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3.0 LEDDY ARENA

Preface

This study was prepared by Bargmann Hendrie + Archetype, inc. for the **City of Burlington, Department of Parks and Recreation**. It is intended to investigate the agency's capital needs, evaluate alternatives, and recommend solutions for the Burlington Community Recreation Center's two proposed locations, Memorial Auditorium and Leddy Park.

The study provides a clear outline of renovation and addition design options examined for each site location. It includes an existing conditions analysis, proposed program, conceptual designs, and estimated construction costs. The conceptual building designs are not intended to be final designs, but rather to illustrate functional relationships and conformance with applicable codes and standards, and serve as the basis for developing an accurate preliminary cost estimate.

Acknowledgements

Operating Agency:

City of Burlington, Vermont
Department of Parks and Recreation

Mayor: *Hon. Peter Clavelle*

Director: *Wayne Gross*

Memorial Auditorium Operating Manager: *Alan Campbell*

Leddy Arena Operating Manager: *Jay Parent*

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Charles McGrory, FRICS, ACI/ARB

Mechanical, Electrical, and *Civil Engineering Consultant:* *Lanpher Associates, Inc. Northeast Harbor, ME*
Dwight Lanpher, P.E., Principal in Charge

1.0 Executive Summary

Purpose of The Study

At the request of the Department of Parks & Recreation, this study has been prepared for the City of Burlington, Vermont. The project emanated from the Mayor's office as a result of the Burlington *Legacy Project Action Plan*: Becoming a Sustainable Community. This initiative is conceived as one way of ensuring the validity of the City over the next century through the creation of support systems for all ages, enhancements for the city, and methods of securing financial stability for the city. The first part of the study, 'Phase I' began by taking an inventory of all the space available for the Department of Parks and Recreation to use. Our firm undertook an extensive review of the sites and analyzed their pros and cons. Independently, we held a community workshop on November 8, 2001 to review the potential sites and the program. The goal was to obtain community input about the sites. Upon attaining that goal, Memorial Auditorium and Leddy Arena have been chosen for development in this next study 'Phase II'.

The purpose of this 'Phase II' study is to develop 'Phase I' progress and generate a higher level of completion that illustrates creative options for the Burlington Community Recreation Center. Information has been gathered from a recent site visit on Sept. 5 & 6, 2002 and a previous report completed on July 29, 2002 (The report compiled all research up to that point in time, including results of the design charrette).

The following study is best understood as two separate analysis that offer a range of options for each site, Memorial Auditorium and Leddy Arena. Each analysis will look at existing conditions, program, code analysis, alternative solutions, and a cost estimate. A choice of Preferred Options and an outline of a clear Implementation Schedule will complete 'Phase II'.

Goal

"What makes Burlington unique, and how can this project enhance those features?"

- Establish a clear, detailed program for each site
- Analyze existing conditions for each site
- Refine Schematic Design Options
- Prepare a cost budget for implementation of the project

1.0 Executive Summary cont.

Site Conditions

MEMORIAL AUDITORIUM

Centrally located, Memorial Auditorium serves as a gateway to downtown Burlington. Currently, it is the only city owned public auditorium that can seat up to 2500 people for any given event.

- A prominent existing, historical, 4 level masonry structure
- Provides an excellent central location downtown
- A considerable amount of underutilized space
- Houses a gymnasium/ auditorium with seating capacity of 2500 people.

The Memorial Auditorium was built in 1927 and has been added to the National Register of Historic Places. The overall structure remains in good condition, however, it does require a level of repairs to the exterior, interior, and mechanical systems. The following report will look at the existing building and the potential uses that can best support the community of Burlington.

LEDDY ARENA

- An existing pre-engineered steel structure enclosed with masonry and metal walls & roof
- Provides recreational facilities for Burlington residents in the north end
- Offers great views of & beach access to Lake Champlain
- Grants direct access to parking, bike path, & outdoor recreation fields
- Presents grading challenges with significant land slope and existing drainage routes

Located along the shoreline of Lake Champlain on the North end of Burlington, the Leddy Arena is at the far west end of Leddy Park. The existing facility houses a regulation size ice rink, a studio rink, locker rooms, skate shop, and a snack bar with seating. The existing facility can no longer accommodate current programs that include local youth groups, high school hockey teams, and semi-pro hockey teams. Not only does this site call for a new rink addition, but it also an ideal place to expand the recreation center program to include a new gymnasium / running track, a new pool, new locker rooms, new youth center, and new offices.

Program

The program was developed in conjunction with the Department of Parks & Recreation and as a result of participation by the citizens of Burlington at workshops. The focus of the Program evolution has been to provide indoor facilities that include a gymnasium, running track, aquatic center, youth center (13 & under), teen center (14 & older), and an additional skating rink.

Conceptual Schemes

It should be noted that following conceptual schemes are not to be perceived as final designs and can be developed in any combination of the following:

This study has offered the community options from which a final 'Preferred Option' needs to be chosen to bring the project to the next level of design implementation. This purpose of this was to allow flexibility to choose just one option or a combination there of. The goal was also to clearly present the information so that it was easy to understand the costs involved with each phase.

MEMORIAL AUDITORIUM

Option 'A'	Capital improvements & upgrades to existing
Option 'B'	New lobby addition
Option 'C'	Teen center addition

Option 'A' represents all work that needs to be done to the existing historical structure to bring it up to code, upgrade MEP systems, and restore it's historical integrity.

Option 'B' is work in addition to the capital improvements and upgrades to the existing building. Represented in the following drawings, this design shows a new addition on the north end of the existing building.
Option 'C' is similar to Option 'B' in that the addition is the same square footage, but the teen center expansion moves into the addition and the new lobby entry is routed through the central existing space.

LEDDY ARENA
A diagrammatic configuration sheet (A-001) illustrates the options available for the Leddy Arena. Depending upon budgets available and community participation, one combination may be favored over another.

Option 'A'	Capital improvements & upgrades to existing
Option 'B'	New Aquatic center
Option 'C'	New gymnasium/ running track
Option 'D'	Rink Expansion

Option 'A' represents all work that needs to be done to the existing structure to bring it up to code, upgrade MEP systems, and refinish existing locker rooms, offices, and snack bar.

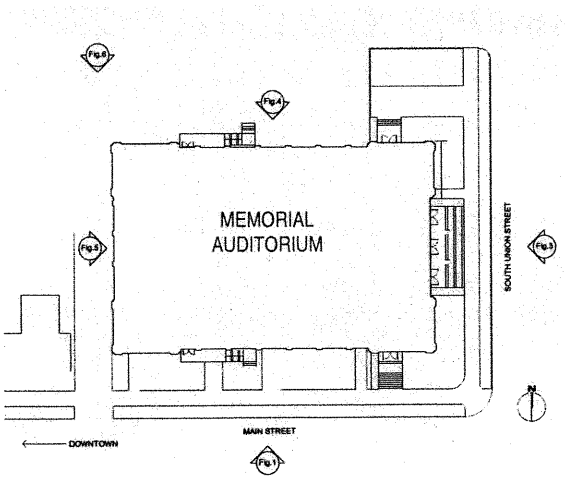
Option 'B' is work separate from the capital improvements and includes a new gymnasium, locker rooms, youth center, new offices, and a new entry pavilion.

Option 'C' is work separate from the capital improvements and includes a new 25 yard lap pool, recreational pool, lifeguard station, storage, equipment room, an optional spa, locker rooms, youth center, new offices, and a new entry pavilion. Options C2 and C3 present other scenarios that include a more playful recreational pool and a larger 25 meter lap pool.

Option 'D' is work separate from the capital improvements and includes a new regulation size ice rink, locker rooms, restrooms, and an expanded entry pavilion.

2.0 MEMORIAL AUDITORIUM

Fig. Southeast corner on Main & South Union Streets



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2.0 MEMORIAL AUDITORIUM

2.1 Existing Conditions

Conditions Analysis

Site:

- **Orientation**

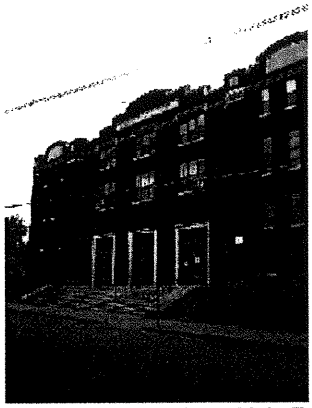

Fig. 1: East Elevation – Main Entry

Fig. 2: North Elevation

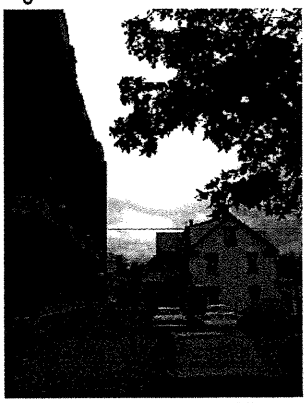

Fig. 3: West Elevation- Alley

This four-story masonry building has been listed in a local survey as a historic structure. The central location at the entrance of downtown allows easy access for pedestrians and vehicles, although parking is currently limited. The south and east facades are bordered by Main Street and South Union Street. The North façade faces a municipal parking lot and incorporates a loading dock.

On Main Street, an adjacent house converted to commercial use is also considered to contribute to the historic district. It is separated from Memorial Auditorium by an alley that is used as a driveway to and from the parking lot. Pedestrians also use this alley, which includes a makeshift wheelchair ramp for the existing teen center "Club 242", resulting in a safety hazard.

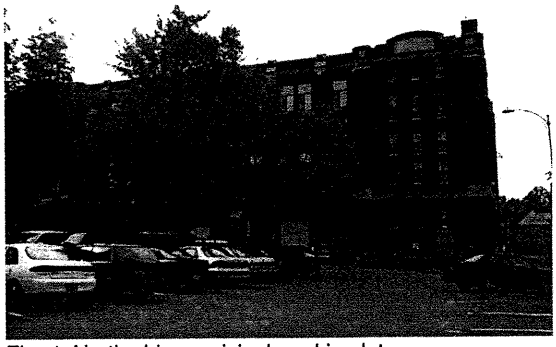

Fig. 4: North side municipal parking lot

Conditions Analysis

Site

- **Entry Stairs**
- **Fire Escapes**

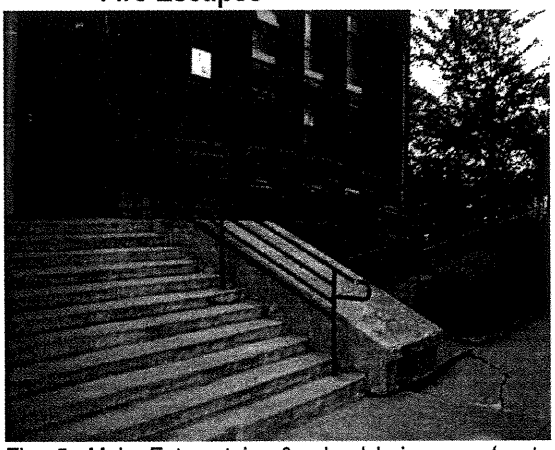

Fig. 5: Main Entry stairs & wheelchair ramp (east elevation)

Entry Stairs

- Remove and reconstruct non conforming wheelchair ramp at west elevation
- Repair, patch and refinish concrete and other surfaces
- Reconstruct masonry stair buttresses at north and south entry stair. Main entry stair at east elevation was already resolved.

Fire Escapes

- Two fire escapes exist, At the north and south elevations; each provide emergency egress from the auditorium.
- Options 'B' and 'C' (See 'Alternative Solutions' for a list of all design options) require removal of the north side fire escape to accommodate an addition; the addition incorporates a revised egress route.

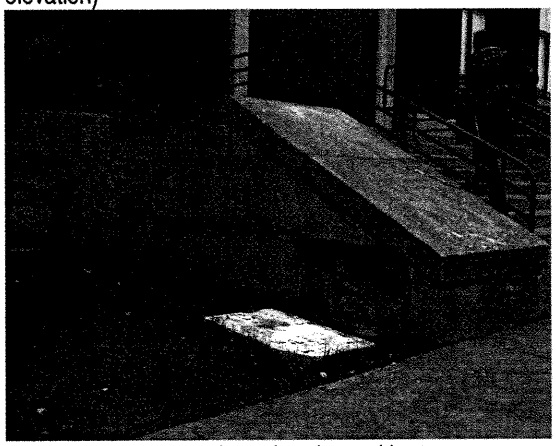

Fig. 6: North Entry stairs – deteriorated buttress

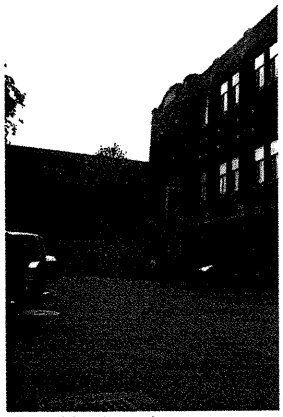

Fig.7:North-stairretaining wall

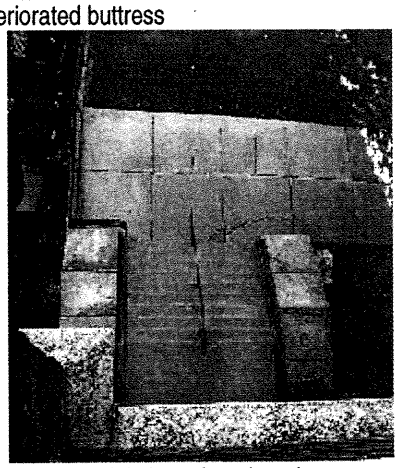

Fig. 8: Aerial view of north stairs

Fig. 9: North side fire escape

Conditions Analysis

Building Envelope

- **Cast Stone**

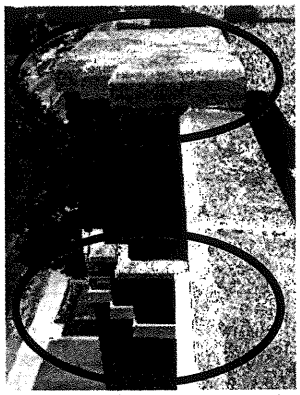

Fig. 10: Coping & cornice deterioration

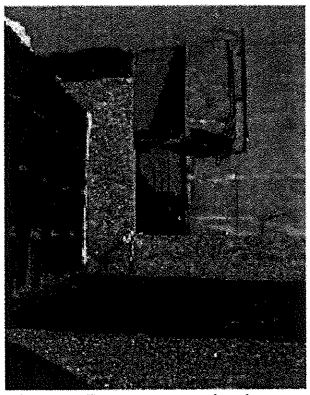

Fig. 11: Parapet weathering

Fig. 12: Cast stone coping detail at parapet – note lead sheet flashing

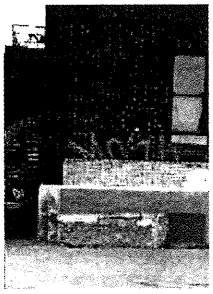

Fig. 13: Northwest building corner at parking area & graffiti

The red brick masonry walls and parapets enclosing Memorial Auditorium incorporate precast concrete ("cast stone") trim in several areas, including belt courses, cornices and copings. While most of these elements appear to be in fair to good condition, some have disintegrated and others exist in an advanced stage of decay. In each case, the damage occurs along the cornice, just below the parapet. Water infiltration from the roof through the parapet wall might appear at first glance to have caused the problems, but a look at the original floor plans shows that flues housing the rainwater leaders coincide in several places with the areas of damage; therefore, leaks and/or condensation related to the ductile iron roof drains may be the principal culprit. Temporary openings into the flues should be created where the drainpipes enter in order to investigate further. It is also possible that poor quality control during casting of the cornice components may have contributed to the problem. Recent roof work included the installation of a membrane that was carried partially up the back of the parapets, so that any leakage from the roof surface into the parapets has been curtailed, if it was a past problem.

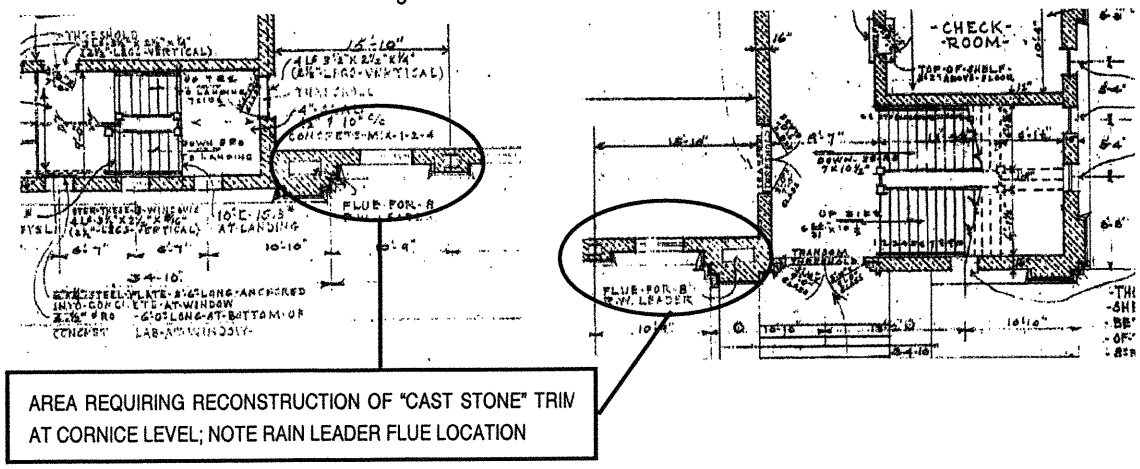

Fig. 14:

Conditions Analysis

Building Envelope

- **Cast Stone**

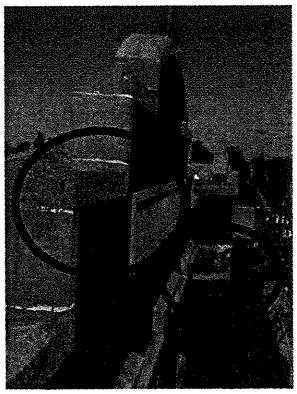

Fig. 15: East main entry parapet, with plaque

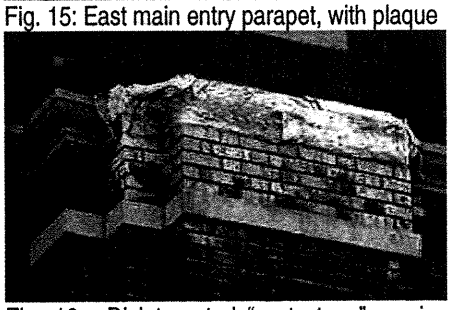

Fig. 16: Disintegrated "cast stone" cornice has stained the brick. The white residue is probably calcium carbonate.

Inspection of the original building section also reveals that the bottom flange of the 18" steel beams supporting the roof may abut the backside of the cast stone cornice. If no cavity was left between the steel and the facing brick and "stone" and moisture infiltration did occur, rust jacking may have resulted, shifting and damaging the cornice components. The drawings also specify "Gov't. Anchors" tying the beam ends to the masonry. In general, cornices pilasters and other masonry areas in which structural steel is embedded without adequate cavities should be regularly inspected and monitored.

At some point, a water repellent or waterproofing coating was applied to some of the masonry parapets and copings. This treatment has discolored the brick and concrete, but the alterations are less visible from street level than from the roof.

Elsewhere, the sloped caps at the façade pilasters (which, at the east and west elevations, house embedded steel columns supporting the roof trusses), remain in fair condition. As would be expected, they are exposed to more weather than the walls; hence, originally smooth surfaces now appear rough because portions of the aggregate binder show through. Capping the rusticated brick base of the building, the wide cast stone belt course is in fair to good condition, but requires repointing – particularly at the (vertical) head joints, which are subject to more erosion from rain water.

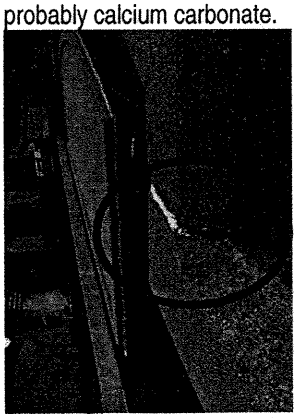

Fig. 17: Parapet seam detail

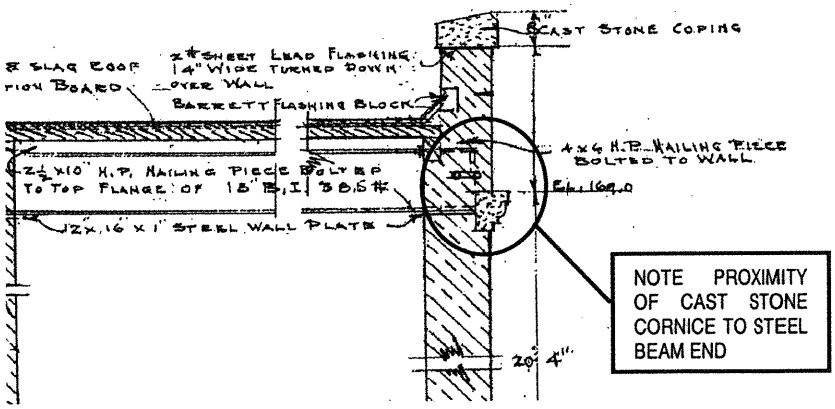

Fig. 18:

Conditions Analysis

Building Envelope

- **Brick Masonry**

Fig. 19:

In general, the exterior masonry walls survive in fair to good condition – due in part to the use of reasonably hard brick and a competent mortar mix. Nonetheless, some areas have weathered more than others and there is some evidence of prior repairs. Repointing is recommended in accordance with the degree of damage, from 20 percent at the upper floors to 75 percent at portions of the rusticated base. Repointing mortars should match the existing as closely as possible, in terms of color and texture, and repaired areas should be tooled to match adjacent masonry.

Exterior masonry repairs at window openings should be coordinated with window repair and replacement, in terms of construction sequencing and prudent use of scaffolding. At all masonry window openings, repair and restoration of the rusted steel lintels is strongly recommended.

At the third floor room currently used as a dance studio, cracks, brick displacement and evidence of earlier repairs in the brick exterior bearing wall where it carries the steel roof beams indicates ongoing problems that may be related to the cast stone cornice deterioration. Rusting beam flanges, bearing plates and/or internal anchors (indicated as "Gov't. Anchors" on the original construction drawings) may be damaging the masonry, which is especially vulnerable where steel roof beams bear on the wall close to window openings. Such areas should be opened up to allow investigation of the steel. Following removal of rust and proper priming of steel, the masonry should be rebuilt around the beams.

Conditions Analysis

Building Envelope

- **Roofing & Flashing**

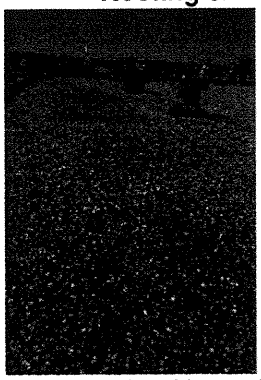

Fig. 20: Roof - evidence of ponding

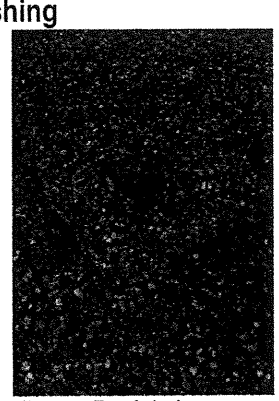

Fig. 21: Roof drain

Repair/ insulate roof drainage system.

•Replace original roof access hatch

•Six exhaust fans were part of the original roof system. Two have been replaced with new fans; the remaining four have been physically blocked off.

•Add dampers and relief vents as needed.

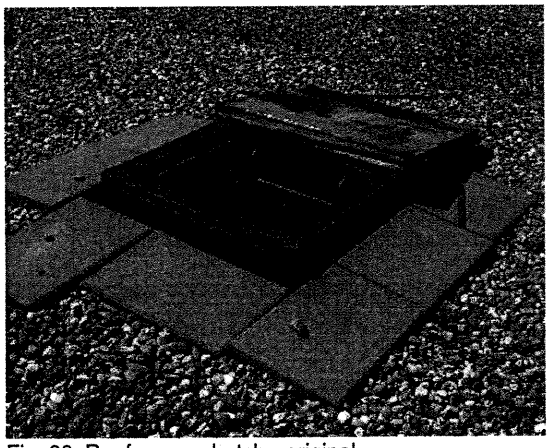

Fig. 22: Roof access hatch - original

Fig. 23: Rooftop exhaust fan

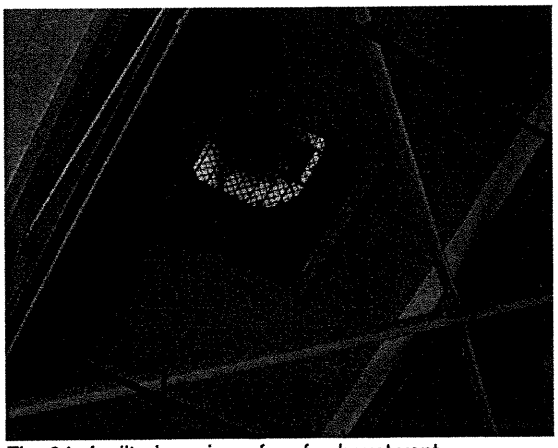

Fig. 24: Auditorium view of roof exhaust vent

Conditions Analysis

Building Envelope

- **Windows**

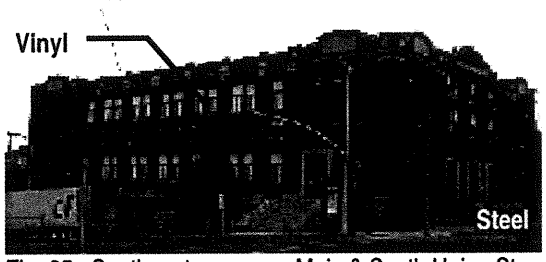

Fig. 25: Southeast corner on Main & South Union Streets

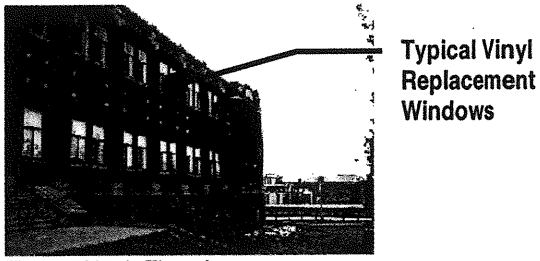

Fig. 26: North Elevation

Fig. 27: Existing vinyl replacement window

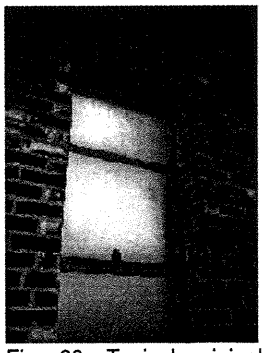

Fig. 28: Typical original steel window, note ribbed glass

Fig. 29: Typical steel window – note rusted frame

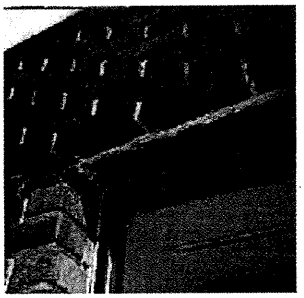

Fig. 30: Steel lintel at window m.o., note rust

Like other large public and institutional buildings of its era, Memorial Auditorium was erected with tall steel windows. the steel frames enabled the building architects to specify large windows using frames of thin cross-section, thereby maximizing the amount of light transmission. Most of the extant windows are glazed with ribbed glass, which was developed and used for factories as a way to diffuse daylight and to "project" it deeper into the interior spaces. Although the 1926-27 drawings appear to indicate pivoting windows of the industrial type, the extant windows are "project-out" awnings with inline hinge arms that allow the window head to slide down the jamb tracks as it is opened.

While the existing steel exhibits significant amounts of rust, the frames appear to retain their structural integrity and strength. However, some of the interior stops lining the perimeter have deteriorated and/or separated from the frames due to condensation-related moisture, and may need to be replaced.

Restoration of the historic steel windows is recommended; this process involves rust removal, repair, refinishing and reglazing, together with perimeter sealants and masonry repair. Depending upon the anchorage system and other scheduling and cost factors, the windows may either be removed or restored in place. Retrofitting the existing steel with insulated glass is likely to be difficult and expensive, so

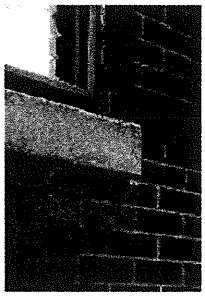

Fig. 31: Existing steel window – Exterior cast stone sill

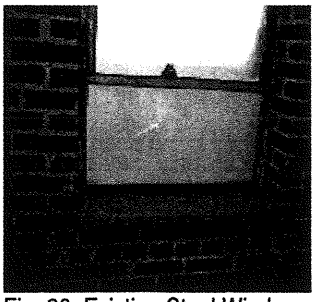

Fig. 32: Existing Steel Window - Interior Sill

with insulated glass is likely to be difficult and expensive, so the addition of inexpensive "magnetic" storm windows is recommended.

A comprehensive window restoration approach would involve replacement of the existing inappropriate vinyl windows with new replacement windows matching the historic configurations as closely as possible. New steel windows configured to match but incorporating deeper cross sections to accommodate insulated glass are recommended. Aluminum windows may be procured for less money but the cross sections will be larger (because aluminum is not as strong as steel) and the insulating qualities will not be improved (because aluminum is a much better thermal conductor and the insulating qualities of acrylic "thermal breaks" are limited).

Several existing basement and ground-floor windows include security grilles and gratings. In general, these are in poor condition. The need for security grilles in each area should be assessed; some windows could be reglazed with laminated glass for security, dispensing with the grilles.

Building Envelope

- **Doors**

Fig. 33: Main Entry

Fig. 34

A handful of the original heavy stile-and-rail wood doors remain at Memorial Auditorium, although many have been replaced with modern doors. In general, the raised-panel doors with glazed panels and frames surmounted by multi-paned, glazed transoms are significant character-defining features that should be retained. Accordingly, reconstruction of the three pairs of main entrance doors at the South Union Street elevation is recommended. Complete restoration of the entrances will require repointing of the cast stone surrounds and replacement of wire glass lights with tempered plate glass.

Conditions Analysis

Interior

- **Ground Floor / Annex**
- **Boiler Room**


Fig. 35: Ground Floor Annex

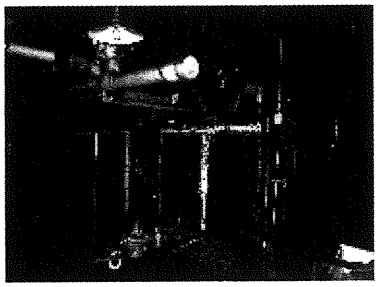
Fig. 36: Boiler Room


Fig. 37: Boiler Room - Storage

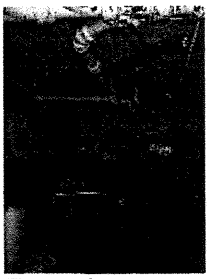
Fig. 38: Annex Storage

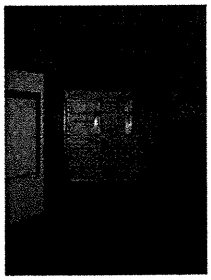
Fig. 39: Annex Overhead Loading Door

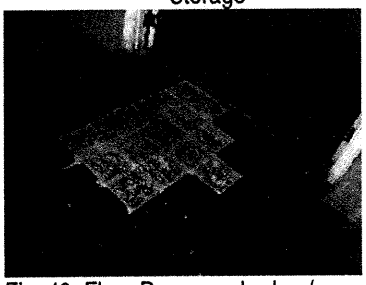
Fig. 40: Floor Damage: broken/ missing VAT

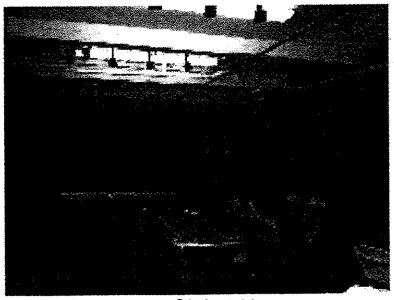
Fig. 41: Annex – Club 242

The Boiler Room is below the "Annex" level, along the west edge of the building. Refer to Lanpher Associates' report on existing MEP systems and required upgrades.

The Annex level currently houses a community arts center including the Frog Hollow and City Arts programs. A recent addition, the city's telecommunications center resides here as well. The remaining space serves as a multi-purpose area, and includes a concessions stand. The Auditorium floor structure above is exposed to view and there is no acoustic separation. Adjacent to the main floor is the existing teen center 'Club 242,' which features a separate entrance.

With the exception of City Arts, the spaces are minimally finished and in need of repairs.

Conditions Analysis

Interior (Intermediate Level)

- **Dressing Rooms**

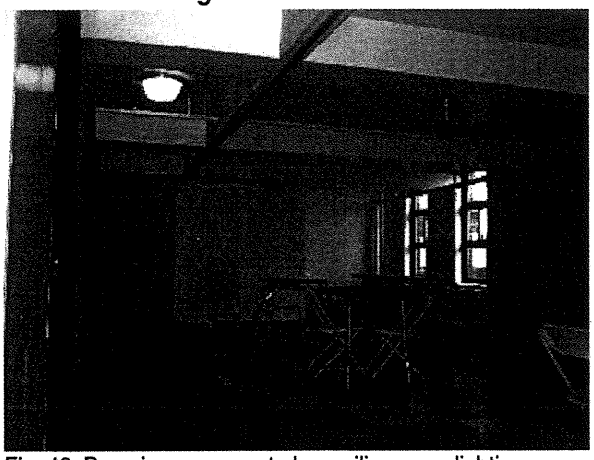

Fig. 42: Dressing room– note low ceiling, poor lighting

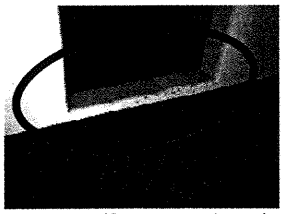

Fig. 43: Entry to changing/ shower room

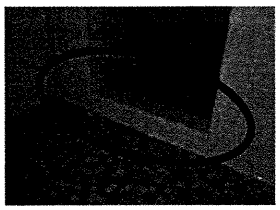

Fig. 44: Barrier at doorway between Changing & Shower Room.
Remove barriers & repair finishes, typ. for 2

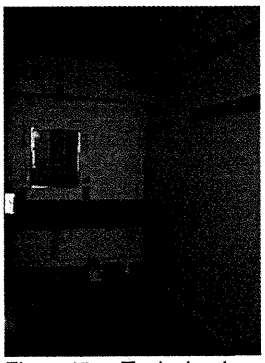

Fig. 45: Typical dressing room

The dressing rooms fit on an intermediate level between the "Annex" ground level and the first floor Auditorium level. The floor is divided into two main rooms with each having individual change rooms, showers, and restrooms.

The entire level needs to be upgraded for ADA accessibility, e.g. doorways, clear widths, showers, and most importantly wheelchair access to the entire dressing room level from the stage and ground level.

New options propose to add a new elevator that will provide access to all levels adjacent to the stage.

Conditions Analysis

Interior (1st & 2nd Floors)

- **Auditorium & Balcony**

Fig. 46: View from balcony

Fig. 47: Existing balcony railing __ AFF (too low)

Fig. 48: Existing balcony- top tier, looking toward rear of auditorium

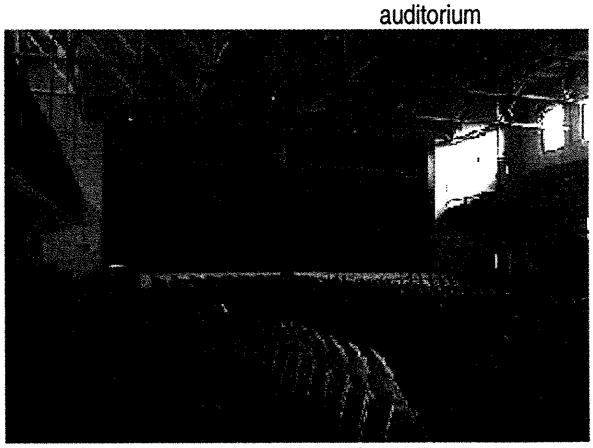

Fig. 49 Auditorium – view of proscenium.
Future elevator shaft location behind proscenium

The existing auditorium use varies from headline concerts, recitals, ceremonies, lectures, and basketball and volleyball games.

Stage sound & lighting conditions are reviewed in Lanpher Associates' inspection report.

The existing balcony and wood chairs are considered to be contributing historical building elements.

The proposed stage/ dressing room elevator would not only provide wheelchair access to these areas, but also an easier method for transporting props and equipment to the stage.

Conditions Analysis

Interior (3rd Floor)

- **Multipurpose Room & Stairs**

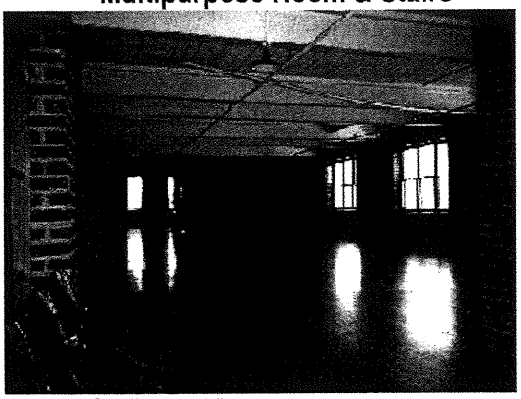

Fig. 50: Studio at 3rd floor

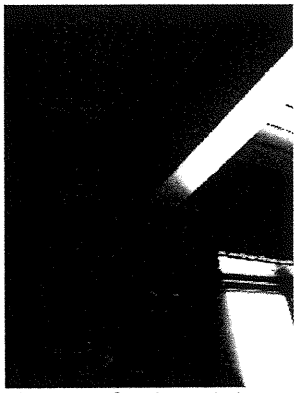

Fig. 51: Steel roof beams bearing on masonry

Multipurpose Room:
Located on the east end of the building, the 3rd floor multipurpose room offers a pleasant space for public dance and music classes.

Some masonry repairs are needed where the steel beams meet the masonry wall.

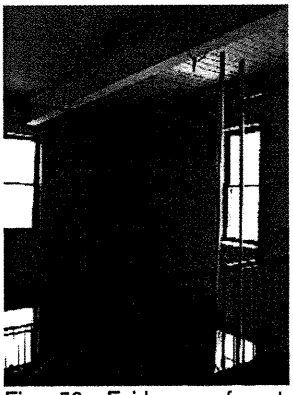

Fig. 52: Evidence of water damage at corner

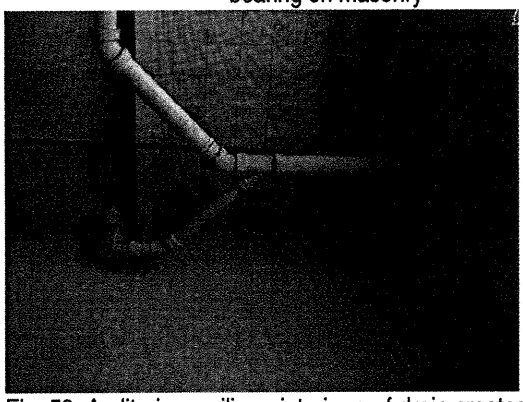

Fig. 53: Auditorium ceiling - interior roof drain creates condensation problems, insulation recommended.

Stairs:
Stairs are located in each of the 4 corners of the building. The two on the west end are enclosed; the two on the east are not.

Several areas along the stairwell masonry suffer from moisture problems and have developed paint deterioration and efflorescence patches.

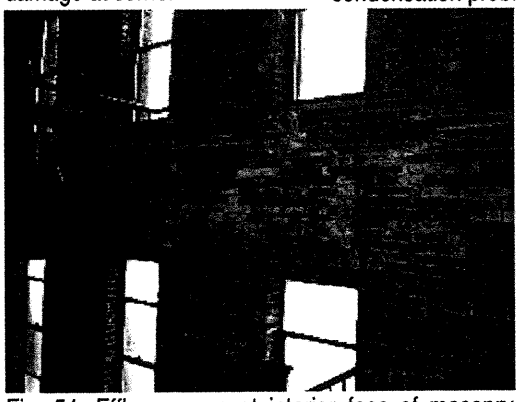

Fig. 54: Efflorescence at interior face of masonry, stairwell

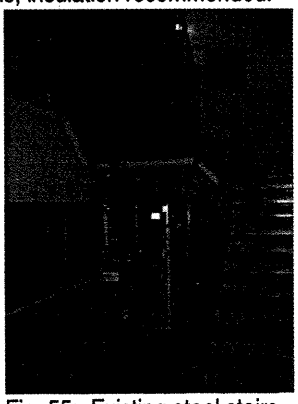

Fig. 55: Existing steel stairs

Conditions Analysis

Interior

- **Restrooms**

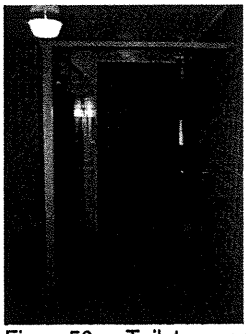

Fig. 56: Toilet room- entrance does not comply with ADA

Fig. 57: Toilet Room- adapted for HC users

The only restrooms with public wheelchair access are located on the "Annex" ground level and directly off of the lobby entry. These restrooms have been upgraded to date, but still have some clearance issues that need to be resolved.

Other restrooms are located on the dressing room level, multipurpose room 3rd floor, and on the intermediate landing levels off the stairs. These restrooms are in desperate need of a fixture upgrade and finishing in accordance with current codes.

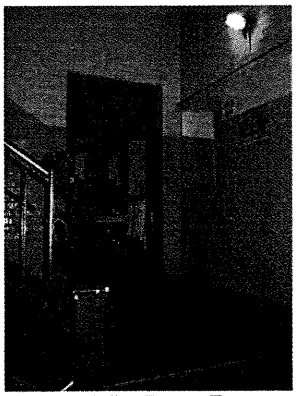

Fig. 58: Toilet Room Entry

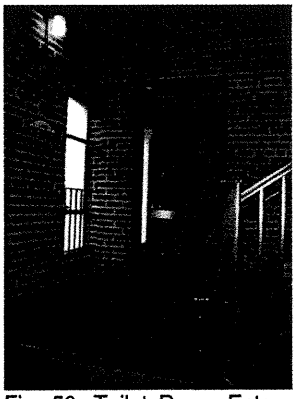

Fig. 59: Toilet Room Entry off stair landing: not accessible

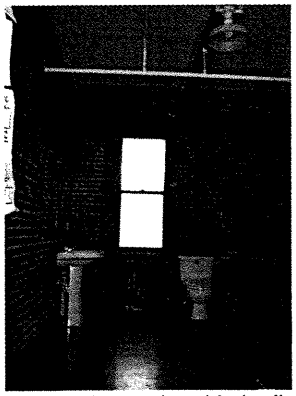

Fig. 60: Recently added toilet room at 3rd floor

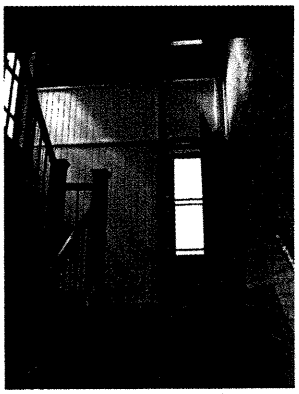

Fig. 61: Existing enclosure at Southwest stairwell

2.0 MEMORIAL AUDITORIUM

2.1 Existing Conditions

Systems Report

Mechanical & Electrical Inspection

LANPHER ASSOCIATES, INC.
DESIGN AND CONSULTING ENGINEERS

MECHANICAL & ELECTRICAL INSPECTION
BURLINGTON, VT MEMORIAL AUDITORIUM
September 26, 2002

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BOX 472, ONE SUMMIT ROAD
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TEL. (207) 276-5350 FAX 276-4067

September 26, 2002

To: Bargmann, Hendrie + Archetype
Attn. Janine Glacier, Jack Glassman

From: Lanpher Associates, Inc.
Eric A. Lanpher, P.E. VT
Dwight M. Lanpher, P.E. VT
Dennis M. Riley, P.E., ME
Rachel J. Riley, E.I., ME

Subj: Inspection of Burlington Memorial Auditorium

The following list of observations is based upon our inspection of the site on Wednesday, September 5, 2001 by Dwight M. Lanpher, P.E. Electrical Engineer, Dennis Riley, P.E. Structural Engineer and Rachel J. Riley, E.I. Mechanical Engineer. Allen Campbell, Manager and the Architects were also present during these inspections.

Our overall opinion of the facility is that it is in generally good condition but there are many older systems dating back to the original building construction.

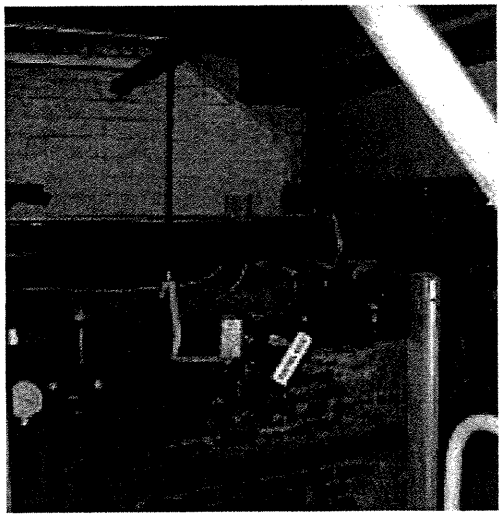
The following report addresses issues with the major systems.

MECHANICAL SYSTEMS

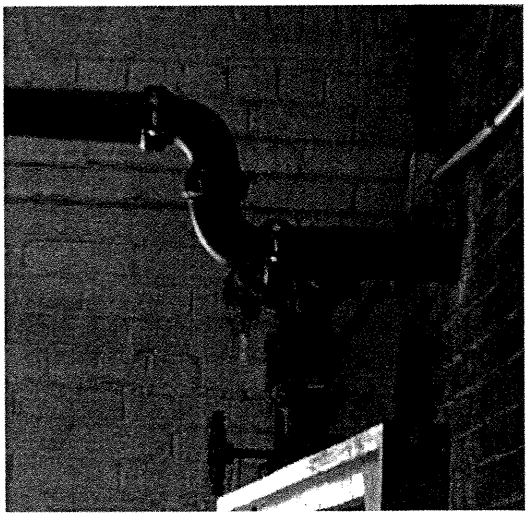
BUILDING AUTOMATIC SPRINKLER SYSTEM

The building has a modern, wet type sprinkler system and fire alarm retrofit installed in the early 1990s which covers most or all of the building we observed, including the boiler room.

No fire hose racks were noted within the building.



Sprinkler Entrance



Termination of Sprinkler System on 3rd Floor

PLUMBING

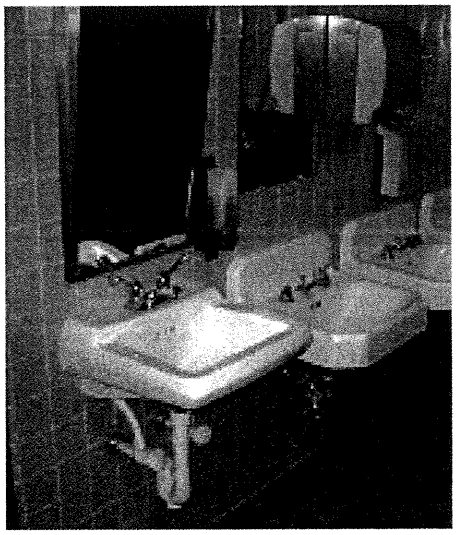
Domestic water for the building is provided from a city water main. A 6" water main is located in the basement.

Water pressure appears satisfactory.

Water piping appears to be leak-free.

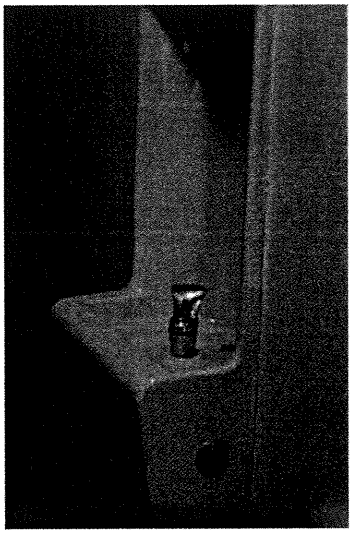
Copper piping solder should be tested for lead content.

The plumbing fixtures in the annex toilet rooms are modern and seem to comply with ADA standards. However, most of the plumbing fixtures throughout the remainder of the building, including the changing area, do not appear to comply.



ADA Sink in Annex Toilet Room

Urinals in Men's Changing Room



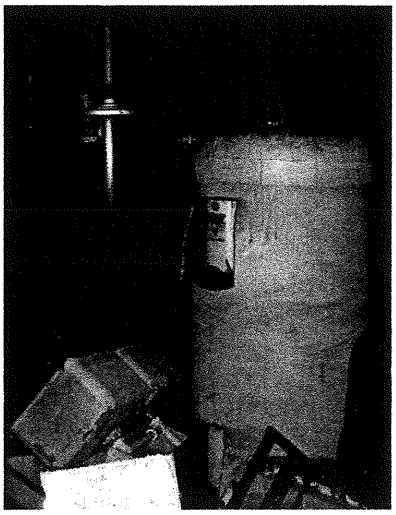
Non-ADA compliant Water Fountain in Changing Rooms

The original waste piping is cast iron. However, some recent plumbing installations, such as the new sink and toilet in the 3rd floor dance studio changing room, has been done in PVC. We were informed that PVC is not to code. In checking with the Burlington Code Enforcement Officer we found that PVC is acceptable and that cast iron is optional.

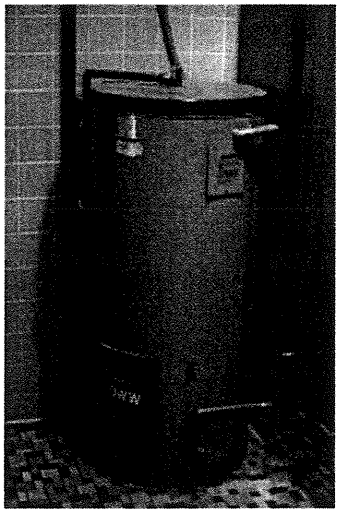
Occasionally, water will drip from the roof drain piping routed along the ceiling of the auditorium when cold rainwater is running through the piping and a lot of people are present. The warm, humid air in the auditorium will condense on the piping and drip, creating a nuisance to people and damage to the floor and seats. This piping should be insulated to prevent condensation from taking place.

DOMESTIC HOT WATER

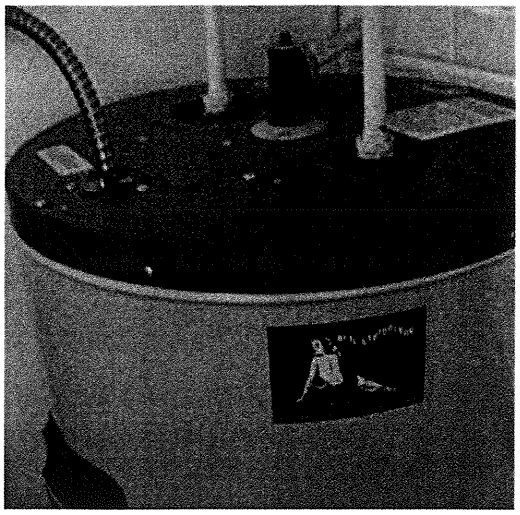
Domestic hot water is provided by the waste heat from the generator in the basement. Heated water is stored in a stone-lined hot water tank. When the generator is not running, domestic hot water is provided by a gas fired hot water heater and another stone-lined storage tank located in the boiler room. Electric hot water heaters are also located throughout the building to provide hot water to the immediate areas.



Gas Fired Hot Water Heater and Storage Tank in Boiler Room



Electric Hot Water Heater in Annex Toilet Room



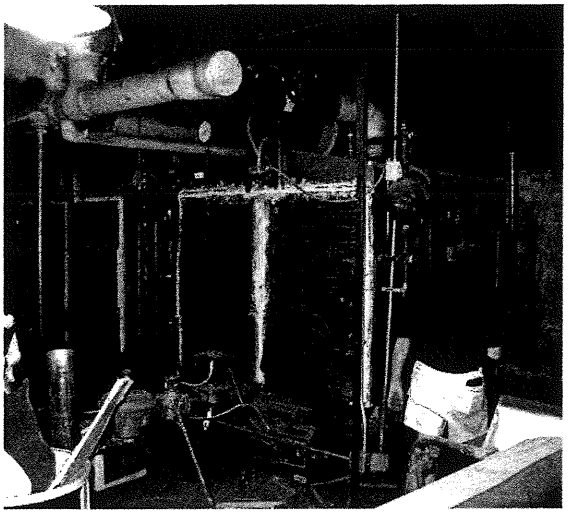
Electric Hot Water Heater in Hall Toilet Room

We recommend replacing the electric hot water tanks with steam-heated tanks. Further study must be conducted to see if a steam line is close enough to make this possible. We also recommend replacing any hot water tanks which are stone or glass-lined to tanks which are polyethylene-lined or stainless steel to prevent corrosion and failure.

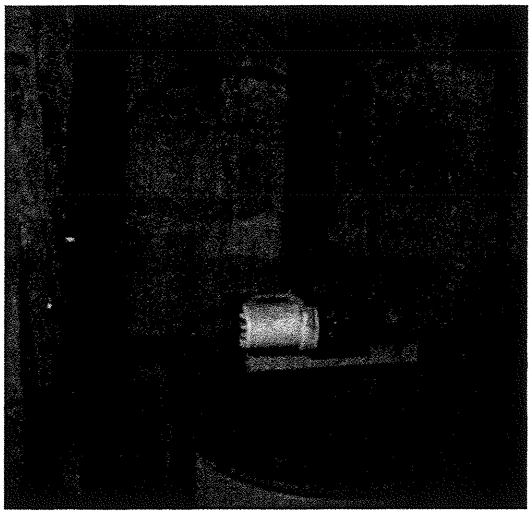
HEATING SYSTEM

The steam heat in the building is provided by two Smith gas fired low pressure boilers. Each boiler has 11 sections and provides 1723 MBH of steam heating. The burners on these boilers date from the mid-1970's and are similar to an atmospheric burner. The boilers and the burners are probably at least 10% less efficient than a modern power-burner system and can use substantially more fuel. The boiler technician reported that the boilers have had no major problems but he does not know how much longer they will last.

The condensate return tank and pump appear to be old and in need of repair or replacement. A partially open tank with a pump perched on top provides water to the system as required. This system should be replaced with a line from the water main to the boilers with a boiler fill valve. It may also be necessary to treat this water to prevent boiler corrosion.



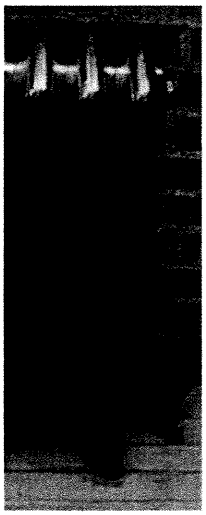
Gas Fired Boilers



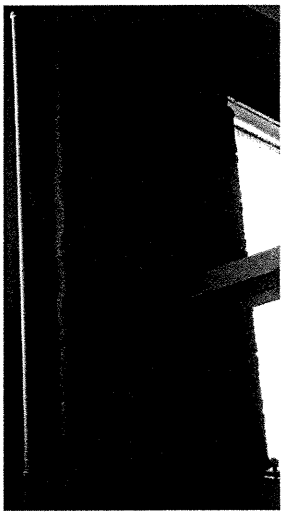
Boiler Fill Tank and Pump

Individual room heating is primarily provided by steam radiators. These appear to be in good condition, although they do get hot to the touch. They can present a burn hazard. A guard was placed over some of the units we observed in the auditorium. Several areas are also heated by steam convectors or steam unit heaters. Many of the units we observed cannot be converted to a hot water heating system.

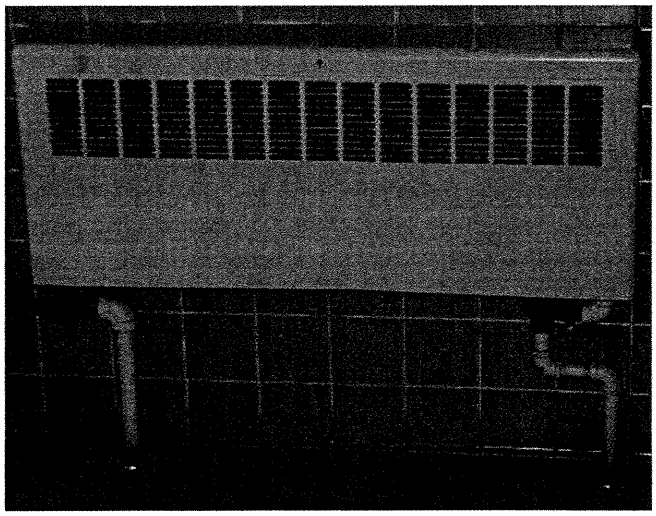
Many heating units did not appear to have vacuum breakers in the steam piping connections. This would cause "water hammer" noises when the steam is flowing through the heater. Steam piping should be inspected and any incorrect piping techniques should be replaced.



Steam Radiator in Dance Studio, Top Floor



Steam Wall Radiator in Auditorium



Steam Convector in Changing Room Area

Most areas do not have problems with underheating in the winter. The Owner's Representative reported that the auditorium heated very quickly when the heaters

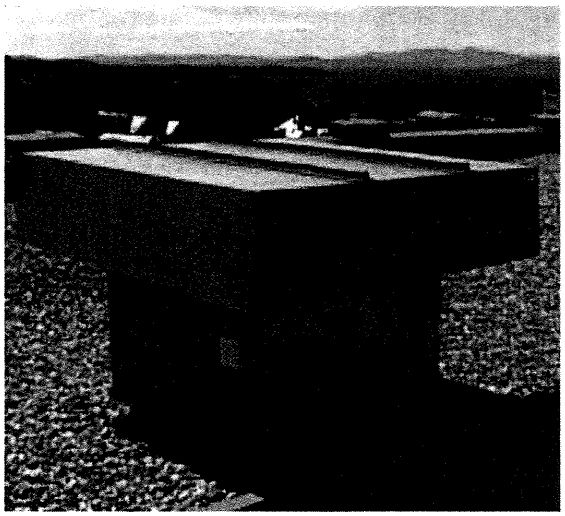
are activated. The dance studio on the third floor does seem to have control problems. It is cold in the winter and hot in the summer. It is not on its own zone and is located on the outer wall of the building, so it probably becomes colder quicker than other areas in the same zone.

Many problems are associated with steam heating systems, including boiler and piping corrosion and noise from pipe expansion. Steam systems also consume about 10-20% more fuel than hot water systems. However, this is a large building and many of the existing radiators and heaters cannot be converted to a hot water system. Since the cost of replacing all the heaters, the boilers and the piping could be large, we do not recommend converting this system to a hot water system without additional study. Also, no major dissatisfaction with the existing steam heating system was reported to us. Although the boilers are old, we have seen no evidence that they will fail soon. If budget allows, they should be replaced with modern boilers and burners to increase heating efficiency. If this is not possible, we recommend replacing the burners.

We believe that the existing steam boilers can handle the additional load of a new lobby addition at the rear parking lot. A new steam line could be drawn off the steam main in the boiler room and routed to this new area. If radiant heat is required, a heat exchanger and hot water tubing are necessary. Otherwise, steam baseboard would also work well and be less expensive. Steam heaters produce about 50% more heat than hot water heaters.

VENTILATION SYSTEM

The auditorium portion of the building is vented with 4 large roof fans and 2 roof relief vents. The fans are equipped with backdraft dampers that close when the fans are not running. They also close when the airflow from the fans is reversed, so that when the fans are supplying air to the space, the dampers close and make this option useless. The fans were running while we were there, the air flow through the room felt adequate.



Roof Fan for Auditorium

Roof Vent for Auditorium

Exhaust fan opening in auditorium ceiling

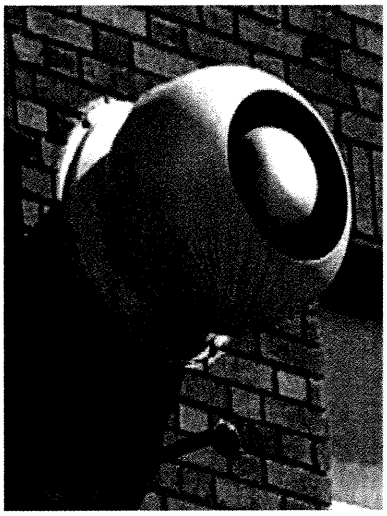
Backdraft damper is open, fan is running.

Backdraft damper sometimes stick open as corrosion accumulates.

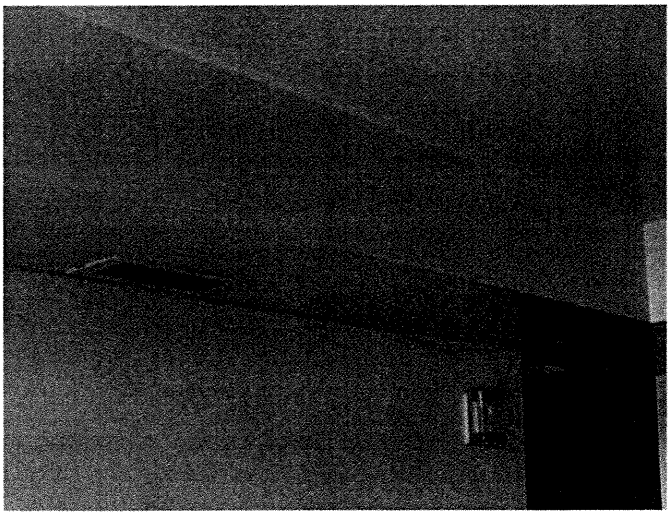
Recommend replacing the backdraft dampers with motorized dampers which will open automatically when the fans are in use and close when they are not. While closed, they have less leakage than backdraft dampers. Relief vents should also be equipped with these units.

The roof fans should be inspected to see if they need replacing. Many of the roof vents look quite worn and should be replaced.

The changing area near the stage is also ventilated with exhaust fans. Three wall-mounted fans associated with three switches exhaust air out of each changing room, the toilet rooms, and the shower rooms. This system appears to be working satisfactorily.



Wall Fan for Changing Area



Ceiling Exhaust Grille in Changing Room Area

Several toilet rooms and the kiln room are also vented with exhaust fans. These units should be further inspected for correct operation.

A new heat exchanger has been recently installed for the new computer room located on the ground floor. A ductless split system wall mounted air conditioning system was also installed in this room.

An old window in the boiler room was retrofitted with ducts to provide combustion and ventilation air to the boiler. This unit does not look large enough, nor does it appear to be working properly. This boiler ventilation system must be replaced with an adequate one.

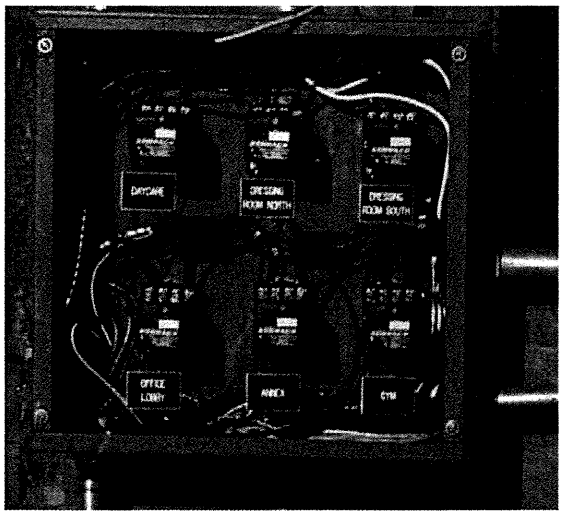
As mentioned earlier in the heating section portion of this report, the dance studio on the third floor is often either too warm or too hot, with little control options. We recommend adding a ventilation system to this area, with a heat coil if possible.

AUTOMATIC TEMPERATURE CONTROL SYSTEM

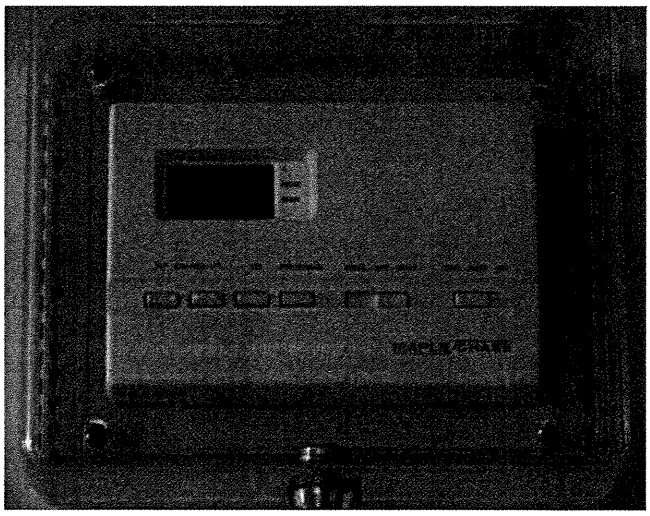
There are five zones and four programmable thermostats in this building for temperature control. This system seems to have no problems, although the third floor dance studio is often too hot or too cold.

There is no central control system in this building, all heating control is done by the programmable thermostats. Some areas are controlled by manually turning the steam valves by hand.

The caretaker of this facility is satisfied with the current control system and has no problem keeping everything running when it should. However, a central control system could make temperature adjustments easier with less manual labor to maintain schedules are all of the individual thermostats.



Relay Control Panel in Boiler Room



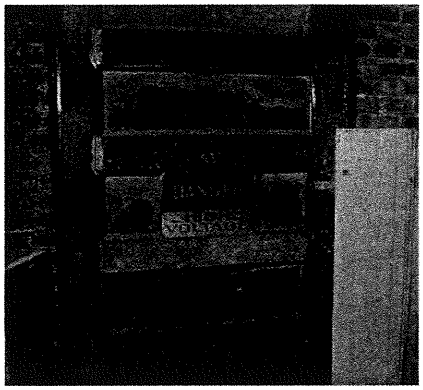
Programmable Thermostat

ELECTRICAL SYSTEMS

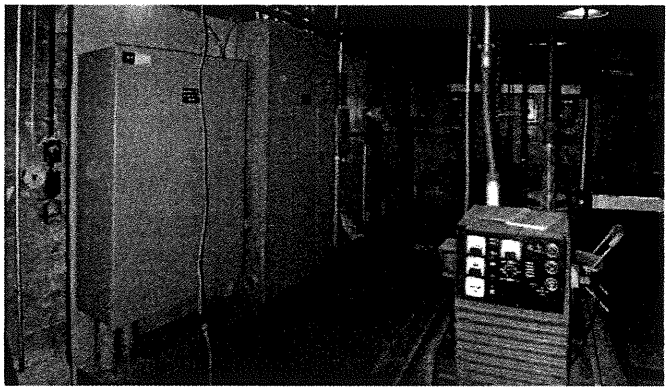
ELECTRIC SERVICE EQUIPMENT

Service transformer vault is located in basement. Access is only by Electric Utility Co. It was stated that the transformer supplies other buildings besides the Auditorium.

Entrance equipment is 800 Ampere, 120/208 volt, 3Ø. mfd. by Cutler Hammer.



Basement Transformer Vault

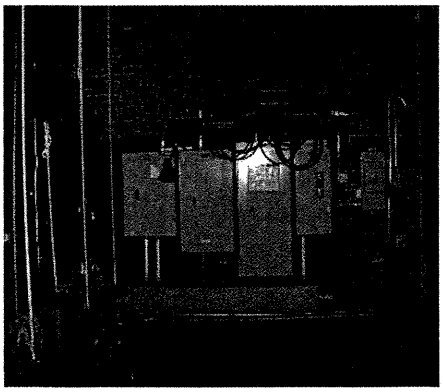


800A Service Entrance & 30KW Generator

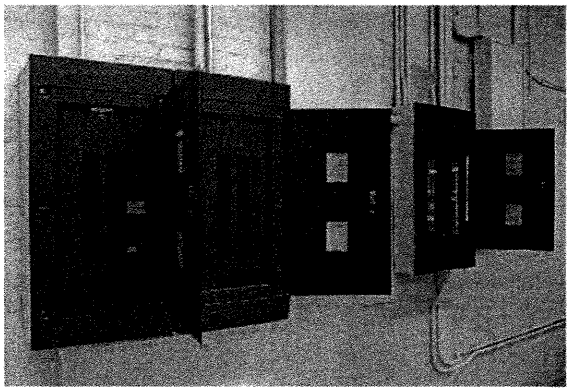
Generator, 30KW, 104A,120/208V, 3Ø, is used for backup of critical systems only.

Transfer switch is 3-Pole, 102/208V, 200A (72KW).

Generator does not meet protected location requirements of Life Safety code. (See *Emergency Lighting* in following sections.)



Stage Service, 400A & 200A



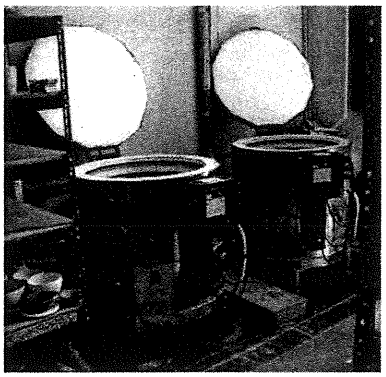
Annex Level Load Panels

With 400A and 200A panels the stage electric service is properly sized for all but the largest touring shows.

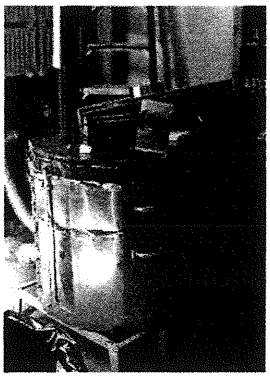
Shows with larger power requirements have been serviced with portable generators. This is probably the most economical method of providing additional power for these occasional shows with large power demands.

Annex level power distribution from modern circuit breaker panels.

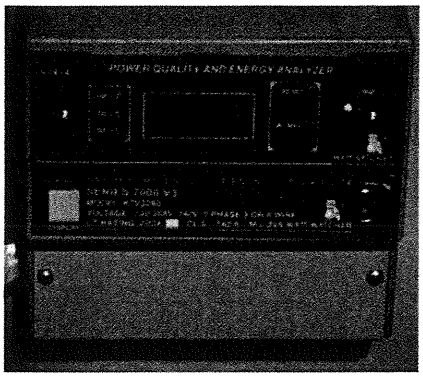
Roof mounted power panel provides power for roof mounted ventilation equipment.



Two Electric Kilns



Large Electric Kiln



Pottery Studio KWH Meter

The pottery shop kilns use large amounts of power, 40-50KW peak (140A at 208V, 3Ø) This is a large load which significantly affects both Peak Demand and Electrical Energy usage for the building's electric bill. An electronic energy analyzer meter was installed to prorate electrical usage to the pottery shop. While it can measure the KW hours of energy consumption, it cannot calculate the additional peak demand added by the Pottery Shop to the Auditorium's electric bill.

A separate electric service was not installed for the pottery shop because of a lack of a service entrance bonding conductor back to the main water entrance. Because of data system grounding needs, this conductor was being added to the service entrance during our inspection and it should now be possible to separate the pottery shop electric service for accurate billing.

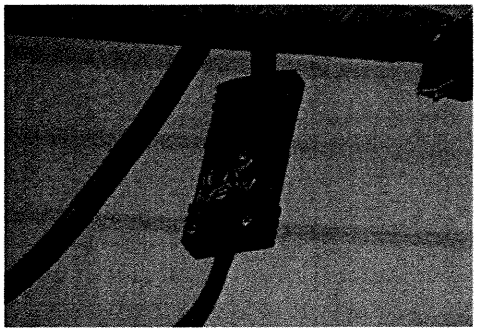
DEVICES

All observed general duty receptacle devices were grounded type receptacles.

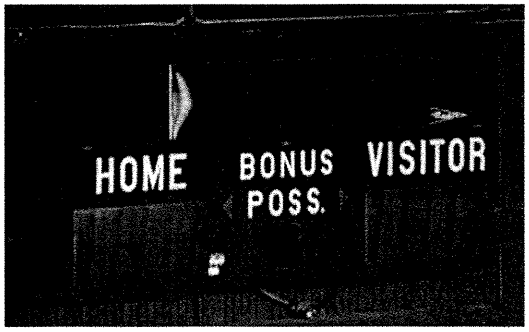
Additional GFIC devices should be installed to protect boiler room and other areas as needed.

Stage Pin plugs are used for auditorium lighting equipment connections.

This was the preferred connector for professional touring groups and theatrical rental houses. There is an evolution towards NEMA L5-20 twistlock connectors (especially in educational facility venues) but it is still too early to consider changing the auditorium's standard connector.



Stage Pin Plug Connector Set



Auditorium Score Clock

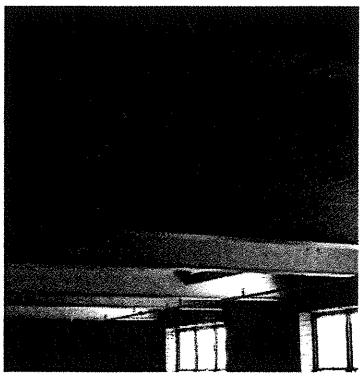
The auditorium score clock is a late 1970's vintage design.

It was noted that parts were available for recent repairs; however, the unit is nearing the end of its useful life and replacement may be necessary within the next five to ten years.

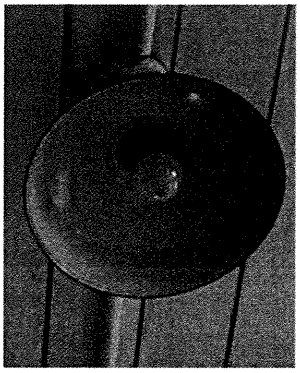
LIGHTING, GENERAL

Lighting in this building is best described as utilitarian.

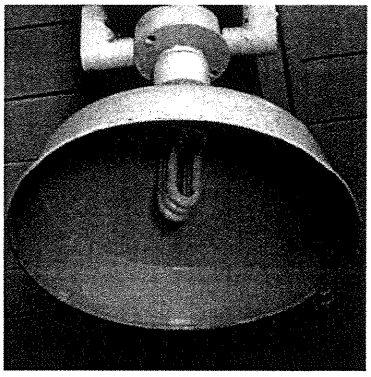
Fixtures are without architectural merit and have dubious historical value.



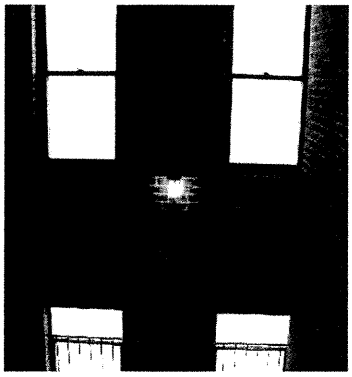
Dance Studio



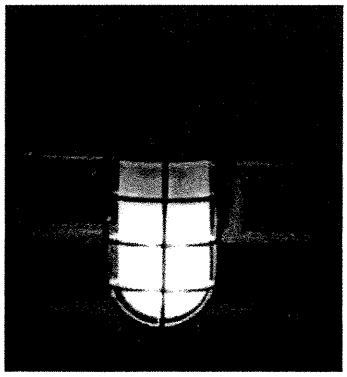
Incandescent Lamp



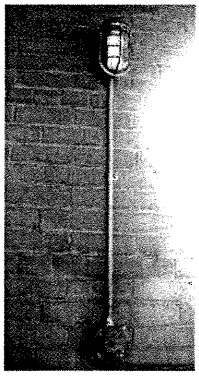
Retrofit Fluorescent



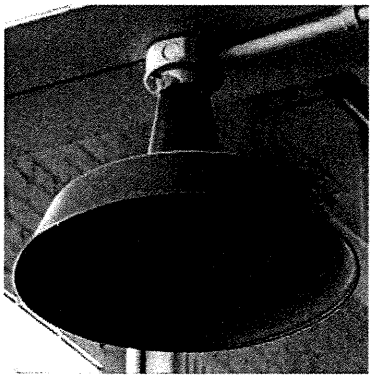
Stairwell



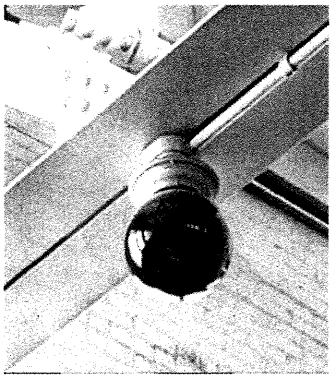
Stairwell Closeup



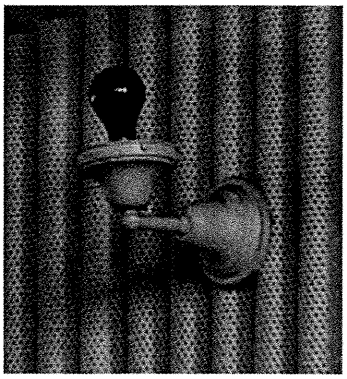
Stairwell



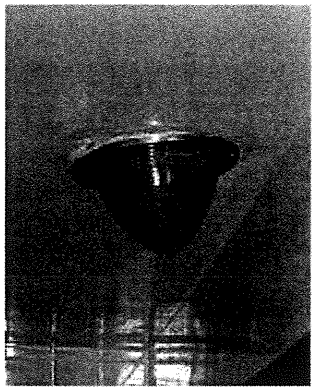
Under Balcony



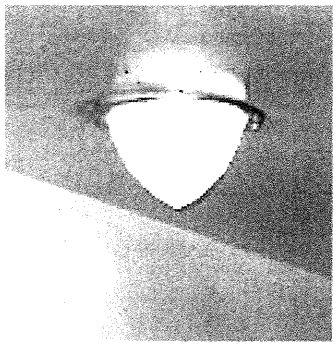
Auditorium



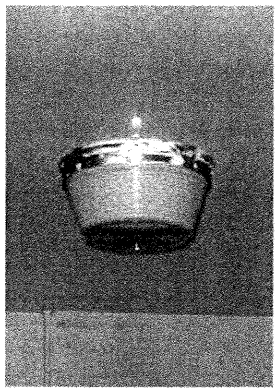
Auditorium



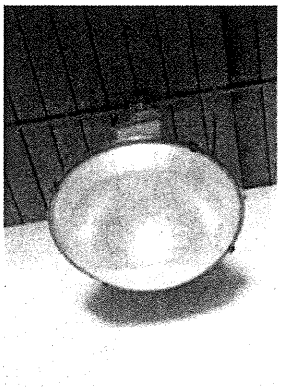
Dressing Area



Dressing Area



Dressing Area



Annex Fixture

Annex Entryway

Especially disappointing is the uninviting lighting of the entrance to the Annex.

Most of the remaining original fixtures are incandescent types with 120V medium screw base sockets. Many of these have been supplied with retrofit type PL fluorescent lamps. Replacement of this type lamp is expensive because the solid state ballast is usually integral and must be thrown away with the lamp. If the ballast assembly does have a socket for lamp replacement, then it is usually low wattage and low lumen output to make the lamp assembly small enough to fit in the fixture.

Recommend that special areas of the auditorium should be selected for improved lighting with a few period pieces or architecturally striking fixtures to highlight and add interest to the facility.

Other utilitarian fixtures should be replaced with plug-in PL or modern T-8 or T-5 fluorescent lamps for economy and energy efficiency.

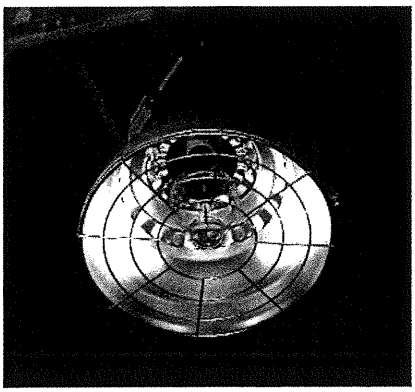
Fixtures in boiler room should have guards to prevent accidental lamp breakage.

LIGHTING, AUDITORIUM

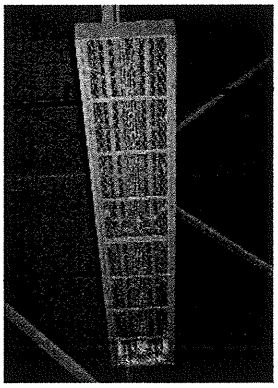
Sixteen modern, energy efficient, 400W metal halide fixtures located over auditorium house area for sporting events.

Fifteen 4 x 32W T-8 fluorescent units installed for "instant on" applications and switched in banks to dim lights for stage performances.

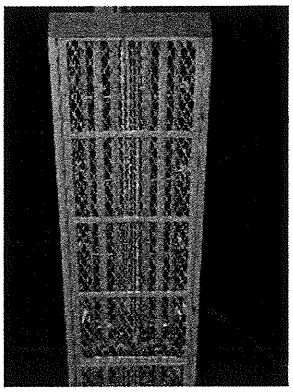
Recommend retrofitting house fluorescent units with dimmable ballasts for true houselight dimming for stage performances.



Auditorium MHD Fixtures



8' "Instant on" Fluorescents



Equipped with T-8 lamps

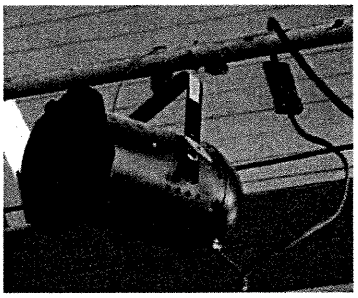
STAGE LIGHTING

Eight PAR cans on 1st house pipe provide minimum stage lights for speeches, etc.

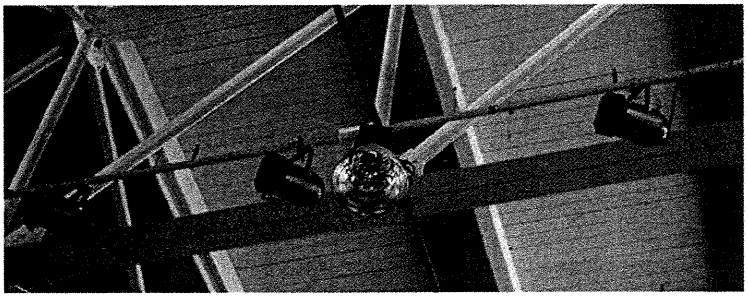
Touring companies bring their own equipment and only need a "house" electric hookup. The 400A & 200A panels provide convenient power for these kinds of groups.

Local performance lighting equipment is rented on an as needed basis. A show might require anywhere from two dozen (very small) to a couple hundred lighting instruments.

This is a cost effective way of running this type of facility but it does require more effort for local performance groups to "hang" a show. Equipment must be rented, delivered, hung, "struck" and returned to the rental house for each show. One big advantage is that maintenance and updating of the equipment becomes the responsibility of the rental houses for rented equipment.



PAR Can Spotlight



1st House Electric (eight spots total)

STAGE SYSTEMS

Stage equipped with a half fly system consisting of eight 500 pound arbor sets.

No loading gallery above so battens have to be raised and lowered several times to hang a full load.

3 Fly System Arbor Sets

Rigging in Auditorium Ceiling

The open grid in the auditorium provides an excellent mounting platform for touring company or rented, ceiling hung scenery, lighting and sound equipment.

EXIT LIGHTING

Most EXIT lights are incandescent type with some auditorium and other area EXIT lights retrofitted with fluorescent lamps.

All should be replaced with LED type units to meet Vermont's energy codes.

Auditorium EXIT light with
Retrofitted Fluorescent Lamp

New Fixture in Renovated
Space on Annex Level

EMERGENCY LIGHTING

No battery type emergency lighting units. Emergency egress lighting provided by generator operation of selected lighting circuits.

The generator is not enclosed in a secure location and a fire in the boiler room would disable all emergency lighting in the building. Even if it were economically feasible to build a fire rated room for the generator, transfer switch and emergency power panel, the lessons learned in the 1993 World Trade Center bombing indicate that this is no longer a desirable practice.

Recommend installing a minimum amount of 12V, 100W battery operated emergency lighting units with up to eight local and remote heads each throughout the building to light egress routes. The generator powered lighting would remain in place as a supplemental lighting system.

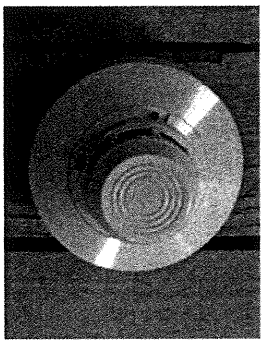
FIRE ALARM SYSTEM

The fire alarm system was replaced in 1994.

The main fire alarm panel is manufactured by FCI, has 24 zones of which 7 are active.

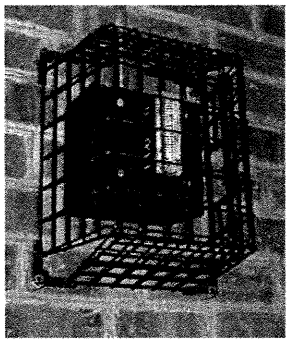
Modern devices are located throughout the building.

Pull Station



Smoke Detector

Heat Detector



Horn/Strobe Alarm

Insufficient number of strobes to meet modern ADA standards.

Recommend adding strobes in all public spaces, corridors, rest rooms and other locations to meet intensities as required by ADA.

A fire alarm voice announcement system needs to be installed for the auditorium and annex spaces.

It was stated that stage smoke effects sometimes set off smoke detectors in the stage, auditorium or adjacent areas. This is a common problem in theatrical facilities. It was also stated that the panel is sometimes disarmed by fire personnel during these types of performances to accommodate these effects if there are firemen stationed throughout the building.

It may be a workable solution to segregate out the affected smoke detectors and bring them back to a separate fire alarm zone. This zone could be key switch programmed to alternately provide a local only panel alert signal without a full fire alarm (horns and strobes activated). Then fire personnel could switch this zone during a show without disabling detection in the rest of the building. Wherever allowed, the smoke detectors should be either replaced with heat detectors or heat detectors should be added adjacent to these partially disabled smoke detectors in the stage, auditorium and adjacent areas. Flame detectors could be substituted in the dance studio at the rear upper level of the auditorium as long as they did not "look" at the stage area.

INTRUSION ALARM SYSTEM

No intrusion detection system.

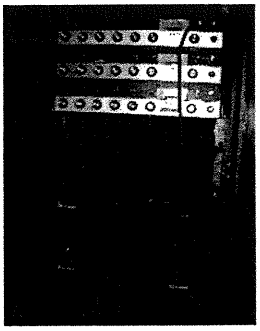
ADA REFUGE AREA ALARMS

No refuge area alarm. With the installation of an elevator, a refuge area alarm panel will need to be added at each floor's refuge location(s) with a central alarm panel at the fire alarm control panel location to indicate trapped handicapped persons.

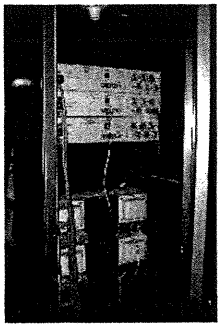
AUDITORIUM PUBLIC ADDRESS SYSTEM

Auditorium is equipped with a basic public address system used for voice sound reinforcement. A PA rack with microphone mixers and amplifiers is located back stage and a single speaker array is positioned at the "front of house" position above the proscenium opening.

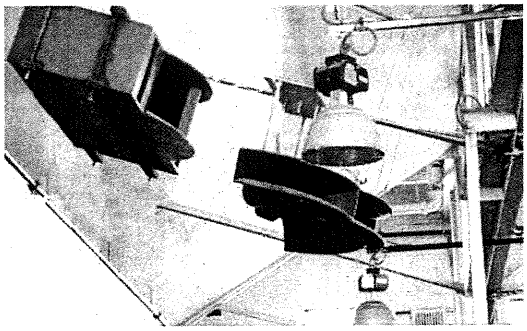
The components are 1970's/1980's vintage equipment. It was stated that sound quality was not good and this may be due to the age of the electronics or possibly a blown driver(s) in the speaker array. The speaker cabinets and horns are valuable components worth keeping and if there are blown drivers they can be replaced. The electronic components should be replaced with current equipment. The enclosed rack assembly can be reused to house the new equipment.



Public Address Rack



PA Rack (rear)



Stage PA Speaker Array

Some small improvement in sound quality may be obtained by rearranging the speaker cabinets so that the drivers are physically aligned and time domain phased.

Again local performance, full stage and musical sound system equipment is rented on an as needed basis.

There is no audio patch snake to a sound operators position in the auditorium house. This might be useful for local performances, eliminating the need to run microphone and monitor cables over the floor with the attendant trip hazards.

TELEPHONE & DATA

Minimal telephone equipment was noted during the inspection. There are approximately a dozen desk sets Centrix connected with no local switch.

A new fiberoptics hub room for the City of Burlington was installed on the ground floor in the SW corner of the building adjacent to the stairway.

It was discussed that this could be an ideal location for the elevator but may involve significant expense and disruption of service if this room is too be relocated.

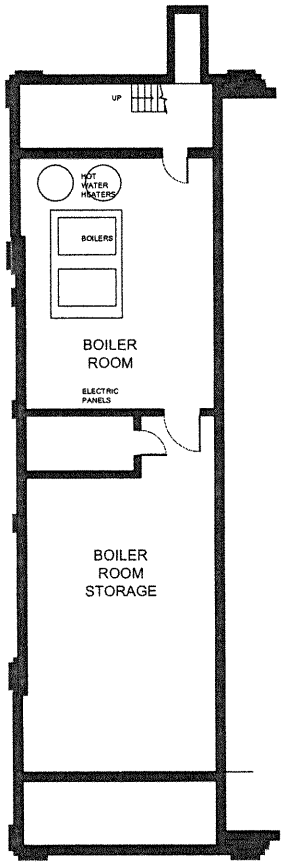
The room was locked and unavailable during the inspection but was described as currently having a data rack with some fiberoptic cables installed.

2.0 MEMORIAL AUDITORIUM

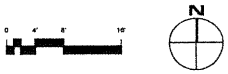
2.1 Existing Conditions

Existing Plans

A-001	Boiler Room Plan
A-100	Ground Floor Plan
A-100m	Mezzanine Plan
A-101	First Floor Plan
A-102	Second Floor Plan
A-103	Third Floor Plan
A-201	Building Sections



BOILER ROOM PLAN
(below ground floor)



ARCHITECT

Bergmann Hendrie + Archetype, Inc.
318 Summer Street
Boston, MA 02210
617 350-0450 Tel
617 350-0215 Fax
www.bhplus.com

PROJECT NAME

Burlington Community Recreation Center

Burlington, VT

CLIENT

City of Burlington

Department of Parks & Recreation
645 Pine Street
Burlington, VT 05401

PROJECT TEAM

REVISIONS

1
2
3
4
5
DATE

DRAWING TITLE

Memorial Auditorium Ground Floor Plan (existing)

DRAWING INFORMATION

October 15, 2002
DATE OF ISSUE

Schematic design
DESCRIPTION

1/20" = 1'-0"
SCALE

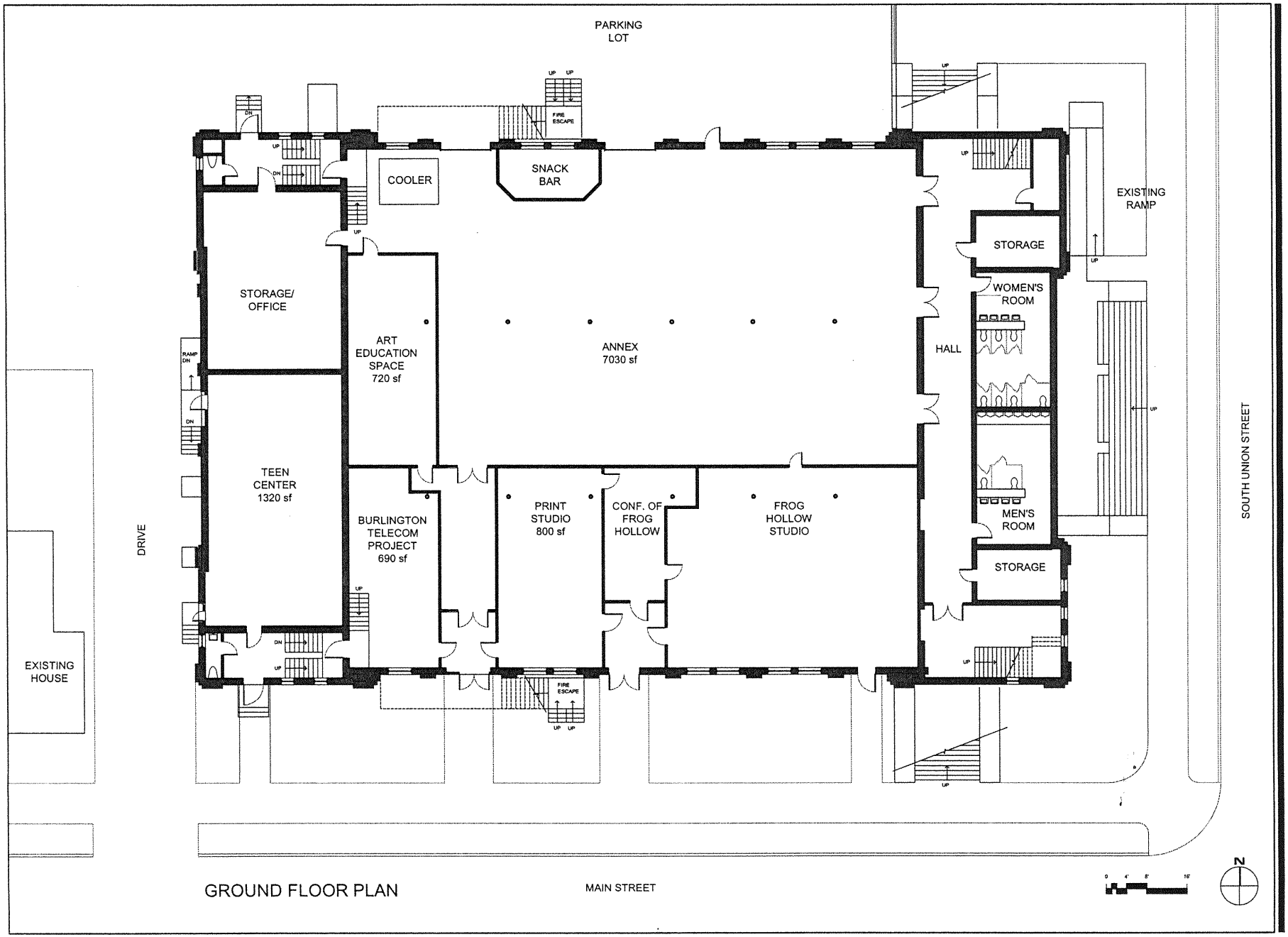
DRAWN BY

2384.00
PROJECT #

A-100 meau dwg
FILE NAME

DRAWING NUMBER

BOILER ROOM
A001



GROUND FLOOR PLAN

ARCHITECT

bhpa

Bargmann Hendrie + Archetype, Inc.
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Boston, MA 02210
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www.bhplus.com

PROJECT NAME

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Burlington, VT 05401

PROJECT TEAM

REVISIONS

1
2
3
4
5
DATE

DRAWING TITLE

Memorial Auditorium Ground Floor Plan (existing)

DRAWING INFORMATION

October 18, 2002
DATE OF ISSUE

Schematic design
DESCRIPTION

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SCALE

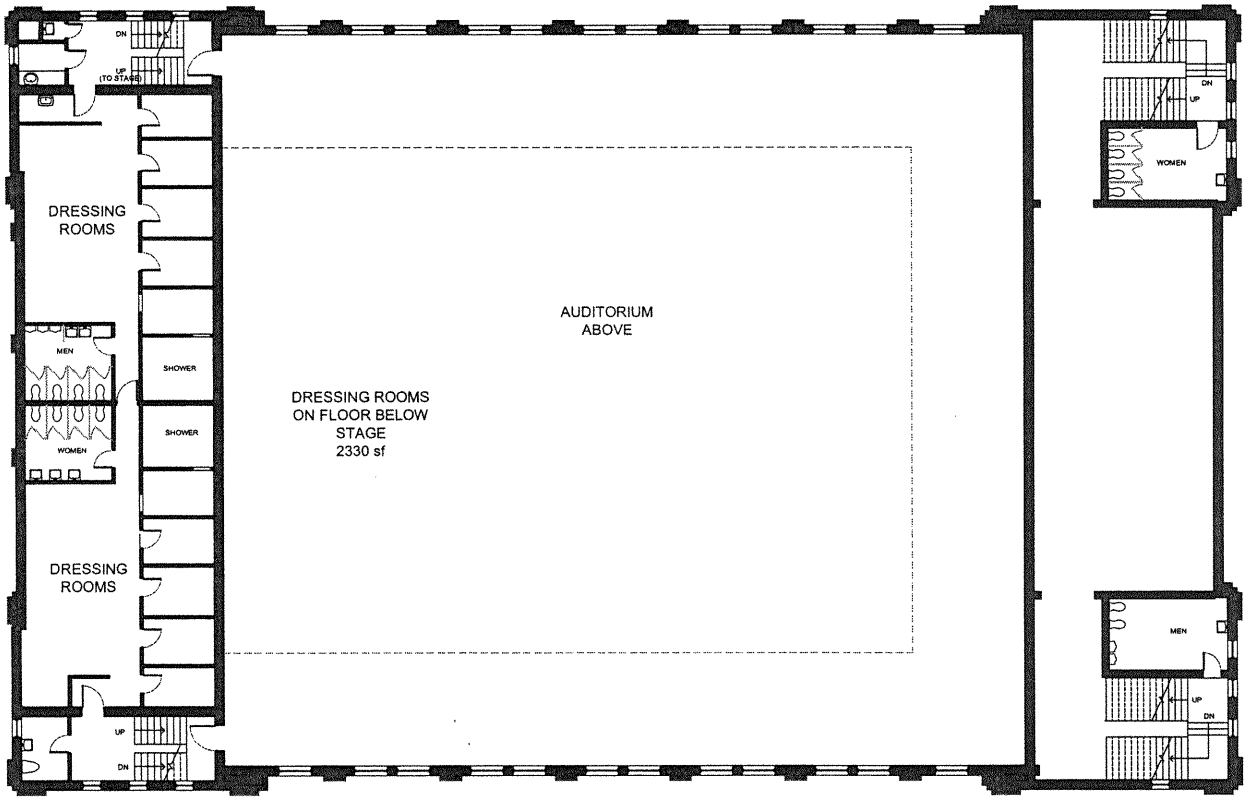
DRAWN BY

2384.00
PROJECT #

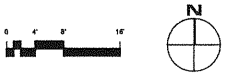
A-100 memo.dwg
FILE NAME

DRAWING NUMBER

A100



DRESSING ROOMS FLOOR PLAN



ARCHITECT

bhha

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Burlington, VT

CLIENT

City of Burlington

Department of Parks & Recreation
645 Pine Street
Burlington, VT 05401

PROJECT TEAM

REVISIONS

1
2
3
4
5 DATE

DRAWING TITLE

Memorial Auditorium Dressing Rooms Floor Plan (existing)

DRAWING INFORMATION

October 15, 2002
DATE OF ISSUE

Schematic design
DESCRIPTION

1/30" = 1'-0"
SCALE

DRAWN BY

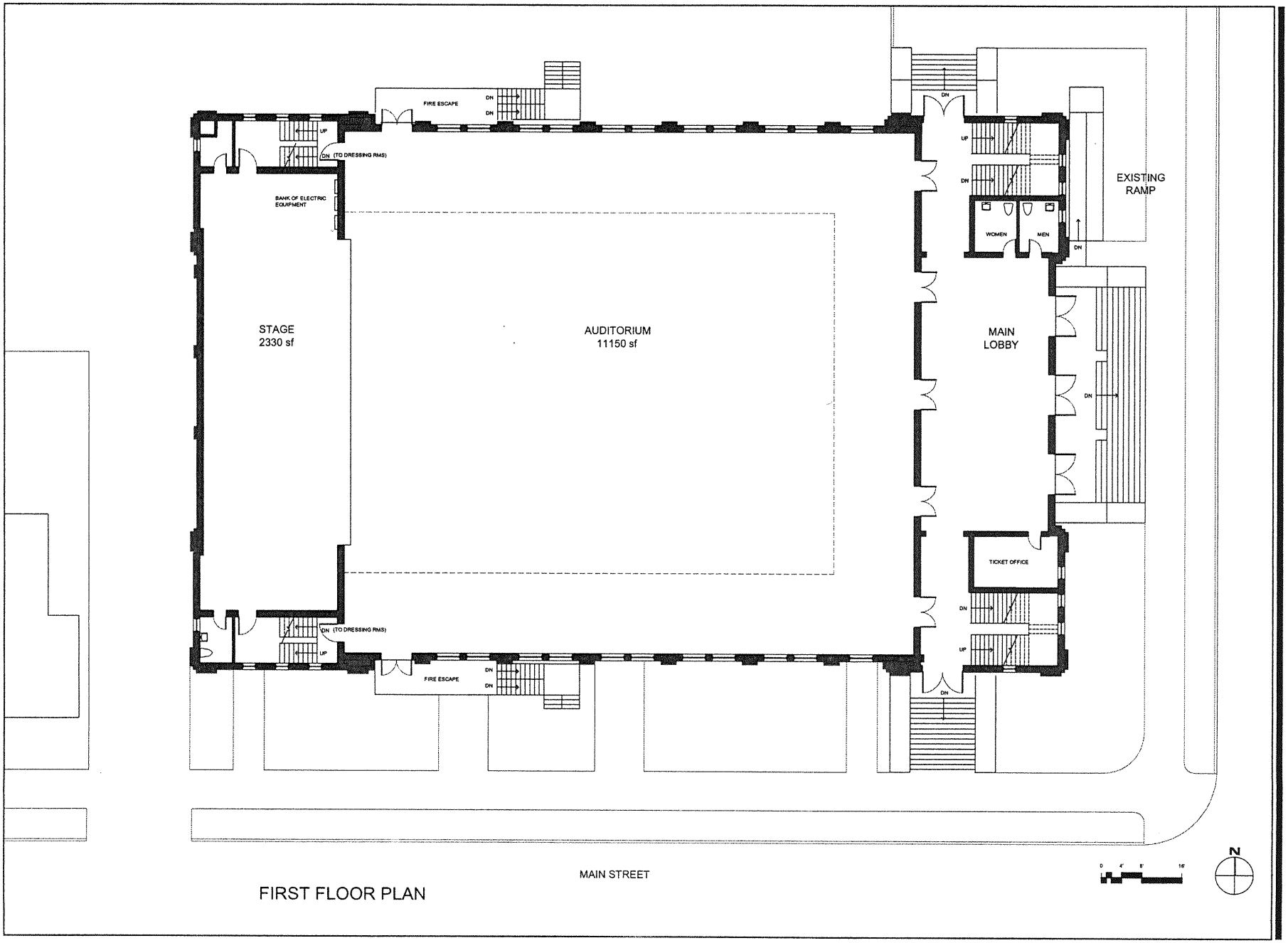
2384.00
PROJECT #

A-101 (REBUILDING FILE NAME)

DRAWING NUMBER

MEZZANINE

A100m



FIRST FLOOR PLAN

ARCHITECT

Bargmann Hendrie + Archetype, Inc.
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PROJECT NAME

Burlington Community Recreation Center

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PROJECT TEAM

REVISIONS

1
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DATE

DRAWING TITLE

Memorial Auditorium First Floor Plan (existing)

DRAWING INFORMATION

October 16, 2002
DATE OF ISSUE

Schematic design
DESCRIPTION

1/32" = 1'-0"
SCALE

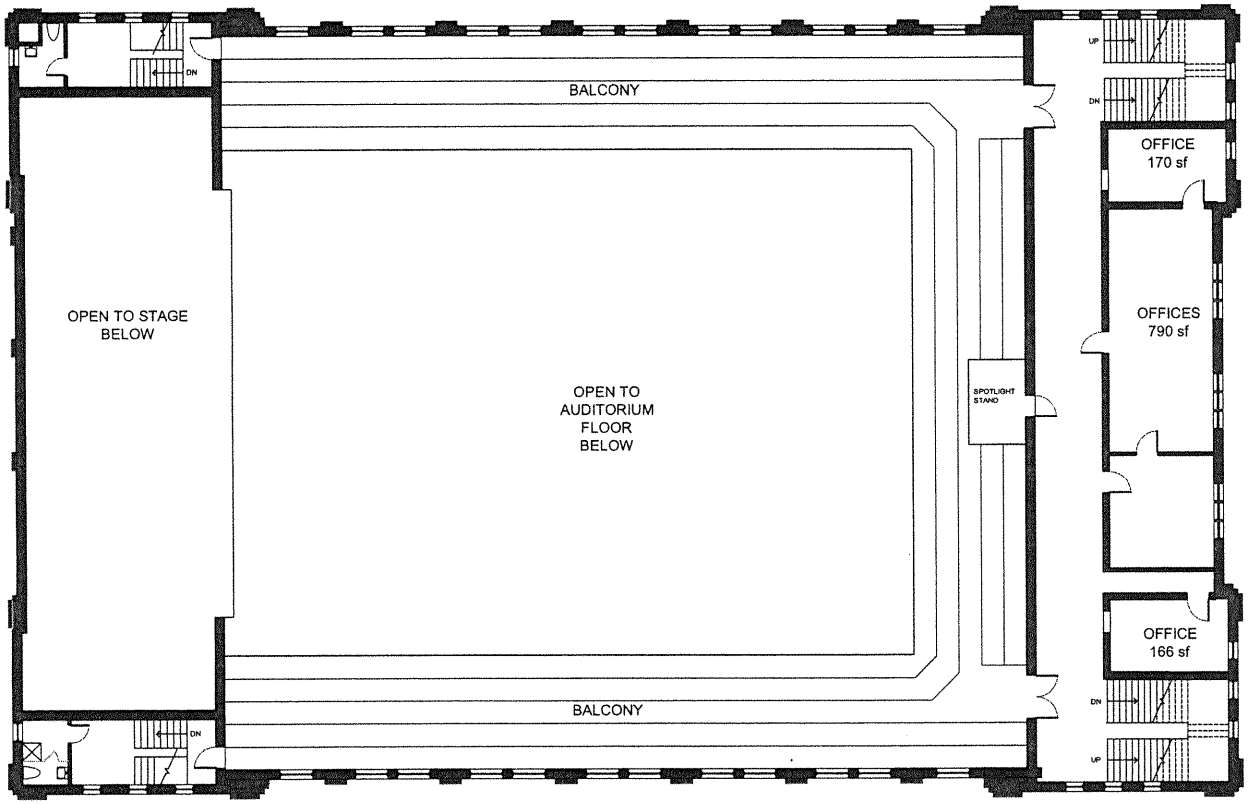
DRAWN BY

2384.00
PROJECT #

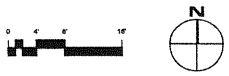
A-101 meau.dwg
FILE NAME

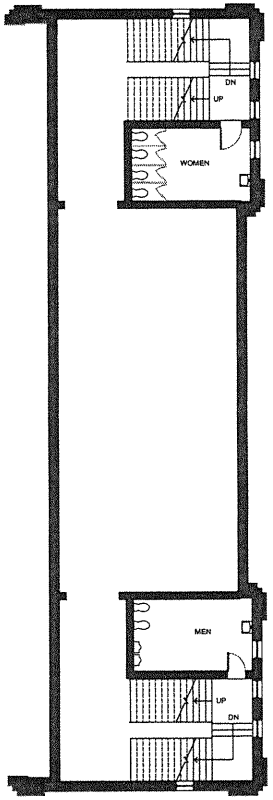
DRAWING NUMBER

A101



SECOND FLOOR PLAN
(balcony plan)





LANDING BELOW
SECOND FLOOR

ARCHITECT

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5 DATE

DRAWING TITLE

Memorial Auditorium Second Floor Plan (existing)

DRAWING INFORMATION

October 15, 2002
DATE OF ISSUE

Schematic design
DESCRIPTION

1/32" = 1'-0"
SCALE

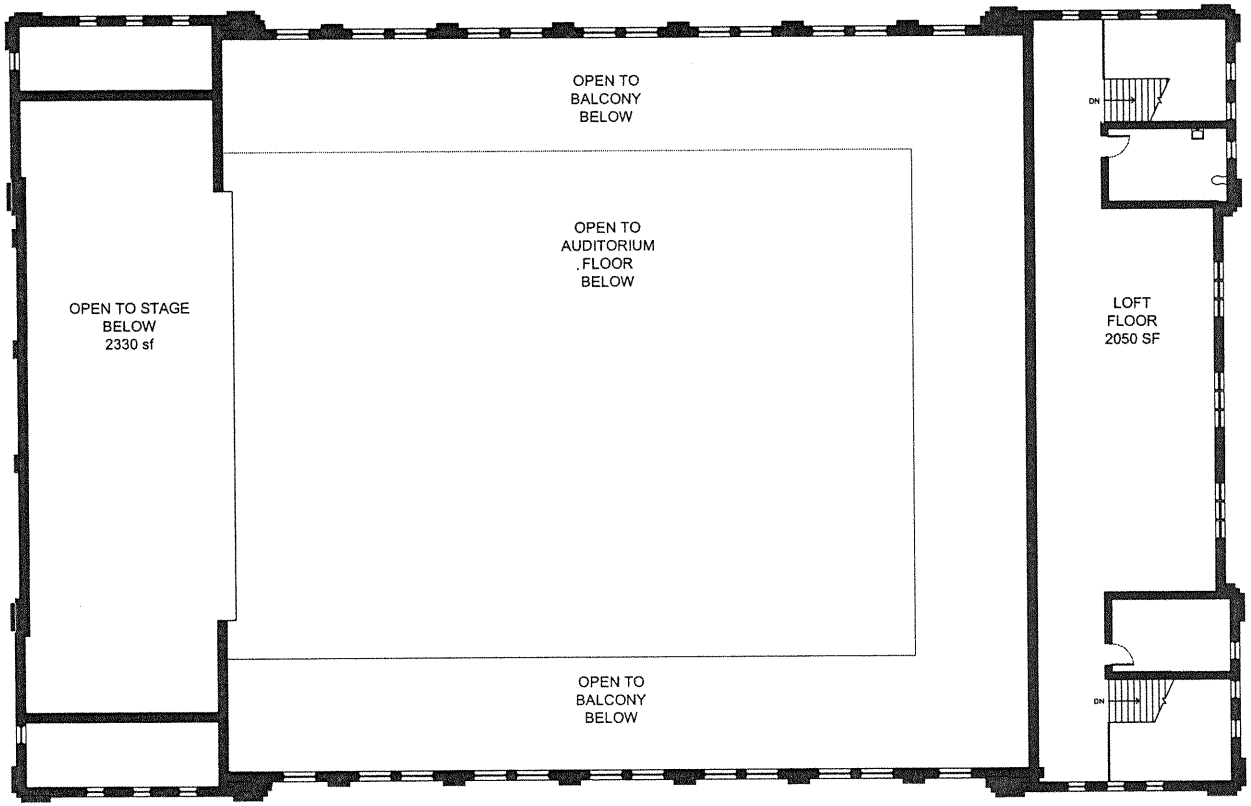
Drawn BY

2364.00
PROJECT #

A-102 meau.dwg
FILE NAME

DRAWING NUMBER

A102



THIRD FLOOR PLAN
(multipurpose room)

0 4' 8' 16'

N

ARCHITECT

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PROJECT NAME

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PROJECT TEAM

REVISIONS

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DRAWING TITLE

Memorial Auditorium Third Floor Plan (existing)

DRAWING INFORMATION

October 15, 2002
DATE OF ISSUE

Schematic design
DESCRIPTION

1/8" = 1'-0"
SCALE

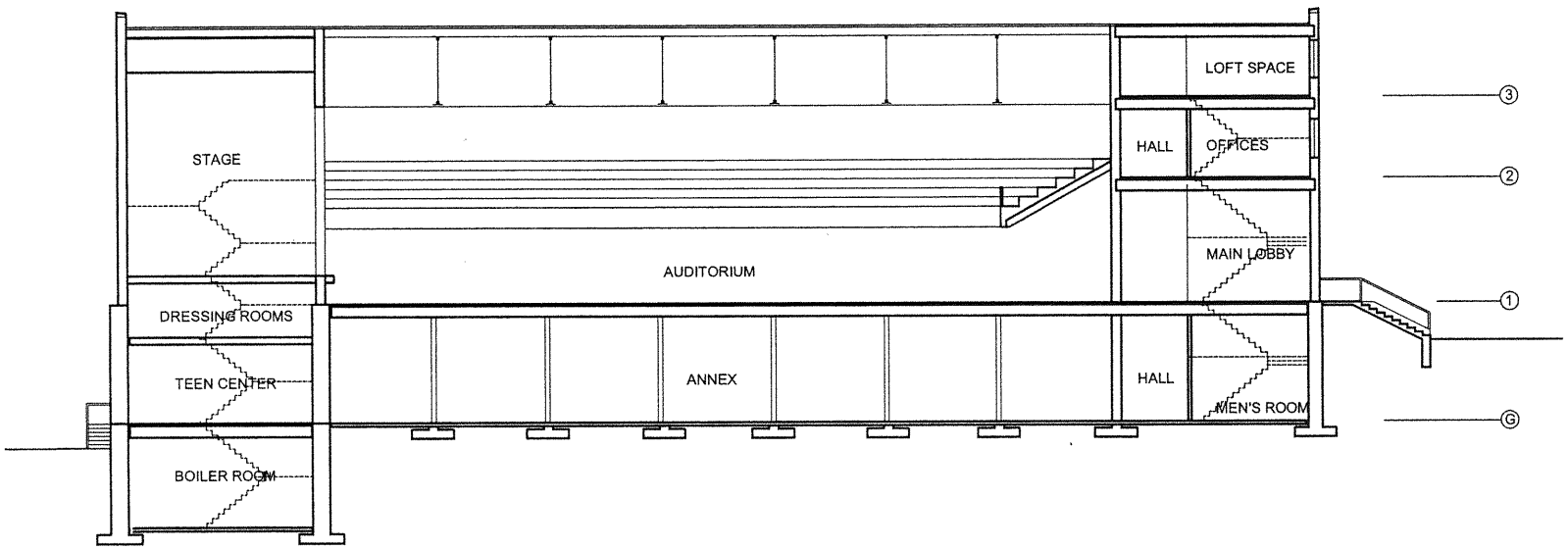
DRAWN BY

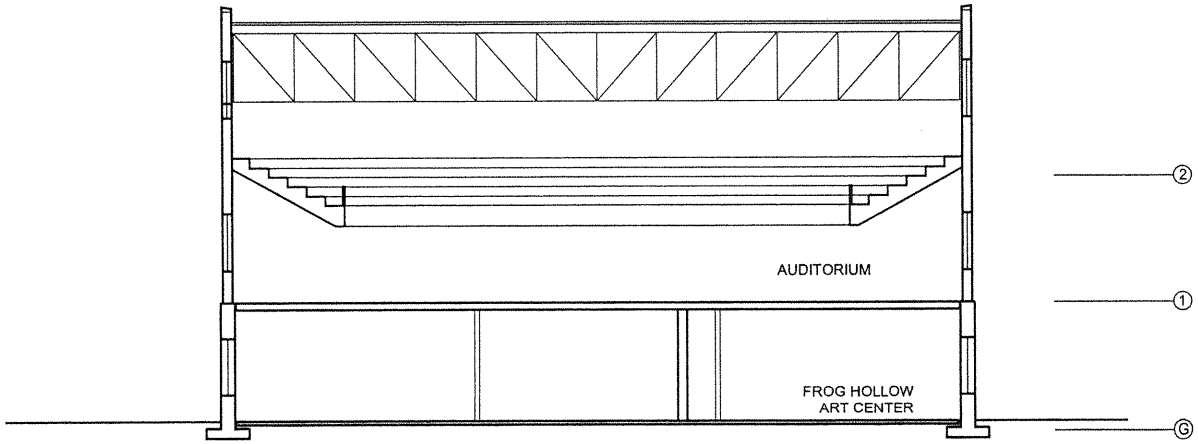
2364.00
PROJECT #

A-103_memu.dwg
FILE NAME

DRAWING NUMBER

A103





EXISTING BUILDING SECTIONS

0 4' 8' 16'

ARCHITECT

bha

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DRAWING TITLE

Memorial Auditorium Building Section

DRAWING INFORMATION

October 15, 2002
DATE OF ISSUE

Schematic design
DESIGNATION

1/30" = 1'-0"
SCALE

DRAWN BY

2364.00
PROJECT #

SECTION .mesu.dwg
FILE NAME

DRAWING NUMBER

A201

2.0 MEMORIAL AUDITORIUM

2.2 Program

Program Criteria

The attached Memorial Auditorium building Program Summary addresses proposed renovations and upgrades as well as major repairs and capital improvements.
The following program has been divided into **3 options**:

OPTION 'A'	Capital Improvements – Upgrades
OPTION 'B'	Addition for New Entry Lobby
OPTION 'C'	Addition for New Teen Center

Assumptions
The renovation plans presuppose that the existing Frog Hollow, City Arts Programs, Teen Center, and Burlington Telecom Project will remain on the ground level. Use of the auditorium will remain as multifunctional space with offices and multipurpose room on the floors above.

Phasing
While economies of scale may be gained by including entire scope of work in one bid, the program may be phased over several years if necessary. When broken down into phases, the first phase (Option A) will include an existing building restoration of exterior brickwork & detailing as well as rebuilding of accessible ramp and repair of stairs. The next phases may concentrate on interior repairs along with updating existing mechanical, electrical, plumbing, and fire protection. Additional phasing (Options B & C) includes expansion of teen center facilities and a new lobby area & loading area.

During construction, assume that portions of Memorial Auditorium will be occupied. The Frog Hollow and City Arts programs on the ground floor have separate entrances and shouldn't be disturbed. The brand new City Fiber Optic/Telecom Station needs to be kept running during the different phases, as well.

Accessibility and Egress
The budget includes construction of one multi-stop elevator at the northeast corner serving virtually all levels, with exception to the restrooms at intermediate landings of the stairs. An additional elevator would provide access to the dressing rooms and auditorium stage.

2.0 MEMORIAL AUDITORIUM

2.2 Program

Program Outline

PROGRAM SUMMARY AND CONCEPTUAL OPTIONS

Option	Work Item	Location	Qty
A	**CAPITAL IMPROVEMENTS -- UPGRADES**		
1	General		1 ls
	Staging/scaffolding		
	Protection		
2	Site Work		
	Selective demolition (masonry, 102 vinyl windows)		1 ls
3	Concrete		
	Reconstruct stair foundations		1 ls
	Repair/patch/refinish concrete water table/foundation walls		200 sf
	Remove and reconstruct wheelchair ramp at west elev.		1 ls
4	Masonry		
	Repair/repoint brick		6,000 sf
	Repoint joints at cast stone belt course		700 lf
	Repair/reconstruct stone stair treads/stringers		1 ls
	Remove/rebuild brick at roof drain pipes and steel beam pockets		1 ls
	Cast stone cornice/coping remove/reproduce/install		250 sf
	Temporary shoring		1 ls
	Remove graffiti; clean entire surface		25,000 sf
	CMU partitions: 2 elevator shafts/machine rooms		1 ls
5	Metals		
	Repair steel lintels at window m.o.		172 ea
	Repair/refinish fire escapes		2 ea
	Remove/repair/refinish/reinstall steel window gratings		8 ea
6	Carpentry		
	Temporary window boarding		172 ea
	Remove barriers at shower doorways; retile	Dressing Area	1 ls
	Construct ADA refuge areas at lobby elevator (4 levels)		1 ls

7 Thermal & Moisture Protection		
Repair/insulate roof drainage system		1 ls
8 Doors/Windows		
Remove/repair/reglaze/reinstall steel windows	per opening	70 ea
Provide/install magnetic interior storm windows	per opening	55 ea
Provide/install new i.g. steel windows (narrow = avg. 14 SF)	per opening	44 ea
Provide/install new i.g. steel windows (wide = avg. 48 SF)	per opening	62 ea
[Note: Delete 8 'wide' units when combined with Option A]		
Provide/install new i.g. steel windows (triple = avg. 50 SF)	per opening	6 ea
Reglaze broken lights (custom glass)	Allow	10 ea
New custom stile-and-rail wd. doors w/ glazed transoms	So. Union St. elev.	3 pr
9 Finishes		
Upgrade finishes at toilet rooms		1 ls
Paint at gwb, CMU, finish carpentry, metals, etc.		1 ls
Sand and refinish gymnasium floor		11,500 sf
10 Mechanical Systems		
Upgrade plumbing fixtures (ADA)	Allow	16 ea
Repair/modify incorrect steam heat piping		1 ls
Remove/replace HW tanks		2 ea
Remove condensate return tank/pump; install new line/valve	Boiler Room	1 ls
Replace burners at boilers	Boiler Room	2 ea
Install new boiler ventilation system	Boiler Room	1 ls
Replace roof exhaust fan backdraft dampers w/ motorized	Auditorium Roof	6 ea
Replace roof fans as required	Auditorium Roof	4 ea
Install ventilation system/control	Dance Studio	1 ls
11 Electrical Systems		
Install additional GFIC devices	Boiler Rm. et. al.	10 ea
Upgrade Auditorium lighting; new architectural fixtures	Allow	16 ea
Retrofit house fluorescent fixtures w/ dimmable ballasts		15 ea
Install guards at Boiler Rm.	Allow	10 ea
Replace incand. EXIT lighting w/ LED	Allow	20 ea
Install battery-operated emergency lighting	Allow	16 ea
12 Fire Alarm System		
Install voice announcement system (ADA)	Auditorium/Annex	1 ls
Install additional strobes (ADA)	Allow	30 ea
Install ADA refuge area alarm panels at elev. lobbies		4 ea
13 Conveying Systems		
New hydraulic passenger elevators, 4-stop		2 ea

B ADDITION (SCHEMES 'B' OR 'C')

1	General	1 ls
	Staging/scaffolding	
	Protection	
2	Site Work	1 ls
	General site preparation	
	Utilities	
	Demolish/remove parking area	
	Finish site work	
	Building pad preparation	3,410 sf
3	Addition	7,090 sf
	Substructure (reinf. conc. walls, slabs)	
	Superstructure (CMU brg. wall/ brick veneer)	
	Metal doors/windows	
	Thermal and moisture protection	
	Finishes	
	Accessories	
	Equipment	
	Furnishings	
	Mechanical (incl. new steam line from Boiler Rm.)	
	Electrical	
	Extend fire suppression system to addition	

2.0 MEMORIAL AUDITORIUM

2.3 Code Analysis

Applicable Codes

- 1999 Vermont Fire Protection and Building Code, BOCA 1996
- Vermont Fire Prevention & Building for Historic Buildings
- 1999 National Electric Code (NEC)
- 1990 BOCA National Plumbing Code
- 1997 Life Safety Code, NFPA 101
- 1997 NFPA 1
- NFPA 10 (for fire extinguisher replacement)
- 2001 Burlington Energy Code/ 2001 Vermont Energy Code
- 2001 International Energy Consultants Code (IECC)
- ANSI/ASME A17.1-1996 Safety Code for Elevators and Escalators (as amended)
- Vermont Public Law 187 (S.117), Vermont Access Board and Department of labor and Industry, 1/12/98
- * Recommended Standards for Swimming Pool Design and Operation, 1996 ed.

** Note: To date, the State of Vermont has no public health laws governing design of pool structures. These standards have been adopted by 11 states in the U.S.*

2.0 MEMORIAL AUDITORIUM

2.3 Code Analysis

Occupancy

Use or Occupancy
Per the BOCA/Vermont code (303.4), the Memorial Auditorium is classified as a Use Group A-3 structure (Assembly). This use group includes buildings with or without an auditorium in which persons assemble for amusement, entertainment or recreation purposes. Art program rooms and offices located throughout the building would most likely be classified as accessory areas (302.1.2), although fire separation assemblies are generally required between the main use group and accessory areas under certain conditions (e.g., where the aggregate area devoted to all accessory uses within a story exceeds 10 percent of the area of the story). Automatic fire suppression requirements for accessory areas are based on the main use group of the "fire area."

The code identifies specific occupancy areas, such as boiler and furnace rooms, laundries greater than 100 square feet in area, storage and maintenance shops, which require separation and protection.

Occupant Load
In determining required facilities (in new construction), the number of occupants for whom exit facilities shall be provided shall be established by the largest number among of the following, in accordance with the BOCA/Vermont code:

1. Actual number of occupants for whom each occupied space, floor or building is designed;
2. Maximum floor area allowances computed per Table 1008.1.2;
3. Number by occupants computed as above, plus the number of occupants similarly computed for all spaces that discharge through the space in order to gain access to an exit;
4. Increased occupant load allowed by code officials.

Note: The existing auditorium seats up to 2500 people for any given event.
(This does not constitute the total number of occupants for the building)

Construction Type: Type 3B (Unprotected)
Buildings of Type 3 construction include those in which the exterior walls are constructed of masonry; and the interior structural elements, load-bearing walls, partitions, floors and roofs are constructed of any approved materials. The Memorial Auditorium building is constructed of a variety of materials, but the code provides that each structural element (in new construction) shall not have less than the fire resistance ratings indicated in Table 602.

2.0 MEMORIAL AUDITORIUM

2.3 Code Analysis

Egress

Egress

Regarding exit discharge, the BOCA/Vermont code requires that all exits discharge directly at a public way or at a yard, court or open space of the required width and size to provide all occupants with a safe access to a public way.

In assembly buildings, the code requires a main entrance and exit discharge that fronts on a public way (1006.2.2). Where there is a single main entrance, the entrance shall be capable of serving as the main exit and shall provide an egress capacity for at least one-half of the total occupant load. In addition, each level of an occupancy in Use Group A shall be provided with additional exits which shall provide a means of egress capacity for at least one-half of the total occupant load served by that level.

Where more than one exit is required from any room, space or floor, such exits shall be placed as remote from each other as practicable, and shall (ideally) be arranged and constructed to provide direct access in separate directions from any point in the area served so as to minimize the possibility that both exits will be blocked by any one fire or other emergency condition.

In the BOCA/Vermont code, accessible means of egress are covered in Section 1007. All spaces required to be accessible shall be provided with not less than one accessible means of egress. Each accessible means of egress shall provide a continuous path of travel from a required accessible space to a public way that is usable by a mobility-impaired person. Under this provision, exit stairways shall have a clear width of <u>at least 48 inches between handrails</u> and shall incorporate, or be accessed from, an area of refuge (1007.2). An elevator complying with this provision shall be accessed from a complying area of refuge or a horizontal exit.

Existing building does not have an elevator. Existing Stair towers on the northeast and southeast corners are not enclosed fire stairs, but do have 48" clear between handrails. The stair towers on the northwest and southwest corners are enclosed, however are not 48" clear between handrails.

Fire escapes are permitted under the BOCA/Vermont code under specific conditions; existing fire escapes are accepted as a component in the means of egress in existing buildings only, and shall not constitute more than 50 percent of the required number of exits nor more than 50 percent the required exit capacity.

The north and south sides of the building do have fairly new fire escapes that circulate occupants from the auditorium floor directly to and open space. Because these passages constitute 50% or less of the required # of exits, they are acceptable.

Vertical Wheelchair Lifts

In accordance with the BOCA/Vermont code and Part XX of ANSI/ASME A17.1, wheelchair lifts may be used as part of an accessible route in or at a "public" building. Provisions of A17.1 cover the following: platform; runway enclosure; machinery and accessories; capacity, speed and travel; operating devices; safety features; structural supports; guide rails; and headroom clearance (80 inches, minimum).

Egress cont.

Existing Buildings

Chapter 34 of the BOCA/Vermont code controls the alteration, repair, addition and change of occupancy of existing structures. Alterations, repairs, additions and changes of occupancy to existing structures shall comply with Sections 3403.0 through 3407.0 or with the requirements of compliance alternatives in accordance with Section 3408.0
Per 3402.2, existing stairs are permitted to remain in service, or to be rebuilt in accordance with the tread and riser provisions of Section 1014.6.

Additions to existing structures shall conform to the requirements for a new structure without requiring the existing structure to comply with the requirements of the BOCA/Vermont code for new construction (3403.1). However, alterations to any structure shall conform to the code requirements for a new structure and shall not result in an increase in hazard to the occupants. Portions of the structure not altered and not affected by the alteration are not required to comply with the code requirements for a new structure (3404.2).

Compliance Alternatives

In certain instances, compliance alternatives are allowed. The provisions of Section 3408 are intended to maintain or increase the current degree of health and safety in existing buildings while permitting repair, alteration, addition and change of occupancy without requiring full compliance. For all proposed work covered by this section, the owner shall cause the existing building to be investigated and evaluated, regarding fire safety, means of egress and general safety (3408.5). The code official shall determine whether the existing building, with the proposed addition, alteration or change of occupancy, complies with the provisions of this section.

Historic Structures

Per Section 3406.0, provisions of the BOCA/Vermont code related to the construction, repair, alteration, addition and restoration of structures shall not be mandatory for existing buildings identified and classified by the federal, state or local government authority as historic buildings, where such buildings are judged by the code official to be safe and in the interest of public health, safety and welfare regarding any proposed construction, alteration, repair, addition and relocation.

2.0 MEMORIAL AUDITORIUM

2.4 Alternative Solutions

Design Narrative

Throughout the study, various options exploring plan configurations were studied. The following narrative explains the design process and why the following options have been presented in the format we have compiled.

The study has given the community options from which a final 'Preferred Option' needs to be chosen to bring the project to the next level of design implementation. The concept behind offering options was to allow flexibility to choose just one option or a combination there of. The goal was also to clearly present the information so that it was easy to understand the costs involved with each phase.

Option 'A' represents all work that needs to be done to the existing historical structure to bring it up to code, upgrade MEP systems, and restore it's historical integrity. It is recommended that this option becomes part of the final design package, regardless. This option is not represented in drawing form, but illustrated in the Existing Conditions Analysis and divided into a Conditions Analysis, Systems Report, and Existing Drawings.

Option 'B' is work in addition to the capital improvements and upgrades to the existing building. Represented in the following drawings, this design shows a new addition on the north end of the existing building. The purpose of the addition in this option is to provide a new controlled entry and staging area for the auditorium and a loading & storage area. The Annex level existing space is then utilized for the expanded teen center. Note that this option can be phased so that the teen center is remodeled first, followed by the addition for the lobby.

Option 'C' is similar to Option 'B' in that the addition is the same square footage, but the teen center expansion moves into the addition and the new lobby entry is routed through the central existing space. The teen center is better situated along an exterior wall so that natural light can be taken advantage of. Since the entry lobby will mostly be used for evening events, natural light does not become an issue.

2.0 MEMORIAL AUDITORIUM

2.4 Alternative Solutions

Drawings

OPTION A

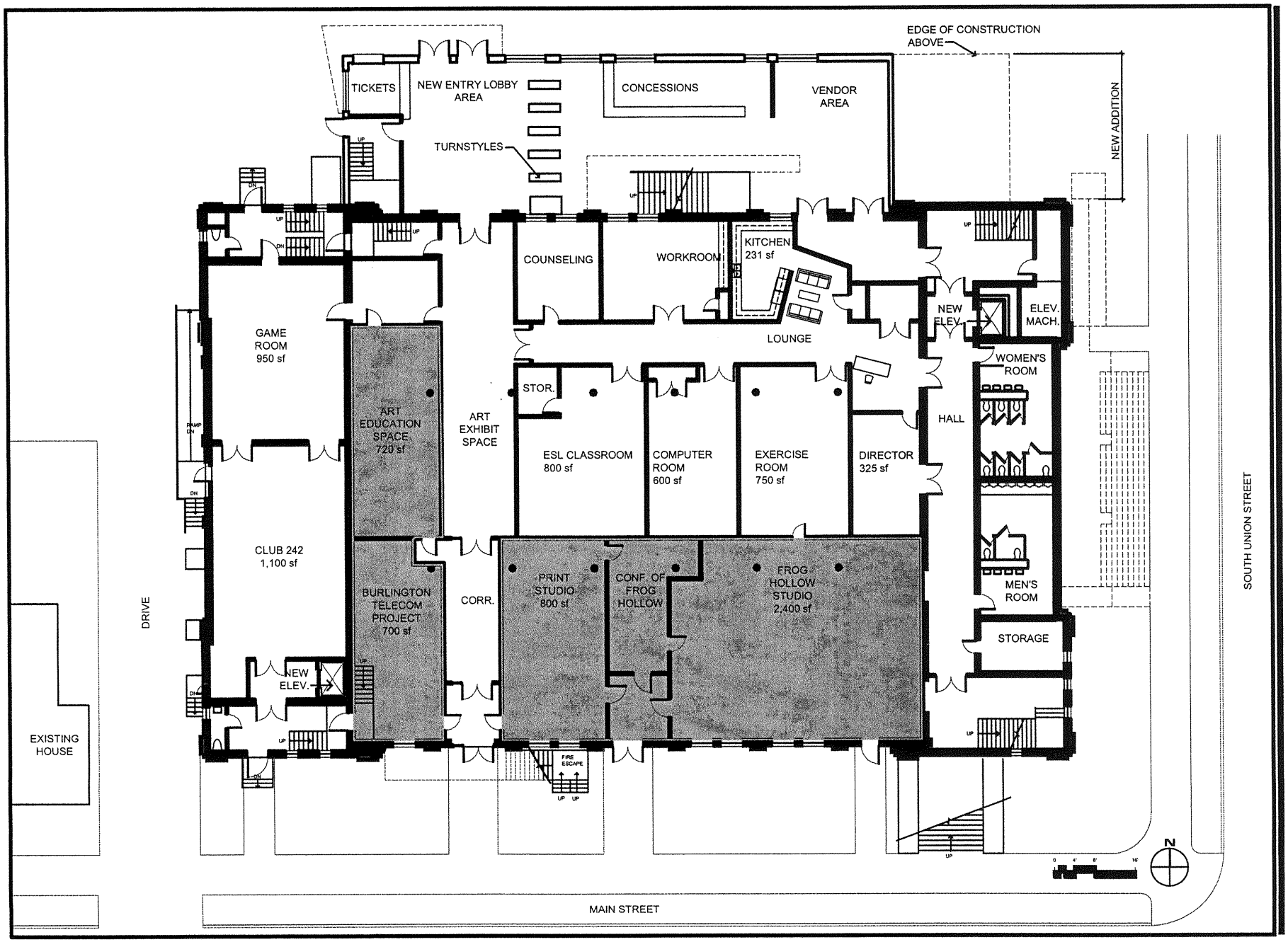
Capital Improvements & Upgrades to Existing Structure – see Program Outline for details (drawings not required).

OPTION B

A-100b	Boiler Room Plan
A-100b	Ground Floor Plan
A-101b	Mezzanine Plan
A-101b	First Floor Plan
A-102b	Second Floor Plan
A-103b	Third Floor Plan

OPTION C

A-100c	Boiler Room Plan
A-100c	Ground Floor Plan
A-101c	Mezzanine Plan
A-101c	First Floor Plan
A-102c	Second Floor Plan
A-103c	Third Floor Plan



ARCHITECT

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DRAWING TITLE

Memorial Auditorium Ground Floor Plan Option B

DRAWING INFORMATION

October 15, 2002
DATE OF ISSUE

Schematic design
DESCRIPTION

1/30" = 1'-0"
SCALE

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DRAWN BY

1384.00
PROJECT #

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FILE NAME

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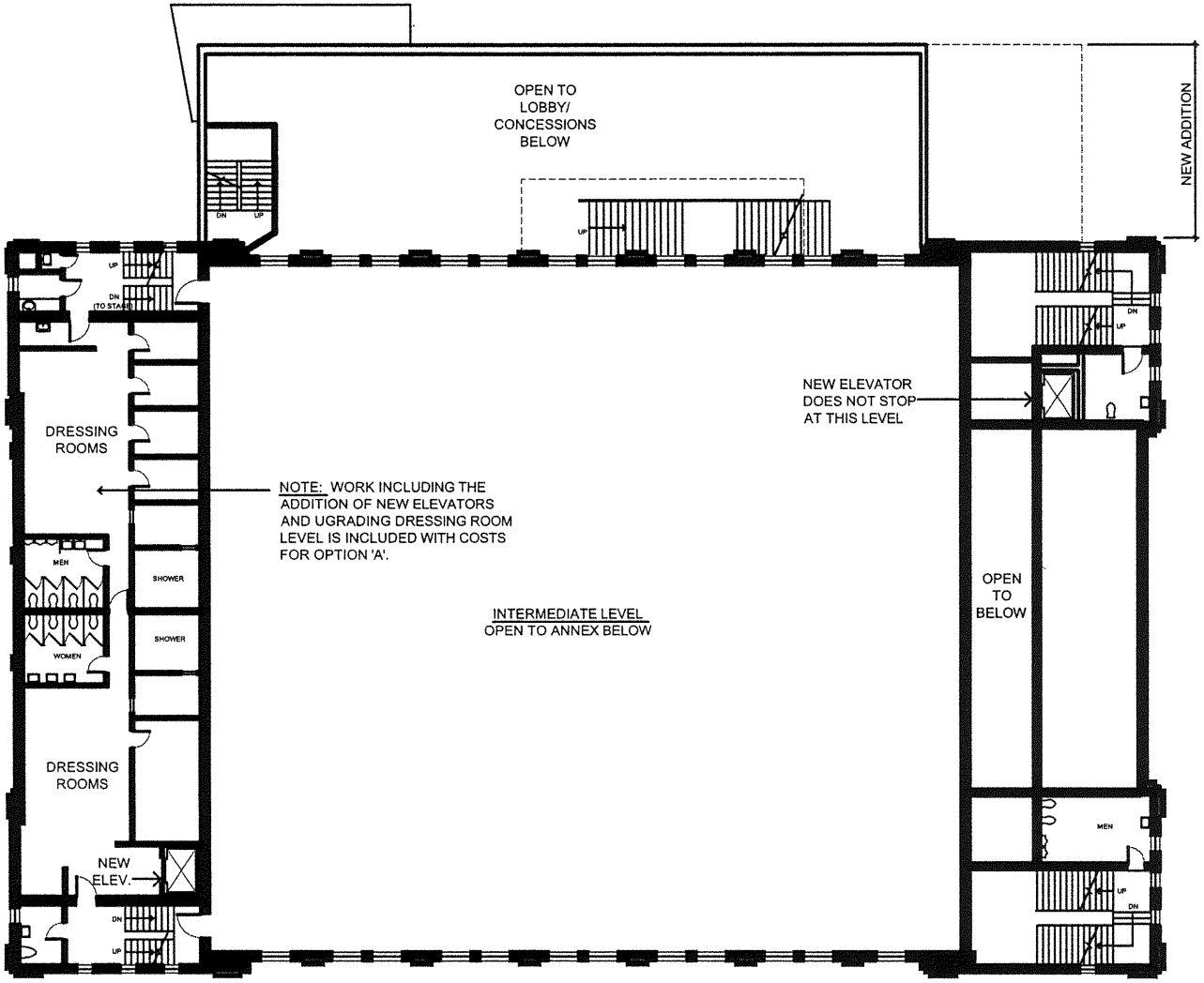
A100b



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Memorial Auditorium Dressing Rooms Floor Plan Option B

DRAWING INFORMATION

October 15, 2002
DATE OF ISSUE

Schematic design
DESCRIPTION

1/96" = 1'-0"
SCALE

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DRAWN BY

2304.00
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FILE NAME

DRAWING NUMBER

MEZZANINE

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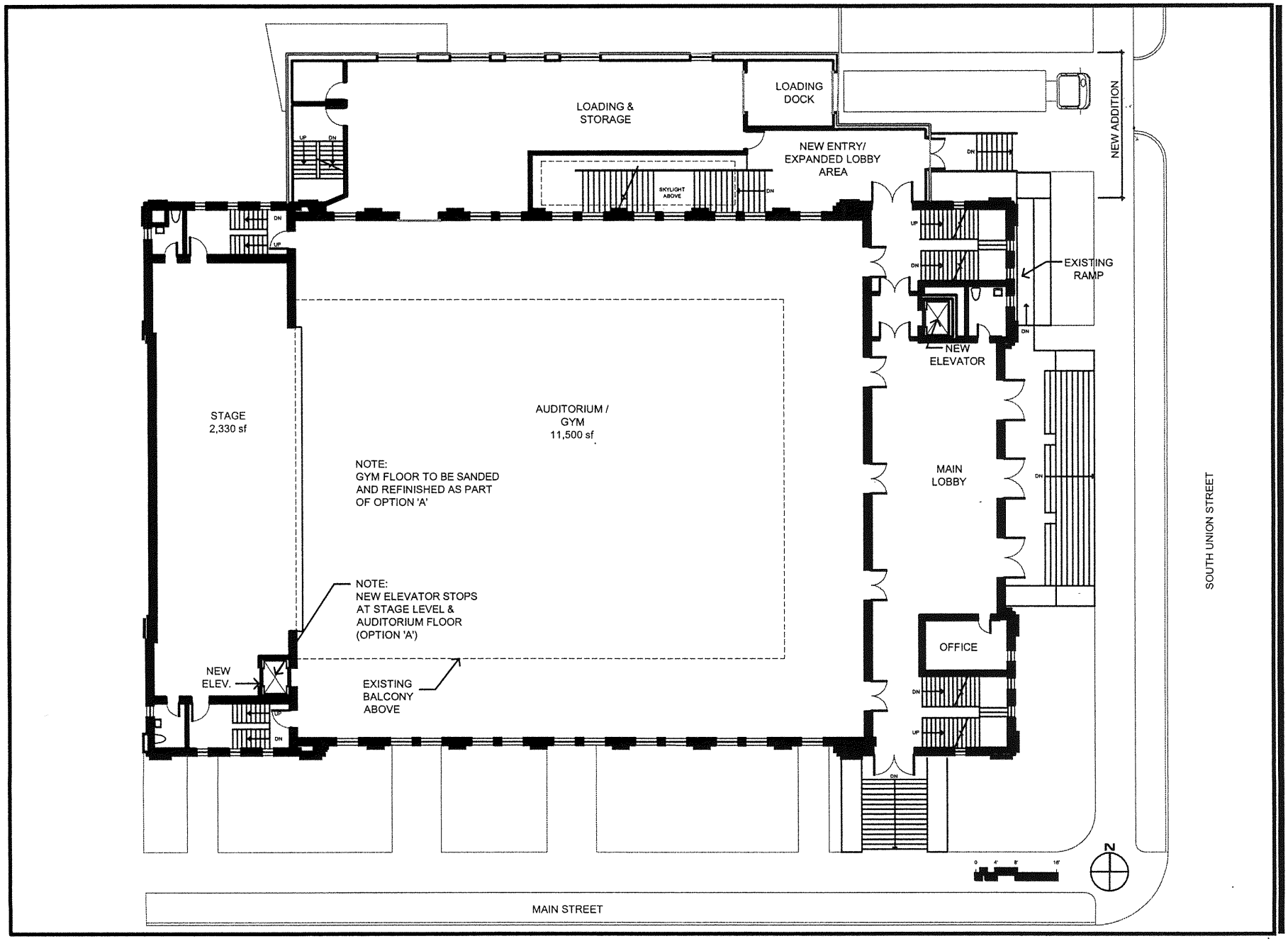

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Memorial Auditorium First Floor Plan Option B

DRAWING INFORMATION

October 15, 2002
DATE OF ISSUE

Schematic design
DESCRIPTION

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SCALE

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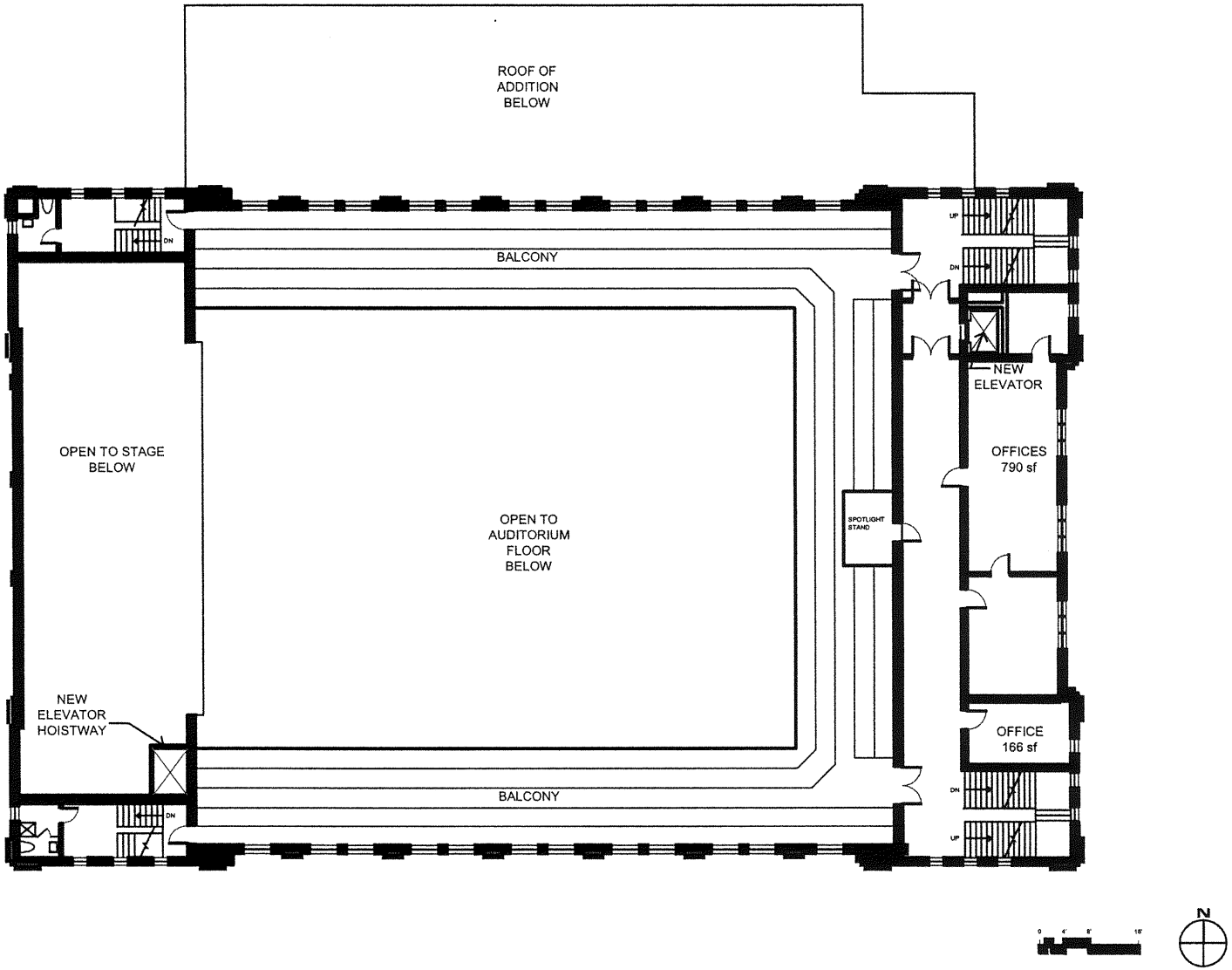
2384.00
PROJECT #

dwg
FILE FORM

DRAWING NUMBER

A101b



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DRAWING TITLE

Memorial Auditorium Second Floor Plan Option B

DRAWING INFORMATION

October 15, 2002
DATE OF ISSUE

Schematic design
DESCRIPTION

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SCALE

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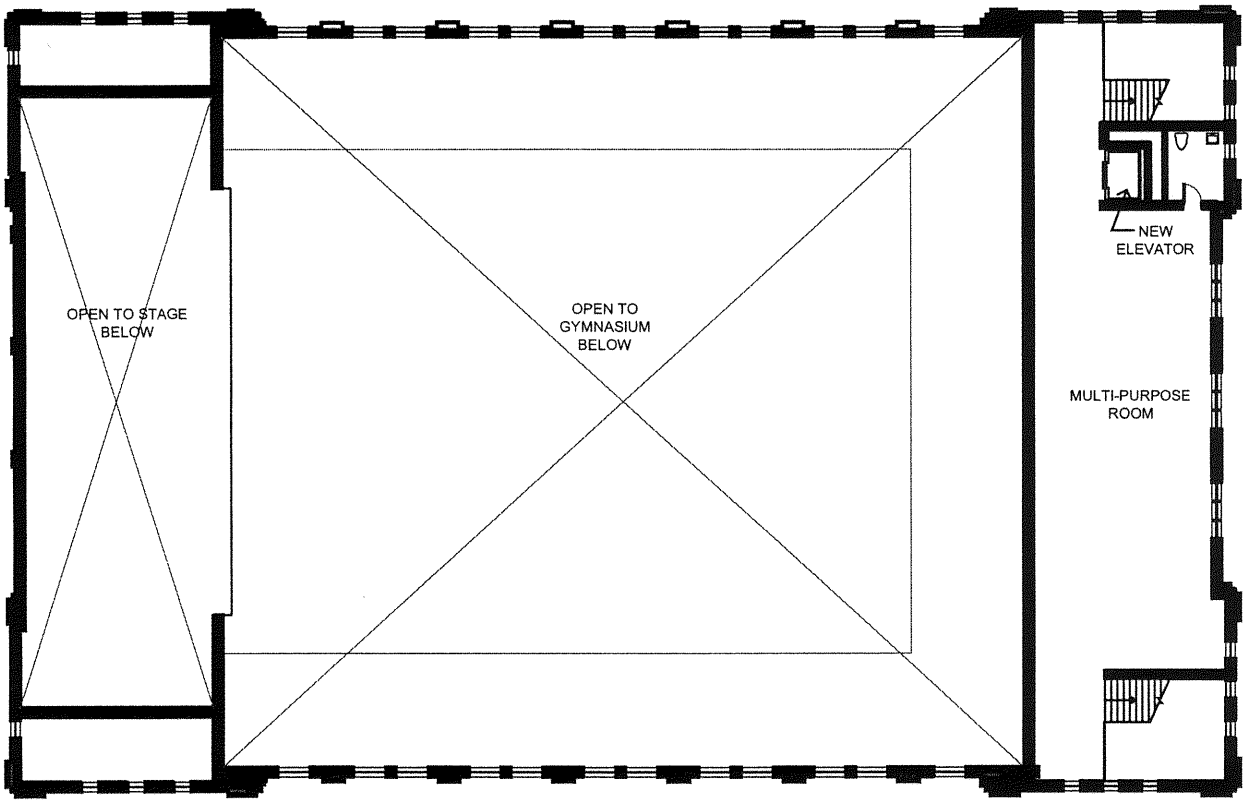

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DRAWING TITLE

Memorial Auditorium Third Floor Plan Option B

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DATE OF ISSUE

Schematic design
DESCRIPTION

1/8" = 1'-0"
SCALE

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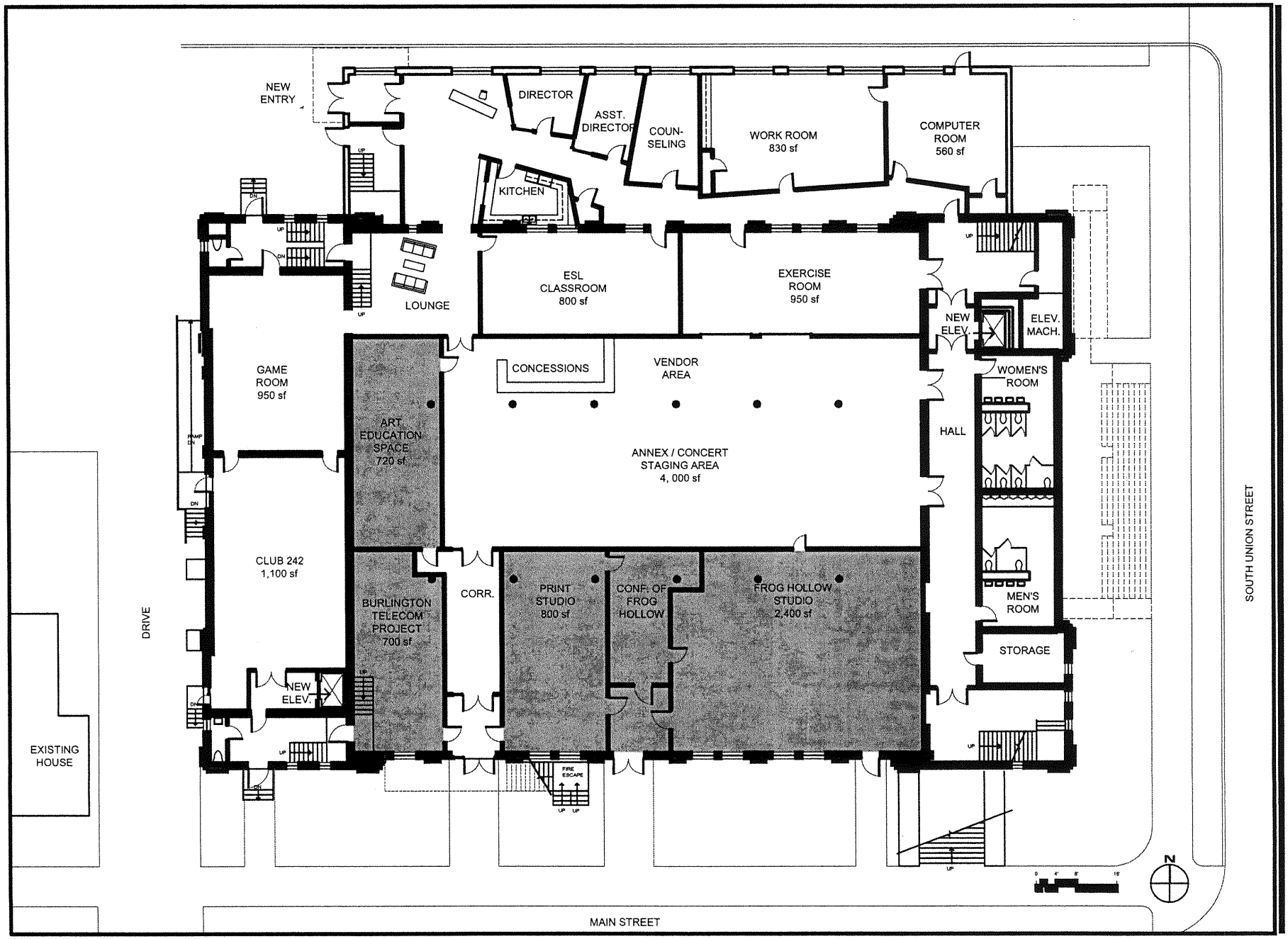
2.084.00
PROJECT #

dwg
FILE TYPE

DRAWING NUMBER

A103b



ARCHITECT

Bargmann Hendrie + Archetype, Inc.
318 Summer Street
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617 350-0450 Tel
617 350-0215 Fax
www.bhplus.com

PROJECT NAME

Burlington Community Recreation Center

Burlington, VT

CLIENT

City of Burlington

Department of Parks & Recreation
645 Pine Street
Burlington, VT 05401

PROJECT TEAM

REVISIONS

DRAWING TITLE

Memorial Auditorium Ground Floor Plan Option C

DRAWING INFORMATION

October 15, 2002
DATE OF ISSUE

Schematic design
DESIGN N/A

1/8" = 1'-0"
SCALE

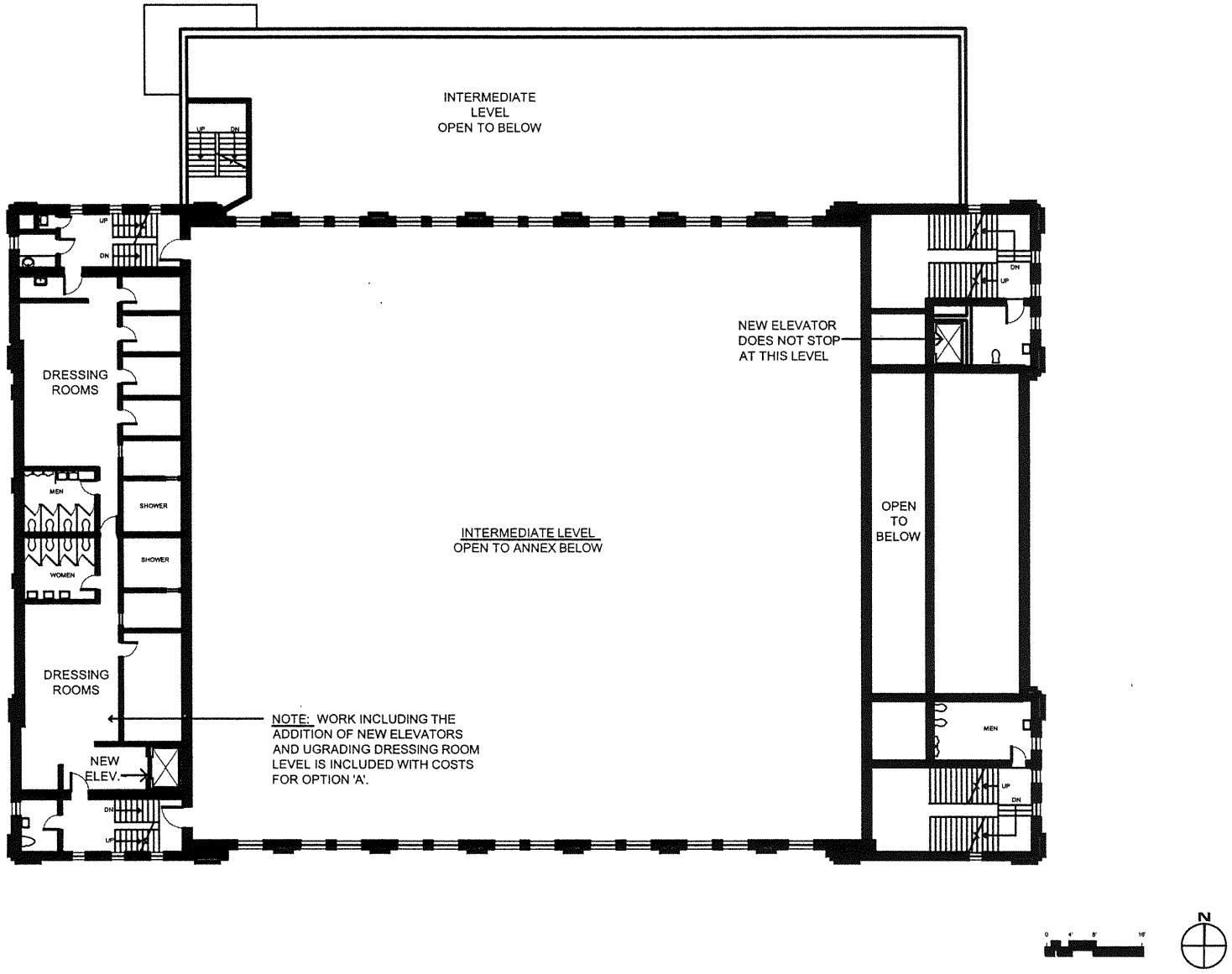
DRAWN BY

2384.00
PROJECT #

FILE NAME

DRAWING NUMBER

A100c



ARCHITECT

bh+a

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PROJECT NAME

Burlington Community Recreation Center

Burlington, VT

CLIENT

City of Burlington

Department of Parks & Recreation
645 Pine Street
Burlington, VT 05401

PROJECT TEAM

REVISIONS

1
2
3
4
5
DATE

DRAWING TITLE

Memorial Auditorium Dressing Rooms Floor Plan Option C

DRAWING INFORMATION

October 16, 2002
DATE OF ISSUE

Schematic design
DESCRIPTION

1/200" = 1'-0"
SCALE

DRAWN BY

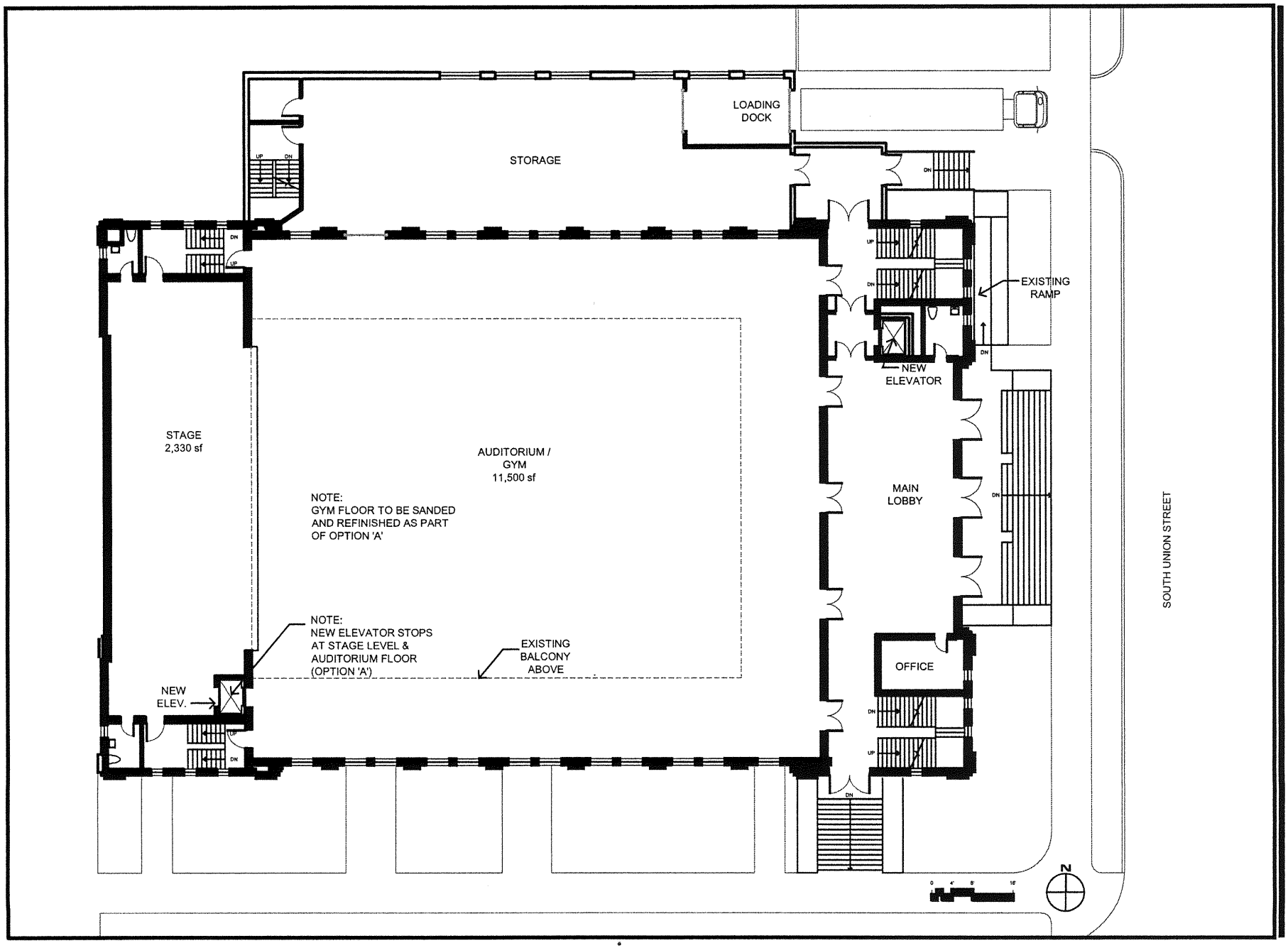
2384.00
PROJECT #

FILE ISSUE

DRAWING NUMBER

MEZZANINE

A100c



ARCHITECT

bhpa

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PROJECT NAME

Burlington Community Recreation Center

Burlington, VT

CLIENT

City of Burlington

Department of Parks & Recreation
645 Pine Street
Burlington, VT 05401

PROJECT TEAM

REVISIONS

1
2
3
4
5
DATE

DRAWING TITLE

Memorial Auditorium First Floor Plan Option C

DRAWING INFORMATION

October 15, 2002
DATE OF ISSUE

Schematic design
DESCRIPTION

1/30" = 1'-0"
SCALE

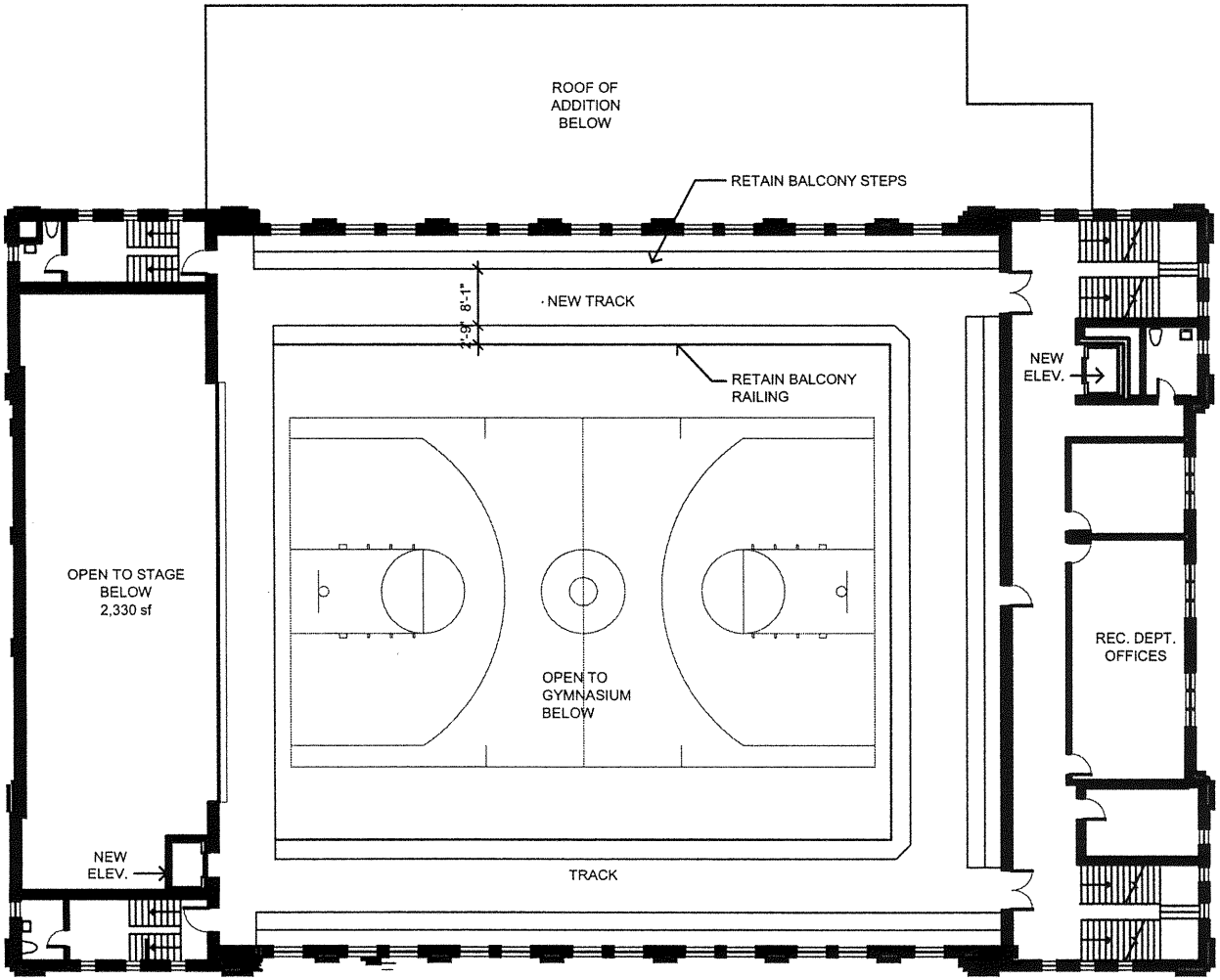
Drawn BY

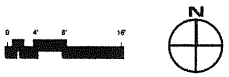
2364.00
PROJECT #

FILE NAME

DRAWING NUMBER

A101c





ARCHITECT

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PROJECT NAME

Burlington Community Recreation Center

Burlington, VT

CLIENT

City of Burlington

Department of Parks & Recreation
645 Pine Street
Burlington, VT 05401

PROJECT TEAM

REVISIONS

1
2
3
4
5 DATE

DRAWING TITLE

Memorial Auditorium Second Floor Plan Option C

DRAWING INFORMATION

October 15, 2002
DATE OF ISSUE

Schematic design
DESIGNATION

1/50" = 1'-0"
SCALE

K
DRAWN BY

2-04.00
PROJECT #

dwg
FILE TYPE

DRAWING NUMBER

A102c

bh+a
Bargmann Hendrie + Archetype

2.0 MEMORIAL AUDITORIUM

2.5 Cost Estimate

Estimate

D.G. JONES & PARTNERS, INC.
Cost Estimators

2.0 MEMORIAL AUDITORIUM

2.5 Cost Estimate

Summary

COST COMPARISON

2001 and 2002 cost estimate comparison

2001 - Previous Design/cost analysis

Space	area		cost
Capital Improvements	lump sum	sf	$2,122,000
Teen Center-annex level	10,300	sf	$498,000
Addition (not included this iteration)	0	sf	$0
Subtotal Program Spaces	**10,300**	**sf**	**$2,620,000**

2002 - Current Design/cost analysis

Space	area		cost
Capital Improvements includes 2 new elev., mep upgrade, ADA upgrade, & finishes	lump sum	sf	$2,173,640
Teen Center-annex level less sf due to new telecom project & city arts addition	8,800	sf	$464,800
Addition -annex & first fl new entry, lobby & loading area	7,000	sf	$1,390,570
Subtotal Program Spaces	**15,800**	**sf**	**$4,029,010**

Contents

Summary - Memorial Auditorium

			MEMORIAL AUDITORIUM					
			Option A : Capital Improvements		Options B and C : New Addition		Youth Center Rehab	
	GROSS FLOOR AREA (in square feet) =		48,130		7,090		8,810	
Option	Element Name		Cost $	$/sf	Cost $	$/sf	Cost $	$/sf
Option A : Capital Improvements								
	General		0	0.00				
	Site Work		133,316	2.77				
	Concrete		28,220	0.59				
	Masonry		263,678	5.48				
	Metals		42,840	0.89				
	Carpentry		42,084	0.87				
	Thermal & Moisture Protection		8,500	0.18				
	Doors/Windows		392,310	8.15				
	Finishes		214,725	4.46				
	Mechanical Systems		200,835	4.17				
	Electrical Systems		97,227	2.02				
	Fire Alarm System		22,117	0.46				
	Conveying System		156,818	3.26				
Options B and C : New Addition								
	General				0	0.00		
	Site Work				115,550	16.30		
	Addition				879,744	124.08		
Youth Center Rehab								
	General						342,714	38.90
	Sub-Total Building		**1,602,668**	**33.30**	**995,294**	**140.38**	**342,714**	**38.90**
	Site Work/Site Utilities		0	0.00	30,000	4.23	0	0.00
	Sub-Total Construction		**1,602,668**	**33.30**	**1,025,294**	**144.61**	**342,714**	**38.90**
	General Requirements	8.00%	128,213	2.66	82,024	11.57	27,417	3.11
	Special Conditions	0.00%	0	0.00	0	0.00	0	0.00
	Escalation to bid date 1Q2004	4.00%	69,235	1.44	44,293	6.25	14,805	1.68
	Design Contingency	15.00%	270,017	5.61	172,742	24.36	57,740	6.55
	Construction Contingency	5.00%	103,507	2.15	66,218	9.34	22,134	2.51
	Total Construction Cost		**2,173,641**	**45.16**	**1,390,569**	**196.13**	**464,811**	**52.76**

Notes

1. Brief project description:-
   - Various options for renovation and additions to existing facilities.

2. The estimate is based on the following:-
   - Vermont prevailing wage rate requirements.
   - Competitive bid.
   - General contractor type project.
   - Receipt of 4# bona-fide bids.
   - Single contract.

3. The gross floor areas are based on the following:-
   - Measurement is taken to the outside face of the exterior wall, measured through all stair wells, elevator shafts and ducts.
   - Atriums/large open voids are excluded.

4. Story heights:-
   - Varies.

5. General Requirements for this project is included @ 8% of the Sub-Total Construction , it includes the following:-
   - Field office expenses.
   - Field personnel.
   - Insurance.
   - Main office expenses.
   - Performance bond.
   - Preparation of progress schedules.
   - Compilation/preparation of site survey data.
   - Preparation of shop drawings.
   - Construction photographs.
   - Materials testing.
   - Temporary utilities.
   - Temporary construction.
   - Construction aids (safety nets, personnel protection equipment, scaffolding, etc.).
   - Barriers and enclosures.
   - Security.
   - Access roads.
   - Temporary controls.
   - Project signs.
   - Field offices and sheds.
   - Equipment rental.
   - Final cleaning.

6. Special Conditions for this project are not applicable.

Notes (Cont'd)

7. Escalation to bid date of 4Q2003 is compounded per annum at 4%.
   - Note: Escalation is taken on the sum of Sub Total Construction and General Requirements.

8. Design contingency is an allowance for future design modifications/additions, which alter the cost of the building as the design progresses, this percentage reduces as the design develops. It is based on a percentage of the sum of Sub-Total Construction, General Requirements and Escalation. For this level of estimate the following has been included:-
   - 15.00%

9. Construction contingency is an allowance for scope/design modifications made by the owner during construction and also for any unforeseen circumstances. It is based on a percentage of the sum of Sub-Total Construction, General Requirements, Escalation and Design Contingency. The following has been included:-
   - 5.00%

10. This estimate has been prepared from the following design information:-
    - Drawing set dated 1/9/02, 9/27/02 & 10/15/02 received on 10/2/02.
    - Various reports from bh+a and Lanpher Associates.
    - Telephone conversation with bh+a.

11. The estimate includes the following:-
    - See Estimate.
    - Window treatment
    - Conduit & draw wire only for telecommunication installation.

12. The estimate excludes the following:-
    - Utility company backcharges.
    - Building permit.
    - Sales tax.
    - Design consultant's fees.
    - Excavation in rock.
    - Ground water treatment/removal.
    - Asbestos removal/hazardous waste removal except allowance for drycleaning.
    - Loose furniture, fittings and equipment.
    - Drywall lining to cmu walls.

13. Allowances:-
    - All of the work is based on allowances of some form at this stage of the design.
    - $765,000.00 (net) for the pool work.

Notes (Cont'd)

14. Assumptions:-
    - Option A : Capital Improvements to Memorial Hall based on Option B layout.
    - No contaminated soil
    - Floor to Roof height on Memorial Auditorium addition to be 15' at 1st Floor.

15. Estimates by other firms:-
    - None.

16. Common abbreviations included in this estimate:-
    - cd = construction documents.
    - cf = cubic foot.
    - cy = cubic yard.
    - dd = design development.
    - ea = each.
    - eo = extra over
    - extg = existing
    - flr = floor.
    - gfa = gross floor area
    - lb = pound.
    - lf = linear foot.
    - ls = lump sum.
    - ly = linear yard.
    - opg = opening.
    - rsr = riser.
    - sd = schematic design.
    - sf = square foot.
    - sy = square yard.
    - tn = ton.

17. Builders work in connection (BWIC) with conveying, mechanical and electrical systems includes the following:-
    - Drilling and coring.
    - Chasing.
    - Cutting and patching.

Description	Qty	Unit	Rate	Amount
General				
Included in General Requirements on Summary (page 2/1)				
General	**Total**			**0**
Site Work				
Demolish exterior ramp @ west elevation	1	ea	2,000.00	2,000
Demolish exterior stairs to north elevation	1	ea	3,500.00	3,500
Allow for excavation, fill, etc. to:-				
- reconstructed exterior stair foundations	1	ls	2,000.00	2,000
- new wheelchair ramp to west elevation	1	ls	1,466.00	1,466
General demolition to interior areas (gfa)	39,320	sf	1.50	58,980
Demolish window	102	ea	85.00	8,670
Form opening in floor for elevator & make good @:-				
- sog including pit	2	ea	8,000.00	16,000
- mezzanine	2	ea	1,250.00	2,500
- 1st Floor	2	ea	1,250.00	2,500
- 2nd Floor	2	ea	1,250.00	2,500
- roof including vent	2	ea	1,500.00	3,000
Form opening in exterior wall & make good:-				
- sl door opening	6	ea	950.00	5,700
- dl door opening		ea	1,250.00	
- rolling door	1	ea	1,750.00	1,750
Form opening in interior wall & make good:-				
- sl door opening	6	ea	600.00	3,600
- dl door opening	2	ea	775.00	1,550
Infill opening & make good:-				
- sl door opening	7	ea	300.00	2,100
- dl door opening	2	ea	500.00	1,000
- window, now interior		ea	275.00	
Allow for making safe MEP Installations	1	ls	1,500.00	1,500
Allow for temporary shoring	1	ls	3,000.00	3,000
Allow for removal of rubbish off site	1	ls	10,000.00	10,000
Site Work	**Total**			**133,316**
Concrete				
Allow for concrete work @:-				
- reconstructed exterior stair foundations	1	ls	15,000.00	15,000
- new wheelchair ramp to west elevation	1	ls	11,220.00	11,220
Repair/patch/refinish concrete water table/found walls	200	sf	10.00	2,000
Concrete	**Total**			**28,220**

Description	Qty	Unit	Rate	Amount
Masonry				
Repair/repoint exterior brick	6,000	sf	15.00	90,000
Repoint joints at cast stone belt course	700	lf	5.00	3,500
Repair/reconstruct exterior stone stair treads/stringers	1	ls	30,000.00	30,000
Replace cast stone cornice/coping	250	sf	75.00	18,750
Remove graffiti & clean entire exterior surfaces	25,000	sf	3.00	75,000
CMU partition, interior	3,944	sf	8.00	31,552
CMU partition, interior, elevator shaft	1,296	sf	9.00	11,664
Precast concrete lintel	107	lf	16.00	1,712
Allow for temporary shoring	1	ls	1,500.00	1,500
Masonry	**Total**			**263,678**
Metals				
Repair steel lintel at exterior window	172	ea	95.00	16,340
Repair/refinish fire escape stair	2	ea	1,000.00	2,000
Remove/repair/refinish reinstall steel window grating	8	ea	250.00	2,000
Allow for work to stairs	1	ls	15,000.00	15,000
Allow for miscellaneous metal work	1	ls	7,500.00	7,500
Metals	**Total**			**42,840**
Carpentry				
Temporary window boarding	172	ea	72.00	12,384
Remove barrier @ shower doorway & retile	2	ea	350.00	700
ADA refuge areas @ lobby elevator, 4# levels	1	ls	14,000.00	14,000
Allow for general wood blocking	1	ls	3,000.00	3,000
Allow for standing/running trim	1	ls	2,000.00	2,000
Wood ramp & stairs to west elevation complete	1	ls	10,000.00	10,000
Carpentry	**Total**			**42,084**
Thermal & Moisture Protection				
Repair/insulate roof drainage system	1	ls	5,000.00	5,000
Allow for general roof repairs	1	ls	3,500.00	3,500
Thermal & Moisture Protection	**Total**			**8,500**

Description	Qty	Unit	Rate	Amount
Doors/Windows				
Remove/repair/reglaze/reinstall steel window	70	ea	1,080.00	75,600
Magnetic interior storm window	55	ea	540.00	29,700
New ig steel windows complete:-				
- narrow, average 14sf	44	ea	770.00	33,880
- wide, average 48sf	62	ea	2,640.00	163,680
- triple, average 50sf	6	ea	2,750.00	16,500
Allow for reglazing broken lights w/custom glass	10	ea	960.00	9,600
Replace exterior stile & rail wood doors w/glazed transom complete to South Union Street elevation	3	ea	4,500.00	13,500
SL exterior door w/frame, hardware, etc complete	2	ea	1,500.00	3,000
Allow for work to other exterior doors	1	ls	5,000.00	5,000
Interior wood doors, hollow metal frames, hardware, etc:-				
- sl door	7	ea	1,050.00	7,350
- dl doors	13	ea	1,650.00	21,450
Allow for glazing to doors	1	ls	1,500.00	1,500
Allow for sidelights, etc	20	sf	40.00	800
Allow for work to other interior doors	1	ls	5,000.00	5,000
Rolling door complete, 8' wide	1	ls	4,500.00	4,500
Allow for access doors	1	ls	1,250.00	1,250
Doors/Windows	**Total**			**392,310**
Finishes				
Allow for:-				
- floor finishes (gfa)	36,630	sf	1.00	36,630
- sand & refinish Auditorium level Gym floor	11,500	sf	2.50	28,750
- base (gfa)	48,130	sf	0.15	7,220
- wall finishes (gfa)	48,130	sf	1.00	48,130
- ceiling finishes (gfa)	48,130	sf	1.00	48,130
Paint to:-				
- stairs	1	ls	3,000.00	3,000
- miscellaneous metal work	1	ls	1,500.00	1,500
- standing/running trim	1	ls	1,000.00	1,000
- exterior sl door (per side)	4	ea	80.00	320
- exterior dl doors (per side)	6	ea	125.00	750
- interior sl door (per side)	14	ea	70.00	980
- interior dl doors (per side)	26	ea	105.00	2,730
- sidelights, etc (per side)	40	sf	3.00	120
- miscellaneous	1	ls	500.00	500
Upgrade of restrooms including finishes, lighting, etc (gfa	2,331	sf	15.00	34,965
Finishes	**Total**			**214,725**

Description	Qty	Unit	Rate	Amount
Mechanical Systems				
Upgrade plumbing fixture to meet ADA	16	ea	950.00	15,200
Sink, double bowl to Kitchen	1	ea	2,000.00	2,000
Repair/modify incorrect steam heat piping	1	ls	15,000.00	15,000
Replace hot water tank	2	ea	3,000.00	6,000
Remove condensate return tank/pump & provide new line and valve	1	ls	5,000.00	5,000
Replace burner to boiler	2	ea	2,500.00	5,000
New boiler ventilation system	1	ls	5,000.00	5,000
Replace roof exhaust fan backdraft damper w/motorized	6	ea	1,000.00	6,000
Replace roof fan	4	ea	1,500.00	6,000
Ventilation system & control to Dance Studio	1	ls	5,000.00	5,000
Allow for new HVAC systems (gfa)	7,700	sf	15.00	115,500
BWIC	1	ls	5,571.00	5,571
GC's O&P	1	ls	9,563.55	9,564
Mechanical Systems	**Total**			**200,835**
Electrical Systems				
Additional GFIC device	10	ea	125.00	1,250
Upgrade Auditorium lighting w/new architectural fittings	16	ea	750.00	12,000
Retrofit house fluorescent fixture w/dimmable ballast	15	ea	500.00	7,500
Guard to Boiler Room light fixture	10	ea	50.00	500
Replace incandescent EXIT light w/LED	20	ea	400.00	8,000
Battery-operated emergency light fixture	16	ea	350.00	5,600
Allow for miscellaneous power	1	ls	5,000.00	5,000
Allow for new lighting/small power/fire alarm/etc (gfa)	7,700	sf	6.50	50,050
BWIC	1	ls	2,697.00	2,697
GC's O&P	1	ls	4,629.85	4,630
Electrical Systems	**Total**			**97,227**
Fire Alarm System				
Voice announcement system (ADA)	1	ls	5,000.00	5,000
Additional strobe (ADA)	30	ea	315.00	9,450
ADA refuge area alarm panel @ elevator lobby	4	ea	1,500.00	6,000
BWIC	1	ls	613.50	614
GC's O&P	1	ls	1,053.18	1,053
Fire Alarm System	**Total**			**22,117**

Description	Qty	Unit	Rate	Amount
Conveying System				
Hydraulic passenger elevator, 4 stop:-				
- all front entry	1	ea	70,000.00	70,000
- 3# front entry & 1# rear entry	1	ea	75,000.00	75,000
BWIC	1	ls	4,350.00	4,350
GC's O&P	1	ls	7,467.50	7,468
Conveying System	**Total**			**156,818**

Description	Qty	Unit	Rate	Amount
General				
Included in General Requirements on Summary (page 2/1)				
General	**Total**			**0**
Site Work				
General site preparation	1	ls	7,500.00	7,500
Utilities	1	ls	30,000.00	30,000
Demolish/remove parking area	1	ls	15,000.00	15,000
Finish site work	1	ls	40,000.00	40,000
Building pad preparation	3,410	sf	5.00	17,050
Stairs @ New Entry complete	1	ls	6,000.00	6,000
Site Work	**Total**			**115,550**
Addition				
Demolition/Alteration	7,090	sf	1.50	10,635
Substructure	7,090	sf	12.50	88,625
Superstructure	7,090	sf	3.50	24,815
Stairs	7,090	sf	5.00	35,450
Roof Finish	7,090	sf	7.00	49,630
Exterior Walls	7,090	sf	29.93	212,175
Exterior Windows & Doors	7,090	sf	6.77	48,000
Interior Walls	7,090	sf	5.12	36,324
Interior Windows & Doors	7,090	sf	1.76	12,500
Finishes	7,090	sf	8.00	56,720
Specialties	7,090	sf	2.00	14,180
Equipment	7,090	sf	2.00	14,180
Furnishings	7,090	sf	5.00	35,450
Conveying	7,090	sf		no work
Plumbing	7,090	sf	1.00	7,090
Fire Protection	7,090	sf	3.00	21,270
HVAC	7,090	sf	18.00	127,620
Electrical	7,090	sf	12.00	85,080
Addition	**Total**			**879,744**

Description	Qty	Unit	Rate	Amount
General				
General demolition to interior areas (gfa)	8,810	sf	2.00	17,621
Form opening in exterior wall & make good:-				
- dl door opening	3	ea	1,250.00	3,750
Form opening in interior wall & make good:-				
- sl door opening	2	ea	600.00	1,200
- dl door opening	2	ea	775.00	1,550
Infill opening & make good:-				
- sl door opening	1	ea	300.00	300
- window, now interior	1	ea	275.00	275
Allow for making safe MEP Installations	1	ls	500.00	500
Allow for temporary shoring	1	ls	1,500.00	1,500
Allow for removal of rubbish off site	1	ls	3,500.00	3,500
CMU partition, interior	7,328	sf	8.00	58,624
CMU partition, interior, elevator shaft	1,296	sf	9.00	11,664
Precast concrete lintel	99	lf	16.00	1,584
Allow for general wood blocking	1	ls	1,000.00	1,000
Allow for standing/running trim	1	ls	1,500.00	1,500
Interior wood doors, hollow metal frames, hardware, etc:-				
- sl door	10	ea	1,050.00	10,500
- dl doors	13	ea	1,650.00	21,450
Allow for glazing to doors	1	ls	1,500.00	1,500
Allow for sidelights, etc	20	sf	40.00	800
Allow for access doors	1	ls	500.00	500
Allow for:-				
- floor finishes (gfa)	8,810	sf	2.00	17,621
- base (gfa)	8,810	sf	0.20	1,762
- wall finishes (gfa)	8,810	sf	1.25	11,013
- ceiling finishes (gfa)	8,810	sf	2.00	17,621
Paint to:-				
- standing/running trim	1	ls	1,000.00	1,000
- interior sl door (per side)	20	ea	70.00	1,400
- interior dl doors (per side)	26	ea	105.00	2,730
- sidelights, etc (per side)	40	sf	3.00	120
- miscellaneous	1	ls	500.00	500
Built-in base & wall cabinets to Kitchen & Workroom	59	lf	400.00	23,600
Sink, double bowl to Kitchen	1	ea	2,000.00	2,000
Adapt/amend Fire Protection system (gfa)	8,810	sf	1.00	8,810
Adapt/amend HVAC (gfa)	8,810	sf	6.00	52,862
Adapt/amend Electrical (gfa)	8,810	sf	6.00	52,862
BWIC	1	ls	3,496.00	3,496
GC's O&P	1	ls	6,001.46	6,001
General	**Total**			**342,714**

2.0 MEMORIAL AUDITORIUM

2.5 Cost Estimate

Outline Specifications

GENERAL NOTES

This document comprises Outline Specifications for additions and alterations to the Memorial Auditorium, an existing historic building located in downtown Burlington, Vermont. Memorial Auditorium is a three-story masonry bearing-wall structure with steel framing and timber roof and floor decking. Foundation walls and some floor slabs are reinforced concrete. The Work comprises, without limitation, repairs, system upgrades and renovations and additions to accommodate existing and new program uses.

DIVISION 1: GENERAL CONDITIONS

A. General Contractor Responsibilities
   1. Project management, supervision, safety program
   2. Field layout, shop drawings, quality control
   3. General liability, workmen's compensation insurances
   4. Payment and performance bonds, builder's risk insurance, building permits
   5. Temporary service (electrical, water, sanitary, power, heat, fire protection, enclosures/barriers)
   6. Site fencing, dust and water control
   7. Construction cleaning, final cleanup, legal disposal of waste
   8. Signs and project identification, field office and storage trailers
   9. Exclusions: Abatement of hazardous materials; testing and removal of existing underground storage tanks

B. Owner Responsibilities
   1. Site plan approvals and regulatory review, including historic preservation and design review
   2. Reasonable, unimpeded access to the site
   3. Timely decision making and nighttime security
   4. Site surveys and establishment of project baseline: construction testing services
   5. Abatement of hazardous materials

DIVISION 2: SITEWORK

A. Site Safety
   1. Construction traffic control from adjacent roadways as required
   2. Signage, fencing, and barriers as required for separating public from construction activities

B. General Site Preparation
   1. Site Preparation
      a. Tree protection, site dewatering, and dust and erosion control
      b. Trees cut and stumps grubbed, removed, and disposed of, loam stockpiled
      c. Parking/ access road cuts/ fills/ borrows and contours
      d. Temporary seeding
      e. Building cuts/fills/borrows and contours – site work contractor establishes building (addition) pad area to elevation equal to existing slab, as indicated
      f. 15" gravel at parking, typical, except 20" at bus turnarounds and entry roads; 8" gravel base at bituminous paved walkways

g. Excavate and backfill exterior utilities to 5' from new structure, with proper bedding and/or concrete encasements as required; protect existing utilities as required, provide curb and pavement patching from utility pickup points

2. Utilities
   a. Addition: New roof drainage to gutters and downspouts
   b. Provide footing drain system
   c. Site light standards with concrete bases
3. Finish Sitework
   a. 2½" bituminous paving at parking, with fine grading
   b. 4" concrete sidewalk
   c. 4" loam and seed at all disturbed and new lawn areas
   d. Landscape allowance
4. Special Considerations
   a. Limited use of existing adjacent parking

C. Addition: Building Pad Preparation
1. Pad Preparation
   a. Excavate/backfill as required for structure, including overexcavation and placement of 12" structural fill beneath all footings; provide imported gravel/granular backfill throughout, do not utilize on-site materials for backfill purposes
   b. 8" crushed stone with reinforced vapor barrier and 2" sand cushion typical under slabs
   c. 5' gravel beneath structural entries & entry pads
   d. Foundation drain
   e. Excavate and backfill interior utilities, including building utility entrances
   f. Fine grade for slabs
2. Utilities
   a. 4" perforated pipe foundation drains at perimeter foundation, wrapped with geo sock material and crushed stone
   b. Utilities interior to the structure provided in Divisions 15 and 16

DIVISION 3: CONCRETE

A. Foundations (3000 psi in 28 days, air entrained where exposed to weathering)
1. Retaining and frost type foundation as required, 5' frost cover
   a. 100#/cy reinforcement at basement retaining foundations, 45#/cy at frost foundations
   b. 125#/cy reinforcement at column footings
   c. 200#/cy reinforcement at column piers

B. Slabs
1. Interior at grade (3500 psi 28 days)
   a. Ground Floor: 6" thick, 8 mil reinforced poly vapor barrier typical, reinforced with 6x6#10 flat mesh
   b. Sawcut along column lines or as required, general size not to exceed 20'x20'
2. Interior on deck (4000 psi 28 days)
   a. Structured Loading Area Slab: 8" thick, reinforced with rebar
3. Exterior structural entries
   a. 6" thick pads, reinforced with rebar as required
   b. Frost walls and footings as required
   c. Dowel to adjacent as required

C. Miscellaneous
   1. 1/2" thick joint fillers all slab edges ending against vertical surfaces, full slab depth
   2. Membrane cure, compatible with future adhered finished flooring, at all areas (wet cure option)
   3. Liquid hardener sealer at floors to remain as exposed interior concrete
   4. Salt-gard finish at exterior concrete flatworks
   5. Anchor bolts and grout plates
   6. Concrete stair pans

DIVISION 4: MASONRY

A. Exterior Wall Construction (Addition)
   1. 12" load bearing cmu masonry full height with 2" rigid insulation and brick veneer; provide allowance for special brick shapes and corbeling at cornice
   2. Labor to place bearing plates, lintels, and the like

B. Existing Building
   1. Repoint exterior brick and cast stone masonry as indicated
   2. Replacement cast stone trim and copings as indicated
   3. Construct new masonry openings; infill existing m.o.

DIVISION 5: METAL

A. Structural Steel (Addition)
   1. W-section and/or tube steel (where exposed) perimeter and interior columns as required; W-section floor and header beams as required
   2. Roof joist construction typical throughout U.O.N.
   3. 1 ½" 22 ga B galvanized roof deck
   4. 9/16" galvanized form deck for intermediate floor concrete pans
   5. Structurals exposed to view at Gymnasium, Rink & Pool, protective finish to be applied, see Div 9

B. Miscellaneous (galvanized where exposed to weather)
   1. Roof angles and deck edge perimeter angles as required
   2. Bearing plates and clip angles as required
   3. Fan frames for supply and exhaust hoods/vents
   4. Wall header reliefs at exterior walls where required
   5. Steel concrete pan stairs with handrails

DIVISION 6: CARPENTRY

A. Rough
   1. Exterior (Addition)
      a. Standard light-gauge steel frame construction: 2" x 4" studs 16" o.c.
      b. Non-arsenic pressure treated roof blocking/supports @ perimeter and equipment/fan curbings
      c. Non-arsenic pressure treated window and door block/shim
      d. 5/8" CDX plywood at steel stud exterior walls
   2. Interior
      a. Blocking as required for built-in woodworks, doors, etc.; plywood electric panel backers

B. Finish/Woodwork
   1. Interior (Existing)
      a. Sand and refinish gymnasium floor
   2. Interior (Addition)
      a. Hardwood window ledges at exterior windows (see Div 9 for sheetrock returns)
      b. Plastic laminate countertops at Women/Men Restrooms
      c. Base and wall cabinetry and countertops, plastic laminate as indicated
   3. Exterior (Existing)
      a. Door casing repair/replacement

DIVISION 7: THERMAL AND MOISTURE PROTECTION

A. Waterproofing (Addition)
   1. Bituthene or equal waterproofing system to bottom of footing at warm retaining walls and at elevator pit

B. Sprayed-on Acoustic Insulation (Addition)
   1. 1" Celbar K-13 spray-on acoustic insulation at ceiling areas

C. Insulation (Addition)
   1. 2" rigid insulation under slab and at foundation to 4' below finish grade
   2. 2 " rigid cavitay wall insulation with bituminous mastic at new masonry walls
   3. R30 rigid board at flat roof construction, mechanicaly fastened, see Division 7 - EPDM roofing
   4. Full stud depth insulation (both air & vapor barriers as required) at exterior stud walls with Division 9 Drywall systems
   5. ¾" rigid board at ext. stud walls with Div. 9 drywall systems (fastener cold conductivity control)
   6. Firestopping allowance

D. EPDM Roofing
   1. White, .060 fully adhered, with roof drains crickets/tapers as required for drainage; smoke and roof hatches with ladders
   2. Perimeter flashings, change height, and edge eave trims, RTU walkway pads

E. Caulking and Sealing

DIVISION 8: DOORS AND GLASS

A. Hollow Metal Doors and Hardware
   1. Frames grouted solid at masonry walls where occurring
   2. Welded frames typical, knock down frames not acceptable
   3. Hollow metal doors where indicated. Doors fire rated as required.
   4. Allowance for rooftop mechanical space access doors

B. Windows and Window Walls (Addition)
   1. 1" thermally broken aluminum frame, insulated low E glass
   2. Fixed or operable as required

C. Windows (Renovation)
   1. Repair/restore existing steel units
   2. New steel fixed and project-out units (to replace vinyl units), complete

D. Storefronts (Addition)
   1. Aluminum frame, thermally broken vestibule set with sidelights and transoms as required; interior and exterior construction

E. Glazing
   1. Reglaze historic windows as indicated/required
   2. 1/2 and 1/4 light allowance for HM and wood door packages

F. Hardware package for all doors as required

DIVISION 9: FINISHES

A. Drywall
   1. 6" 18 ga. steel studs, with 5/8" type X drywall, batt insulation, and vapor barrier at exterior walls
   2. 3 5/8" 25 ga steel stud partitions, with 5/8" type X drywall and batt insulation at interior non load-bearing walls
   3. Gypsum board ceilings on channel furring at areas requiring fire rated enclosure and as indicated
   4. 5/8" drywall on furring at all masonry walls requiring interior drywall finish
   5. General duct chases as required; soffit constructions as required at downlight areas

B. Acoustical Work
   1. 2' x 2' tegular drop-ins at lobbies
   2. 2' x 2' square edge drop-ins typical all other ceilings where drywall not occurring

C. Flooring and Wall Finishes
   1. Carpet with vinyl base typical
   2. VCT with vinyl base
   3. Ceramic tile floors with 4' tile wainscot at restrooms
   4. Hardened and sealed concrete floor finish at Elevator Machine Room
   5. Rubber treads/risers/landings at new stairwells

D. Painting
   1. Exposed to view steel. Miscellaneous metals, stairs and rails, hollow metal doors and frames
   2. Exposed pipings
   3. Hollow metal and wood doors and frames
   4. Non-factory finish woodwork and shelving
   5. Exposed drywall
   6. Exposed interior masonry: epoxy finish
   7. Exterior wood: stained and sealed or painted

DIVISION 10: ACCESSORIES

A. Allowances to be established for:
   1. Floor mount, ceiling braced solid plastic toilet and urinal partitions
   2. Signage
   3. Fire extinguishers with semi-flush mount wall cabinets
   4. Toilet accessories

DIVISION 12: FURNISHINGS

A. Window treatment allowance

B. Recessed aluminum floor grilles at all new exterior entries

DIVISION 14: CONVEYING SYSTEMS

A. 2500# passenger elevator, single-entrance (2-speed doors), one stop per floor (4 stops)
B. 3500# passenger elevator, double-entrance (2-speed doors), 4 stops (Ground, Dressing-Room, Auditorium and Stage levels)

DIVISION 15: MECHANICAL

A. HVAC
   1. Gas fired, boiler base heating system, typical to be coordinated with or replace existing system as appropriate
   2. Water source air handlers for ducted supply/return heating and fresh air exchange throughout; supplement with kickspace cabinet heaters or fintube radiation where necessary
   3. Complete makeup air and fan supply/exhaust systems, including toilet exhausts
   4. Testing and balancing

B. Plumbing
   1. Commercial grade vitreous china throughout
   2. Wall mount water closets and urinals with chair carriers at Women/Men Restrooms
   3. Lavatories at Women/Men Restrooms; wall mount with chair carriers
   4. Chilled water drinking fountains provided
   5. Floor drains at Women/Men Restrooms
   6. Elevator sump pit
   7. Exterior frostproof hose bibbs
   8. Point of use heaters for domestic hot water at Women/Men Restrooms
   9. Janitor floor sink with accessory mop strip at Janitor Storage

C. Sprinkler system (Addition)
   1. Sufficiency of City supply and pressure assumed
   2. Complete wet interior system typical

DIVISION 16: ELECTRICAL

A. Electrical
   1. Lighting and power package as required
   2. Communication and telephone allowance
   3. Extend fire alarm and emergency egress/battery pak systems (central reporting hookups by others)
   4. Site walkway lights see Div 2
   5. Mechanical equipment hookups
   6. Temporary construction power and job wiring and lamping
   7. Generator system allowance
   8. Security systems are by the Owner