. The theatre portion of the building has its on Theatrical Sound system for use during productions and rehearsals.
5. The Theatre Society has its own phone and data systems independent of the School.

6. Security System

1. There is a security system installed within then facility. It is assumed it is tied into the school system but acts as a separate entity so the Theatre can operate while the school is being monitored.
2. It consists of a key pad at the main entrance to the facility. There are PIR detectors installed throughout the facility. Some exit doors have magnetic door contacts installed on them.

9.0 CONCLUSIONS

1. Power Distribution System
   1. The majority of the power distribution system is old and spare parts are not available or very hard to source.
   2. The main components are located in an area of the building that is slated for demolition. A new main electrical service will be required within the remaining portion of the building after the Gymnasium component has been demolished. This will have to come from the new proposed high school as a sub service, or an application to BC Hydro will be required for a new separate service to the building. This will only be possible if the Theatre becomes a separate entity from the School and the property for the Theatre is subdivided off the school property.
   3. A new main electrical room will have to be built, either on the main floor level in the northeast corner, or in the crawlspace area of the building. A new main distribution board will have to be installed within the room. Depending on the service voltage a transformer may be required to transform the incoming voltage to 120/208 volts 3 phase 4 wire to suit the equipment presently installed with the building. The size of the new distribution board will be 2000 amps.
   4. All existing panels and the dimmer systems sub-distribution board will have to be fed from this new service.
   5. The existing panels and control equipment located in the attic space above the gymnasium will have to be relocated to a suitable location within the building that is slated to remain.
   6. All existing mechanical equipment that is being retained and any new mechanical equipment loads will have to be connected to this new service, either by existing distribution components or new components installed to replace any equipment that was demolished.

2. Lighting Systems

   1. The majority of the lighting systems are of an older less energy friendly vintage than the systems available today.
   2. The lighting in the audience chamber is functional and works well for the use it is intended within of the building. There would be no need to change it unless the Theatre Society decided that a make over was needed for the entire audience chamber.
   3. The lamp source and the condition of the exterior light fixtures should be determined. The coverage of the site and the quality of the light (ie Dark Sky compliant) should be reviewed and assessed for adequacy to provide safety for the staff and patrons of the Theatre entering and exiting the facility during the evening and early morning hours.

3. Exit and Emergency Lighting

1. The number of exit signs are not adequate for the safe exiting from the facility.
2. Many of the exit signs are old and not connected to an emergency power source.
3. All incandescent and fluorescent Exit signs should be replaced with new technology LED type exit signs.
4. All exit signs should be connected to emergency power source such as 12 volt DC battery packs.
5. The emergency lighting system is not adequate to provide the safe exiting from the building. The BCBC requires a minimum of 10 lux (1 FC) in the exit pathway.
6. Some of the battery units and the remote heads are old and reaching their expected life span.

4. Fire Alarm System

1. The fire alarm system will become non functional when the existing school is demolished and the existing head end control panel is removed.
2. The installation of the devices, particularly the smoke detectors does not meet current code requirements.
3. The zone descriptions are confusing and do not seem to comply with requirements of the current BCBC.
4. Strobe lights are required in the Music and Choral rooms, the practice rooms, and in the areas behind the stage where construction of sets may occur.

5. Communications

1. When the existing secondary school is demolished the link to Telus incoming service lines will be lost. Incoming connections to Shaw Cable TV network will also be severed.
2. There is no connection point for the voice / data systems within the portion of the school other than the terminal board in the crawlspace.
3. The head end equipment controlling the school P/A system is located in the existing school.
4. It is assumed that the Massey Theatre Society had its own computer data network and separate phone lines. The head end equipment for these systems are located within the Society's offices.

6. Security Systems

1. The security components for this facility are connected to the main school head end equipment. They are zoned to act as a separate system c/w a separate keypad at the main entrance to the Theatre. This allows the theatre to be occupied while the rest of the school can be left alarmed and protected.

10.0 RECOMMENDATIONS

1. Power Distribution System

1. A new electrical room will need to be constructed within the remaining area of the facility.

2. This electrical room will house new electrical service either directly from BC Hydro or a sub service from the new high school electrical service. The service could be either a 347/600 Volt service or a 120/208 volt service. If the service is 347/600 volts, then transformers will need to be added to provide power for the existing components within the facility.
3. Metering will be required for the new incoming electrical service. It will be either utility metering or owner's consumption metering allowing the owners the ability to monitor the power consumed by the facility and bill the tenant if required. If the meter is used for billing purposes, the metering shall meet the standards set down by Measurements Canada.
3. A new Sub Distribution centre will be required to provide breakers for the any new panelboards and for all the existing panel boards that are remaining in use, including the existing dimmer sub-distribution board.
4. New panelboards will be required to replace those located in areas the areas of the building being demolished, yet feeding loads within the remaining building.
5. New motor control devices will be installed in an MCC for the any existing mechanical equipment that is remaining and presently fed from the electrical room in the located in the area being demolished. Any new mechanical loads will require to be connected to the new MCC as well.
6. If an elevator is added to the building to provide accessibility to the second floor area, it will have to be connected to the new distribution system.

2.. Lighting System

1. The wall mounted luminaires located in the main entry Lobby area of the Theatre are relatively new and could be retained. The lamp source of the potlights located in the centre of the vaulted ceiling should be reviewed and upgraded to an energy friendly source such as LED's.
2. The light fixtures in other common areas of the building such as corridors, stairwells and other circulation spaces should be upgraded to fluorescent T8 lamps and electronic programmed start ballasts.
3. Luminaires in the Washroom areas should be upgraded to suit any revisions planned for these spaces. Luminaries with new technology T8 lamps and programmed start electronic ballasts should be installed. The light fixtures should be controlled by occupancy sensors to turn the light fixtures off when the space is unoccupied.
4. Similarly the light fixtures in the dressing rooms areas located in the basement below the stage area should be replaced with luminaires equipped with T8 lamp sources and the programmed start electronic ballasts. Wire guards should be added to the incandescent fixtures mounted on the walls near the mirrors. Consideration should be given to controlling the overhead lights in the Dressing Rooms by occupancy sensors.
5. The lighting in the remaining ancillary areas of the facility such the Theatre office, classrooms, Box Office, Plasket Gallery, board room area should be upgraded with energy efficient lighting. Choice of the light fixtures will depend on the planned usage of the spaces.
6. The luminaires located in the Crawlspaces presently lamped with incandescent bulbs should be relamped with energy efficient self ballasted CFL's.
9. The exterior light fixtures should be reviewed. Any luminaires that are not dark sky compliant should be replaced with new fixtures that comply with the requirement.
10. Consideration should be given to changing the lamp source to metal halide for al exterior light fixtures.

11. The exterior lighting in the parking areas should be reviewed to ensure the levels provide optimum security for the staff and patrons of the building.
12. Consideration should be given to adding additional lighting between the Massey Theatre facility and the Moody Park Arena.

3. Exit Signs and Emergency Lighting

1. All the existing exit signs should be replaced with new LED type exit signs that comply with CSA 860.
2. The exit signs should be connected to the emergency Power battery units to ensure they will illuminate during a power outage.
3. New 12 VDC battery packs and 12 watt remote twin heads units should be installed in the facility to ensure exit paths are illuminated within the audience chamber, the corridors and the exit stairwells.
4. Emergency lighting should also be added to the washrooms, dressing rooms, and back of stage area.

4. Fire Alarm Systems

1. As the facility will become a standalone structure, a new addressable fire alarm control panel should be installed within the new electrical room. This system can be either a single or two stage system. If the facility becomes a Live Arts theatre type facility exclusively, consideration should be given to installing a two stage system. This allows the staff to investigate the source of the fire alarm prior to general evacuation signal. This will help the staff to organize an orderly evacuation of the building if needed or cancelling the alarm if it is not a valid alarm condition.
2. Addressable manual pull stations should be installed at all exterior exit doors, and all doors leading to exit stairwells on the various floor levels.
3. It is assumed that the existing sprinkler system will; remain. The flow and tamper switches for this system should be monitored by the new fire alarm system. Any new flow or tamper switches should be added to the system as well.
4. Smoke detectors should be added to the corridors within the facility.
5. Smoke detectors should also be added to the top of all exit stairs and any shafts including the new elevator shaft (if added).
6. New fire alarm gongs should be added throughout the facility to ensure that the alarm signal is audible in all areas of the building.
7. Strobe lights should be added to all areas of high ambient noise. This would include the audience chamber, the dressing rooms and washrooms, the Music / Choral rooms including the practice rooms, and the workshop area where the sets are constructed.

5. Communications

1. A new Communications room should be installed in the remaining area of the building. A new underground telephone service should be installed from either the existing pole line on 8th Avenue or some other location as directed by Telus. Additional underground ducts should be installed for fibre optic cable and Shaw Cable service. Alternatively, if the facility is to be part of the new high school, then a duct system should be installed to the main communications room within the new Secondary School to the new communications room in the Massey Theatre Building. This would allow the sound system, and voice / data systems be extended from the school to the Massey Theatre building.

2. If the facility becomes a standalone Live Arts facility, then the existing theatrical sound system should be extended throughout the facility with zoned speakers added in the washrooms, corridors and other areas of the facility. Volume control switches should be added in areas where it may be desirable to monitor the production occurring on the stage but have control over the volume levels.

3. Voice / data outlets should be installed throughout the facility to suit the proposed usage of the various spaces within the facility.

6. Security Systems

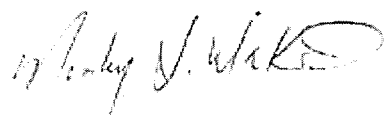
1. A new security system should be installed within the Massey Theatre facility. This will allow it to function as a separate entity, even if it is still part of the school complex.
2. Passive infrared devices (PIR's) should be installed in all areas of the main floor level. Glass break detectors should be installed in areas where windows are accessible from grade level.
3. Any existing magnetic door contacts should be connected to the new system.
4. Any areas that are vulnerable to access from roof areas should be monitored as well.

11.0 CLOSURE

We trust that the foregoing provides the information required at this time. Should you have any questions or require additional information, please do not hesitate to contact the undersigned.

Report Prepared By:

COBALT ENGINEERING LLP



Morley Waksel
Project Manager

MJW/mw
P:\09-B037-E15
Massey_Theatre_New_Westminster_BC_Electrical_Systems_Report\Engineering_B_FileBinder\B_Reports_Studies\Electrical Report CONCEPT.doc

Appendix D - Asbestos Report

June 18, 2009

ATELIER PACIFIC ARCHITECTURE INC.
#109 - 131 Water Street
Vancouver, BC V6B 4M3

Attention: Mr. Patrick R. May, MAIBC, Principal

Ref: PRE-RENOVATION/PRE-DEMOLITION HAZARDOUS BUILDING MATERIALS SURVEY OF THE MASSEY THEATRE BUILDING LOCATED AT 735 - 8TH AVENUE, NEW WESTMINSTER, BC

1.0 INTRODUCTION

Astech Consultants were retained by Atelier Pacific Architecture Inc. to conduct a Pre-Renovation/Pre-Demolition Hazardous Building Materials Survey and compile a detailed report on the presence and location of asbestos containing building materials, PCB containing ballasts, lead, mercury, and stored chemicals at the Massey Theatre Building located at 735 - 8th Avenue, New Westminster, BC. This survey report includes only the areas included on the floor plans provided by your office and our original proposal. The Large Gymnasium including areas above and below the Gymnasium are not included in this report.

Astech Consultants Ltd. survey and report format is designed specifically to satisfy the current applicable regulation from the Workers' Compensation Board of British Columbia Occupational Health and Safety Regulation 20.112 regarding hazardous building material assessments, which is listed below.

PART 20: CONSTRUCTION, EXCAVATION AND DEMOLITION

Hazardous materials 20.112 Before work begins on the demolition or salvage of machinery, equipment, buildings or structures, the employer or owner must

(a) inspect the site to identify any asbestos, lead or other heavy metal or toxic, flammable or explosive materials that may be handled, disturbed or removed.

(b) have the inspection results available at the worksite, including any drawings, plans or specifications, as appropriate, to show the locations of any hazardous substances,

(c) ensure that any hazardous materials found are safely contained or removed, and

(d) if hazardous materials are discovered during demolition work that were not identified in the inspection required by paragraph (a), ensure that all work ceases until such materials are contained or removed.

This survey was conducted on May 29, June 11, 15, & 16, 2009 by Tom Farrell, Rob Kingsley, and Stephen Price of Astech Consultants, and is amalgamated with information obtained from the provided Survey and Risk Assessment of Asbestos Containing Materials report by ACM Environmental Corporation dated June 8, 2007. Areas such as inaccessible floor cavities, wall cavities, and ceiling cavities which would require dismantling or damaging portions of the building in order to gain access were not investigated. No attempt was made to investigate underground services or the surrounding property.

#103-16140-84th Avenue
Surrey, BC, Canada V4N 0V9
Tel: (604) 572-7946 Fax: (604) 572-7936

2.0 METHODOLOGY

2.1 ASBESTOS CONTAINING MATERIALS

A visual inspection was undertaken in order to determine the type and location of asbestos containing building materials located at the subject building. During this inspection, fifty-eight (58) bulk samples of potential asbestos containing materials were collected from specific locations of the building. The samples collected were submitted for laboratory analysis in accordance with the Workers' Compensation Board of British Columbia Occupational Health and Safety Regulation, utilizing polarized light microscopy, and dispersion staining techniques. Results of laboratory analysis of samples collected during this survey are attached.

2.2 PCB CONTAINING MATERIALS, LEAD, MERCURY, AND STORED CHEMICALS

A visual inspection was undertaken in order to determine the presence of:

- fluorescent light fixtures & HID light fixtures suspected of containing PCB ballasts or capacitors,
- paints, coatings, and construction materials suspected of containing lead and other heavy metals,
- thermostats and associated equipment suspected of containing mercury, and
- stored chemicals suspected of being toxic, flammable, or explosive.

3.0 INSPECTION RESULTS

3.1 ASBESTOS CONTAINING MATERIALS

General Notes
- Potential **asbestos** containing composite school chairs and stools in a few areas throughout the building. Destructive testing not conducted at this time.
- Potential **asbestos** containing gaskets and packing materials at valves and flanges of mechanical piping systems throughout the building. Destructive testing not conducted at this time.

LOWER/MAIN FLOOR

Northeast Lobby
- **Asbestos** containing floor tiles (some concealed).

Storage beneath Northeast Stairwell,
Operations Office, Conference Room, and Storage Room (3 rooms), and
Drama Room Rear Entrance Foyer/Storage
- No asbestos materials observed.

Drama Area Ceiling Spaces
- **Asbestos** containing ceiling tile adhesive on walls and/or ceilings (above suspended ceiling).

Small Storage Room (accessed from Drama Room),
Large Storage Room (accessed from Drama Room, formerly 2 rooms),
Drama Lounge (accessed from Drama Room),
Fan Room (accessed from Drama Room),
Office (accessed from Drama Room), and
Drama Room including Main Entrance Ramp
- No asbestos materials observed.

Wardrobe Storage Room (accessed from Drama Room)
- No asbestos materials observed.

Washroom Hallway (at rear of Drama Room)
- **Asbestos** containing paper backed sheet flooring (some concealed). Note: The newer sheet flooring beneath the washup sink is non-asbestos.

Boys' and Girls' Washroom (1 room, at rear of Drama Room), and
Staff Washroom (at rear of Drama Room)
- **Asbestos** containing paper backed sheet flooring (some concealed).

Northeast Corridor/Ramp to Crawlspaces (accessed from Northeast Lobby)
- **Asbestos** containing insulating cement may be on some fittings of the mechanical piping system.

Hallway to North Crawlspace/Storage and Large Gymnasium Crawlspace, and
North Crawlspace/Storage including Two Rooms within (below Rooms North of Main Corridor)
- No asbestos materials observed.

Centre North (below Main Corridor) and West (below Theatre Lobby & Plasket Gallery) Crawlspaces
- **Asbestos** containing preformed insulation on mechanical piping system (near west end of Centre North Crawlspace).

Maintenance/Fire Control Room (adjacent to Stairwell to Stage Left)
Stairwell to Stage Left
- No asbestos materials observed.

Storage Area beneath Stage including Three Rooms within
- **Asbestos** containing filling compound on gypsum board (some concealed).
- **Asbestos** containing insulating cement on fittings of small diameter mechanical piping system (near entrance door).
- **Asbestos** containing mastic on joints of ductwork (some concealed).

Dressing Room Corridor and Exit Corridor
- **Asbestos** containing filling compound on gypsum board at Fan Room 1 (some concealed).

Fan Room 1 beneath Stairwell including Wall Cavity behind
- **Asbestos** containing filling compound on gypsum board (some concealed).
- **Asbestos** containing mastic on joints of ductwork (some concealed).

Dressing Room 2,
Dressing Room 3,
Men's Change Room 4,
Male Washroom 5,
Male Washroom 6,
Women's Washroom 7,
Women's Washroom 8,
Female Change Room 9,
Dressing Room 10,
Dressing Room 11,
Janitor Room (near Dressing Rooms), and
Southeast Stairwell to Second Floor Stage
- No asbestos materials observed.

Old Hallway (east of South Crawlspaces) including Stairwell to Theatre
- No asbestos materials observed.

Storage/Crawlspace (accessed from Old Hallway) (beneath Band Room 104B)
Southwest Crawlspaces (accessed from floor hatch in Band Storage Room)
- **Asbestos** containing cementitious drain pipe (some concealed including beneath floor slab).

Wall Cavities and Ceiling Spaces
- **Asbestos** containing mastic on joints of ductwork (some concealed). Note: The black duct mastic is non-asbestos.
- **Asbestos** containing preformed insulation and/or insulating cement on mechanical piping (mostly in inaccessible wall cavities and ceiling spaces).
- **Asbestos** containing cementitious drain pipe (some concealed).

SECOND FLOOR

Main Corridor
- **Asbestos** containing floor tiles (concealed beneath a layer of non-asbestos sheet flooring and other building materials).
- **Asbestos** containing filling compound on some gypsum board and feathered onto adjoining plaster (some concealed).
- **Asbestos** containing ceiling tile adhesive on ceiling (above suspended ceiling).

Small Gymnasium 102, and
Storage Room (accessed from Small Gymnasium 102)
- No asbestos materials observed.

Office, Washroom, and Shower Room (3 rooms, accessed from Small Gymnasium 102)
- **Asbestos** containing floor tiles and floor tile adhesive (some concealed).

Fire Exit Stairwell (from Small Gymnasium 102 to exterior)
- No asbestos materials observed.

Fan Room (accessed from Small Gymnasium 102 wall hatch)
- **Asbestos** containing mastic on joints of ductwork (some concealed including within ductwork).

Northeast Stairwell to Lower/Main Floor
- **Asbestos** containing floor tiles and floor tile adhesive (some concealed).

Football Lounge (adjacent to Northeast Stairwell)
- No asbestos materials observed.

Small Storage Room (at east end of Main Corridor)
- **Asbestos** containing floor tiles (concealed beneath a layer of non-asbestos sheet flooring and other building materials).

Large Storage Room
- Potential **asbestos** containing floor tiles (concealed beneath a layer of non-asbestos sheet flooring, wood, and other building materials).
- **Asbestos** containing filling compound on gypsum board and feathered onto adjoining plaster (some concealed).

Female Staffroom including Closet, Washroom, and Shower (accessed from Large Gymnasium)
- **Asbestos** containing floor tiles in Washroom (some concealed).
- **Asbestos** containing filling compound on gypsum board and feathered onto adjoining plaster (some concealed).

Short Hallway to Large Gymnasium (adjacent to Large Storage Room)
- **Asbestos** containing floor tiles (concealed beneath carpet and other building materials).
- **Asbestos** containing ceiling tile adhesive on ceiling (above suspended ceiling).

Janitor Room including Closet (across from Custodian Room - Theatre Storage on Floor Plan), Custodian Room (Theatre Storage on Floor Plan), and Office
- No asbestos materials observed.

Short Hallway to Large Gymnasium (adjacent to Office)
- **Asbestos** containing floor tiles (concealed beneath carpet and other building materials).
- **Asbestos** containing ceiling tile adhesive on ceiling (above suspended ceiling).

Medical Room
- **Asbestos** containing paper backed sheet flooring (some concealed).

Male Staffroom including Closet, Washroom, and Shower (accessed from Large Gymnasium)
- **Asbestos** containing paper backed sheet flooring in Washroom (some concealed).
- **Asbestos** containing filling compound on gypsum board and feathered onto adjoining plaster (some concealed).

Women's Washroom, Men's Washroom, and Women's Washroom (across from Handicap Washroom)
- Potential **asbestos** containing flooring materials (concealed beneath a layer of non-asbestos ceramic tiles and other building materials).
- Potential **asbestos** containing filling compound on some gypsum board (some concealed).

Handicap Washroom including Janitor Room within
- **Asbestos** containing floor tiles (concealed beneath a layer of non-asbestos ceramic tiles and other building materials).
- **Asbestos** containing filling compound on gypsum board (some concealed).
- **Asbestos** containing ceiling tile adhesive on ceiling (some above suspended ceiling and some above non-asbestos 12" ceiling tiles).

Northwest Entrance Foyer
- **Asbestos** containing filling compound on gypsum board (some concealed).

Two Storage Rooms (beneath Northwest Stairwell)
- **Asbestos** containing vinyl tread (some concealed).
- **Asbestos** containing floor tiles (some concealed beneath a layer of **asbestos** containing vinyl tread and other building materials).
- **Asbestos** containing filling compound patches on some plaster walls and ceilings (some concealed).

Theatre Lobby
- Potential **asbestos** containing flooring materials (concealed beneath a layer of non-asbestos floor tiles and other building materials), although tenants state that all old flooring was removed.
- **Asbestos** containing filling compound on gypsum board and feathered onto adjoining plaster (some concealed).

Plasket Gallery,
Plasket Gallery Concession, and
Plasket Gallery Kitchen including Usher Jacket Storage Room
- No asbestos materials observed.

Hallway (from Theatre Lobby to Plasket Gallery Kitchen)
- **Asbestos** containing floor tiles (concealed beneath a layer of non-asbestos paper backed sheet flooring and other building materials).

Massey Theatre Ticket Sales Office
- No asbestos materials observed.

Theatre Entrance Hallway including Two Storage Rooms
- **Asbestos** containing ceiling tile adhesive on walls (behind non-asbestos 12" tiles) in Storage Rooms.

Theatre Control Room,
Theatre Seating Area, and
Stage including Laundry Closet
- No asbestos materials observed.

Storage Room including Mezzanine (Stage Right)
- **Asbestos** containing filling compound on gypsum board (some concealed).

Stage Supplies/Workshop including Mezzanine, Mezzanine Stairwell, and Room within
- No asbestos materials observed.

Southwest Stairwell to Third Floor
- **Asbestos** containing vinyl stair tread (some concealed).
- Potential **asbestos** containing floor tiles (some concealed).

Wall Cavity/Ceiling Space (accessed from Southwest Stairwell wall hatch)
- No asbestos materials observed.

South Corridors including Steps (from Theatre Lobby to Stage)
- **Asbestos** containing paper backed sheet flooring (some concealed beneath carpet and other building materials).
- **Asbestos** containing vinyl stair tread (some concealed).
- Potential **asbestos** containing floor tiles at top stairwell landing (some concealed).
- **Asbestos** containing filling compound on gypsum board (some concealed).

Band Room 104A including Steps and Rear Vestibule
- **Asbestos** containing filling compound on gypsum board (some concealed).
- **Asbestos** containing 2' x 4' ceiling tiles and contaminated track system. **Note:** The newer ceiling tiles that are distributed throughout the ceiling system should also be considered as **asbestos** contaminated.

Storage Room (accessed from Band Room 104A),
Band Storage Room/Office (between Band Rooms), and
Office (Lunchroom) (accessed from Band Storage Room/Office)
- Asbestos containing filling compound on gypsum board (some concealed).

Stairwell to Third Floor (from Band Storage Room/Office)
- Asbestos containing floor tiles (some concealed).
- Asbestos containing filling compound on gypsum board (some concealed).

Band Room 104B including Closets
- Asbestos containing filling compound on gypsum board (some concealed).
- Asbestos containing 2' x 4' ceiling tiles and contaminated track system. **Note:** The newer ceiling tiles that are distributed throughout the ceiling system should also be considered as asbestos contaminated.

Two Soundproof Rooms (accessed from Band Room 104B)
- Asbestos containing filling compound on gypsum board (some concealed).
- Asbestos containing ceiling tile adhesive on ceilings (above non-asbestos 12" ceiling tiles).

Vestibule (from exterior to Band Room 104B)
- Potential asbestos containing floor tiles (some concealed).
- Asbestos containing filling compound on gypsum board (some concealed).

Floor Cavities, Wall Cavities, and Ceiling Spaces
- Asbestos containing mastic on joints of ductwork (some concealed).
- Asbestos containing preformed insulation and/or insulating cement on mechanical piping (mostly in inaccessible wall cavities and ceiling spaces).
- Asbestos containing cementitious drain pipe (some concealed).

THIRD FLOOR

Main Corridor
- Asbestos containing floor tiles (concealed beneath a layer of non-asbestos sheet flooring and other building materials).
- Asbestos containing filling compound on some gypsum board and feathered onto adjoining plaster (some concealed).
- Asbestos containing ceiling tile adhesive on ceiling (above suspended ceiling).

Short Hallway to Large Gymnasium Balcony (at east end of Main Corridor)
- Asbestos containing floor tiles (concealed beneath a layer of non-asbestos sheet flooring and other building materials).
- Asbestos containing filling compound on gypsum board at former doorway and feathered onto adjoining plaster (some concealed).

Boiler Room including Mezzanine
- Asbestos containing filling compound on gypsum board (some concealed).
- Potential asbestos containing gaskets at burner assemblies concealed within operating boilers.

Janitor Room (across from Boiler Room)
- Asbestos containing floor tiles (some concealed).

Drama Room including Stairwell to Fourth Floor Attic/Fan Room
- Potential **asbestos** containing flooring materials (concealed beneath a layer of non-asbestos floor tiles and other building materials).
- **Asbestos** containing filling compound on gypsum board (some concealed).

Storage beneath Stairwell (accessed from Drama Room)
- No asbestos materials observed.

Large Gymnasium Partition Wall Storage Room (accessed from Drama Room wall hatch)
- This room was inaccessible at time of survey, except for viewing from wall hatch.
- Potential **asbestos** containing flooring materials.

Foyer, Office, and Washroom (between Art Room and Drama Room)
- **Asbestos** containing filling compound on gypsum board (some concealed).
- **Asbestos** containing filling compound patches on plaster (some above suspended ceiling).
- **Asbestos** containing aluminized paper insulation within incandescent light fixture in Washroom.

Art Room (formerly 2 rooms)
- **Asbestos** containing floor tiles (concealed beneath carpet and other building materials, and may be multi-layered).
- **Asbestos** containing filling compound on gypsum board (some concealed).

Stairwell to Fourth Floor Storage Room (above Art Room)
- **Asbestos** containing filling compound on gypsum board (some concealed), and debris.

Janitor Room (across from Art Room), and
Short Hallway to Large Gymnasium Balcony (adjacent to Northwest Stairwell)
- **Asbestos** containing floor tiles (concealed beneath a layer of non-asbestos sheet flooring and other building materials).

Northwest Stairwell to Second Floor including Display Room atop Stairwell
- **Asbestos** containing vinyl stair tread (some concealed).
- **Asbestos** containing filling compound on gypsum board (some concealed).

Kiln Room, and
Office (at west end of Main Corridor)
- **Asbestos** containing floor tiles (concealed beneath a layer of non-asbestos sheet flooring and other building materials).
- **Asbestos** containing filling compound on gypsum board (some concealed).
- **Asbestos** containing ceiling tile adhesive on ceiling (behind non-asbestos 12" ceiling tiles).

Music Room including Short Hallway to Main Corridor (Art Room on Floor Plan)
- **Asbestos** containing floor tiles (concealed beneath a layer of carpet, non-asbestos sheet flooring, and other building materials).
- **Asbestos** containing filling compound on gypsum board (some concealed).
- **Asbestos** containing ceiling tile adhesive on ceiling (behind non-asbestos 12" ceiling tiles).

Storage Room (accessed from Music Room)
- **Asbestos** containing floor tiles (concealed beneath a layer of non-asbestos sheet flooring and other building materials).
- **Asbestos** containing filling compound on gypsum board (some concealed).
- **Asbestos** containing ceiling tile adhesive on ceiling (behind non-asbestos 12" ceiling tiles).

Balcony Lobby
- Potential **asbestos** containing floor tiles (some concealed).
- **Asbestos** containing filling compound on gypsum board and feathered onto adjoining plaster (some concealed).

Massey Theatre Administration Office including Closets
- Potential **asbestos** containing flooring materials (concealed beneath carpet and other building materials).
- **Asbestos** containing ceiling tile adhesive on ceiling (behind non-asbestos 12" ceiling tiles).

Theatre Balcony including Three Entrance Foyers
- **Asbestos** containing mastic on joints of ductwork (some concealed).
- Potential **asbestos** containing floor tiles (some concealed).

Stairwell to Fourth Floor Massey Theatre Boardroom
- **Asbestos** containing filling compound on gypsum board and feathered onto adjoining plaster (some concealed).

Hallway (above Band Storage Room/Office)
- **Asbestos** containing floor tiles (some concealed).
- **Asbestos** containing filling compound on gypsum board (some concealed).
- **Asbestos** containing mastic on joints of ductwork (some concealed).

Storage Room (above Band Storage Room/Office)
- **Asbestos** containing filling compound on gypsum board (some concealed).
- **Asbestos** containing mastic on joints of ductwork (some concealed).
- **Asbestos** containing insulating cement on fittings of mechanical piping system.

Mechanical Room (above Band Storage Room/Office)
- **Asbestos** containing floor tiles (loose near doorway).
- **Asbestos** containing filling compound on gypsum board (some concealed).
- **Asbestos** containing mastic on joints of ductwork (some concealed).
- **Asbestos** containing insulating cement on fittings of mechanical piping system, and debris.

Floor Cavities, Wall Cavities, and Ceiling Spaces
- **Asbestos** containing mastic on joints of ductwork (some concealed).
- **Asbestos** containing preformed insulation and/or insulating cement on mechanical piping (mostly in inaccessible wall cavities and ceiling spaces).

FOURTH FLOOR

Storage Room (above Art Room)
- **Asbestos** containing filling compound on gypsum board (some concealed).

Theatre Control Room (5 rooms, accessed from Theatre Balcony)
- **Asbestos** containing ceiling tile adhesive on ceiling (behind non-asbestos 12" ceiling tiles).

Massey Theatre Boardroom
- No asbestos materials observed.

Wall Cavities and Ceiling Spaces including Stage and Theatre Catwalks
- **Asbestos** containing mastic on joints of ductwork (some concealed).
- **Asbestos** containing preformed insulation and/or insulating cement on mechanical piping (mostly in inaccessible wall cavities and ceiling spaces).

Attic Space (above Main Corridor)
- **Asbestos** containing mastic on joints of ductwork (some concealed).

Attic Space (between Drama Room and Storage Room above Art Room)
- **Asbestos** containing mastic on joints of ductwork (some concealed).
- **Asbestos** containing preformed insulation and insulating cement on mechanical piping.

EXTERIOR

Loading Dock and Ramp,
Walls, Windows, and Canopies, and
Rooftops
- No asbestos materials observed.

3.2 PCB CONTAINING MATERIALS

The visual inspection determined that there are approximately five hundred (500) fluorescent light fixtures (including some in display cases and signs) at the building that are both old and new. The older light fixtures are suspected of having PCB containing ballasts. PCB ballast identification requires the disassembly of the light fixture in order to locate the manufacturer's identification code.

3.3 LEAD

The visual inspection determined that enamel type paints and primers suspected of containing lead and other heavy metals were utilized on interior mouldings and finishes of the building, on structural components, and on some mechanical systems/equipment. The connection bells of cast iron drain pipes contain a lead packing material (including below ground), there are lead sleeves at toilets, and there are lead roof vents and caps on the rooftops of the building. As well, there are rechargeable batteries in emergency lighting at the building.

3.4 LIQUID MERCURY

The visual inspection determined that there is a mercury containing thermostat in the Lower/Main Floor Dressing Room Area Fan Room 1 at the building.

3.5 STORED CHEMICALS AND OTHER HAZARDOUS MATERIALS

The following list of materials were present inside and outside the building at time of inspection (including items likely to be retained for future use):

- several containers of paint, solvents, cleaners, petroleum products, rodent poison, and boiler chemicals,
- compressor bearing petroleum products,
- numerous fire extinguishers,
- compressors with suspect ozone depleting substances (CFC's) in a few refrigerators, coolers, vending machines, air conditioners, and air handling units, and
- piping containing natural gas leading to heating equipment.

4.0 RECOMMENDATIONS

4.1 ASBESTOS CONTAINING MATERIALS

Prior to the renovation or demolition of a building or it's components, the asbestos containing materials directly impacted by the work, should first be removed. Asbestos containing materials not impacted by the work may remain in place as long as they continue to be in their existing stable condition in which they are considered to be safely enclosed or encapsulated, and workers are advised of their presence. Removing, enclosing, or encapsulating asbestos containing materials must be performed by a qualified asbestos abatement contractor in accordance with the Workers' Compensation Board of British Columbia Occupational Health and Safety Regulation. Disposal of asbestos containing materials must be performed in accordance with the BC Ministry of Environment - Environmental Management Act - Hazardous Waste Regulation.

4.2 POLYCHLORINATED BIPHENYL (PCB) CONTAINING BALLASTS

Where affected by a renovation or demolition project, it is recommended that the identification of PCB ballasts/ capacitors be performed by qualified personnel prior to or in conjunction with the project, at a time when it becomes feasible to isolate electrical power and disassemble/disconnect the light fixtures. The ballasts/ capacitors that are identified as PCB containing must be removed in accordance with the Workers' Compensation Board of British Columbia Occupational Health and Safety Regulation, and disposed of in accordance with the BC Ministry of Environment - Environmental Management Act - Hazardous Waste Regulation.

4.3 LEAD BUILDING MATERIALS AND HEAVY METAL BASED PAINTS

In order to satisfy the requirements of the Workers' Compensation Board of British Columbia Occupational Health and Safety Regulation, and if impacted by the work to be conducted, the suspect lead and other heavy metal based paints should be removed intact by the contractor, in accordance with normal renovation/demolition work procedures. Lead containing paints which remain attached to building materials such as wood, metal, concrete block, etc., may be disposed of in a manner applicable to normal demolition waste. If the lead paints are separated from the building materials, they may, depending on lead concentrations, become a Special Waste and therefore must be disposed of in accordance with the BC Ministry of Environment - Environmental Management Act - Hazardous Waste Regulation.

If affected by a renovation or demolition project, the lead in bells of drain pipes, lead sleeves at toilets, and lead roof jacks must first be removed, and be recycled or disposed of, in accordance with the BC Ministry of Environment - Environmental Management Act - Hazardous Waste Regulation.

4.4 MERCURY

Prior to a project affecting the thermostat devices, the mercury in thermostats must first be removed, and be recycled or disposed of, in accordance with the BC Ministry of Environment - Environmental Management Act - Hazardous Waste Regulation.

4.5 STORED CHEMICALS AND OTHER HAZARDOUS MATERIALS

Stored Chemicals

Prior to a project that affects the listed materials, stored chemicals and ozone depleting substances within refrigeration equipment must first be relocated for future use, or be removed, and be recycled or disposed of, in accordance with the BC Ministry of Environment - Environmental Management Act - Hazardous Waste Regulation.

Natural Gas
The natural gas that is contained in some piping must be shut off and purged by Terasen Gas or a qualified trades person prior to work that would affect the gas.

5.0 ESTIMATED CONTRACTOR BUDGETS FOR HAZARDOUS MATERIALS ABATEMENT

The following estimated budgets for complete removal and disposal of hazardous building materials are based on current market conditions with the site work being performed by a qualified abatement contractor during a single phase project.

ASBESTOS CONTAINING MATERIALS	UNIT PRICING	BUDGETS
Asbestos and Potential Asbestos Floor Tiles (budget estimate may be reduced by further destructive testing)	$2.50 to $3.25 per square foot	$ 47,600.00
Asbestos Paper Backed Sheet Flooring	$2.50 to $3.25 per square foot	$ 3,900.00
Asbestos Filling Compound and Affected Gypsum Board	$2.75 to $3.25 per square foot	$ 82,400.00
Asbestos Ceiling Tile Adhesive and Associated Contaminated Building Materials	$2.50 to $3.00 per square foot	$ 21,150.00
Asbestos 2' x 4' Ceiling Tiles and Contaminated Track System (including scaffold/lift equipment and enclosure system for access and containment)	$2.50 to $3.50 per square foot	$ 12,600.00
Asbestos Insulating Cement on Fittings of Mechanical Piping (accessible)	$60.00 per fitting	$ 2,400.00
Asbestos Insulations and/or Insulating Cement on Mechanical Piping (small amount in crawlspace and attic, but mostly concealed in inaccessible wall cavities and ceiling spaces)	$20.00 to $30.00 per lineal foot or fitting	$ 9,000.00
Asbestos Cementitious Drain Pipe (excluding underground)	$15.00 to $20.00 per lineal foot	$ 6,000.00
Asbestos Aluminized Paper Insulation within Incandescent Light Fixtures	$10.00 each	$ 10.00
Asbestos Mastic on Joints of Ductwork/Plenums (differing sizes both exposed and concealed)	Not Applicable	$ 44,000.00
Potential Asbestos Gaskets within Operating Boilers	Not Applicable	$ 300.00
Potential Asbestos Gaskets and Packing Materials at Flanges and Valves	$60 to $100 each	$ 3,000.00
Potential Asbestos School Chairs and Stools (likely to be retained)	Not Determined	Not Determined
HAZARDOUS BUILDING MATERIALS		
Determination and Disposal of PCB containing Ballasts (estimated at 40% containing PCBs)	$20.00 to $24.00 each	$ 8,400.00
Lead Paint remaining attached to building materials	Not Applicable	No Extra Cost
Lead Products for recycle (lead in bells of drain pipes, lead sleeves, and lead roof vents)	$20.00 each	$ 2,400.00
Mercury containing thermostats for recycle	$15.00 each	$ 15.00
Stored Chemicals including refrigeration equipment retained for future use	Not Applicable	Not Applicable
SUBTOTAL		**$ 243,175.00**
10% CONTINGENCY		**$ 24,317.50**
ESTIMATED TOTAL (excluding GST)		**$ 267,492.50**

NOTE: The unit prices listed above are based on a minimum of 500 sq.ft. per application of removal.

6.0 OWNER'S RESPONSIBILITIES

For the remediation of hazardous building materials, contract specifications, quality control, and final acceptance of the work remain the responsibility of the Owner. In order to ensure that the Owner has acted in a responsible manner, and to ensure regulatory board compliance, it is recommended that a detailed hazardous materials abatement specification be provided to a select group of qualified and insured (with asbestos inclusion rider) hazardous materials abatement contractors. As well, the performance of the

asbestos abatement work by the contractor's trained and authorized personnel should be inspected and air monitored on a daily basis.

7.0 ASTECH CONSULTANTS' PROJECT CONSULTING SERVICES

PROJECT SCOPE OF WORK & TENDER PROCESS:

a) **Scope of Work** - Interface with Owner and Project Planning Team to determine project bid options and preparation of detailed Hazardous Building Materials Abatement Specification Section 02080 for inclusion with Front End Contract Documents to be issued to a select group of qualified and insured (with asbestos inclusion rider) Hazmat Abatement Contractors.

b) **Mandatory Pre-Bid Site Walk-Through** - Once the documents are prepared and approved, Astech Consultants would assist in organizing and conducting a mandatory pre-bid meeting and site inspection for the select group of qualified Hazmat Abatement Contractors. Astech would assist with any clarifications or interpretations as may arise before, during, and after the close of tenders.

c) **Bid Review** - We could also assist in reviewing the bids received and make recommendations for contract award.

PROJECT SITE INSPECTIONS:

a) **Asbestos Pre-Contamination Inspections** - Very critical third party inspections that determine if all preparation work is complete, in compliance with regulatory board requirements and the Contract Specifications, before the actual asbestos abatement can begin. Inspections ensure enforcement of safe work procedures, and review of relevant project documentation, including worker training, and respirator fit testing.

b) **Asbestos Abatement Inspections** - Once actual asbestos abatement is in progress Astech Consultants will conduct inspections inside the work areas. The perimeter of the work areas, and adjacent areas of the building, will also be inspected and air monitored.

c) **Asbestos Visual Clearance Inspections** - Perhaps the most critical of all inspections. The visual clearance inspections are a comprehensive and meticulous inspection of the work areas at the conclusion of removal activities to ensure that asbestos abatement is complete, and that even small traces of asbestos materials have been properly cleaned up and disposed of.

PROJECT AIR SAMPLING:

a) ambient asbestos air samples adjacent to the work areas, to verify that airborne asbestos fibres have not migrated outside the work areas.

b) occupational asbestos air samples inside the work areas to establish and assess work procedures, and ensure that work procedures do not create unnecessarily high asbestos fibre concentrations.

c) clean room air samples in the worker decontamination facility to verify that airborne asbestos fibres have not migrated outside the "High Risk" work areas, as applicable.

d) air clearance asbestos air samples at the conclusion of visual clearance inspection of the "High Risk" work areas, as applicable.

PROJECT REPORTS:

Air sample results are submitted to the Hazmat Abatement Contractor for posting on site daily. Inspections requiring action by the Hazmat Abatement Contractor will be in written form and be submitted for immediate action. Copies of all documentation is retained in a comprehensive Final Report that will be submitted to the Client at the conclusion of the project.

ASTECH FEE SCHEDULE FOR PROJECT CONSULTING SERVICES:

Astech Consultants Ltd. has estimated that a single phase project for complete removal and disposal of hazardous materials can be scheduled to be completed in forty to forty-five shifts, dependent upon the contractor's crew size. Our consulting services fee schedule for a forty shift project can be estimated as follows:

Service	Hours	Lab	Unit	Extension
Interface with Owner & Project Planning Team and Preparation of Hazmat Abatement Specification Section 02080	16		$ 65.00	$ 1,040.00
Mandatory and Second Pre-Bid Site Meetings with Project Team and Bidders	12		$ 65.00	$ 780.00
Assist with Clarifications, Review of Bids, and Written Recommendations for Contract Award	2		$ 65.00	$ 130.00
Start-Up Meeting with Client/Contractor, Site Inspections, Collection of Air Samples, and Written Documentation	200		$ 60.00	$ 12,000.00
Laboratory Analysis of Air Samples (Asbestos)		120	$ 30.00	$ 3,600.00
Review of Contractor Submittals and Final Report	8		$ 60.00	$ 480.00
Surcharge (5%), for Travel Related Costs and Asbestos Inclusion Insurance				$ 901.50
TOTAL (excluding GST)				**$ 18,931.50**

IMPORTANT ITEMS FOR CONSIDERATION:

a) Astech's Fee Schedule for project consulting services should be considered as an upset maximum price for a **forty shift project.** Should fewer hours or samples be required, the applicable savings will be passed on. Conversely, should the abatement contractor's work schedule be greater than forty shifts and still require inspections and air monitoring by Astech, additional fees would be applicable.

b) Astech Consultants does not charge out materials and equipment that are required for this project.

We hope you have found the above information useful. If you have any questions, or require clarification please contact this office.

Sincerely,

Tom Farrell
Astech Consultants Ltd.
Ref: 8599HE01.RK

BULK SAMPLE REPORT

Date: June 18, 2009

Client: **ATELIER PACIFIC ARCHITECTURE INC.**

Location: **Massey Theatre Building**
735 - 8th Avenue
New Westminster, BC

Comments:
1) Analysed as per WCB of BC OH&S Regulation.
2) WCB defines asbestos containing material as 1% or more asbestos.
3) Quantitation limit for asbestos analysis is 1%.
4) Sample results report fibre composition only.
5) Sample(s) will be disposed of after 90 days, unless the client requests otherwise.

Samples Collected on May 29, 2009

Bulk Sample # 8599BS01 : **Third Floor - Boiler Room**
Sample Type : Gypsum Board Filling Compound (Wall)
Result : **5 - 10% Chrysotile Asbestos**

Bulk Sample # 8599BS02 : **Third Floor - Boiler Room**
Sample Type : Wall Plaster (Outer Layer)
Result : 1 - 5% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS03 : **Third Floor - Boiler Room**
Sample Type : Wall Plaster (Inner Layer)
Result : 5 - 10% Animal Fibres
: 1 - 5% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS04 : **Third Floor - Boiler Room**
Sample Type : Insulating Cement (HWS Flange)
Result : 35 - 40% Glass Fibres
: 25 - 30% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS05 : **Third Floor - Main Corridor**
Sample Type : Jute Backed Sheet Flooring (Beige & Pink) (Top Layer)
Result : 10 - 15% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS06 : **Third Floor - Main Corridor**
Sample Type : Sheet Flooring Adhesive (Off-White) (Second Layer)
Result : 5 - 10% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS07 : **Third Floor - Main Corridor**
Sample Type : Floor Tile (Black) (Third Layer)
Result : **1 - 5% Chrysotile Asbestos**

Bulk Sample # 8599BS08 : **Third Floor - Main Corridor**
Sample Type : Floor Tile Adhesive (Black) (Bottom Layer)
Result : 10 - 15% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS09 : **Third Floor - Main Corridor**
Sample Type : 2' X 4' Ceiling Tile
Result : 60 - 65% Cellulose Fibres
: 20 - 25% Glass Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS10 : **Third Floor - Main Corridor**
Sample Type : Ceiling Tile Adhesive (Brown) (above Suspended Ceiling System)
Result : **25 - 30% Chrysotile Asbestos**

Bulk Sample # 8599BS11 : **Third Floor - Main Corridor**
Sample Type : Ceiling Plaster (above Suspended Ceiling System)
Result : 1 - 5% Cellulose Fibres
: 1 - 5% Animal Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS12 : **Third Floor - Main Corridor**
Sample Type : Gypsum Board Filling Compound (West Wall)
Result : No Asbestos Fibres Observed

Bulk Sample # 8599BS13 : **Third Floor - Main Corridor**
Sample Type : Sealant Tape (Black) (at Interior Window)
Result : No Asbestos Fibres Observed

Bulk Sample # 8599BS14 : **Third Floor - Northwest Stairwell to Second Floor**
Sample Type : Vinyl Stair Tread (Rust)
Result : **1 - 5% Chrysotile Asbestos**

Bulk Sample # 8599BS15 : **Third Floor - Northwest Stairwell to Second Floor**
Sample Type : Gypsum Board Filling Compound (Wall)
Result : **1 - 5% Chrysotile Asbestos**

Bulk Sample # 8599BS16 : **Second Floor - Main Corridor Wall Cavity**
Sample Type : Insulating Cement (Pipe Elbow)
Result : **65 - 70% Chrysotile Asbestos**

Samples Collected on June 11, 2009

Bulk Sample # 8599BS17 : **Second Floor - Northwest Entrance Foyer**
Sample Type : Jute Backed Sheet Flooring (Black)
Result : 20 - 25% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS18 : **Second Floor - Men's Washroom Ceiling Space**
Sample Type : Insulating Cement (Grey) (Pipe Elbow)
Result : 65 - 70% Glass Fibres
: 1 - 5% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS19 : **Second Floor - Men's Washroom**
Sample Type : Gypsum Board Filling Compound (Wall)
Result : No Asbestos Fibres Observed

Bulk Sample # 8599BS20 : **Second Floor - Short Hallway to Large Gymnasium**
Sample Type : Duct Mastic (Black)
Result : 1 - 5% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS21 : **Second Floor - Medical Room**
Sample Type : Paper Backed Sheet Flooring (Brown Mosaic)
Result : **40 - 45% Chrysotile Asbestos**
: 1 - 5% Cellulose Fibres

Bulk Sample # 8599BS22 : **Second Floor - Office**
Sample Type : 2' X 4' Ceiling Tile (Tan with Salmon Backing)
Result : 65 - 70% Cellulose Fibres
: 25 - 30% Glass Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS23 : **Second Floor - Janitor Room**
Sample Type : Wall Plaster (Grey) (Inner Layer)
Result : 1 - 5% Animal Fibres
: 1 - 5% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS24 : **Second Floor - Janitor Room**
Sample Type : Wall Plaster (White) (Outer Layer)
Result : No Asbestos Fibres Observed

Bulk Sample # 8599BS25 : **Second Floor - Large Storage Room**
Sample Type : Gypsum Board Filling Compound (Ceiling at Bulkhead)
Result : **1 - 5% Chrysotile Asbestos**

Bulk Sample # 8599BS26 : **Second Floor - Northeast Stairwell**
Sample Type : 9" Floor Tile (Beige)
Result : **1 - 5% Chrysotile Asbestos**

Bulk Sample # 8599BS27 : **Second Floor - Northeast Stairwell**
Sample Type : Floor Tile Adhesive (Black)
Result : 1 - 5% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS28 : **Second Floor - Fan Room (accessed from Small Gym Wall Hatch)**
Sample Type : Gypsum Board Filling Compound (Wall)
Result : **1 - 5% Chrysotile Asbestos**

Bulk Sample # 8599BS29 : **Second Floor - Fan Room (accessed from Small Gym Wall Hatch)**
Sample Type : Insulating Cement (Pipe Elbow)
Result : 60 - 65% Glass Fibres
: 5 - 10% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS30 : **Fourth Floor - Ceiling Space (above Theatre Control Room and Balcony)**
Sample Type : Duct Mastic (Red)
Result : **25 - 30% Chrysotile Asbestos**

Bulk Sample # 8599BS31 : **Second Floor - Wall Cavity (accessed from SW Stairwell Wall Hatch)**
Sample Type : Wall Stucco (Outer Layer)
Result : 1 - 5% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS32 : **Second Floor - Wall Cavity (accessed from SW Stairwell Wall Hatch)**
Sample Type : Wall Stucco (Inner Layer)
Result : 1 - 5% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS33 : **Second Floor - Wall Cavity (accessed from SW Stairwell Wall Hatch)**
Sample Type : Wall Construction Paper (Black) (Bottom Layer)
Result : 90 - 95% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS34 : **Fourth Floor - Massey Theatre Board Room**
Sample Type : Gypsum Board Filling Compound (Wall)
Result : 1 - 5% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS35 : **Third Floor - Short Music Room Hallway (from Main Corridor)**
Sample Type : Gypsum Board Filling Compound (Wall Patch at New Entranceway)
Result : No Asbestos Fibres Observed

Bulk Sample # 8599BS36 : **Third Floor - Music Room**
Sample Type : Gypsum Board Filling Compound (South Wall)
Result : **5 - 10% Chrysotile Asbestos**

Bulk Sample # 8599BS37 : **Third Floor - Music Room**
Sample Type : Jute Backed Sheet Flooring (Beige) (Top Layer)
Result : 20 - 25% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS38 : **Third Floor - Music Room**
Sample Type : Floor Tile (Beige) (Bottom Layer)
Result : **1 - 5% Chrysotile Asbestos**

Bulk Sample # 8599BS39 : **Third Floor - Kiln Room**
Sample Type : Gypsum Board Filling Compound (Wall)
Result : **5 - 10% Chrysotile Asbestos**

Samples Collected on June 15, 2009

Bulk Sample # 8599BS40 : **Lower/Main Floor - Centre North Crawlspace**
Sample Type : Insulating Cement (White) (Pipe Elbow)
Result : 55 - 60% Cellulose Fibres
: 25 - 30% Glass Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS41 : **Lower/Main Floor - Storage Area Beneath Stage**
Sample Type : Insulating Cement (Grey) (Small Diameter Pipe Elbow)
Result : **60 - 65% Chrysotile Asbestos**
: **5 - 10% Amosite Asbestos**

Bulk Sample # 8599BS42 : **Lower/Main Floor - Storage Area Beneath Stage**
Sample Type : Gypsum Board Filling Compound (Wall)
Result : **1 - 5% Chrysotile Asbestos**

Bulk Sample # 8599BS43 : **Lower/Main Floor - Fan Room (accessed from Drama Lounge)**
Sample Type : Insulating Cement (Grey & White) (Pipe Elbow)
Result : 60 - 65% Glass Fibres
: 20 - 25% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS44 : **Lower/Main Floor - Drama Room**
Sample Type : Gypsum Board Filling Compound (Wall)
Result : No Asbestos Fibres Observed

Bulk Sample # 8599BS45 : **Lower/Main Floor - Washroom Hallway (at Rear of Drama Room)**
Sample Type : Paper Backed Sheet Flooring (Brown & Beige)
Result : **40 - 45% Chrysotile Asbestos**

Bulk Sample # 8599BS46 : **Lower/Main Floor - Storage/Crawlspace (Beneath Band Room Area) (Accessed from Old Hallway)**
Sample Type : Duct Mastic (Black)
Result : 1 - 5% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS47 : **Second Floor - Theatre Storage Room (Stage Right)**
Sample Type : Gypsum Board Filling Compound (Wall)
Result : **1 - 5% Chrysotile Asbestos**

Bulk Sample # 8599BS48 : **Second Floor - Massey Theatre Ticket Sales Office**
Sample Type : 12" Floor Tile (Blue)
Result : No Asbestos Fibres Observed

Bulk Sample # 8599BS49 : **Second Floor - Massey Theatre Ticket Sales Office**
Sample Type : Floor Tile Adhesive (Black)
Result : 5 - 10% Cellulose Fibres
: No Asbestos Fibres Observed

Bulk Sample # 8599BS50 : **Second Floor - Male Staff Washroom (Accessed from Large Gym)**
Sample Type : Paper Backed Sheet Flooring (Green)
Result : **40 - 45% Chrysotile Asbestos**

Samples Collected on June 16, 2009

Bulk Sample # 8599BS51 : **Second Floor - Storage Room (Accessed from Band Room 104A)**
Sample Type : Gypsum Board Filling Compound (Wall)
Result : **1 - 5% Chrysotile Asbestos**

Bulk Sample # 8599BS52 : **Second Floor - Soundproof Room (Accessed from Band Room 104B)**
Sample Type : Ceiling Tile Adhesive (Brown)
Result : **1 - 5% Tremolite Asbestos**

Bulk Sample # 8599BS53 : **Second Floor - Stairwell to Third Floor (Acc. from Band Storage/Office)**
Sample Type : 12" Floor Tile (Beige)
Result : **5 - 10% Chrysotile Asbestos**

Bulk Sample # 8599BS54 : **Third Floor - Storage Room (Above Band Storage/Office)**
Sample Type : Gypsum Board Filling Compound (Ceiling)
Result : **1 - 5% Chrysotile Asbestos**
: 5 - 10% Cellulose Fibres

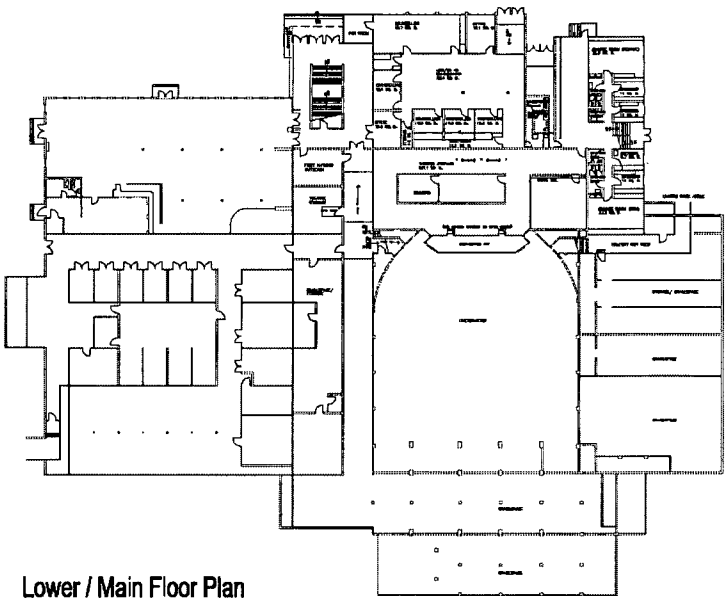
Bulk Sample # 8599BS55 : **Third Floor - Mechanical Room (Above Band Storage/Office)**
Sample Type : Insulating Cement (Pipe Elbow)
Result : **15 - 20% Chrysotile Asbestos**
: 25 - 30% Glass Fibres
: 10 - 15% Cellulose Fibres

Bulk Sample # 8599BS56 : **Third Floor - Mechanical Room (Above Band Storage/Office)**
Sample Type : Duct Mastic (Aluminized, Painted Blue)
Result : **20 - 25% Chrysotile Asbestos**

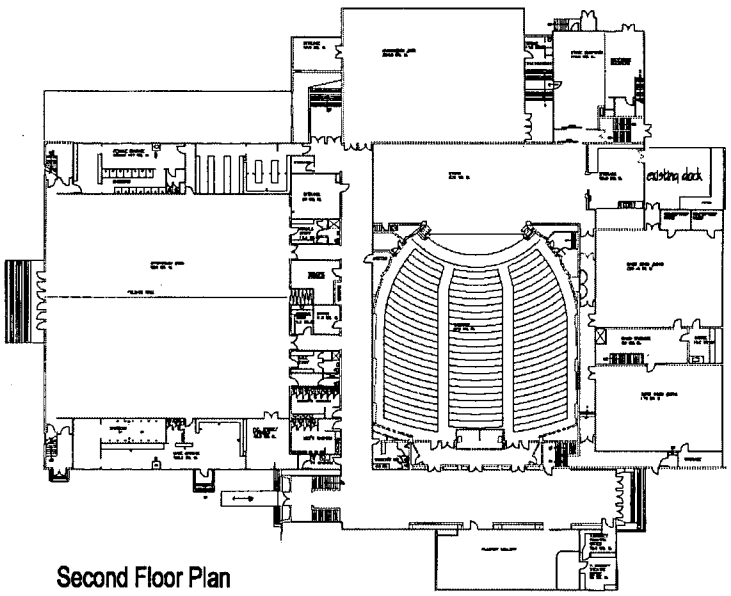
Bulk Sample # 8599BS57 : **Third Floor - Mechanical Room (Above Band Storage/Office)**
Sample Type : Gypsum Board Filling Compound (Wall)
Result : **1 - 5% Chrysotile Asbestos**

Bulk Sample # 8599BS58 : **Second Floor - South Corridor**
Sample Type : Paper Backed Sheet Flooring (Brown Mosaic)
Result : **30 - 35% Chrysotile Asbestos**

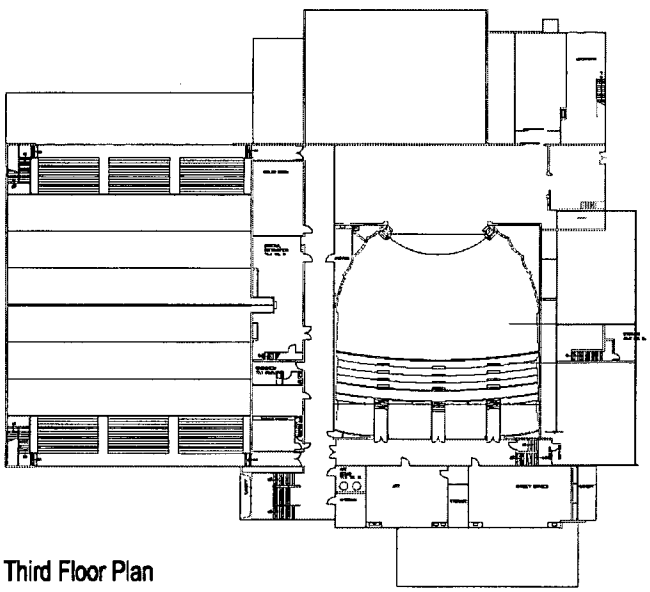
Appendix E – Existing Drawings / Building Code Review



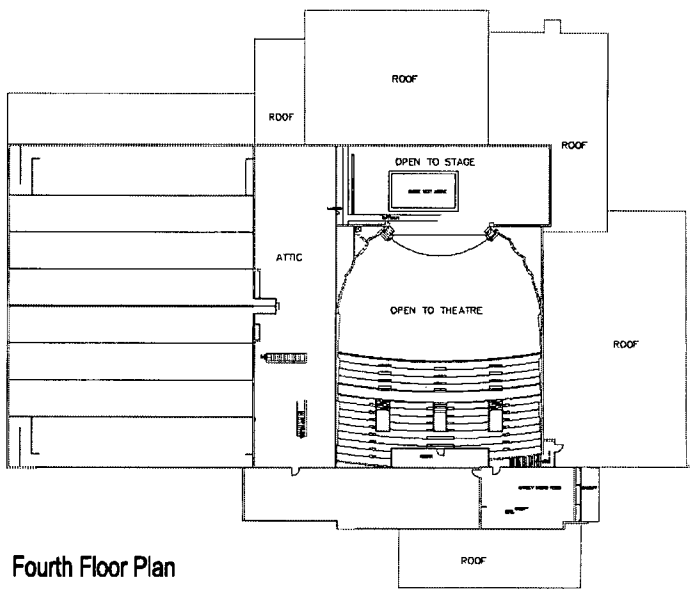
Lower / Main Floor Plan



Second Floor Plan



Third Floor Plan



Fourth Floor Plan

BUILDING CODE REVIEW:

CURRENT BUILDING CODE: BCBC 2006

BUILDING DESCRIPTION:

The Massey Theatre building is an existing building located on 8th Avenue at 8th Street in the City of New Westminster. It is presently connected but not part of the New Westminster Senior Secondary School. The existing theatre is a four storey building roughly rectangular, approximately 2016 m^2 ($21,700 ft^2). The theatre and surrounding structure was built around 1950, is of combustible construction and is fully sprinklered. The existing school is scheduled to be replaced in the near future leaving the theatre as a stand alone building.

BUILDING OCCUPANCY CLASSIFICATION:

Under the current building code the Occupancy classification is **Group A, Division 1 Assembly Occupancy** intended for the production and viewing of the performing arts. The theatre currently has fixed seating for 1200 persons, a stage and support spaces at a basement level.

As the theatre building has more than one storey it can only be further classified under **Article 3.2.2.20** Group **A, Division 1, Any Height, Any Area, Sprinklered.**
Requirements of Article 3.2.2.20 are:

- The building shall be of **non-combustible** construction,
- The building shall be **sprinklered throughout**,
- **Floor assemblies** shall be fire separations with a fire-resistance rating not less than **2 hours**,
- **Mezzanines** shall have a fire-resistance rating not less than **1 hour**,
- Load bearing walls, columns and arches shall have a fire-resistance rating not less than that required for the supported assembly.

ADDITIONAL REQUIREMENTS FOR ASSEMBLY OCCUPANCY SUBSECTION 3.3.2:

Article 3.3.2.2

- The seating area of a Group A, Division 1 occupancy shall be separated from adjacent occupancies in the floor area by a fire separation having a fire-resistance rating not less than 1 hour if the occupant load in the seating area exceeds 200.

Article 3.3.2.4 Fixed Seat Requirements:

- It is assumed that if new seats are to be provided the configuration will be the same as the existing configuration.

Article 3.3.2.5 Aisles:

- It is assumed that aisle configuration will be the same as the existing configuration.

Article 3.3.2.13 Stages for Theatrical Performances:

- A stage for theatrical performances and ancillary spaces shall be sprinklered. **The building is sprinklered throughout.**

- A fire separation with a fire-resistance rating not less than 1 hour shall be provided between the stage and ancillary spaces. **To be confirmed**.

- A stage for theatrical performances and ancillary spaces shall be separated from the

seating area by a fire separation having a fire-resistance rating not less than 1 hour, except for a proscenium opening protected with a sprinkler deluge system, an unframed fire curtain if the opening is not more than 20m (65 ft.) wide that is designed to close automatically upon actuation of the sprinkler system, actuation of the fire alarm system and manually by remote control devices at the curtain control panel. **To be confirmed.**
A fire separation is not required between the stage and the seating area in a building that is sprinklered throughout provided a sprinkler deluge system is installed between the stage and the seating area.

- At least 2 vents for the purpose of venting fire and smoke to the outside of the building shall be provided above a stage designed for theatrical performances and shall have an aggregate area of one eighth (1/8) of the area of the stage behind the proscenium opening and be arranged to open automatically upon actuation of the sprinkler system.

  The existing theatre has a single smoke vent opening located on the fly tower roof. The stage area is 258 m^2, the required smoke vent area to be 258 x .125 = 32.25 m^2, vent opening area provided is 33.9 m^2. The existing smoke vent area is adequate, however it is provide by one opening to a penthouse structure with what appear to be operable vents on the north and south sides, the operation of which is unknown.

Exiting:

It appears that the exiting of the theatre is adequate to accommodate the 1200 persons attending a performance. There are four 1524mm (5'-0") exits from the main floor seating, two at either side of the stage exiting through a corridor to the outside and two at the back of the house, exiting through a lobby to the outside. The balcony has three 1524mm (5'-0") exits at the back of the house, exiting in two directions through a lobby area and down stairs to the outside. Should the existing attached gymnasiums and music rooms be demolished the exiting will be revised to exit directly to the outside and/or shortening of travel distances involved.
Many of the existing stairways do not comply with current building codes. Stairs lack handrails to both sides and handrail extensions. There are no aids for the visually impaired provided.
Exit doors and existing hardware to be reviewed and replaced where non-compliant or defective.

Conclusion / Recommendations:

The existing Massey Theatre is non-compliant with the current building code in nearly all areas of the building. The greatest concern is that the building is mainly of combustible construction, although being sprinklered throughout does help the situation somewhat. For the building to stand alone consultation with the City of New Westminster and it's Fire Department will have to take place to identify any areas where fire separations and life safety systems may have to be upgraded or replaced.