



FEASIBILITY STUDY FOR MALDEN CENTER FOR ARTS & CULTURE AT 89 SUMMER STREET, MALDEN, MA 02148

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MALDEN CENTER FOR ARTS &
CULTURE

89 SUMMER STREET,
MALDEN, MA 02148



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INTRODUCTION
/ EXECUTIVE
SUMMARY



Current Exterior Image of the Malden District Court

EXECUTIVE SUMMARY

The new Malden Center for Arts and Culture promises to have a transformative impact on the Malden community and beyond. This feasibility study includes a design proposal that is based on city and community input, related construction costs, and a phasing plan to help chart a course forward. As the project proceeds a number of considerations will need to be considered to balance the flexible use of space, the recognition of the history of the building, and the financial limitations that are imposed on any project of this scale.

The existing building envelope is in very good shape and has been well maintained by DCAMM. The building has a new roof, new windows, and the existing masonry appears to be in very good condition. While the envelope is in good condition, many of the existing building systems servicing the building are beyond the end of their useful life. This report recommends electrical service and fire alarm replacement, and also makes recommendations to upgrade the existing HVAC systems. Additionally, the building does not have a sprinkler system and any reuse of this building for public use will require a new sprinkler system throughout.

The study does include a construction cost estimate for the project as well as a phased project approach (Page 14) that reduces first costs of construction. Construction costs for this project are estimated to be \$13,548,062 if done as one complete project. The report includes the possibility of phasing the work over time into two separate projects. The phased project costs are \$9,794,131 for the first phase, and \$4,187,378 for the second phase of construction if completed two years after the first phase. For a full project cost, the city should anticipate another 30% in addition to construction costs for architectural and engineering design services, owner project management, furniture, fixtures, and equipment, and other project related costs.

We have included the Cultural Facility Market Study & Operating Pro Forma completed by RKG as an appendix to this document for reference as it relates to anticipated revenues. Additionally, the city should review operational costs as they relate to the phasing plan since not completing certain aspects of the project could have an impact on expected revenues.

The new Malden Center for Arts and Culture presents a wonderful opportunity for the city to celebrate the remarkable diversity of its population and the wide range of arts and creative individuals and organizations that make Malden what it is today.



Historic drawing of the Malden District Court, built in 1922.
Courtesy of courthousehistory.com

HISTORY & SIGNIFICANCE

The Massachusetts Historical Commission (MHC)* hosts a database of architecturally significant buildings in the Commonwealth of Massachusetts. Following are excerpts gathered from that MHC database for the building at 89 Summer Street in Malden, Massachusetts.

John Ward Pettengill (1836-1903) of Malden was the first justice appointed to the court. After service in the Union army during the civil war, he opened a law practice in Boston. By 1870 he was appointed special justice of the Charlestown police court and in 1874 appointed to the Malden bench.

In 1927, Malden native Emma Fall Schofield (1885-1980), a graduate of Boston University Law School, was named the first female assistant attorney general in New England. Schofield was appointed a justice of the Malden District Court becoming the first female judge in Massachusetts and New England. She was sworn in on December 20, 1930. In 1997, the Malden District Court organized the Emma Fall Schofield Memorial Committee. It organized a celebration not only of Schofield's appointment but also of six decades of women on the bench in Massachusetts.

* The information included here is paraphrased from the Massachusetts Historical Commission database (MACRIS) for the Malden District Courthouse at 89 Summer Street in Malden. That database entry can be found in its entirety at: mhc-macris.net

BUILDING HISTORY & SIGNIFICANCE

The court house was designed in the Colonial Revival style by noted Boston architect Charles R. Greco (1873-1962) Facing Summer Street, the recessed entrance portico is supported by four Corinthian columns, displaying stylized Acanthus leaves, typical of the Corinthian order. The entrance portico is reached by two flights of granite steps. Original double wood entry doors are surrounded by a segmented pediment of cast stone. Above the Corinthian columns in cast stone is etched the name of the structure "First District Court of Eastern Middlesex" and above that, also in cast stone is the Middlesex County seal.

An elevation drawing was published in the Malden Evening News of December 7, 1921. Originally the structure had a two story



Historic drawing of the Malden District Court, built in 1922.
Courtesy of postcard listing on ebay.com

portion fronting on Summer Street and a single story extension in the rear. A second story addition was added to the rear section in 1938.

As originally designed the first floor contained two courtrooms which were located in the single story portion, along with the judge's lobby. The first floor also contained offices for the clerks, a conference room, and a room for juvenile hearings. The second floor front elevation contained mens' and womens' lavatories, offices for the probation department, a matron's room, and three consultation rooms. The Lower Level contained the heating plant, two cells and a padded cell for the insane. One of the courtrooms survives today as does the judge's lobby. The courthouse building opened in June of 1922. In 1938 a second story addition was added to the rear section of the courthouse. This addition added two courtrooms, library, and judge's lobbies to the rear second floor.. The court first used this addition on February 4,1938. It was dedicated on February 24,1938.

The design of this structure does not compare with any other structure in Malden perhaps with the exception of Greco's Colonial Revival Central Fire Station. Its expressive architecture and facade are appropriate to the first free standing court house erected in Malden. All previous court buildings in Malden were commercial structures with stores on the ground floors and courtrooms above on the second floor.

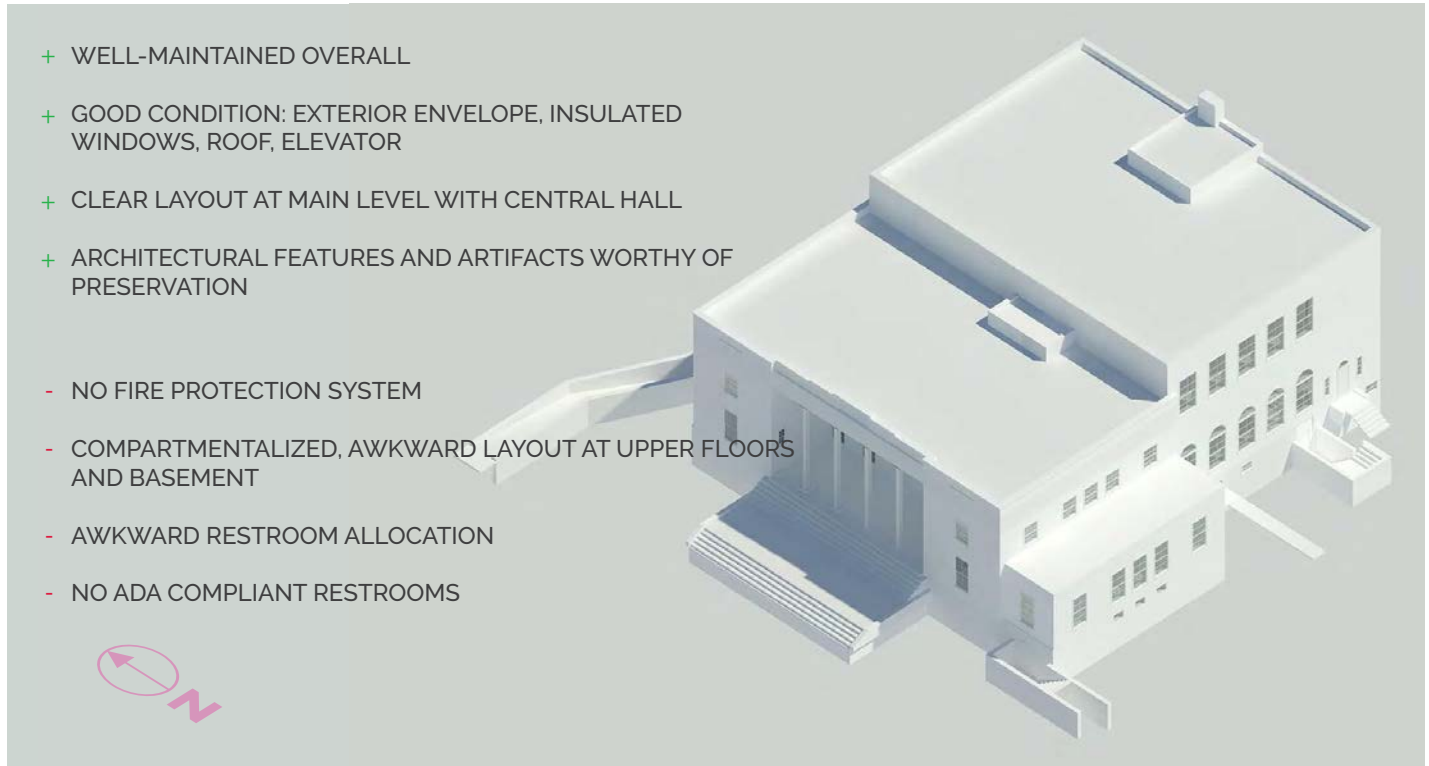
Several of Greco's structures are listed in the National Register of Historic Places, perhaps most notable is The Temple (1924) in Cleveland, Ohio. Coincidentally, Greco also designed the art deco Second District Court of Eastern Middlesex in Waltham (WLT.515), which is also listed on the National Register of Historic Places.



REUSE RECOMMENDATIONS



REUSE RECOMMENDATIONS - PHYSICAL CONDITION OF EXTERIOR



EXTERIOR

The building at 89 Summer Street has been well maintained through the years. The exterior envelope seems to have been restored within the last 10 years. The exterior brickwork is in good condition and appears to have been repointed, the windows are in excellent condition, and the roof appears to have been replaced and has a number of years left of service.

The building is handicap accessible via a ramped entrance that enters at the lower level. This is not the main entrance to the building and does not meet the objectives of universal design today.



REUSE RECOMMENDATIONS - PHYSICAL CONDITION OF EXTERIOR



Exterior - Photo 1



Exterior - Photo 2

RECOMMENDATIONS

The design proposes to enlarge and modify the existing “gash” ramp (Photo 2) to create a more welcoming accessible entrance and outdoor plaza that is connected to an indoor cafe. This will require the demolition of the existing concrete ramp, railings and a portion of the exterior walls. The new entrance will feature a courtyard space with storefront windows, a new entrance canopy, vegetation and plantings. The existing Summer Street grand stair entrance (Photo 1) will serve as a shared public space and will feature a renovated functioning terrace connected to the first floor interior gallery space.

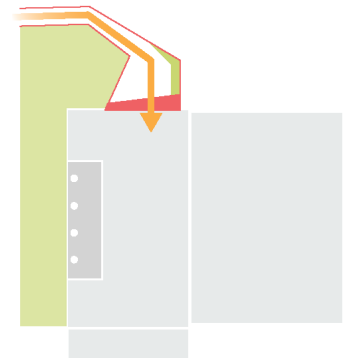
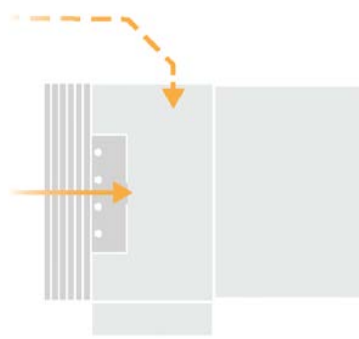
Other exterior envelope work includes cleaning of the brick, stone, and concrete, selective repointing and masonry repair, and general maintenance. Existing egress stairs from the lower level and first floor to remain all have non-code compliant handrails and guardrails and will need to be replaced as a part of this project.



EXISTING ACCESS



PROPOSED ACCESS & GREEN SPACE



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REUSE RECOMMENDATIONS - EXTERIOR - LANDSCAPE



Exterior Precedent - Front Activated Stairs



Exterior Precedent - Perimeter Planting Strategy



Exterior Precedent - Sculpture Park

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REUSE RECOMMENDATIONS - EXTERIOR - LANDSCAPE



Exterior - Photo 3



Exterior - Photo 4



Exterior Precedent - Front Activated Stairs

RECOMMENDATIONS

The goal of the project is to create a building and landscape that will be welcoming to all of Malden's residents and beyond. As noted earlier, the big exterior change to the building will be the relocation of the front door from the Summer Street grand stair to a universally accessible entrance at the northwest corner of the building at Lincoln Street and Summer Street. The site diagram included here shows how the existing site may be used by the public for events and programming.

Front Activated Stairs

The building does have a historic designation and our understanding is that the stairs will need to remain despite the fact that the entrance will be relocated. The existing stairs can be repurposed and programmed to create a more theatrical feel by breaking up the stairs with new decking, sculptural, lighting, and planting elements. Breaking up the scale of the stairs would be the goal to create an inviting and welcoming space.

Entry/ The Gash

The new entry ramp and plaza needs to be welcoming to the public. The ramp itself and related retaining walls can incorporate art and lighting into the space. We envision an open plaza at the bottom of the ramp with cafe tables for visitors to the cafe inside the building. The plaza would also have plantings, art, and become an outdoor gallery or space for small events. Bicycle parking should be located close to the entrance.



REUSE RECOMMENDATIONS - EXTERIOR - LANDSCAPE



Exterior Precedent - Perimeter Planting Strategy



Exterior Precedent - Bicycle Parking



Exterior Precedent - Stormwater Strategy

Perimeter

The Mountain Avenue and Lincoln Street landscaped areas can be used for nice plantings to soften the street edge and help create a welcoming experience for residents.

Backyard

The rear of the building is currently used for parking, however there are parking lots on adjacent properties that may allow for this area of the project site to be used for programming or events. This area should be developed as a neighborhood pocket park that can be utilized to serve the public with sitting areas as well as a place for occasional art events or public markets.

It will be a requirement to manage stormwater on site and we believe that the only areas sufficient for this are the perimeter or backyard areas depending on grading and area needed for the capacity of stormwater on the site. An underground stormwater detention system is proposed that all stormwater on the site can be directed to.



REUSE RECOMMENDATIONS - PHASING OPTION

The project is a substantial undertaking and it is worth considering the phasing of construction over time to meet the various objectives of the city. Phasing of the project would be more expensive over time however it would give the City an opportunity to closely monitor community needs, operational costs, and the business model as the building is used. Our proposal for phasing is as follows and is what is included in the cost estimates in this document. Other phasing models may be considered however cost split will be similar because the first phase will include infrastructure such as the new sprinkler system and new restrooms which will be required to occupy the building.

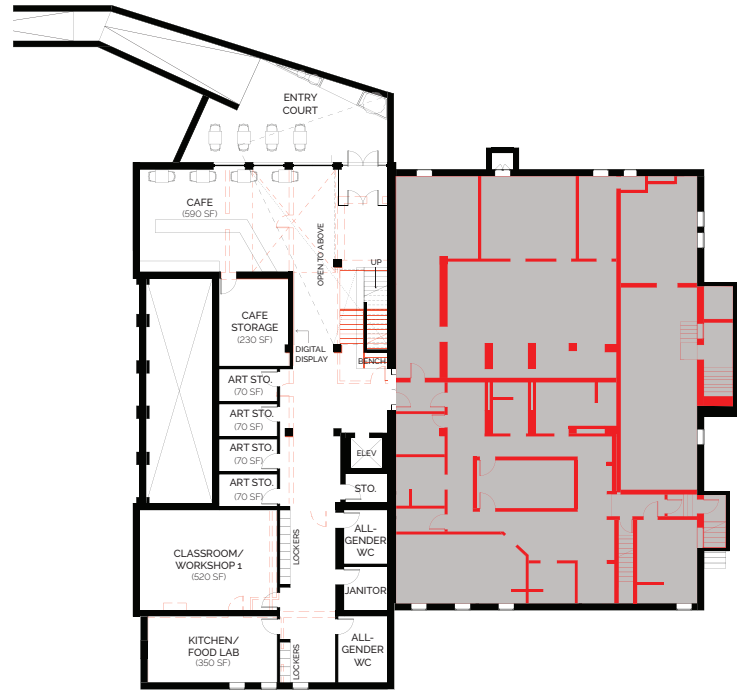
PHASING SCENARIO

Lower Level: Full demolition of the lower level should be completed and construction of the new building lobby, classroom area and food lab would be included in Phase 1. A second future phase could develop the east side of the lower level recording studios.

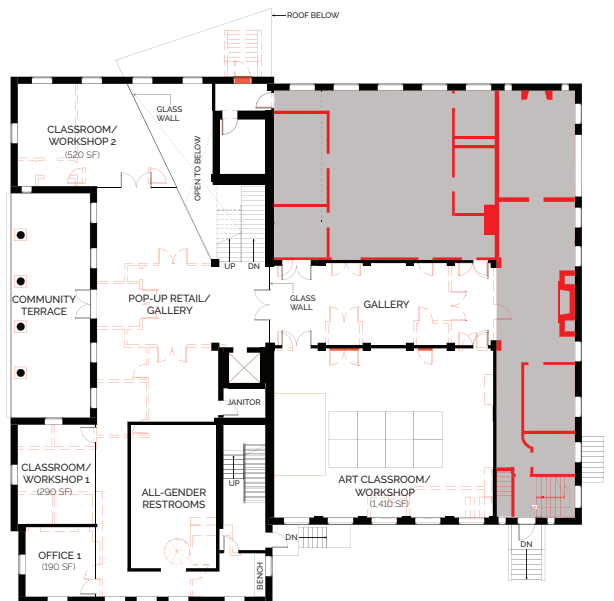
On the upper floors, the two existing large courtrooms are stacked on the south side of the building. We propose to renovate those spaces to create the new Art Classroom/ Workshop on the first floor and the Dance Studio on the second floor. The northeast corner of the building would remain as-is for future development. The second phase would include the Black Box Theater, art studios and other spaces in this area of the building and an additional roof terrace connected by a new elevator.

Phasing: Building Systems

If the project is done in multiple phases the building systems recommendations included in the IMEG section of this report will be impacted. In general, much



LOWER LEVEL



FIRST FLOOR



REUSE RECOMMENDATIONS - PHASING OPTION

of the work related to building systems upgrades will need to take place in the first phase as follows.

Fire Protection: The building will need to have a new sprinkler system installed before the building can be used for an Arts and Culture Center.

Fire Alarm: The fire alarm system will need to be completely upgraded in Phase 1.

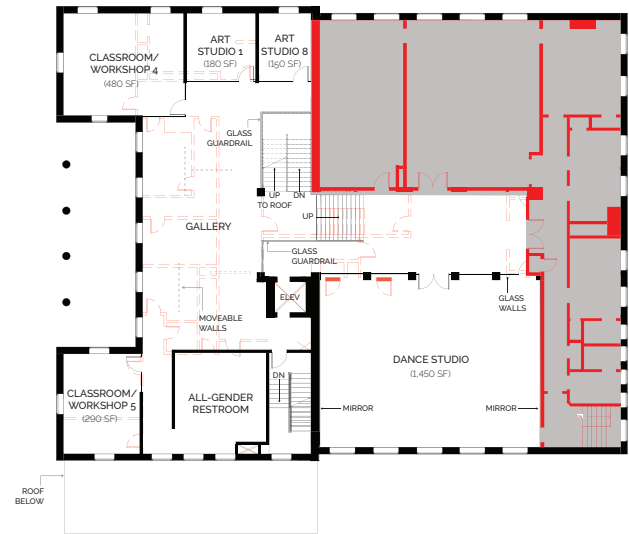
Plumbing: All of the new restrooms will need to be constructed in Phase 1. Some of the existing plumbing and restrooms that are in Phase 2 areas can be removed during the second phase.

Electrical: The service upgrade required for the future build out of the building should be completed during the first phase. All work in the main electrical room should also be completed including replacement of existing panels as noted in the IMEG report. Distribution panels and existing lighting in Phase 2 areas can remain until the second phase.

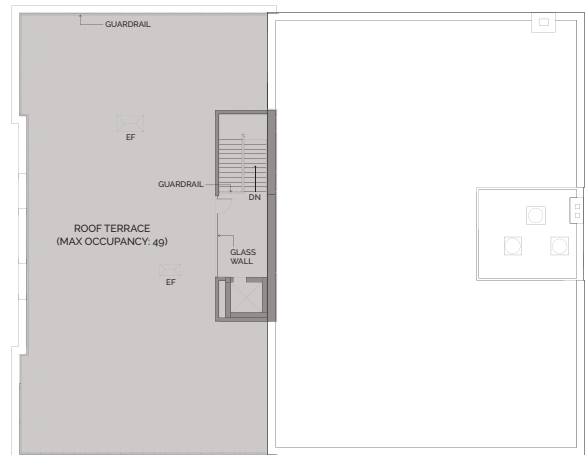
HVAC: Some of the existing HVAC systems can continue to be used with the Phase 1 project however further study will need to be done to understand how to best implement this. In general, the design team recommendation would be to size equipment being procured for Phase 1 so that they can meet the requirements of Phase 2.

Phasing: Landscape

We recommend that the stairs and the new ramp entrance and plaza be completed during Phase 1. Doing the stair work in phase 1 will help to make it clear that that main entrance has been moved. If a new stormwater management system is installed we would also recommend this be done in Phase 1 at the rear of the



SECOND FLOOR



ROOF



REUSE RECOMMENDATIONS - CODE REVIEW

SCOPE OF WORK

Project Description: This project is a complete interior and exterior renovation of an existing building in Malden, MA. Renovation consists of a new entrance with accessible ramp. New double height space at entry and new interior program. Interior program consists of public cafe, educational classrooms and kitchen, black box theatre, music rooms, dance studio and art studios.

EXISTING BUILDING OCCUPANCY

Lower Level: A-3, S1

First Floor: A-3

Second Floor: A-3

EXISTING CONSTRUCTION TYPE

3B

FIRE PROTECTION

There are no sprinkler or standpipe systems in the building.

APPLICABLE CODES AND STANDARDS

Building: 780 CMR Massachusetts Building Code (9th Edition), (2015 International Building Code, amended), (2015 International Existing Building Code, amended)

Energy: 2015 International Energy Conservation Code, amended

Fire: 527 CMR: Massachusetts Fire Prevention Regulations, (2015 NFPA-1, amended)

Accessibility: 521 CMR: Massachusetts Architectural Access Board Regulations, ADA: Americans with Disabilities Act (2010 ADAAG)

Electrical: 527 CMR 12.00 Massachusetts Electrical Code , (2017 National Electrical Code, amended)

Mechanical: 2015 International Mechanical Code

Plumbing: 248 CMR: Massachusetts Plumbing Code



REUSE RECOMMENDATIONS - CODE REVIEW

PROPOSED

Occupancy of Proposed Space

A1:

A3:

E:

B:

MEANS OF EGRESS

Occupant Load (Table 1004.1.2)

Floor / Use / Criteria	Area (SF)	Calculated Population Basis	Calculated Occupancy
------------------------	-----------	-----------------------------	----------------------

Lower Level

Educational (Kitchen + Classrooms)	870 SF	20 net	44
Business (Recording Studios)	1570 SF	100 gross	16
Assembly - 3 (Gallery)	1537 SF	30 net	52
Storage (Art Storage)	280 SF	300 gross	1
TOTAL	7577 SF		113

First Floor

Educational (Classrooms)	810 SF	20 net	41
Business (Back of House)	760 SF	100 gross	8
Assembly - 1 (Black Box Theatre)	1893 SF	15 net	127
Assembly - 3 (Gallery)	1495 SF	30 net	50
Storage	173 SF	300 gross	1
TOTAL	5131 SF	263	227

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REUSE RECOMMENDATIONS - CODE REVIEW

Floor / Use / Criteria	Area (SF)	Calculated Occupancy	Calculated Population Basis
Second Floor			
Educational (Classrooms)	770 SF	20 net	39
Business (Music Rooms)	1119 SF	100 gross	12
Assembly - 3 (Gallery)	3271 SF	15 net	219
TOTAL	5160 SF		270

NUMBER OF EXITS (TABLE 1006.3.1)

Stories with one exit or access to one exit for other occupancies

Floor #	Occupant Load	Required # of Exits	Provided # of Exits
Lower Level	113	2	2
First Floor	227	4	3
Second Floor	270	2	2
Roof	49 (One Exit)	1	1

This space has an adequate number of exits = 2 for the occupant load.

**TABLE 1006.3.1
MINIMUM NUMBER OF EXITS OR
ACCESS TO EXITS PER STORY**

OCCUPANT LOAD PER STORY	MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS FROM STORY
1-500	2
501-1,000	3
More than 1,000	4

TRAVEL DISTANCE (TABLE 1016.1)

Exit access travel distance in "Education" shall be less than 250 ft with an Automatic Sprinkler System. (Reference CMR TABLE 1015.1 Exit Access Travel Distance)

CORRIDORS (TABLE 1020.1)

Corridors and associated doors are permitted to have a zero (0) hour rating in Use Group A, E and B. Corridors serving an occupancy of greater than 51 but less than 99 shall have a clear width of 44" per table 1020.2



REUSE RECOMMENDATIONS - CODE REVIEW

TABLE 1015.1 EXIT ACCESS TRAVEL DISTANCE

OCCUPANCY	WITHOUT SPRINKLER SYSTEM (feet)	WITH SPRINKLER SYSTEM (feet)
A, E, F-1, I-1, M, R, S-1	200	250 ^b
B	200	300 ^b
F-2, S-2, U	300	400 ^b
H-1	Not Permitted	75 ^c
H-2	Not Permitted	100 ^c
H-3	Not Permitted	150 ^c
H-4	Not Permitted	175 ^c
H-5	Not Permitted	200 ^c
I-2, I-3, I-4	150	200 ^c

VERTICAL EXIT ACCESS (SECTION 1019.3, CONDITION 4)

Exit access stairways and ramps that serve or atmospherically communicate between only two stories shall be permitted to have a zero (0) hour rating.

Analysis:

The building complies with the minimum number of means of egress, the exit capacity required, exit separation distance, and the maximum travel distance allowed

FIRE EXTINGUISHERS (906.1)

Fire Extinguishers shall be provided in accordance with 906.1.

INTERIOR FINISH

All newly installed interior wall and ceiling finishes shall comply with Chapter 8 of the 2015 IBC.

Interior Finish Requirements (Table 803.11):

A-1 Use Group – Sprinklered

Interior Exit Stairways and Ramps and Exit Passageways: B

Corridors and Enclosure for Exit Access Stairways and Ramps: B

Rooms and Enclosed Spaces: C

A-3 Use Group – Sprinklered

Interior Exit Stairways and Ramps and Exit Passageways: B

Corridors and Enclosure for Exit Access Stairways and Ramps: B

Rooms and Enclosed Spaces: C

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REUSE RECOMMENDATIONS - CODE REVIEW

B / E Use Group – Non-sprinklered

Interior Exit Stairways and Ramps and Exit Passageways: B

Corridors and Enclosure for Exit Access Stairways and Ramps: C

Rooms and Enclosed Spaces: C

S Use Group – Non-sprinklered

Interior Exit Stairways and Ramps and Exit Passageways: C

Corridors and Enclosure for Exit Access Stairways and Ramps: C

Rooms and Enclosed Spaces: C

GROUP	SPRINKLERED ¹			NONSPRINKLERED		
	Vertical exits and exit passageways ^{a,b}	Exit access corridors and other exitways	Rooms and enclosed spaces ^c	Vertical exits and exit passageways ^{a,b}	Exit access corridors and other exitways	Rooms and enclosed spaces ^c
A-1 & A-2	B	B	C	A	A ^d	B ^e
A-3 ^f , A-4, A-5	B	B	C	A	A ^d	E
B, E, M, R-1, R-4	B	C	C	A	A ^d	C
F	C	C	C	B	C	C
H	B	B	C ^g	A	A	B
I-1	B	C	C	A	B	B
I-2	B	B	B ^{h,1}	A	A	B
I-3	A	A ⁱ	C	A	A	B
I-4	B	B	B ^{h,1}	A	A	B
R-2	C	C	C	B	B	C
R-3	C	C	C	C	C	C
S	C	C	C	B	B	C
U	No restrictions			No restrictions		

ACCESSIBILITY CODE (521 CMR)

Any work within public spaces must be compliant with the MAAB.

PLUMBING CODE (248 CMR)

(35) Provide toilet fixtures in numbers as required for by the MA Plumbing Code (248 CMR). (710.1)

Toilet fixtures will be provided based on the actual, justifiable occupant load of the building.

(i) Per 248 CMR 10.10 (18) (r) For purposes of the minimum fixture requirements of 248 CMR, wherever 248 CMR 10.00 requires two or more toilet fixtures designated by gender, those facilities may be replaced with single use Gender-neutral toilet rooms pursuant to one of the following options:



REUSE RECOMMENDATIONS - CODE REVIEW

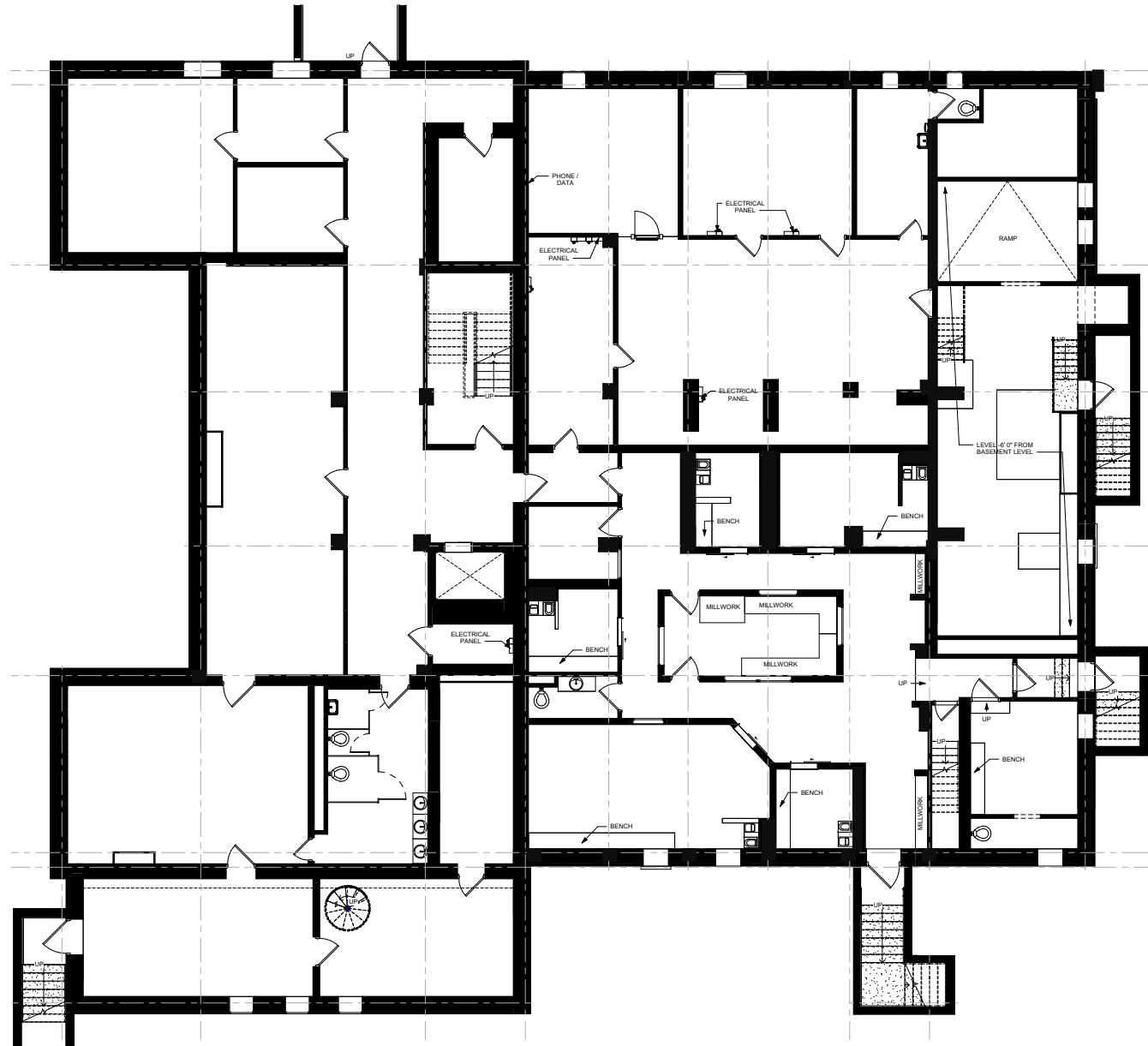
1. Every gender designated toilet fixture is replaced with an equal number of single use gender-neutral toilet rooms (such that there are no gender designated fixtures); or

2. Where the code requires four or more toilet fixtures combined for males and females, gender designated fixtures may be replaced by single use Gender-neutral toilet rooms in increments of two such that for every male designated fixture replaced by a Gender-neutral toilet room, a female designated fixture must also be replaced by a Gender-neutral toilet room, and vice-versa (e.g. instead of three men’s toilets, four female toilets, there may be installed two men’s toilets, three female toilets, and two single use Gender-neutral toilet rooms).

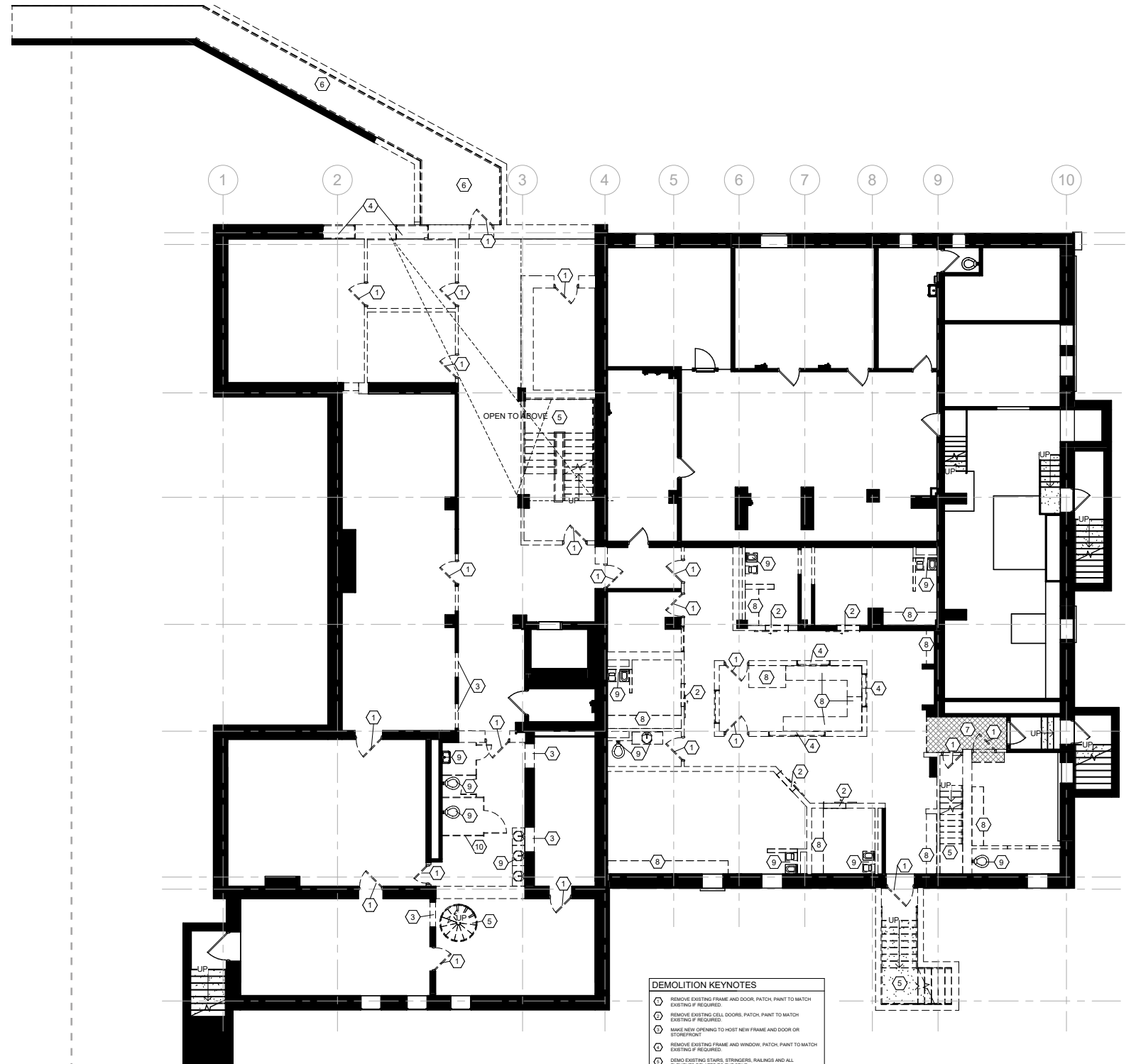
Floor / Use / Criteria	Calculated Occupancy	Toilets	Lav
Lower Level			
Educational	44	Female: 1/30 Male: 1/90	1/90
Business	16	Female: 1/20 Male: 1/25	1/50
Assembly - 3	52	Female: 1/50 Male: 1/100	1/200
First Floor			
Educational	41	Female: 1/30 Male: 1/90	1/90
Business	8	Female: 1/20 Male: 1/25	1/50
Assembly - 3	127	Female: 1/50 Male: 1/100	1/200
Assembly - 1	50	Female: 1/30 Male: 1/60	1/100
Second Floor			
Educational	39	Female: 1/30 Male: 1/90	1/90
Business	12	Female: 1/20 Male: 1/25	1/50
Assembly - 3	219	Female: 1/50 Male: 1/100	1/200



LOWER LEVEL



EXISTING LOWER LEVEL PLAN



LOWER LEVEL DEMO PLAN

- DEMOLITION KEYNOTES**
- ① REMOVE EXISTING FRAME AND DOOR, PATCH, PAINT TO MATCH EXISTING IF REQUIRED.
 - ② REMOVE EXISTING CELL DOORS, PATCH, PAINT TO MATCH EXISTING IF REQUIRED.
 - ③ MAKE NEW OPENING TO HOST NEW FRAME AND DOOR OR STOREFRONT
 - ④ REMOVE EXISTING FRAME AND WINDOW, PATCH, PAINT TO MATCH EXISTING IF REQUIRED.
 - ⑤ DEMO EXISTING STAIRS, STRINGERS, RAILINGS AND ALL ELEMENTS RELATED TO THE STAIR.
 - ⑥ DEMO EXISTING RAMP, RAILING AND ALL ELEMENTS RELATED TO THE RAMP. PATCH, FILL AS REQUIRED.
 - ⑦ DEMO FLOOR AND ALL ITS SUB-COMPONENTS, PATCH, FILL IF REQUIRED. REMOVE CEILING, LIGHTING AND HANG IF UNDER THE FLOOR TO BE DEMO.
 - ⑧ REMOVE EXISTING MILLWORK AND ALL ITS SUB-COMPONENTS, PATCH, PAINT AS REQUIRED.
 - ⑨ REMOVE EXISTING PLUMBING FIXTURES, CABINETRY, ACCESSORIES, ALL ITS RELATED COMPONENTS AND PIPE LINES. ASSOCIATED, CAP AND SEAL AS NEEDED AS PER CODE AND PREVIOUS PLAN.
 - ⑩ REMOVE STALL PARTITION WALLS OF RESTROOMS
 - ⑪ FILL OPENING OR DEMO SHAFTS WITH SLAB FLOOR AND FINISHES, INSTALLED CEILING, LIGHTING AND MECHANICAL SYSTEMS BELOW IF REQUIRED.
 - ⑫ REMOVE AND RELOCATE ELECTRICAL PANELS AND INSTALLATION.
 - ⑬ DEMO EXISTING CANOPY, PATCH AND REPAIR AS NEEDED.
 - ⑭ REMOVE EXISTING FLOOR AND PAVING, FILL AND LEVEL AS NEEDED TO RECEIVE NEW FLOOR, MECHANICAL, EQUIPMENT ON SITE IF NEEDED TO BE RELOCATED WITH ENGINEER ASSOCIATED. KEEP ELEVATOR SHAFT.

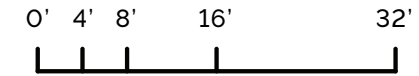


LOWER LEVEL PROPOSED FLOOR PLAN



PROGRAM LEGEND

- COMMON SPACE
- PROGRAM SPACE
- SUPPORT SPACE

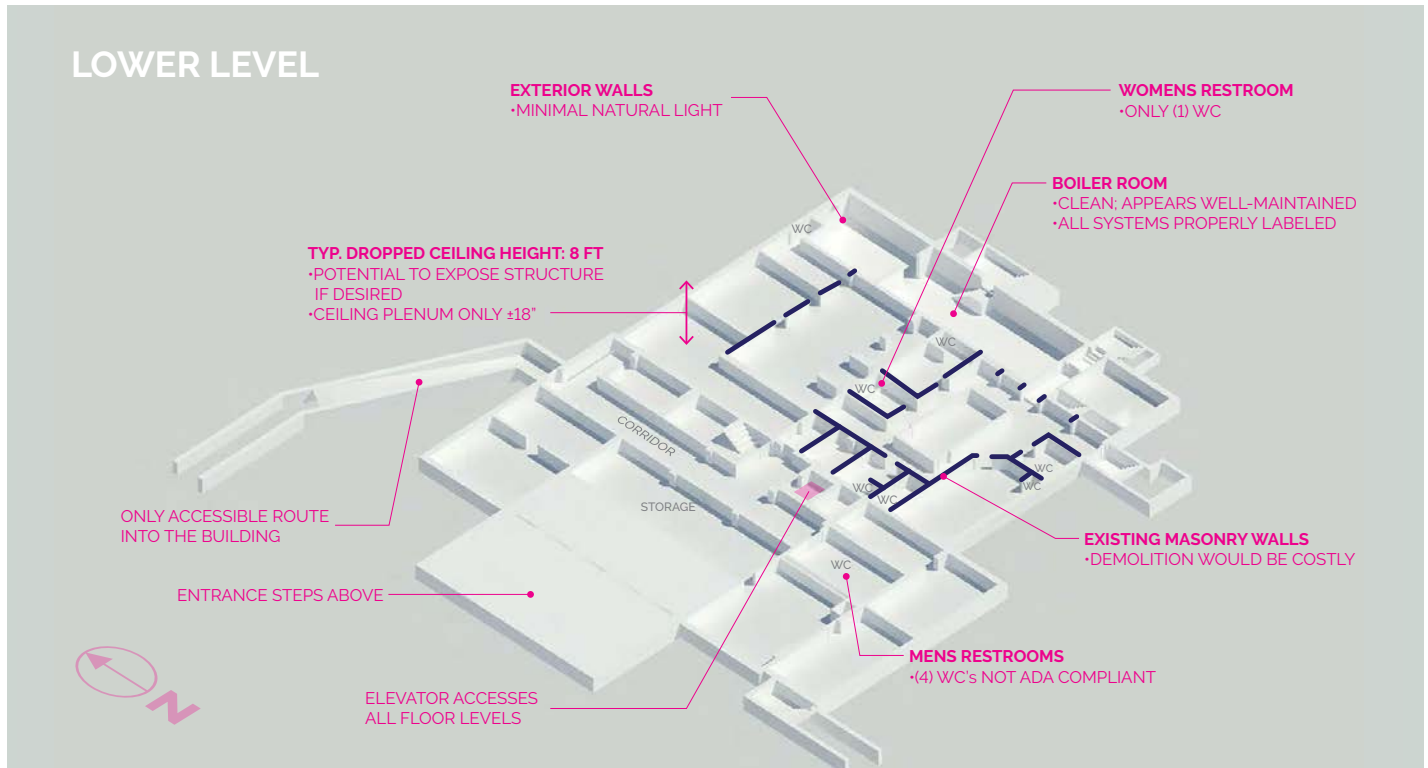


LOWER LEVEL REUSE CONSIDERATIONS

content



REUSE RECOMMENDATIONS - LOWER LEVEL



INTERIOR

The lower level floor of the building contains the only accessible existing route into the building however it is not at all welcoming today. This floor has much of the HVAC and electrical equipment located on this level. There is no sprinkler in the building so space will need to be allocated in the lower level for a new water service and sprinkler system. Refer to the IMEG section later in the document that outlines requirements for the sprinkler system.

The lower level is where people awaiting their trials were held in jail cells that are constructed of concrete block walls and steel doors. All of the cells have stainless steel plumbing fixtures. The typical dropped ceiling height is 8ft with an 18" plenum space, with the potential to expose the structure for a larger ceiling height if desired. The exterior walls emit a minimal amount of natural light and there are existing masonry walls that contain compact jail cells within the building. The existing restrooms do not meet current building codes and need to be replaced throughout.

There is an elevator within the building that runs from the lower level to the 2nd floor. The project team has asked that the roof area be considered to be used for events and as a result the existing elevator would need to be replaced with a new elevator that can serve the roof area.



REUSE RECOMMENDATIONS - LOWER LEVEL - ENTRY

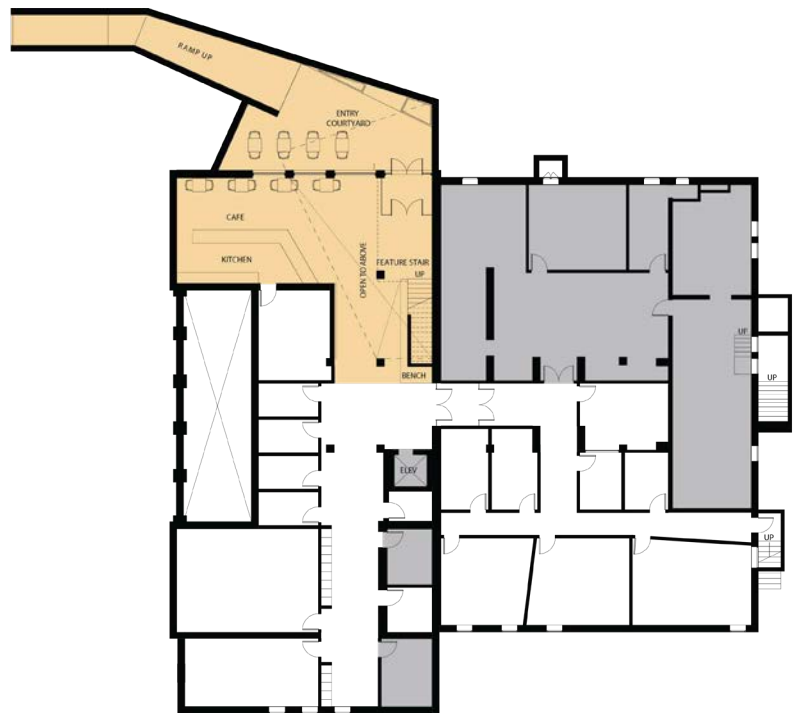


Existing ramp to be modified for new main entry ramp



Existing stair to be removed for new stair in double height opening

The new building lobby and entrance will welcome visitors into a new well lit double height active space via the new accessible entry and ramp (Photo 1). The space will feature new storefront windows, a feature stair to the first floor, and open cafe space. The design includes a digital display to help visitors find the exhibition, performance, recording studio, art space, or classroom they are looking for.



LOWER LEVEL

MALDEN CENTER FOR ARTS & CULTURE

89 SUMMER STREET,

MALDEN, MA 02148



REUSE RECOMMENDATIONS - LOWER LEVEL - ENTRY



Proposed Entry Section



Minimal lighting in lower level



Typical existing condition of lower level



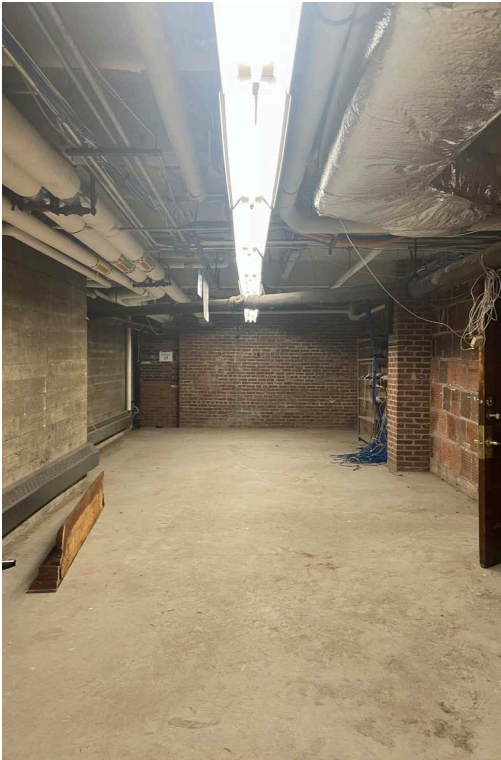
Typical existing condition of lower level

MALDEN CENTER FOR ARTS &
CULTURE

89 SUMMER STREET,
MALDEN, MA 02148



REUSE RECOMMENDATIONS - LOWER LEVEL - STORAGE / MECHANICAL

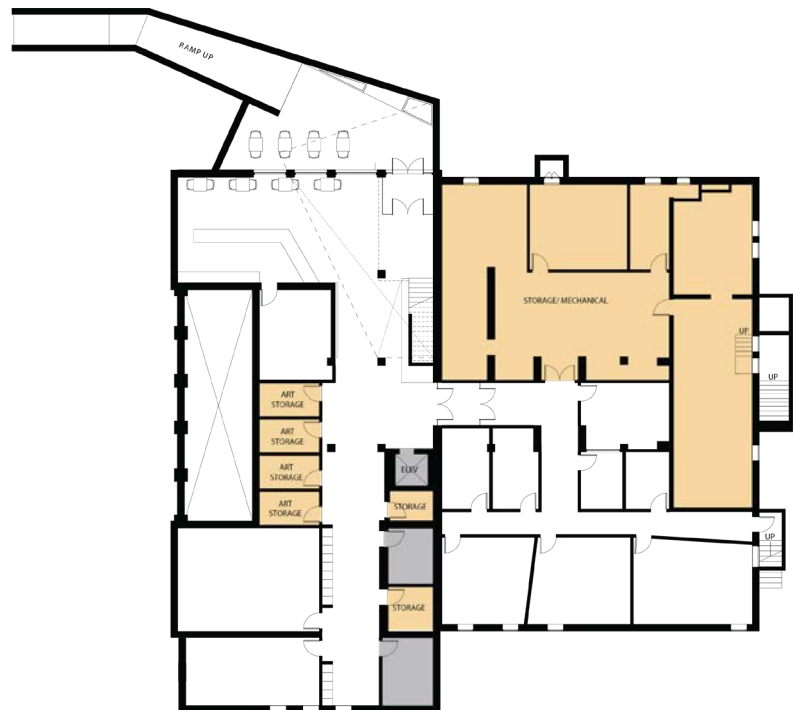


Storage and ancillary spaces to be added with updated finishes - new walls, paint, VCT and proper lighting. Large utility room to remain generally untouched. Updated and new building systems for the entire building will be contained at this level per the IMEG report contained within this report. (Photo 2)

Typical lower level condition



Existing mechanical room



LOWER LEVEL

MALDEN CENTER FOR ARTS & CULTURE

89 SUMMER STREET,

MALDEN, MA 02148



REUSE RECOMMENDATIONS - LOWER LEVEL - ARTS & CULTURE



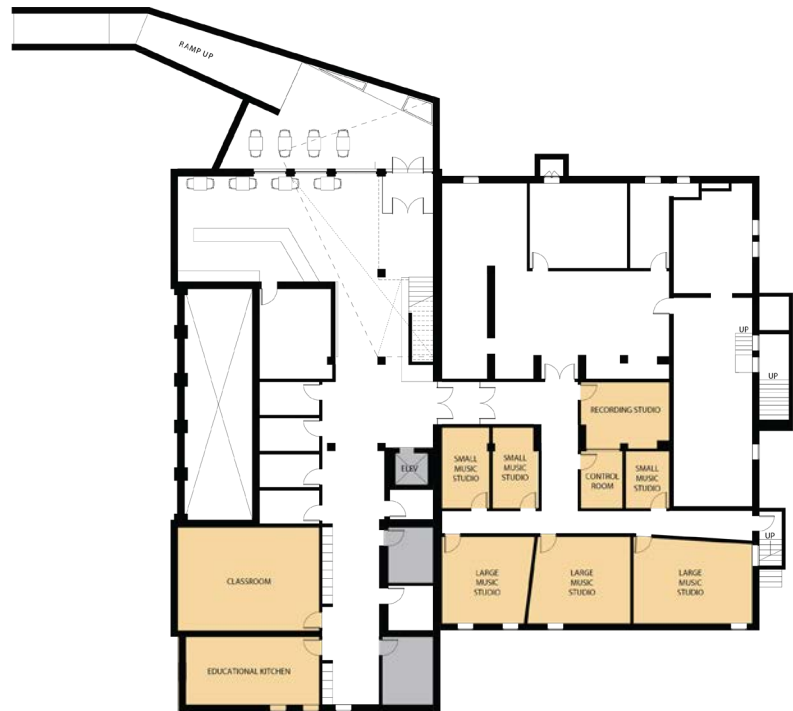
Existing holding cells where future music studios will go

In addition to the cafe in the entry lobby, the lower level includes music recording studios, a 520 SF classroom, and a commercial kitchen and food lab that will provide cooking classes for the community.

Food Lab: Commercial grade flooring, ceiling, kitchen appliances, fire protection systems

Classroom: Carpeted floor, 2x2 ACT ceiling, video to allow for people to plug their laptops into video screens on the wall.

Recording Studios and Music Practice Room: these are to be “box in box” construction so that they are acoustically isolated from the structure. Sound absorbing materials are to be provided inside the rooms.



LOWER LEVEL

MALDEN CENTER FOR ARTS & CULTURE

89 SUMMER STREET,

MALDEN, MA 02148



REUSE RECOMMENDATIONS - LOWER LEVEL - RESTROOMS

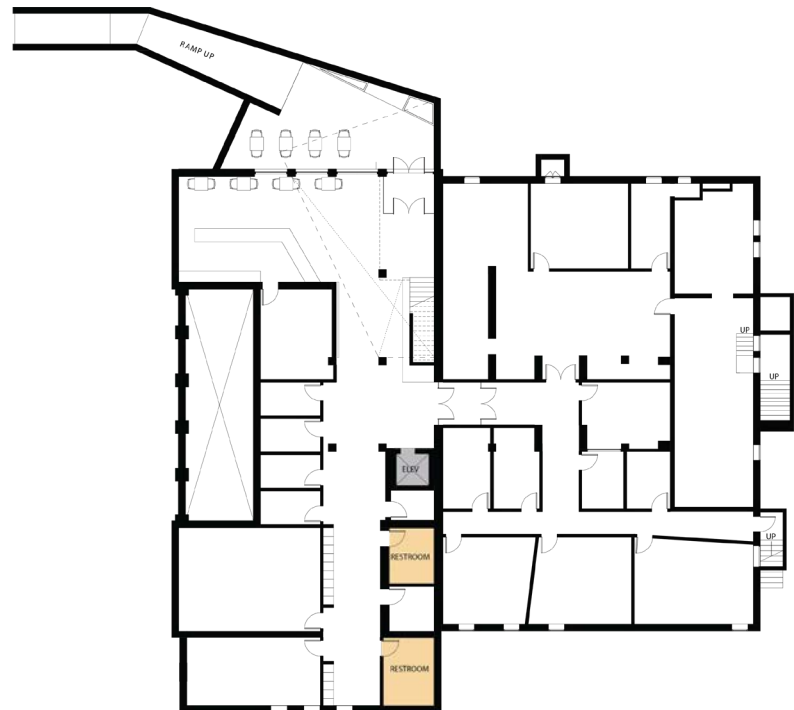


Typical existing restrooms



Typical holding cell restrooms

Existing restrooms are dispersed throughout the building due to the nature of a courthouse needing to separate the various parties attending trials. As a result, plumbing is spread out across the building however there are not centrally consolidated restrooms in quantities or locations that are ideal for the new arts and culture center. Note that on the lower level, there are existing jail cell fixtures with stainless steel benching. (Photo 2)



LOWER LEVEL

MALDEN CENTER FOR ARTS &
CULTURE

89 SUMMER STREET,
MALDEN, MA 02148



REUSE RECOMMENDATIONS - LOWER LEVEL - RESTROOMS



Rhode Island School of Design Student Center / WORKac. Image © Bruce Damonte - Arch.Daily - https://www.archdaily.com/984280/designing-around-debate-the-gender-neutral-bathroom?ad_medium=gallery

There is a great deal of interest in non-gender restrooms and this project proposes to utilize these at all levels. All existing restrooms will be demolished. New restrooms will have toilets separated by walls and doors, tile floors, wall tile to 4', paint, modern lighting, ACT ceiling finishes, and new sinks in shared solid surface countertops. See diagram and precedent images as reference.

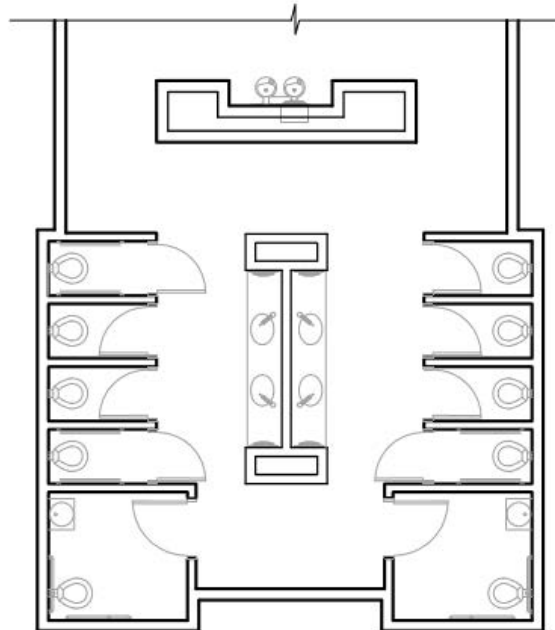
The following number of fixtures will be required at the lower level for the anticipated occupancy of the building.

FLOOR OCCUPANCY = 155 PEOPLE

3 FEMALE WC / 2 MALE WC

2 LAVATORY UNITS

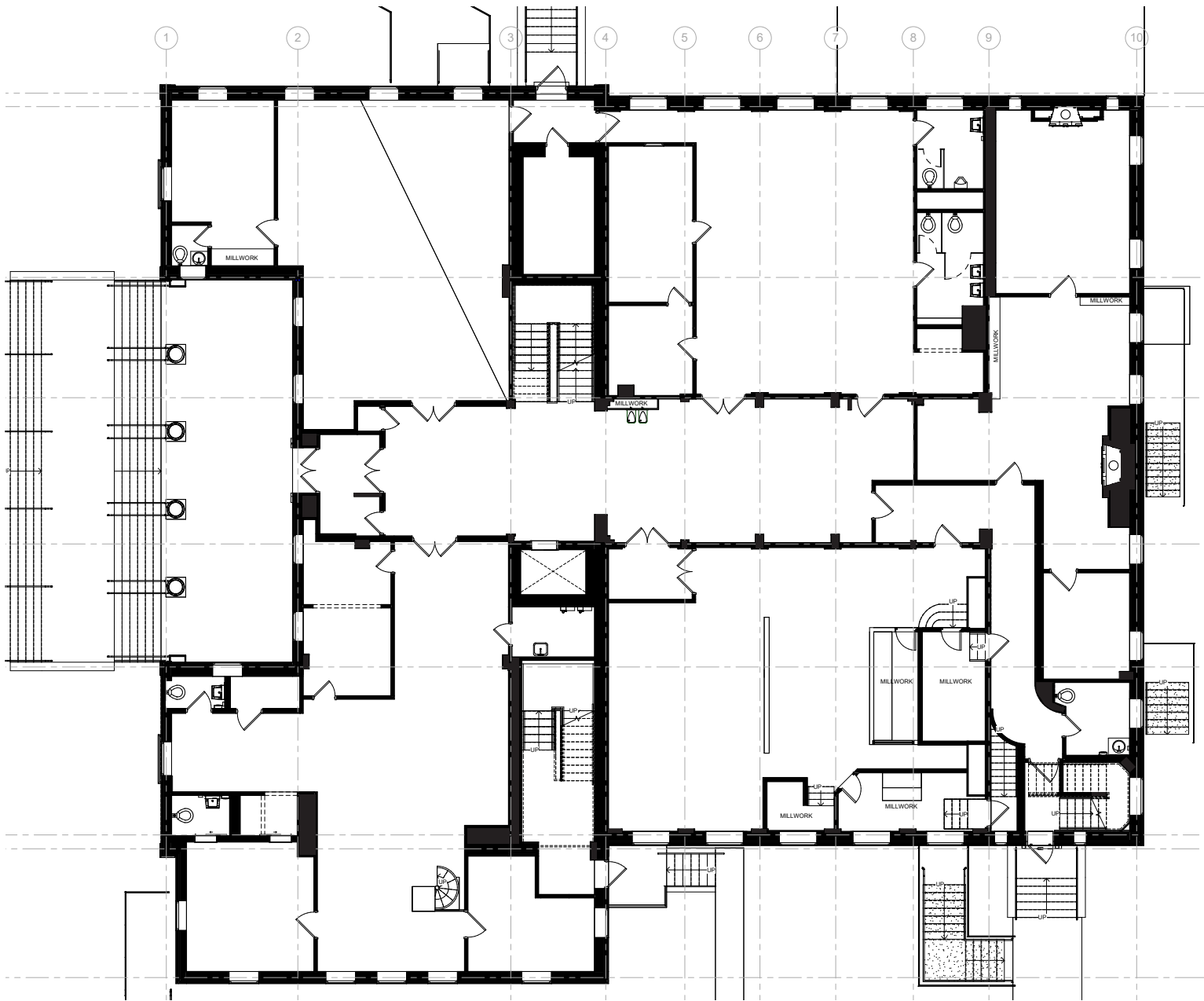
EXAMPLE OF GENDER NEUTRAL LAYOUT:



Gender Neutral Bathroom Example - Referenced from Doug Simpson, Facilities Architec and Bea Badipe, Architectural Intern from the University of Washington Facilities Engineering Services. <https://facilities.uw.edu/files/media/uwf-ds-facilities-gender-neutral-guide.pdf>

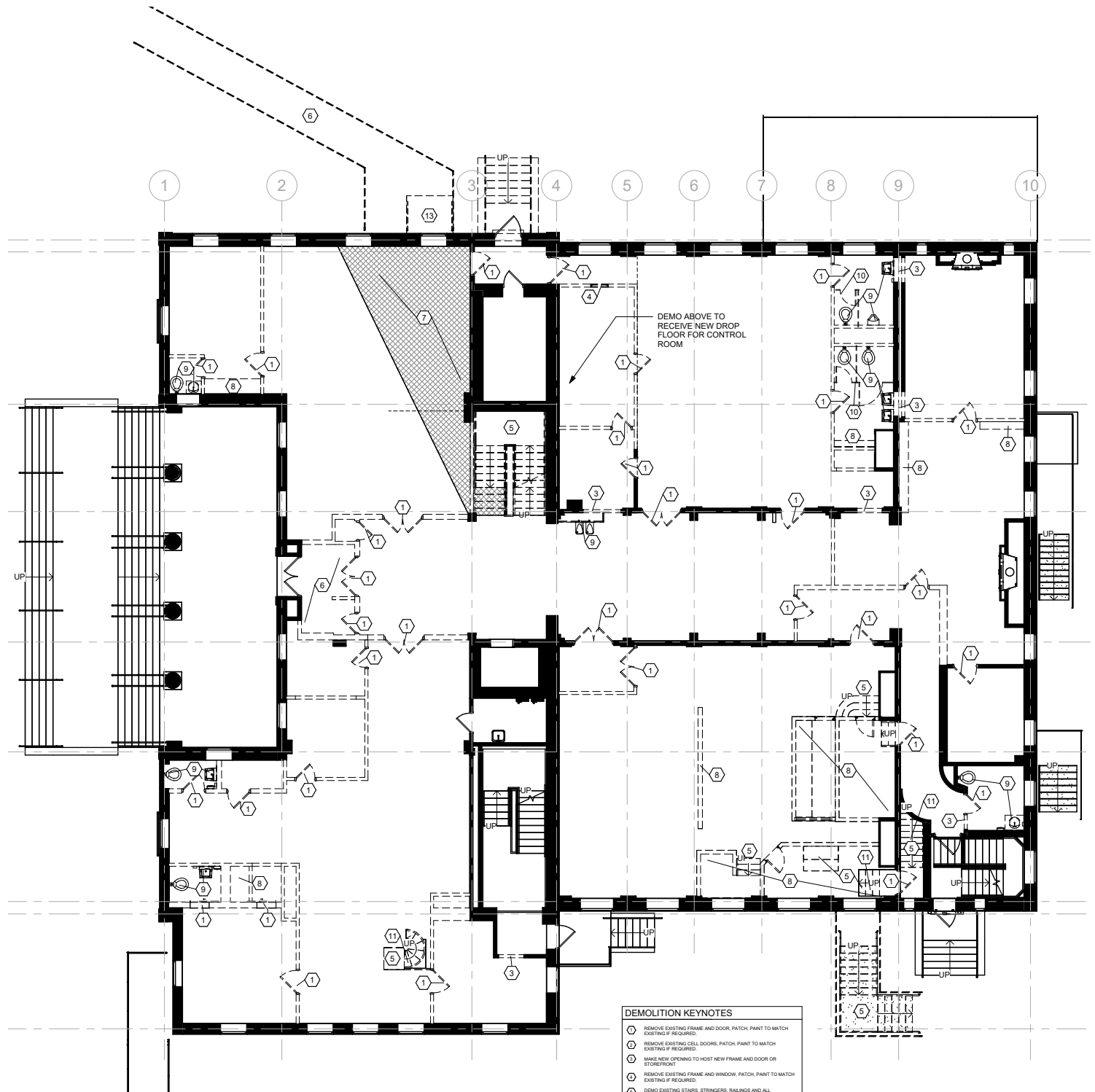


FIRST FLOOR



EXISTING FIRST FLOOR PLAN

MALDEN CENTER FOR ARTS
 89 SUMMER STREET,
 MALDEN, MA 02148



FIRST FLOOR DEMO PLAN

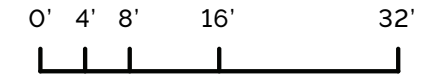
- DEMOLITION KEYNOTES**
- ① REMOVE EXISTING FRAME AND DOOR. PATCH PAINT TO MATCH EXISTING IF REQUIRED.
 - ② REMOVE EXISTING CELL DOORS. PATCH PAINT TO MATCH EXISTING IF REQUIRED.
 - ③ MAKE NEW OPENING TO HOST NEW FRAME AND DOOR OR STOREFRONT.
 - ④ REMOVE EXISTING FRAME AND WINDOW. PATCH PAINT TO MATCH EXISTING IF REQUIRED.
 - ⑤ DEMO EXISTING STAIR, STRINGERS, RAILINGS AND ALL ELEMENTS RELATED TO THE STAIR.
 - ⑥ DEMO EXISTING RAMP, RAILING AND ALL ELEMENTS RELATED TO THE RAMP. PATCH, FILL AS REQUIRED.
 - ⑦ DEMO FLOOR AND ALL ITS SUB-COMPONENTS. PATCH, FILL IF REQUIRED. REMOVE CEILING, LIGHTING AND HVAC IF UNDER THE FLOOR TO BE DEMO.
 - ⑧ REMOVE EXISTING MILLWORK AND ALL ITS SUB-COMPONENTS. PATCH PAINT AS REQUIRED.
 - ⑨ REMOVE EXISTING PLUMBING FIXTURES, CABINETRY, ACCESSORIES. ALL ITS RELATED COMPONENTS AND PIPE LINES ASSOCIATED. CAP AND SEAL AS NEEDED AS PER CODE AND ENGINEER PLAN.
 - ⑩ REMOVE STALL PARTITION WALLS OF RESTROOMS.
 - ⑪ FILL OPENING OR DEMO SHAFTS WITH SLAB FLOOR AND FINISHES. INSTALL CEILING, LIGHTING AND MECHANICAL SYSTEMS BELOW IT IF REQUIRED.
 - ⑫ DEMO EXISTING CADDIS. PATCH AND REPAIR AS NEEDED.
 - ⑬ REMOVE EXISTING FLOOR AND FINISHES. FILL AND LEVEL AS NEEDED TO RECEIVE NEW FLOOR. VERIFY MECHANICAL EQUIPMENT OR ETS IF NEEDED TO BE RELOCATED WITH ENGINEER.
 - ⑭ REMOVE EXISTING WALLS, ROOF AND ITS SUB-COMPONENTS ASSOCIATED. KEEP ELEVATOR SHAFT.



FIRST FLOOR PROPOSED FLOOR PLAN

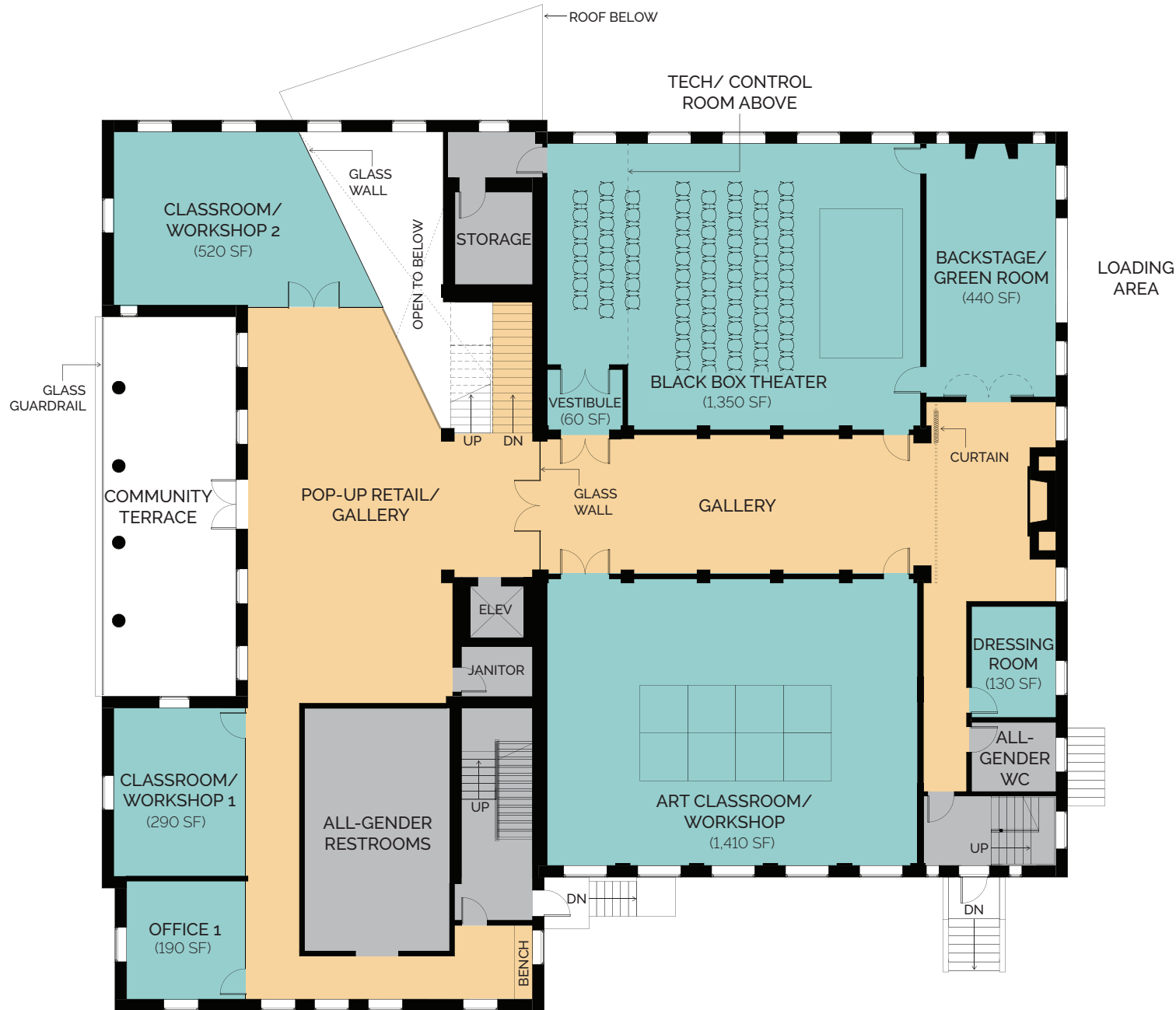
PROGRAM LEGEND

- COMMON SPACE
- PROGRAM SPACE
- SUPPORT SPACE



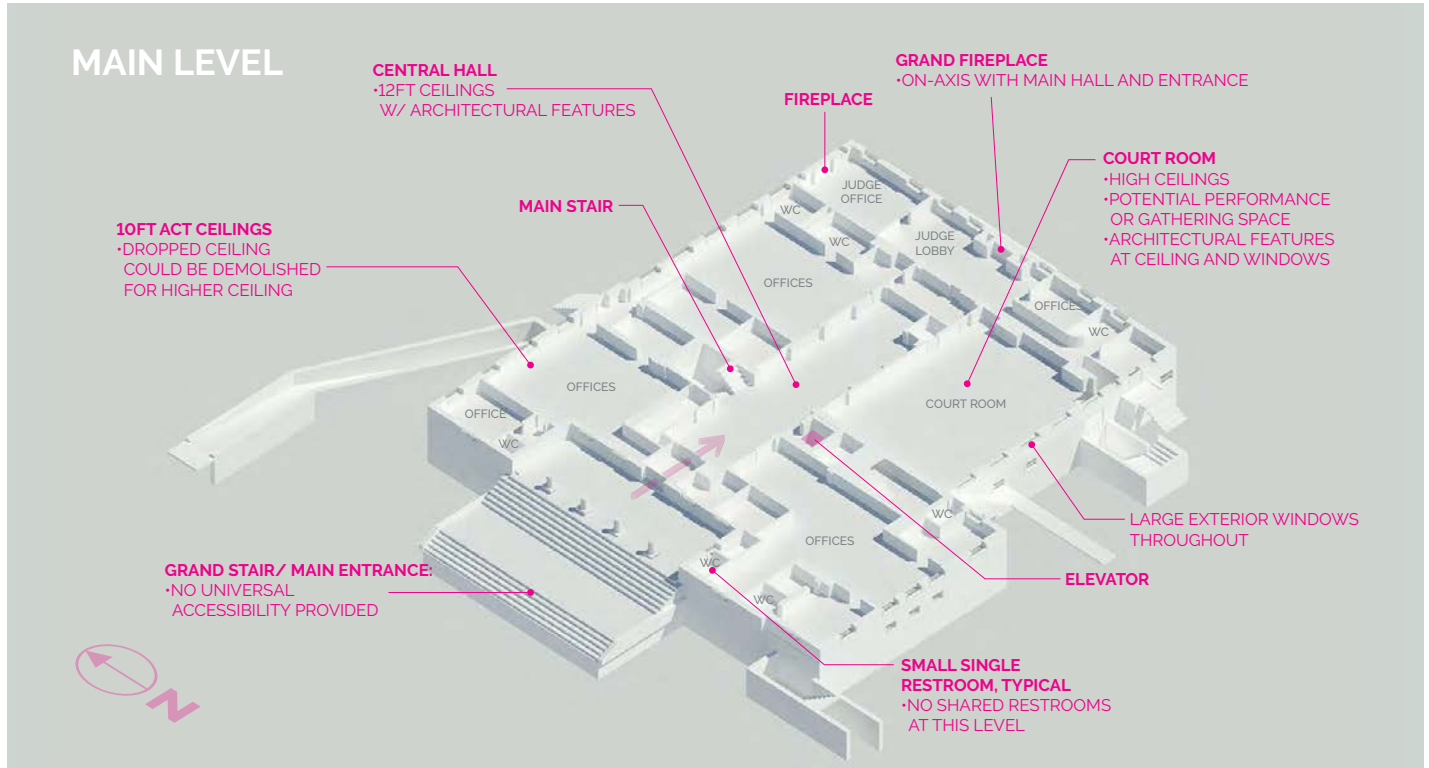
FIRST FLOOR REUSE CONSIDERATIONS

content





REUSE RECOMMENDATIONS - FIRST FLOOR



INTERIOR

The First Floor of the new Malden Center for Arts & Culture is the heart of the building. Existing courtrooms with high ceilings are ideally sized to create larger spaces for art and performance. Included on this floor is an art gallery, Black Box Theater, multiple art classrooms of different sizes, and some office space for arts administrators. Part of the space is open to the entry lobby below.



REUSE RECOMMENDATIONS - FIRST FLOOR - FEATURE STAIR

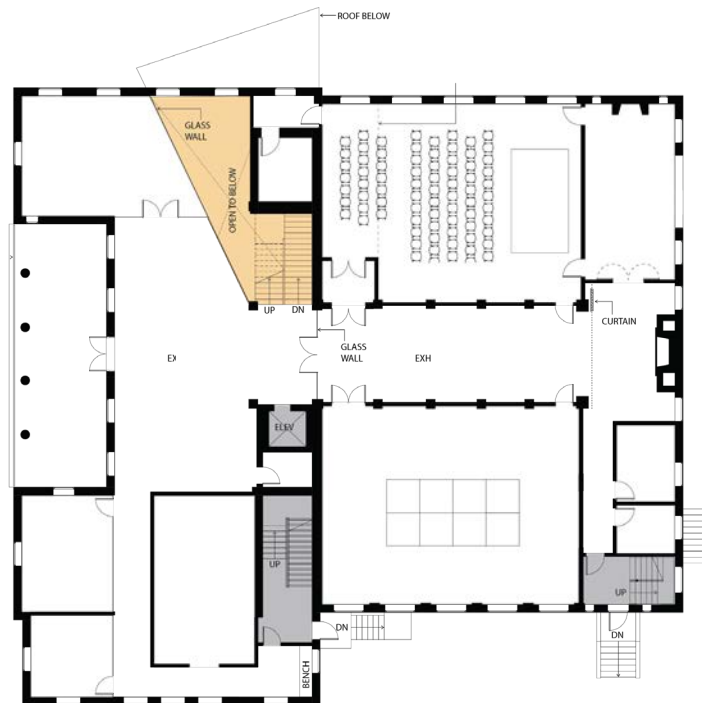


New stair in new double height lobby



Existing stair to be removed

The new feature stair from the entry lobby to the first floor will be a “museum quality” stair with glass railings and stone or wood block treads. The existing stair will need to be removed to create space for this new feature element.



FIRST FLOOR

MALDEN CENTER FOR ARTS & CULTURE

89 SUMMER STREET,

MALDEN, MA 02148



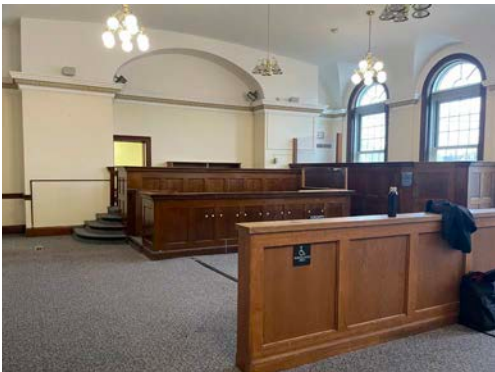
REUSE RECOMMENDATIONS - FIRST FLOOR - ARTS & CULTURE



Future gallery area



Existing courthouse lobby



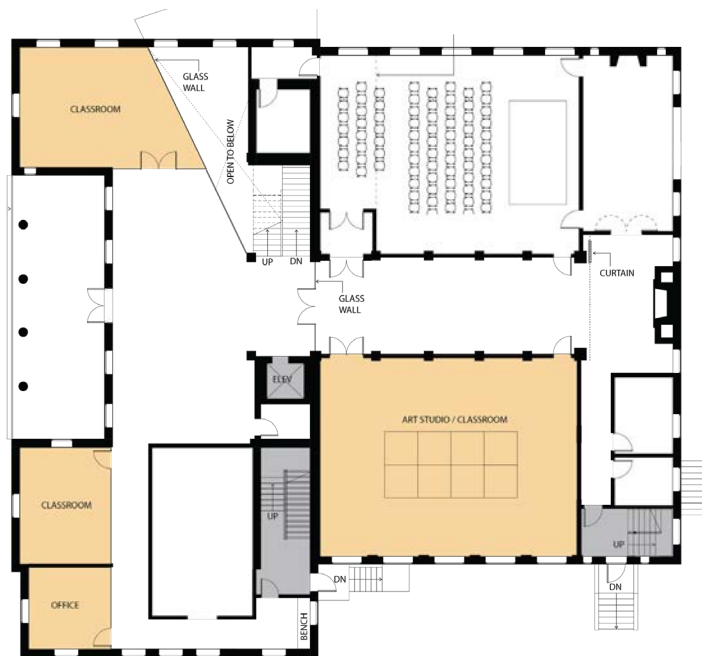
Existing courtroom, note high ceilings ideal for art, dance or performance

The first floor spaces offer a great deal of flexibility where artists, performers, and the public can come together. All kinds of events can happen on this floor as follows:

Gallery Space is provided that can be used for exhibitions, pop up retail, or as a reception space for events taking place in the adjacent spaces. The gallery space should have track lighting for flexibility of various exhibitions (2D and 3D), LVT flooring, and painted walls. A wood slat ceiling across the space can hide HVAC systems while incorporating the track lighting. The gallery can connect to the community terrace that connects back to the landscaped stair area.

The Black Box Theater offers the ultimate flexibility for various forms of performance. Refer to the Acentech section of this report for acoustic and audio visual specifications for the black box theater. One important aspect of the theater is loading for large stage sets and other equipment. It is proposed to create a new loading door in the existing facade that will connect through the backstage green room area.

Classrooms: Carpeted floor, 2x2 ACT ceiling, video to allow for people to plug their laptops into video screens on the wall.



FIRST FLOOR

MALDEN CENTER FOR ARTS & CULTURE

89 SUMMER STREET,

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REUSE RECOMMENDATIONS - FIRST FLOOR - RESTROOMS

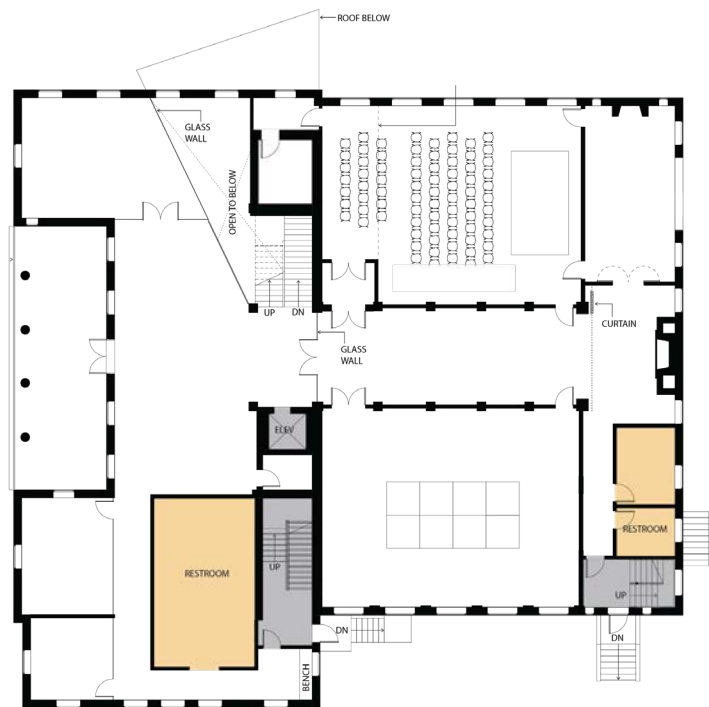
There is a great deal of interest in non-gender restrooms and this project proposes to utilize these at all levels. All existing restrooms will be demolished. New restrooms will have toilets separated by walls and doors, tile floors, wall tile to 4', paint, modern lighting, ACT ceiling finishes, and new sinks in shared solid surface countertops. See diagram and precedent images as reference.

The following number of fixtures will be required at the first floor for the anticipated occupancy of the building.

FLOOR OCCUPANCY = 232 PEOPLE

4 FEMALE WC / 2 MALE WC

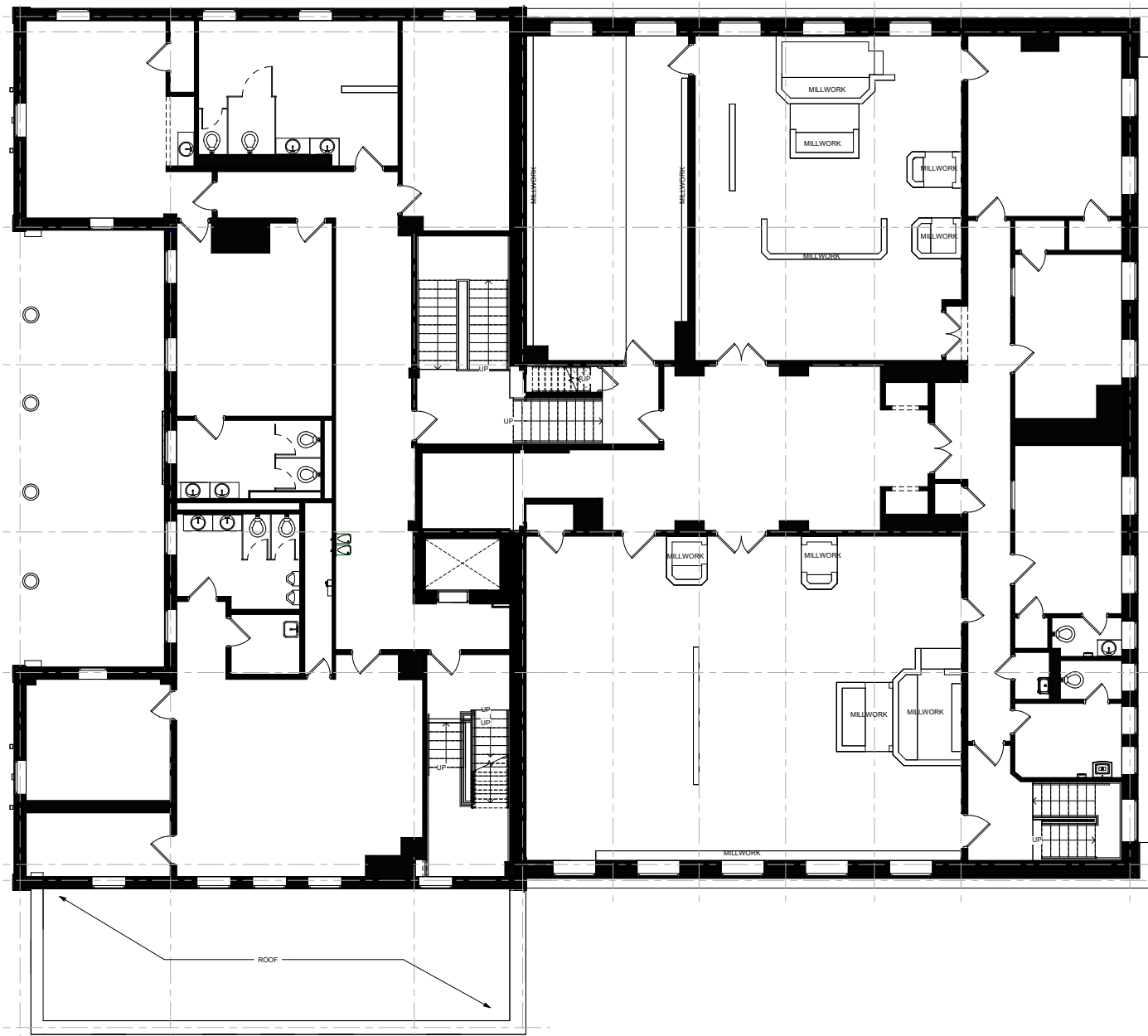
3 LAVATORY UNITS



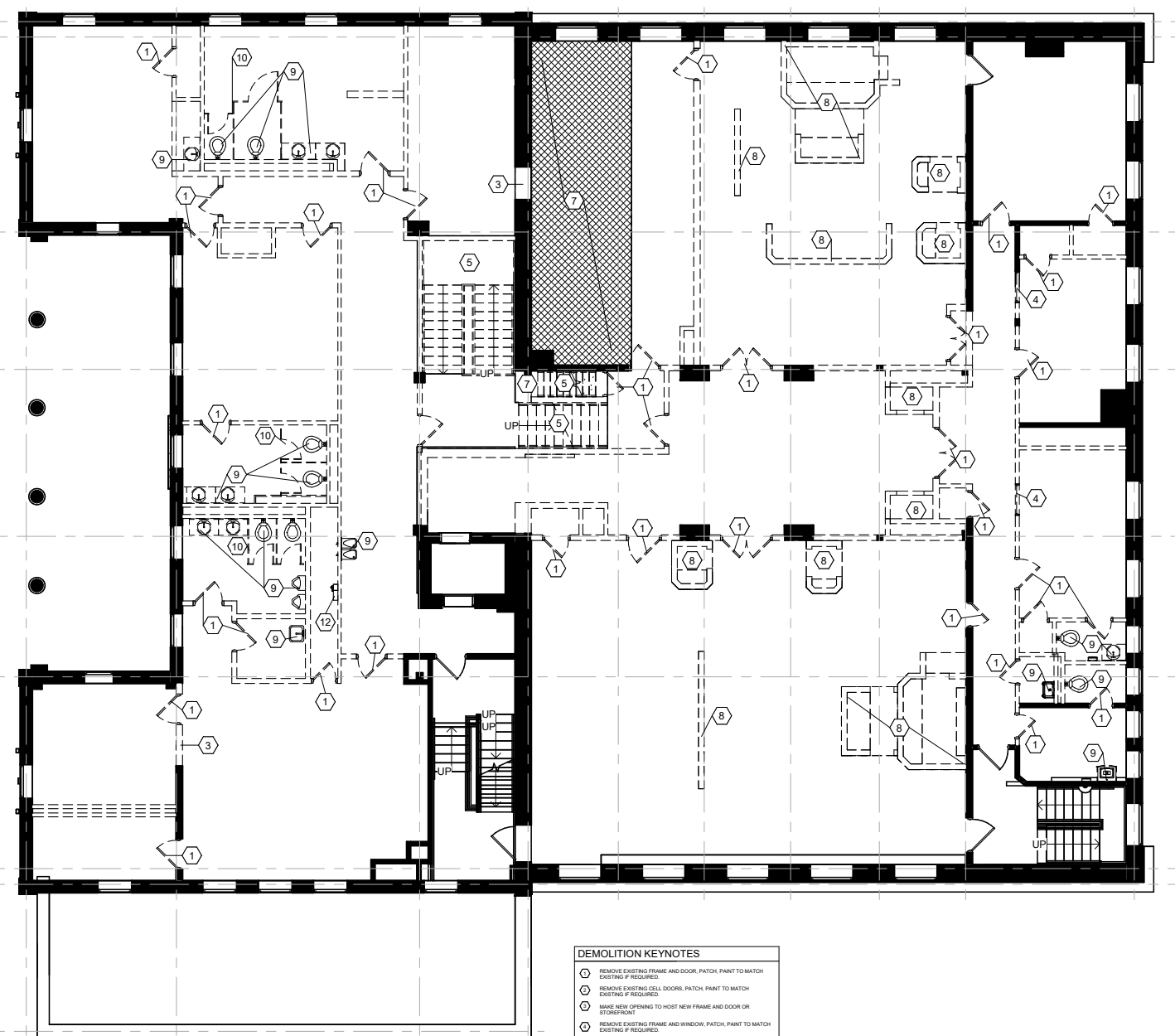
FIRST FLOOR



SECOND FLOOR



EXISTING SECOND FLOOR PLAN



SECOND FLOOR DEMO PLAN

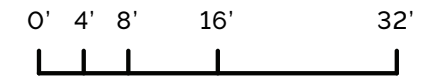
- DEMOLITION KEYNOTES**
- 1 REMOVE EXISTING FRAME AND DOOR, PATCH, PAINT TO MATCH EXISTING IF REQUIRED.
 - 2 REMOVE EXISTING CELL DOORS, PATCH, PAINT TO MATCH EXISTING IF REQUIRED.
 - 3 MAKE NEW OPENING TO HOST NEW FRAME AND DOOR OR STOREFRONT.
 - 4 REMOVE EXISTING FRAME AND WINDOW, PATCH, PAINT TO MATCH EXISTING IF REQUIRED.
 - 5 DEMO EXISTING STAIRS, STRINGERS, RAILINGS AND ALL ELEMENTS RELATED TO THE STAIR.
 - 6 DEMO EXISTING RAMP, RAILING AND ALL ELEMENTS RELATED TO THE RAMP, PATCH, FILL AS REQUIRED.
 - 7 DEMO FLOOR AND ALL ITS SUB-COMPONENTS, PATCH, FILL IF REQUIRED. REMOVE CEILING LIGHTING AND TRAC IF UNDER THE FLOOR.
 - 8 REMOVE EXISTING MILLWORK AND ALL ITS SUB-COMPONENTS, PATCH, PAINT AS REQUIRED.
 - 9 REMOVE EXISTING PLUMBING FIXTURES, CABINETRY, ACCESSORIES, ALL ITS RELATED COMPONENTS AND PIPE LINES ASSOCIATED. CAP AND SEAL AS NEEDED AS PER CODE AND ENGINEER PLAN.
 - 10 REMOVE STALL PARTITION WALLS OF RESTROOMS.
 - 11 FILL OPENING OR DEMO SHAPES WITH SLAB FLOOR AND FINISHES. RE-INSTALL CEILING LIGHTING AND MECHANICAL SYSTEMS BELOW IF REQUIRED.
 - 12 REMOVE AND RELOCATE ELECTRICAL PANELS AND INSTALLATION. DEMO EXISTING CANOPY, PATCH AND REPAIR AS NEEDED.
 - 13 REMOVE EXISTING FLOOR AND PAVING, FILL AND LEVEL AS NEEDED TO RECEIVE NEW FLOOR. VERIFY MECHANICAL EQUIPMENT ON SITE IF NEEDED TO BE RELOCATED WITH ENGINEER.
 - 14 REMOVE EXISTING WALLS, ROOF AND ITS SUB-COMPONENTS ASSOCIATED. KEEP ELEVATOR SHAFT.



SECOND FLOOR PROPOSED FLOOR PLAN

PROGRAM LEGEND

- COMMON SPACE
- PROGRAM SPACE
- SUPPORT SPACE



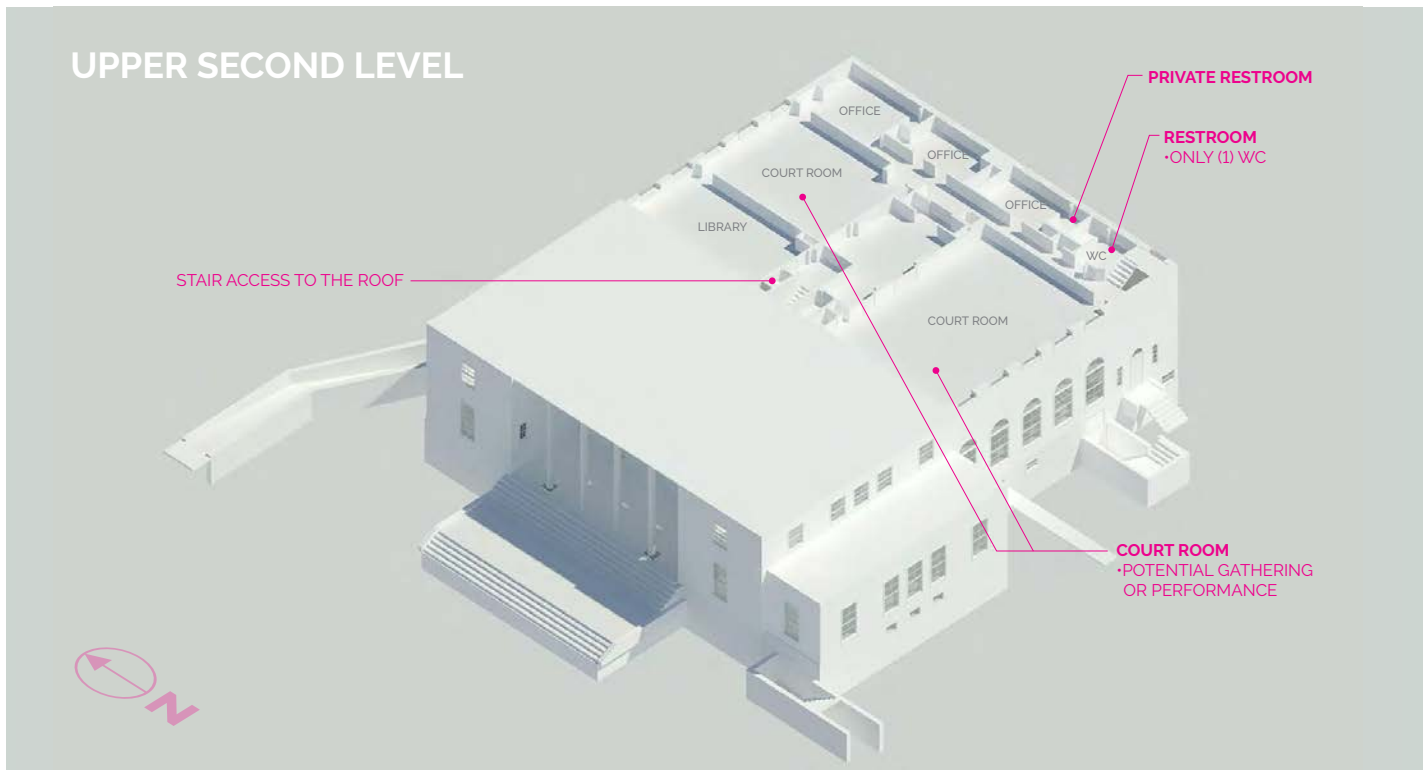
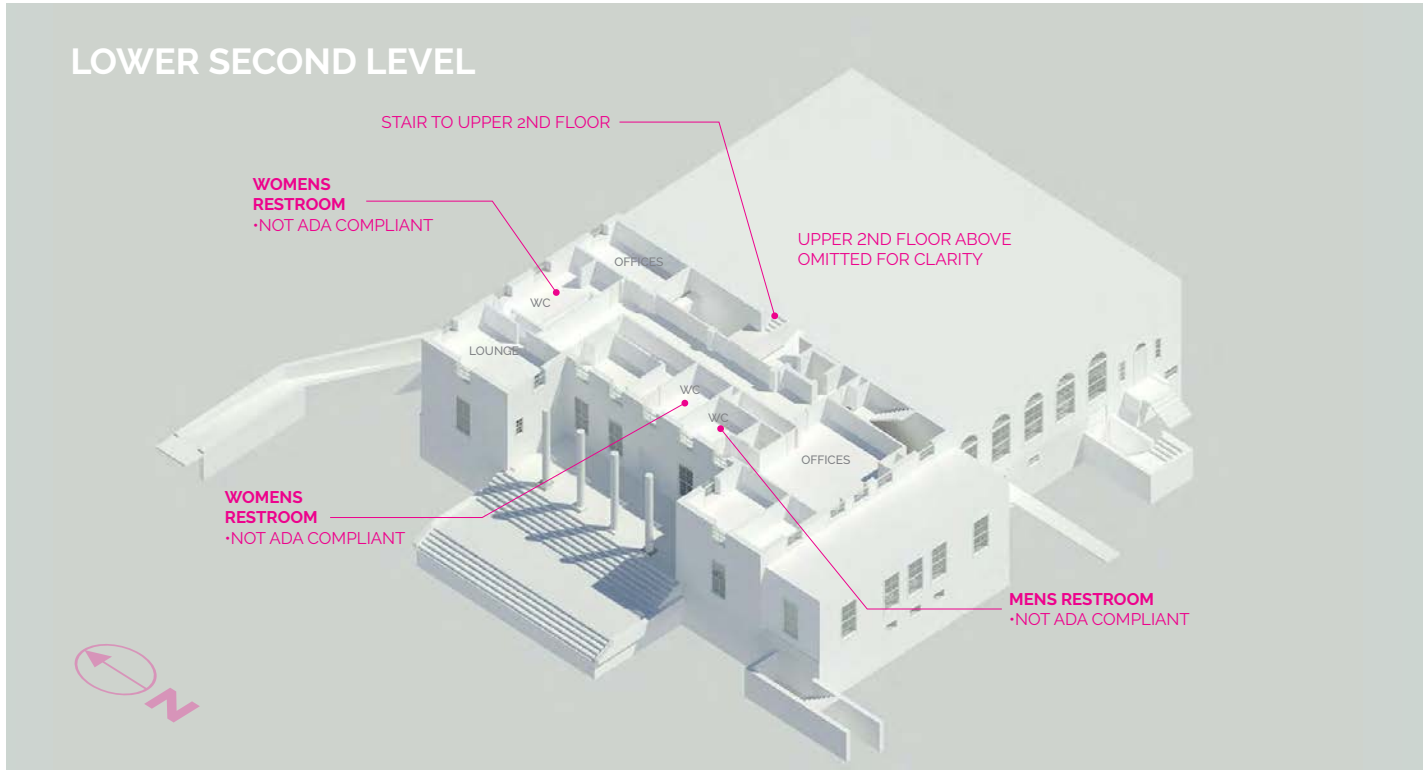
FIRST FLOOR REUSE CONSIDERATIONS

content



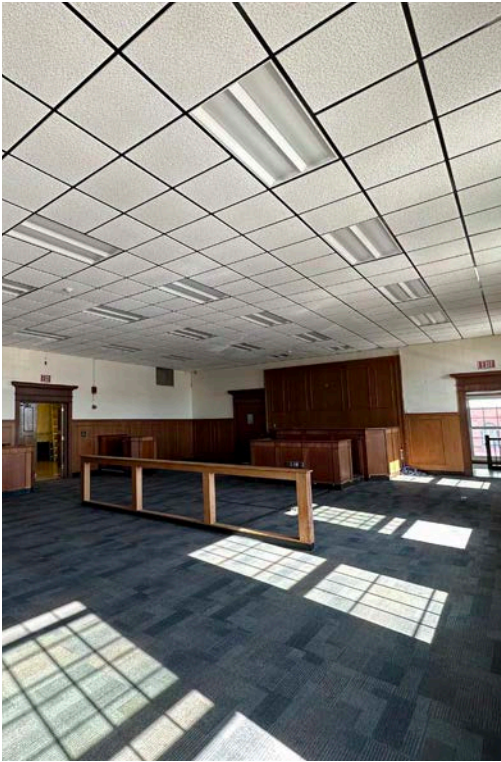


REUSE RECOMMENDATIONS - SECOND FLOOR





REUSE RECOMMENDATIONS - SECOND FLOOR - CLASSROOMS + ART



Existing second floor courtroom

INTERIOR

The second floor is split into two areas at different elevations. The new open stair from the lobby to the first floor will continue to the second floor stair and ultimately to the new roof terrace. Existing courtrooms with high ceilings are ideally sized to create larger spaces for art and performance. Included on this floor is an art gallery, a community room and rehearsal space, a dance studio, multiple art classrooms of different sizes, and some art studios with natural light. This floor also has a tech room that services the black box theater below on the first floor.

The second floor spaces offer a great deal of flexibility where artists, performers, and the public can come together. All kinds of events can happen on this floor as follows:

Classrooms: Carpeted floor, 2x2 ACT ceiling, video to allow for people to plug their laptops into video screens on the wall.

Art Studios: These rooms should be flexible spaces where artists are free to make art and the associated mess that might come along with that. Finishes in these spaces should be first and foremost durable so that they hold up over time and/ or are easy to replace if necessary. We would recommend VCT floors and ACT ceilings that are as high as can be installed, even if that means exposed ductwork and other building systems.



SECOND FLOOR

MALDEN CENTER FOR ARTS & CULTURE

89 SUMMER STREET,

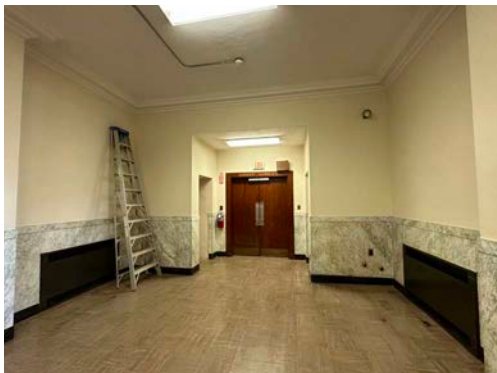
MALDEN, MA 02148



REUSE RECOMMENDATIONS - SECOND FLOOR - REHEARSAL STUDIO + GALLERY SPACE



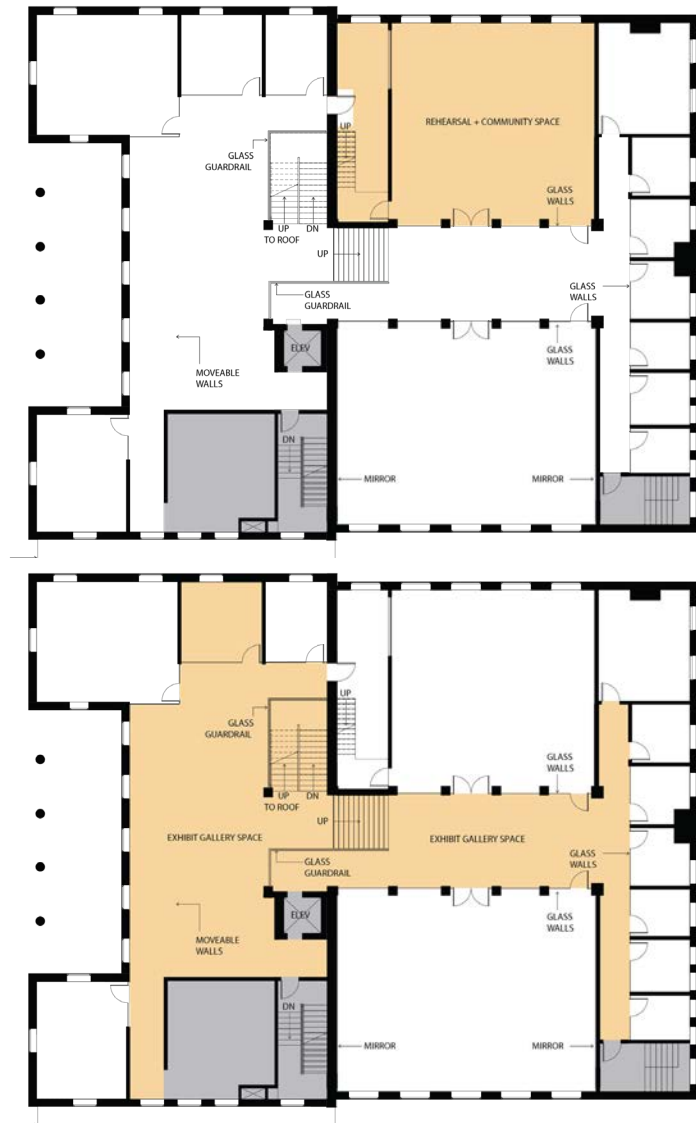
Proposed future black box theatre



Existing courthouse upper floor lobby

The Community Room and Rehearsal Space offers flexible space that can be used for a variety of functions including meetings, classes, small music performance, or can be rented with the black box theater performers that need space for rehearsal.

Gallery Space is provided that can be used for exhibitions. The gallery space should have track lighting for flexibility of various exhibitions (2D and 3D), LVT flooring, and painted walls. A wood slat ceiling across the space can hide HVAC systems while incorporating the track lighting.



SECOND FLOOR

MALDEN CENTER FOR ARTS & CULTURE

89 SUMMER STREET,

MALDEN, MA 02148



REUSE RECOMMENDATIONS - SECOND FLOOR - MUSIC ROOMS / RECORDING STUDIO + DANCE STUDIO



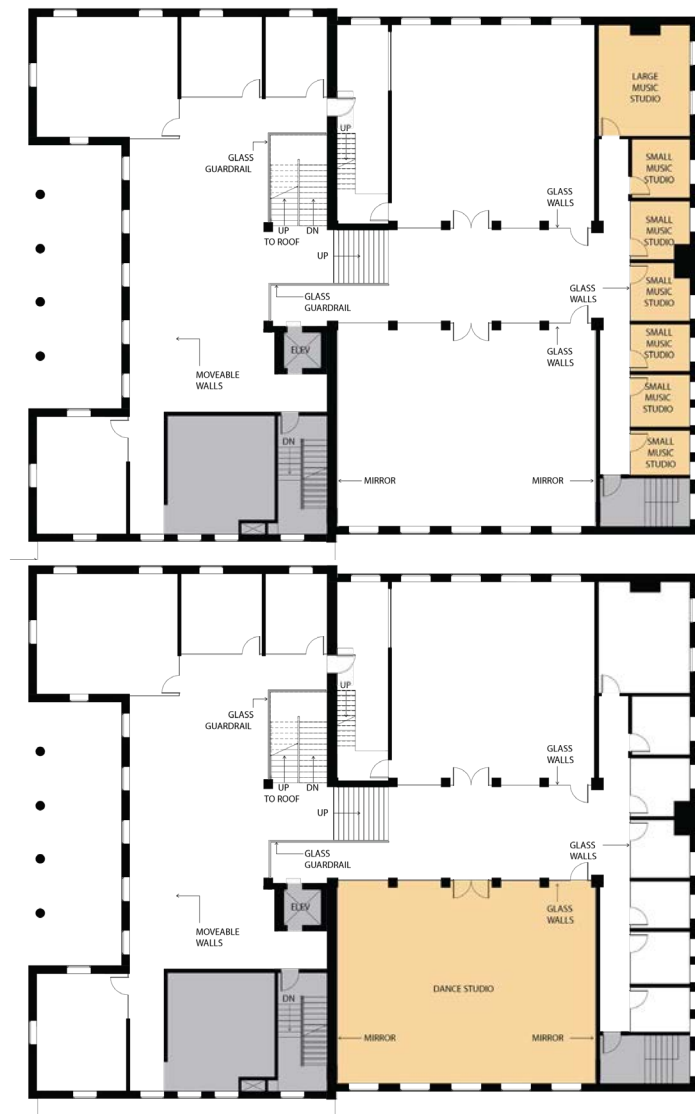
Existing upper floor library space



Typical condition of upper floors

Recording Studios and Music Practice Room: these are to be “box in box” construction so that they are acoustically isolated from the structure. Sound absorbing materials are to be provided inside the rooms.

The Dance Studio is a space that is to be used for all forms of dance performance. Mirror and ballet bars and an appropriate sprung dance floor system will be provided in this space. Refer to the Acentech section of this report for acoustic and audio visual specifications related to these spaces.



SECOND FLOOR



REUSE RECOMMENDATIONS - SECOND FLOOR - RESTROOMS

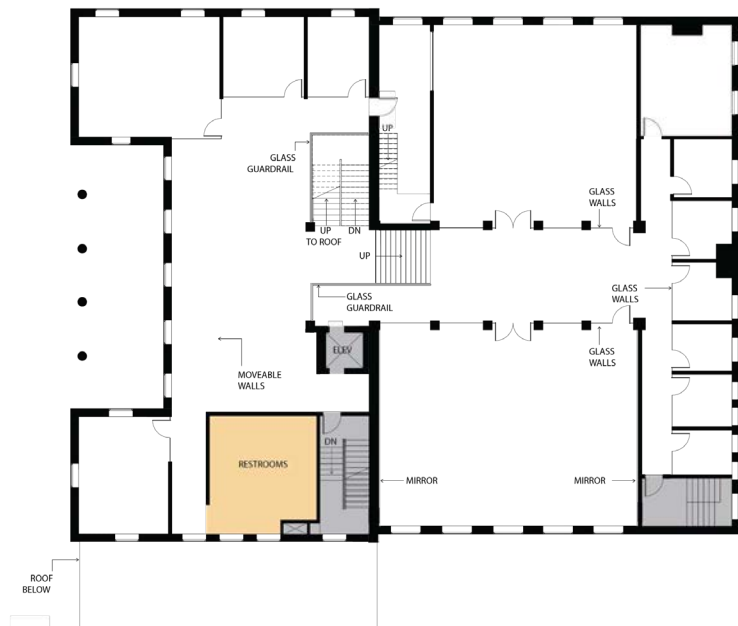
There is a great deal of interest in non-gender restrooms and this project proposes to utilize these at all levels. All existing restrooms will be demolished. New restrooms will have toilets separated by walls and doors, tile floors, wall tile to 4', paint, modern lighting, ACT ceiling finishes, and new sinks in shared solid surface countertops. See diagram and precedent images as reference.

The following number of fixtures will be required at the second floor for the anticipated occupancy of the building.

FLOOR OCCUPANCY = 267 PEOPLE + 49 PEOPLE FOR ROOF TERRACE

6 FEMALE WC / 3 MALE WC

4 LAVATORY UNITS



SECOND FLOOR

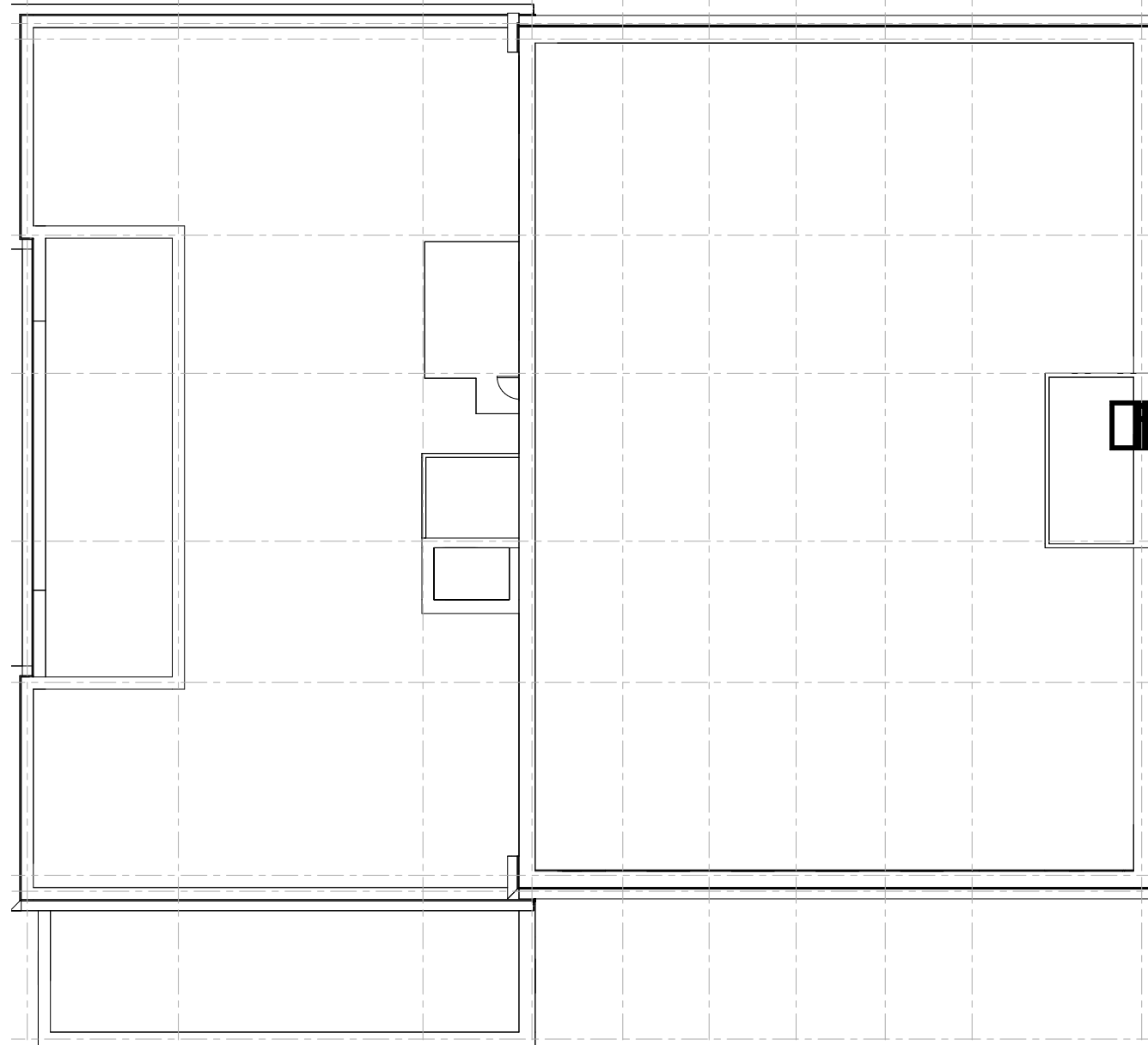
MALDEN CENTER FOR ARTS &
CULTURE

89 SUMMER STREET,

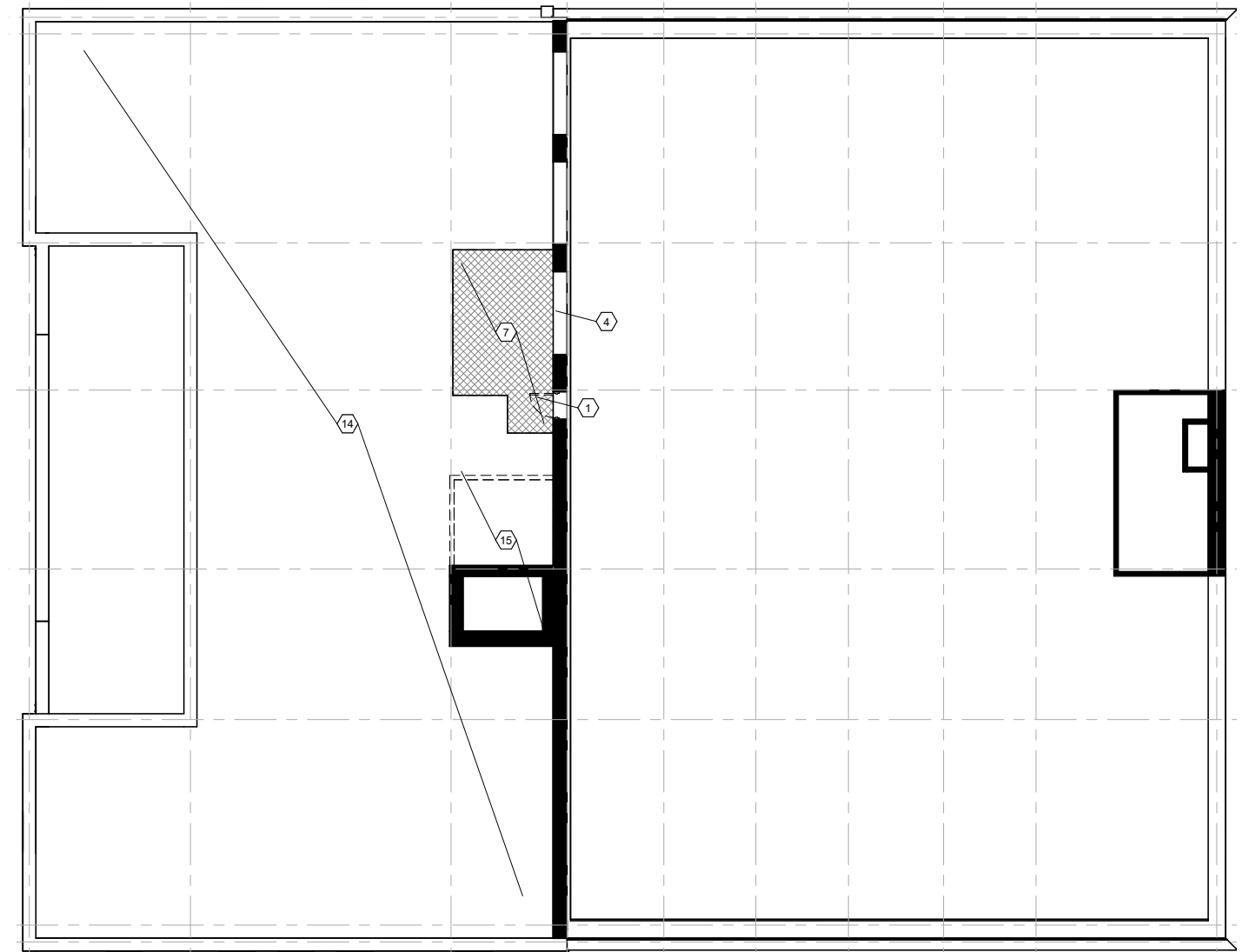
MALDEN, MA 02148



ROOF

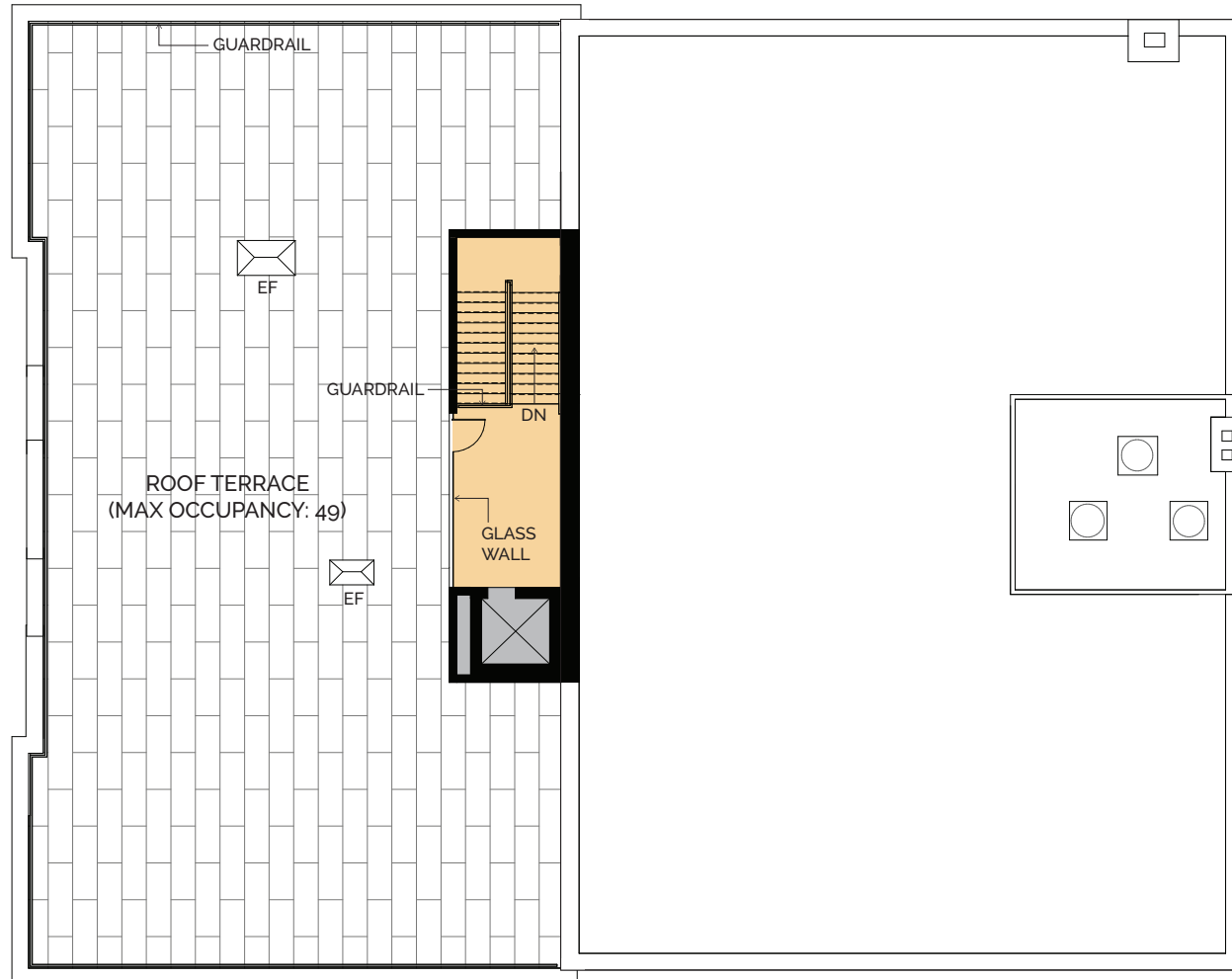


EXISTING ROOF PLAN







ROOF DEMO PLAN

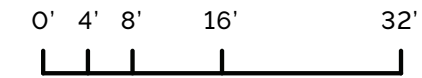
- DEMOLITION KEYNOTES**
- ① REMOVE EXISTING FRAME AND DOOR. PATCH PAINT TO MATCH EXISTING IF REQUIRED.
 - ② REMOVE EXISTING CELL DOORS. PATCH PAINT TO MATCH EXISTING IF REQUIRED.
 - ③ MAKE NEW OPENING TO HOST NEW FRAME AND DOOR OR STOREFRONT
 - ④ REMOVE EXISTING FRAME AND WINDOW. PATCH PAINT TO MATCH EXISTING IF REQUIRED.
 - ⑤ DEMO EXISTING STAIRS, STRINGERS, RAILINGS AND ALL ELEMENTS RELATED TO THE STAIR.
 - ⑥ DEMO EXISTING RAMP, RIMING AND ALL ELEMENTS RELATED TO THE RAMP. PATCH, FILL AS REQUIRED.
 - ⑦ DEMO FLOOR AND ALL ITS SUB-COMPONENTS. PATCH, FILL IF REQUIRED. REMOVE CEILING LIGHTING AND HVAC IF UNDER THE FLOOR TO BE DEMO.
 - ⑧ REMOVE EXISTING MILLWORK AND ALL ITS SUB-COMPONENTS. PATCH PAINT AS REQUIRED.
 - ⑨ REMOVE EXISTING PLUMBING FIXTURES, CABINETS, ACCESSORIES, ALL ITS RELATED COMPONENTS AND PIPE LINES ASSOCIATED. CAP AND SEAL AS NEEDED AS PER CODE AND ENGINEER PLAN.
 - ⑩ REMOVE STALL PARTITION WALLS OF RESTROOMS
 - ⑪ FILL OPENING OR DEMO SHAFTS WITH SLAB FLOOR AND FINISHES. INSTALLED CEILING LIGHTING AND MECHANICAL SYSTEMS BELOW IT IF REQUIRED.
 - ⑫ REMOVE AND RELOCATE ELECTRICAL PANELS AND INSTALLATION
 - ⑬ DEMO EXISTING CANOPY. PATCH AND REPAIR AS NEEDED.
 - ⑭ REMOVE EXISTING FLOOR AND PAVING. FILL AND LEVEL AS NEEDED TO RECEIVE NEW FLOOR. KEEP MECHANICAL EQUIPMENT ON SITE IF NEEDS TO BE RELOCATED WITH ENGINEER
 - ⑮ REMOVE EXISTING WALLS, ROOF AND ITS SUB-COMPONENTS ASSOCIATED. KEEP ELEVATOR SHAFT.



ROOF PROPOSED FLOOR PLAN

PROGRAM LEGEND

-  COMMON SPACE
-  PROGRAM SPACE
-  SUPPORT SPACE
-  ROOF TERRACE



FIRST FLOOR REUSE CONSIDERATIONS

content



REUSE RECOMMENDATIONS - ROOF TERRACE

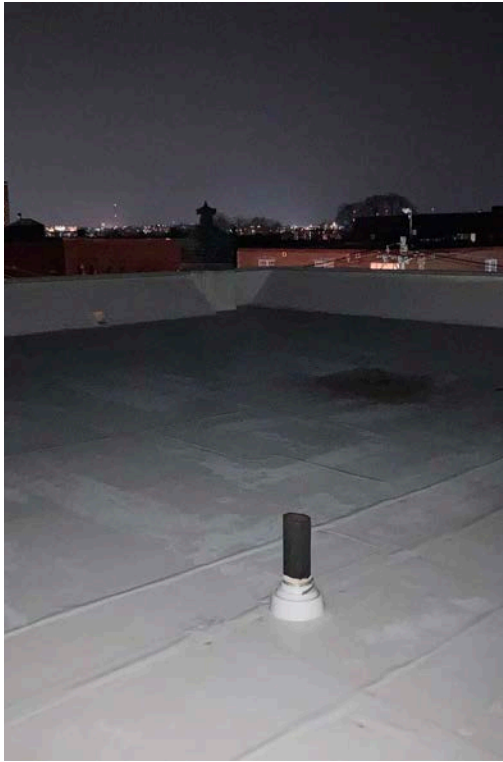


Photo 1

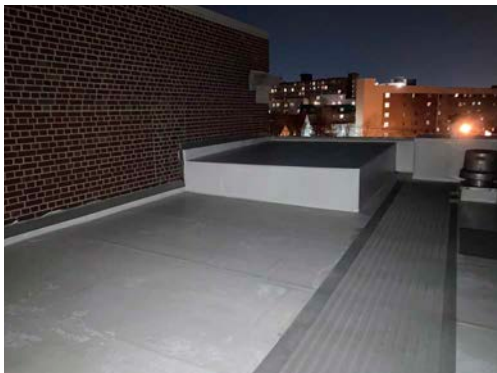


Photo 2

As noted earlier, the building has had a new roof installed fairly recently. The client team has requested that we consider events on the roof of the building. The new roof terrace will require the following work to accommodate the request:

The existing elevator will need to be replaced so that a stop to the roof can be added. This will require new equipment in the elevator machine room, extension of the elevator shaft, and any code required updates that have been put in place since the original elevator was installed.

The new stair will continue to the roof and will be the only means of egress from the roof. In order to have one means of egress capacity of the roof will be limited to 49 people.

A new wood decking system will be placed over the existing rubber membrane roof. These systems have adjustable pedestals that sit on the roof to maintain a flat elevation over the pitched roof. New guardrails should be installed at the edges of this new decking system to keep people from going close to the roof edge.

The new elevator and stair exit to a new elevator lobby that is an enclosed space that will require cooling and heating, lighting, and fire protection and alarm systems.



SECOND FLOOR

MALDEN CENTER FOR ARTS & CULTURE

89 SUMMER STREET,

MALDEN, MA 02148



BUILDING SYSTEMS ASSESSMENT



MALDEN COURTHOUSE/CENTER FOR ARTS + CULTURE– MALDEN, MA

A visit was made to the above referenced site on March 2nd, 2023 by RSE Associates to review the existing condition of the building. The building is two stories with exterior and interior masonry bearing walls and wood floor framing with steel beams at certain locations. Based on the structure that could be seen, the building is believed to have been built in the early 1900s. There was an elevator added in 1972 and the drawings for that renovation have been provided to our office.

This report presents our findings based on a review of the structural components accessible at the time of the visit and excludes below grade elements that were not able to be seen, such as foundation walls and footings.

EXISTING CONDITIONS

EXTERIOR

The exterior of the building was in good structural condition. There were no signs of settlement or deflection to the masonry walls or foundation walls that were visible above grade (Photos 1-3). There were no large cracks in the stone blocks at the foundation or the exterior face of the masonry walls above.

FOUNDATION

The existing building foundation walls were partially visible at the unfinished basement level. It is assumed that the existing building is supported on these foundation walls that continue below grade and bear on a wall footing. The upper portion of the walls is masonry at the interior and stone at the exterior. The lower portion of the walls is concrete at the interior and could not be observed at the exterior (Photos 4 &5). The overall condition of the foundation was good with only two cracks noted. These cracks occurred below a beam that was supported at the top of the wall. It is common to see cracks in these locations. The cracks were not structurally concerning due to their modest size (less than ¼") but should be monitored for any changes (Photos 6&7). There were no other signs of deflection or distress. It is assumed that the basement level slab is a slab on grade and the interior masonry piers bear on spread footings below (Photos 8, 14 &15).

FIRST FLOOR FRAMING

The first-floor framing was mostly covered with finishes. At locations where it could be observed it was found to be wood joists that measured 2"x13½" and were supported on the exterior masonry foundation walls and steel beams encased in concrete at the interior. The steel beams span to masonry piers. There were no signs of significant deflection or distress of the first-floor framing

members or the finishes. There were interior terracotta clay tile walls at the basement level, it is believed that these are partition walls and not load bearing (Photos 8-15).

SECOND FLOOR FRAMING

The second-floor framing was also covered with finishes, but at the main corridor there were soffits which are assumed to cover beams and columns (Photos 16-18). At the front rooms off the main corridor there was a dropped ceiling and above that a plastered ceiling which covered the framing (Photo 19-20). Based on the framing at the first floor and the 1972 elevator drawings it is assumed that the framing at the front rooms is 2"x13½" wood joists spanning to masonry bearing walls or steel beams that are supported on steel columns. The second-floor framing at one of the rear rooms off the main corridor could be observed through an access hatch and was found to be 2x10 joists supported on an angle member that was bolted to a W21 steel beam (Photos 21-25). The wood joists have been notched to fit into the space under the top flange, at one location a split in the joist was noted (Photo 25). It is assumed that there is a similar floor assembly at the other rear room across the corridor from this one (Photo 26). There were no signs of significant deflection or distress of the second-floor framing members or the finishes.

ROOF FRAMING

The roof framing was mainly covered with finishes, but there was one location where it could be observed and was found to be wood joists. It is believed that these wood joists are supported on wood or steel beams and masonry bearing walls. (Photos 27-30). This is also how it is diagrammatically shown in the 1972 renovation drawings at the elevator head house (Photo 31). There were no signs of significant deflection or distress of the finishes at the second-floor ceiling that covers the roof framing.

DISCUSSION AND RECOMMENDATIONS

EXISTING FLOOR AND ROOF CAPACITY

Based on the observed condition of the first and second floor, the building has been adequately carrying the existing dead load and the live load of 50-100 psf that the code prescribes for the space. Also based on the observed condition of the second-floor ceiling finishes that cover the roof framing it can be assumed that the roof has been adequately carrying the existing dead, live and snow loads.

EXISTING FOUNDATION CAPACITY

The existing foundation walls and slab on grade were in good condition and there were no signs of settlement of below grade footings, therefore it can be assumed that the foundation is adequately supporting the dead and live loads of the structure above.

RECOMMENDATIONS

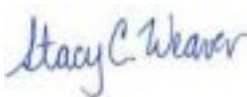
The 2x10 joist at the second-floor level that has been notched to fit under the top flange of the W21 beam and is split should be repaired/reinforced (Photo 26). Likewise, if damaged framing members are uncovered during construction those should be brought to the attention of the SER and repaired/reinforced.

It should be noted that if future proposed alternations will exceed 50% of the aggregate area of the building, then per the Massachusetts State Building Code Amendments to the IEBC the exterior multi wythe brick walls are required to be structurally anchored to the floors and roof to meet the reduced IBC seismic forces unless an evaluation demonstrates compliance of existing wall anchorage. If anchorage is required this is typically done with masonry epoxy anchors, steel straps and wood blocking that tie the wood floor framing to the brick walls.

EXISTING BUILDING DISCLAIMER

This building assessment is based on structural elements visible at the time of the site visit. Note that most of the wood framing and foundations reviewed as part of this inspection were hidden within interior finishes or below grade, respectively. Due to this fact, the exact condition of the structure that is "out-of-sight" cannot be determined as part of this review, nor can RSE Associates make an assessment of the ability of these elements to support structural loads imposed on them.

Yours Truly,

A handwritten signature in blue ink that reads "Stacy C. Weaver".

Stacy C. Weaver, PE



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12

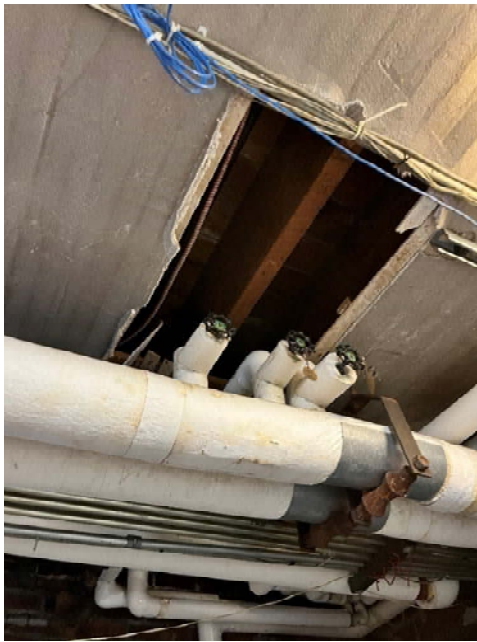


Photo 13



Photo 14



Photo 15

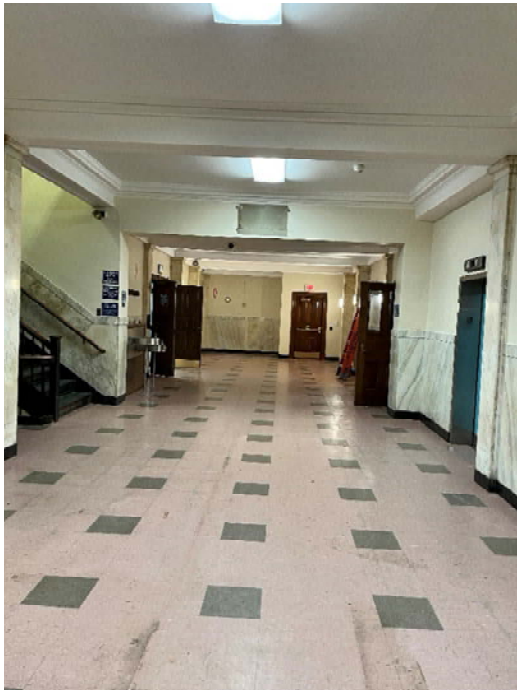


Photo 16

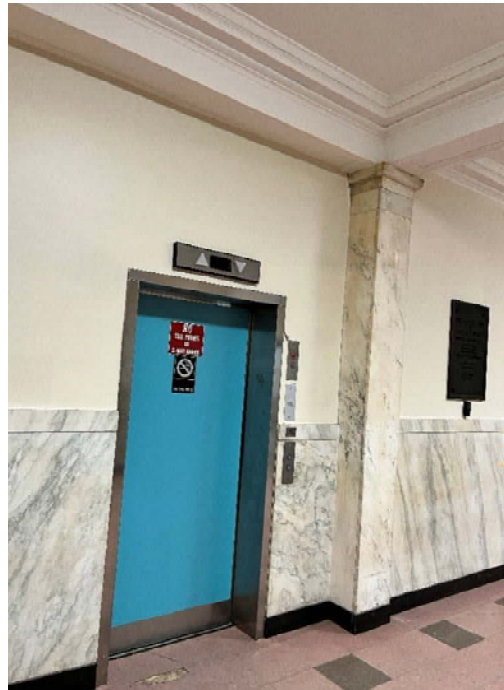


Photo 17



Photo 18



Photo 19



Photo 20



Photo 21



Photo 22



Photo 23



Photo 24

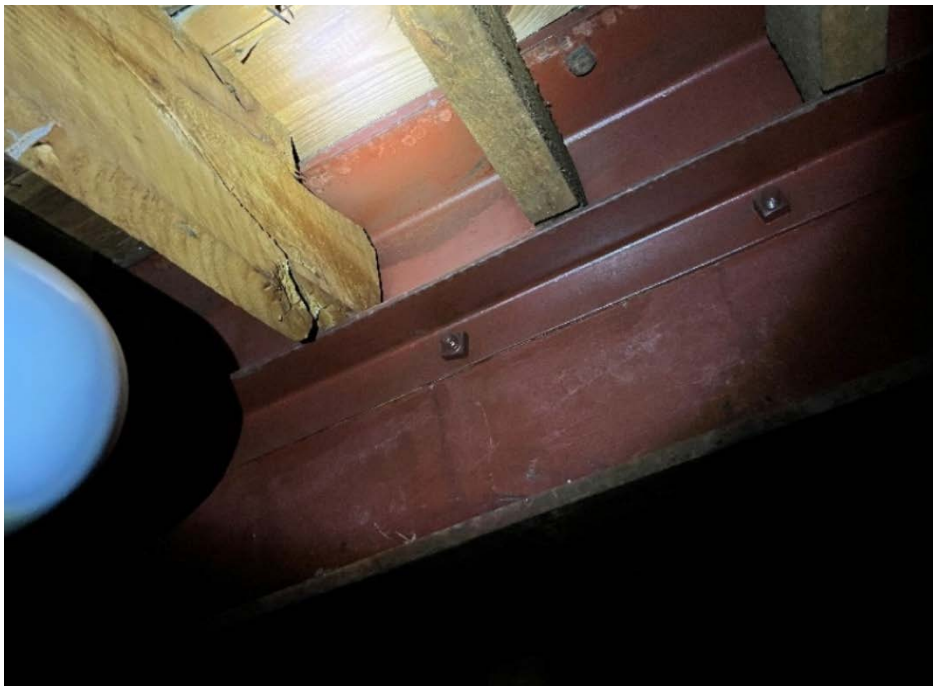


Photo 25



Photo 26



Photo 27

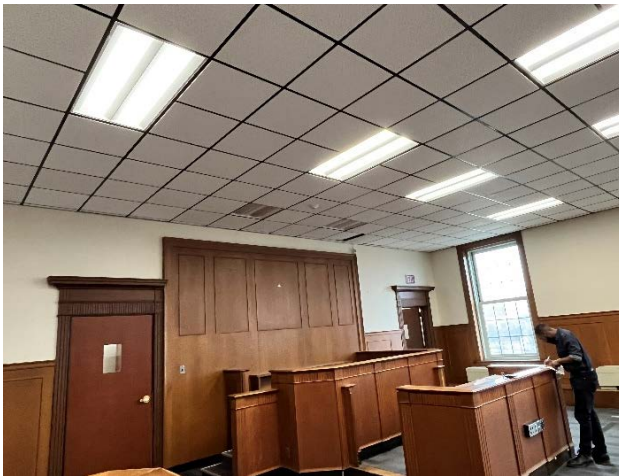


Photo 28



Photo 29



Photo 30

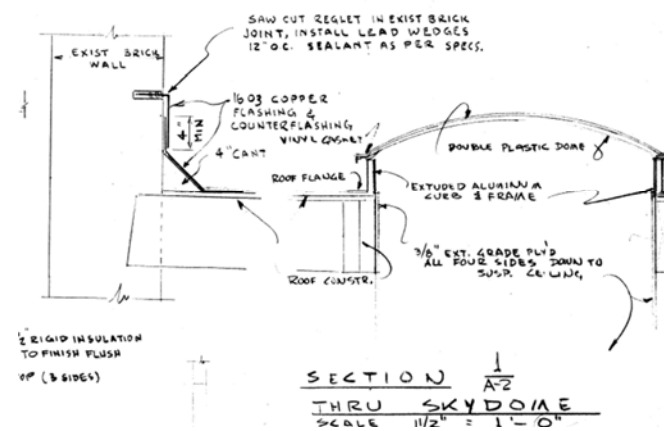


Photo 31



MALDEN CENTER FOR ARTS & CULTURE

MALDEN, MA

STRUCTURAL NARRATIVE

July 28th, 2023

Concept design drawings for the Malden Center for Arts & Culture, located in the previous Malden Courthouse, dated July 10th, 2023, were provided to RSE Associates. These drawings outline the proposed renovations, certain structural modifications to the existing building will be necessary to make these proposed renovations possible. The structural implications are outlined below.

EXISTING STRUCTURE

The building is two stories with exterior and interior masonry bearing walls and wood floor framing with steel beams at certain locations. The building is believed to have been built in the early 1900s. There was an elevator added in 1972. It is believed that the existing building is supported on foundation walls that continue below grade and bear on wall footings. The upper portion of the walls is masonry at the interior and stone at the exterior. The lower portion of the walls is concrete at the interior and unknown at the exterior.

Per the Massachusetts State Building Code 9th Ed. Amendments to the International Existing Building Code the exterior multi-wythe brick walls are required to be structurally anchored to the floors and roof. This can be done with masonry epoxy anchors, steel straps and wood blocking that tie the wood framing to the brick walls. For pricing purposes, it can be assumed these anchors will be required at 3'-0" o.c.

NEW ENTRY COURT

The proposed location of the new entry is at the side of the existing building and will require new reinforced concrete retaining walls and a new concrete slab on grade at the ramp and courtyard area. The existing masonry foundation wall will be removed to allow for new windows and doors at the entry. There will be steel beams and steel posts required to frame out the new opening and support the structure above. There is a proposed roof canopy over a portion of the entry court which will be steel framed with tie rods back to the existing structure. The existing structure will need to be reinforced at the location of the tie rods.

NEW ENTRY STAIR

There is a proposed staircase at the new entry along with a floor opening to provide a two-story open space adjacent to the staircase. Where the first-floor framing will be removed for this opening, new steel beams will be required to support the existing floor framing. If possible, the new steel beams

will be supported on existing columns, these columns will require reinforcement or modifications to accept the new steel beams. The proposed staircase will extend to the second floor and roof. New wood and/or steel framing will be required to support the existing floor and roof joists at the stair.

FIRST FLOOR

There will be the removal of walls which may require new beams, this is dependent on the existing bearing conditions of the floor framing. There is a proposed theatre which will have a code prescribed live load of 100 psf and it is anticipated that the existing floor framing will need to be reinforced for the increase in live load.

SECOND FLOOR

At the rear of the theater there will be a new tech room which will require new floor framing as it will be at the lower second floor level but in an existing space which has its floor at the upper second floor level. The existing floor framing at the upper second floor level will need to be removed for the tech room and there will be new beams required to support the existing framing that is to remain. The proposed dance studio at the upper second floor will have a raised basket weave floor which will require a ramp. Also, it is recommended that the existing wood joists be reinforced under the proposed dance studio to manage vibration concerns. The existing roof access stair will be removed to allow for the stair to the upper second floor to be widened. This will require new framing for the proposed stair and to support the existing second floor joists at the upper and lower second floor levels.

NEW ROOF TERRACE

There is a proposed roof terrace at the front of the existing building with roof pavers. The existing wood roof joists under the proposed roof terrace will need to be reinforced for the additional dead load from the roof pavers and the increase in live load for the new accessible space. It is believed that the wood roof joists are supported on the exterior masonry walls and potentially wood or steel beams at the interior. Where the wood roof joists are supported on wood or steel beams these will need to be reinforced along with the columns or walls they are supported on.



MEPFP NARRATIVE FOR MALDEN ARTS CENTER - MALDEN, MA

IMEG #23003199.00

MAY 16,2023

INTRODUCTION

PURPOSE

a. The primary purpose of this report is to describe and provide a permanent record of the building systems for the existing Malden Courthouse in Malden, Massachusetts. In addition to describing the systems, the fundamental assumptions used for the design are outlined. These include: external and-internal temperature and humidity criteria, noise limits, occupancy, vibration criteria, future expansion needs, fire resistance, and lighting levels.

PROJECT DESCRIPTION

b. The project consists of roughly 36,000 square feet of existing courthouse programming, including court rooms, detainee holding areas, clerks and clerical offices, bathrooms, and mechanical and utility spaces. The space is being renovated for new use as an arts center for the city of Malden.

MALDEN COURTHOUSE/CENTER FOR ARTS + CULTURE– MALDEN, MA

A visit was made to the above referenced site on March 2nd, 2023 by RSE Associates to review the existing condition of the building. The building is two stories with exterior and interior masonry bearing walls and wood floor framing with steel beams at certain locations. Based on the structure that could be seen, the building is believed to have been built in the early 1900s. There was an elevator added in 1972 and the drawings for that renovation have been provided to our office.

This report presents our findings based on a review of the structural components accessible at the time of the visit and excludes below grade elements that were not able to be seen, such as foundation walls and footings.

MECHANICAL

Chilled water is provided by a Trane CG75D water-cooled chiller with a 75-ton cooling capacity. It's located in the Lower Level mechanical room. The chiller provides chilled water to a two-pipe changeover system, meaning that the building chilled water loop also serves as the heating hot water loop. The system is seasonally changed over from cooling mode to heating mode by turning on/off equipment and opening/closing four bypass valves in the mechanical room. Two base mounted centrifugal pumps distribute the water throughout the building to Lower Level air handling units and perimeter fan coil



units. A third pump distributes condenser water to the outdoor Marley Aquatower cooling tower. The chiller and cooling tower appear to be in very poor condition. At the time of the visit the shell-and-tube condenser was open for cleaning and there is corrosion in the tubes and pipe inlets. The corrosion in the chilled water system is visible throughout the mechanical room at the chiller and condenser water pumps, and at the cooling tower. There is cooling tower water treatment equipment nearby, but it is unknown if it is functioning or if the maintenance routine has been followed over the years.

Heating hot water is generated by two Thermal Solutions natural gas condensing boilers, each with an output capacity of 880 MBH. They are in the basement level mechanical room with the chiller. The boilers are estimated to have been installed in 2012, based on the equipment serial numbers, so the boilers are well within their 25-year expected useful life span. There are signs of corrosion on the boiler casing, pad, and the inlet and outlet pipes. They have not had preventative maintenance completed since 2016 and one boiler's access panels were removed for servicing. The boiler combustion air is vented through a ducted venting system and up to the roof through a chimney.

Combustion make-up air is brought in through automatic operable louvers, but the louvers are no longer functioning properly and appear to be manually operated. Floor standing Carrier fan coil units are installed all around the perimeter of the building on the 1st and 2nd floor. These units have a single hot water/chilled water coil and provide heating and cooling depending on the season. A few of the fan coil units on the 2nd floor serving courtrooms are equipped with outdoor air louvers and provide ventilation. Each unit is provided temperature control by a wall mounted thermostat. There is a local fan speed controller on each fan coil unit as well. The fan coil units appear to be functioning properly and are in fair condition, with only some signs of corrosion in the drain pans and on coils. The dual temperature distribution piping, however, is in very poor condition and in need of replacement. There are signs of leaks throughout the building and there are many sections of piping that have been replaced due to leaking.

RECOMMENDATIONS

IMEG recommends replacing all the dual temperature (heating hot water/chilled water) piping and distribution equipment with a new 4-pipe distribution system. The cooling system needs replacement and should be replaced with a high efficiency air-source chiller. The floor standing fan coil units have exceeded their useful life of 20 years and if the central plant and distribution system is being replaced, it would make sense to replace these units as well to better match the sensible heating and cooling loads in the new programming spaces. Any high occupancy spaces will need adequate ventilation provided from new dedicated outside air systems ducted from the rooftop. It is not recommended to use the current style unit ventilator/fan coil unit for providing high volumes of outside air. All new equipment should receive new DDC controls with energy savings control strategies programmed.



PLUMBING

PLUMBING FIXTURES

- a. Toilet rooms are located on all levels of the building. Only a men's multi-fixture restroom exists in the basement level. Two staff single user restrooms, that are not ADA compliant, along with jail cell fixtures are on the basement level.
- b. Existing water closets throughout the building are predominantly wall mounted, flush valve type fixtures. There are ADA water closets in the multi-fixture restrooms on all levels.
- c. Existing urinals throughout the building are predominantly wall mounted, flush valve type fixtures. A urinal in each men's multi-fixture restrooms were mounted at an ADA height which is a current plumbing code violation.
- d. Existing lavatories throughout the building are predominantly cabinet mounted type fixtures with manual faucets. The lavatories viewed during this site visit do not appear to be provided with individual mixing valves to limit the temperature of water provided at the fixture. Current plumbing code requirements limit the temperature of hot water at public lavatories to 110°F. Based on the required temperature of hot water being stored and delivered (approximately 140°F) throughout the building to avoid legionella, this requirement doesn't appear to be met currently.
- e. ADA bi-level drinking fountains are installed on all levels except the basement.
- f. Janitor's service sinks throughout the building are wall hung type fixtures. These fixtures appear to be in good working order although all of these fixtures are older models and showing signs of age.
- g. There are anti ligature combination lavatory/water closet fixtures in the jail cells in the basement. The hot and cold water supply, supplying the cells pass through main shut offs, are located behind an access panel in the corridor outside the cells.

RECOMMENDATIONS

Demolish all fixtures and install new fixtures to accommodate new architectural layout. The new water closet will be provided with a new flushometer valve (1.28 gpf). The new urinal will be wall mounted and will be provided with a new flushometer valve (0.125 gpf).

The new lavatory shall be installed in compliance with ADA requirements. A new ADA compliant faucet shall be provided with a capacity of 0.5 gallons per minute flow and ASSE 1017 thermostatic mixing valve to provide a maximum outlet temperature of 110°F. All new angle stops and water supply hoses shall be provided to supply water to the lavatory. A new P-trap and tailpiece shall be provided to convey waste to the building drainage system. Insulation wrap shall be provided underneath the lavatory for the drainage and water connections.



DOMESTIC COLD WATER

a. The building is currently provided with a 2" domestic water service that enters a utility room in the basement. This 2" service immediately passes through a 2" water meter. No backflow prevention is installed on the service.

RECOMMENDATIONS

Assess cold water service once architectural planning of number and type of fixtures, and upgrade if necessary. All aboveground domestic hot water piping shall be type 'L' copper with soldered joints.

DOMESTIC HOT WATER

a. An electric 80 gallon water heater is located in the Basement Mechanical Room which supplies all the fixtures requiring hot water throughout the building. The water heater is over 10 years old and appears to be at the end of its life expectancy.

b. There was no master mixing valve to reduce the temperature of the domestic water supply. It is unknown at what temperature the water heater is set at. Based on the required temperature of hot water being stored to avoid legionella, a mixing valve at the water heater would be required

c. There is no hot water recirculation system even though the furthest fixture is over 100 feet from the water heater.

RECOMMENDATIONS

Replace existing water heater with a new electric water heater. Size according to new amount and type of fixtures. Install a thermostatic, hi-lo master mixing valve and hot water recirculation system. Hot water recirculation system shall be provided with duplex recirculation pumps. Thermostatic balancing valve assemblies shall be provided on hot water recirculation branches as needed. All aboveground domestic hot water piping shall be type 'L' copper with soldered joints. Hot water and hot water recirculation piping shall be insulated per the Massachusetts Energy Code requirements.

SANITARY AND VENT SYSTEM

a. The original plans indicate the sanitary system is a gravity system that drains out the west side of the building.

b. The sanitary piping that could be viewed was cast iron. There were areas observed where sections of pipe appeared to be new. The existing piping appears to be in fair/poor condition.



RECOMMENDATIONS

Assess sanitary size with number and type of fixtures and either demolish sanitary lines back to main sanitary entrance or to 10 feet outside building, if sanitary size needs to be increased. Underground sanitary piping shall be installed using service weight hub and spigot piping with neoprene gaskets. Aboveground sanitary waste and vent piping shall be installed using service weight, hubless cast iron piping with stainless steel couplings. Depending on the existing building main sizes, they may need to be increased based on the additional number of fixtures being added to the system.

STORM SYSTEM

a. The building storm drainage system consists of roof drains located throughout the various building roof heights. All roof drains observed appeared to be in good condition. All roof drains observed were clear of debris. Internal storm system piping was not visible. The storm system appears to be adequate for the facility at present.

RECOMMENDATIONS

Replace storm line back to main storm exit of building. Relocate stacks to accommodate new architectural layout. Underground sanitary piping shall be installed using service weight hub and spigot piping with neoprene gaskets. Aboveground sanitary waste and vent piping shall be installed using service weight, hubless cast iron piping with stainless steel couplings.

NATURAL GAS SYSTEM

a. A gas service enters the basement and supplies the boilers in the Basement Mechanical Room. An older gas service that is capped is also located at the service entrance.

b. Gas is supplied to the boilers only at this time.

c. Any gas piping observed appeared to be in good condition.

RECOMMENDATIONS

Install new gas piping to accommodate any new gas fired equipment if required. Gas piping shall be schedule 40 steel with threaded joints.

FIRE PROTECTION

SYSTEMS

a. There are no sprinkler or standpipe systems in the building.



RECOMMENDATIONS

A complete wet automatic sprinkler system installed in compliance with:

- 780 CMR - Fire Protection Systems
- NFPA 13 - Installation of Sprinkler Systems

A 6 inch sprinkler service connection from the street into the building with a

Massachusetts approved double check valve backflow preventer assembly, complete with OS&Y valves on the inlet and outlet.

Each floor of the building will be a separate zone. The floor control valve assembly at the riser that feeds each floor will contain a flow switch and tamper switch. An inspector's test connection will be installed on the floor control valve station. Sprinkler heads shall be glass bulb, quick response concealed pendent or upright, depending on whether there is a ceiling.

All tamper and flow switches installed on the sprinkler system will be connected to the buildings fire alarm system. Each tamper and flow switch will be a dedicated point on the fire alarm system.

Exterior fire department connection located within 100 feet of a fire hydrant.

The hydraulic requirements for the building will be as follows:

- Light Hazard - All offices, corridors, restrooms, and classrooms hydraulically calculated to deliver 0.1 gpm per square foot over the most remote 1,500 square feet.
- Ordinary Hazard Group I – All electric rooms hydraulically calculated to deliver 0.15 gpm per square foot over the most remote 1,500 square feet.
- Ordinary Hazard Group II – All storage rooms hydraulically calculated to deliver 0.2 gpm per square foot over the most remote 1,500 square feet.

ELECTRICAL

POWER

a. The building distribution system includes a Federal Pacific, 1200A Main switchboard, meter and CT cabinet, located on the ground level of the 93 Bishop Allen Dr. Building. A 120/208V feeder is extended underground from a utility vault located in the Summer street area to the Main disconnect switch, meter and CT cabinet.

b. The main switchboard is manufactured by Federal Pacific of 1960's vintage. The switchboard is in fair condition and near the end of its useful life. The majority of the panelboards were replaced in the 1994 renovation and are in fair condition. The panels are almost 30 years old and near the end of their



useful life. Panel PP is modified with an unlisted breaker. The disconnect switches in the boiler room are over 50 years old and in fair condition.

c. There were several instances of unsupported nm cable, MC cable, and miscellaneous wiring observed above the ceiling.

RECOMMENDATIONS

The existing electrical service is adequate to support the building including its existing chiller and cooling tower and fan coil units throughout. If no significant additional cooling or other loads are added to the building, the service is adequate. The main switchboard is near the end of its useful life and is recommended to be replaced. Panel PP is modified with an unlisted breaker and is recommended to be replaced. The disconnect switches in the boiler room are over 50 years old and should be replaced.

The existing distribution system is almost 30 years old and near the end of its useful life. It is recommended to replace the electrical distribution system throughout the building. The new system will re-feed all loads that are existing and power new loads including a new elevator, new lighting, new power, and new cooling equipment.

Remove all existing branch circuit wiring in its entirety. Remove all existing receptacles. Provide new branch circuit wiring to all existing mechanical equipment as required. Provide new branch circuit wiring to new receptacles and lighting as required.

LIGHTING

a. The lighting is a combination of older linear fluorescent wraparound fixtures, recessed volumetric fluorescent fixtures, LED wall sconces, and incandescent fixtures. There are automatic lighting controls within the building with the majority of the lighting controlled by wall switches and occupancy sensors. There are older emergency battery units that appear to be over 30 years old and are not working.

b. The emergency lighting is provided by emergency battery units that are almost 30 years old and in poor condition. There are no emergency fixtures in the elevator machine room and inadequate emergency lighting in the stairs. There is no emergency lighting at the exterior egress points. There are some newer LED exit signs and many self-illuminated, non-powered radioactive exit signs.

RECOMMENDATIONS

The existing lighting is either fluorescent or incandescent and between 20 and 40 years old. It is recommended to replace the existing fluorescent and incandescent lighting. The new lighting systems will consist of energy efficient LED fixtures using the suggested below approaches:



Location	Illumination Level	Notes
Corridors	5-10 FC	1'x4' or 2'x 2' recessed "indirect"-style LED fixtures.
Private offices, small conference rooms	35-45 FC	Suspended direct/indirect LED fixtures.
Multipurpose/Exercise /Movie/ presentations	35-35 FC	Suspended direct/indirect LED fixtures.
Bathrooms	10-20 FC	LED Slot fixtures over mirror supplemented with recessed LED downlights
Mechanical and electrical rooms	30+ FC	LED strips, pendant or surface.
Stairway	10-15 FC	Wall-mounted direct/indirect LED fixtures, high impact polycarbonate lens.

Lighting controls are required for a level 3 alteration or in any space where lighting is renovated. It is recommended to provide new lighting controls throughout the building.

With the addition of energy efficient LED lighting and automatic lighting controls significant energy savings can be achieved with the majority of the lighting only in use when each space is occupied.

All lighting will be automatically controlled using a combination of ceiling occupancy sensors in multipurpose rooms, offices, and smaller spaces, and network programmable relays for larger spaces such as corridors and general circulation. Perimeter spaces will have closed loop light

level sensors 12' from window for 2 zone dimming control of primary and secondary daylight zones.

The existing emergency lighting is not functional and there many radioactive signs in the building. It is recommended to replace the lighting and exit lighting will be replaced to accommodate the new layout of the building. The emergency lighting will be provided with emergency battery backup integral to the luminaires located in the path of egress. Approximate 1/3 of the lighting in the path of egress will be equipped with an integral emergency battery. Exterior egress lighting is recommended at all egress doors.



FIRE ALARM

a. The fire alarm system is an addressable system with horn/strobe notification appliances utilizing a Fire Control 4100es fire alarm control panel (FACP). The FACP is located in the main electrical room. The system reports to the Malden Fire Department through a central service through a digital communicator integral with the FACP and a starlink radio masterbox. Manual pull stations are located at exits and automatic detection is provided throughout the building including smoke detectors. Horn/strobe notification appliances appear to be ADA compliant type and are located throughout the building, but coverage is questionable in some areas. There is no visual notification in any of the toilet rooms throughout the building. There is an old masterbox, beacon, and zone directory that is over 30 years old and in poor condition.

RECOMMENDATIONS

The existing fire alarm system will be removed and replaced with a new system.

The new system will consist of an addressable fire alarm control panel, automatic smoke and heat detectors, manual pull stations, voice and visible alarm signals, elevator recall, and connection to the Fire Department. The new fire alarm system will report to the Fire Department through a radio master box.

The fire alarm control panel will be located in the main electric room with an LCD remote annunciator located at the Main entrance where the fire department responds to an alarm condition.

Audio notification devices and visual high intensity strobes alarm devices will be installed per NFPA-72.

Smoke detectors will be provided throughout the building to provide full coverage. Interface and control modules will be provided for elevator recall, air handling unit shut down, gas shut off, door hold release, door hardware bypass, and any other systems requiring control under an alarm condition.

Carbon monoxide detectors will be provided in all areas with fuel burning equipment and will provide a supervisory alarm on the fire alarm system.



MEPFP NARRATIVE FOR MALDEN ARTS CENTER - MALDEN, MA

IMEG #23003199.00

AUGUST 8, 112023

INTRODUCTION

PURPOSE

a. The primary purpose of this report is to describe and provide a schematic design narrative of the building systems for the Malden Arts and Center for Culture in Malden, Massachusetts.

PROJECT DESCRIPTION

b. The project consists of roughly 36,000 square feet of existing courthouse programming, that will be renovated for new use as an arts center for the city of Malden. The new design will include a new accessible entrance on Lincoln Street as well as programming to support an arts center comprised of classrooms, kitchen/food lab, galleries, dance studio, music studios, recording studio, and black box theater. The design will also include a café at the new entrance.

MECHANICAL

RECOMMENDATIONS

a. Demo and remove the existing heating plant including, but not limited to, the two natural gas boilers, venting, pumps, piping, valves, and controls.

b. Demo and remove the existing cooling plant including, but not limited to, the water-cooled chiller, cooling tower, chemical treatment, chilled water pumps, piping, valves, and controls.

c. Demo and remove 50 perimeter floor mounted fan coil units and all piping, valves, controls, and thermostats. Patch and fill holes used for piping. Patch and fill 6 masonry openings for the fresh air fan coil units serving second floor courtrooms.

d. Demo and remove the basement HVAC system including, but not limited to, the basement air handling unit, ductwork, diffusers, refrigerant piping, hot water piping, coils, valves, and outdoor condensing unit.

e. Demo and remove existing bathroom exhaust systems including 3 rooftop centrifugal fans, ductwork, and grilles.

f. Demo and remove courtroom exhaust systems including, but not limited to, 3 centrifugal fans located in the attic, floor mounts, ductwork, motors, controls, and rooftop vents. Patch and seal 3 roof penetrations



g. Install a new 100-ton air-source heat pump chiller, HP-1, on a new pad at grade in place of the existing cooling tower to provide both hot water for heating and chilled water for cooling. Install a 4-pipe (hot water supply and return, and chilled water supply and return) distribution system from HP-1 to feed all new terminal units and AHU coils. Provide an acoustic panel enclosure to surround HP-1.

h. Install new hot water and chilled water pumps in the basement mechanical room on new concrete pads.

i. Install a new 13,000 CFM air handling unit, AHU-1, in the basement mechanical room. The unit will consist of dampers, energy recovery device, electric preheat for frost control, hot water coil, chilled water coil, full economizer section, supply fan with VFD, return fan with VFD, prefilters (MERV8), and final filters (MERV 14). This unit to provide heating, cooling, and ventilation to the Black Box Theater, large 1st floor art classroom/workshop, community room/rehearsal space, dance studio, gallery, and pop up/gallery.

j. Install displacement ventilation systems to serve the black box theater, art classroom/workshop, community room/rehearsal space, and dance studio. These rooms to be provided with conditioned ventilation air from below through a supply and return ductwork distribution system, fed from AHU-1 in the basement. Room thermostats to measure temperature and carbon dioxide for demand control ventilation.

k. Install a new 10,000 CFM air handling unit, AHU-2, in the basement mechanical room. The unit will consist of dampers, energy recovery device, electric preheat for frost control, hot water coil, chilled water coil, full economizer section, supply fan with VFD, return fan with VFD, prefilters (MERV8), and final filters (MERV 14). This unit to provide heating, cooling, and ventilation to all remaining classrooms, studios, offices, backstage, and café. Rooms are to be zoned with VAV boxes equipped with electric reheat coils.

l. Install new bathroom exhaust fan system.

m. Install new DDC controls on all new HVAC equipment, tied to a new building management system.

PLUMBING

RECOMMENDATIONS

a. Demolish all fixtures and install new fixtures to accommodate new architectural layout. The new water closet will be provided with a new flushometer valve (1.28 gpf). The new urinal will be wall mounted and will be provided with a new flushometer valve (0.125 gpf).

b. The new lavatory shall be installed in compliance with ADA requirements. A new ADA compliant faucet shall be provided with a capacity of 0.5 gallons per minute flow and ASSE 1017 thermostatic



mixing valve to provide a maximum outlet temperature of 110°F. All new angle stops and water supply hoses shall be provided to supply water to the lavatory. A new P-trap and tailpiece shall be provided to convey waste to the building drainage system. Insulation wrap shall be provided underneath the lavatory for the drainage and water connections.

DOMESTIC COLD WATER

a. The building is currently provided with a 2" domestic water service that enters a utility room in the basement. This 2" service immediately passes through a 2" water meter. No backflow prevention is installed on the service.

RECOMMENDATIONS

1. All aboveground domestic cold water piping shall be replaced with type 'L' copper and soldered joints to supply new plumbing fixtures.

DOMESTIC HOT WATER

a. An electric 80 gallon water heater is located in the Basement Mechanical Room, which supplies all the fixtures requiring hot water throughout the building. The water heater is over 10 years old and appears to be at the end of its life expectancy.

b. There was no master mixing valve to reduce the temperature of the domestic water supply. It is unknown at what temperature the water heater is set at. Based on the required temperature of hot water being stored to avoid legionella, a mixing valve at the water heater would be required.

c. There is no hot water recirculation system even though the furthest fixture is over 100 feet from the water heater.

RECOMMENDATIONS

1. Replace existing water heater with a new electric water heater. Size according to new amount and type of fixtures. Install a thermostatic, hi-lo master mixing valve and hot water recirculation system. Hot water recirculation system shall be provided with duplex recirculation pumps. Thermostatic balancing valve assemblies shall be provided on hot water recirculation branches, as needed. All aboveground domestic hot water and hot water recirculation piping shall be demolished and replaced with type 'L' copper and soldered joints to supply new fixtures. Hot water and hot water recirculation piping shall be insulated per the Massachusetts Energy Code requirements.

SANITARY AND VENT SYSTEM

a. The original plans indicate the sanitary system is a gravity system that drains out the west side of the building.



b. The sanitary piping that could be viewed was cast iron. There were areas observed where sections of pipe appeared to be new. The existing piping appears to be in fair/poor condition.

RECOMMENDATIONS

1. Assess sanitary size with number and type of fixtures and either demolish sanitary lines back to main sanitary entrance or to 10 feet outside building, if sanitary size needs to be increased. Underground sanitary piping shall be installed using service weight hub and spigot piping with neoprene gaskets. Aboveground sanitary waste and vent piping shall be installed using service weight, hubless cast iron piping with stainless steel couplings. Depending on the existing building main sizes, they may need to be increased based on the additional number of fixtures being added to the system. An exterior grease trap shall serve the new test kitchen space. Point of use grease traps shall be connected to dishwashers and pot sinks.

STORM SYSTEM

a. The building storm drainage system consists of roof drains located throughout the various building roof heights. All roof drains observed appeared to be in good condition. All roof drains observed were clear of debris. Internal storm system piping was not visible. The storm system appears to be adequate for the facility at present.

RECOMMENDATIONS

1. Replace storm line back to main storm exit of building. Relocate stacks to accommodate new architectural layout. Underground sanitary piping shall be installed using service weight hub and spigot piping with neoprene gaskets. Aboveground sanitary waste and vent piping shall be installed using service weight, hubless cast iron piping with stainless steel couplings.

NATURAL GAS SYSTEM

a. A gas service enters the basement and supplies the boilers in the Basement Mechanical Room. An older gas service that is capped is also located at the service entrance.

b. Gas is supplied to the boilers only at this time.

c. Any gas piping observed appeared to be in good condition.

RECOMMENDATIONS

1. Gas pipe shall be demolished and capped at entrance. No gas equipment shall be installed in building.



FIRE PROTECTION

SYSTEMS

a. There are no sprinkler or standpipe systems in the building.

RECOMMENDATIONS

1. A complete wet automatic sprinkler and standpipe system installed in compliance with:
 - a. 780 CMR - Fire Protection Systems
 - b. NFPA 13 - Installation of Sprinkler Systems
 - c. NFPA 14 - Installation of Standpipe Systems
2. A 6 inch sprinkler service connection from the street into the building with a Massachusetts approved double check valve backflow preventer assembly, complete with OS&Y valves on the inlet and outlet.
3. Each floor of the building will be a separate zone. The floor control valve assembly at the riser that feeds each floor will contain a flow switch and tamper switch. An inspector's test connection will be installed on the floor control valve station.
4. Fire protection piping main feeds to the fire protection systems from the alarm check valves will extend out to the building through the first-floor ceiling space. The piping will then extend to combination standpipe risers in each stairwell. Sprinkler systems will connect from the combination standpipe risers to all areas of the building to provide complete sprinkler coverage throughout. Potential sprinkler zoning will be coordinated with any new fire wall layouts.
5. The fire protection design will include a combination standpipe system located in all egress stairways. These standpipes will feed the sprinkler system as well as provide a fire department hose connection at each level of the building.
6. The sprinkler system standpipes will feed the sprinkler system at each floor level. Each floor will be separated into zones. A roof hydrant will be located on the highest floor roof. The flow control valve assembly at the riser that feeds each zone will contain a flow switch and tamper switch. An inspector's test connection will be installed on the floor control valve station.
7. Sprinkler heads shall be glass bulb, quick response concealed pendent or upright, depending on whether there is a ceiling.
8. All tamper and flow switches installed on the sprinkler system will be connected to the buildings' fire alarm system. Each tamper and flow switch will be a dedicated point on the fire alarm system.



9. Exterior fire department connection located within 100 feet of a fire hydrant.

10. The hydraulic requirements for the building will be as follows:

a. Light Hazard - All offices, corridors, restrooms, and classrooms hydraulically calculated to deliver 0.1 gpm per square foot over the most remote 1,500 square feet.

b. Ordinary Hazard Group I – All electric rooms hydraulically calculated to deliver 0.15 gpm per square foot over the most remote 1,500 square feet.

c. Ordinary Hazard Group II – All storage rooms hydraulically calculated to deliver 0.2 gpm per square foot over the most remote 1,500 square feet.

ELECTRICAL

RECOMMENDATIONS

a. The existing electrical service is not adequate to support the building including its existing chiller and cooling tower and fan coil units throughout. The new program and additional cooling requires a service upgrade. The main switchboard is near the end of its useful life and is recommended to be replaced. Panel PP is modified with an unlisted breaker and is recommended to be replaced. The disconnect switches in the boiler room are over 50 years old and should be replaced.

b. The existing distribution system is almost 30 years old and near the end of its useful life. It is recommended to replace the electrical distribution system throughout the building. The new system will re-feed all loads that are existing and power new loads including a new elevator, new lighting, new power, and new cooling equipment.

c. It is recommended to remove all existing branch circuit wiring in its entirety. Remove all existing receptacles. Provide new branch circuit wiring to all existing mechanical equipment as required. Provide new branch circuit wiring to new receptacles and lighting as required.

LIGHTING

a. The lighting is a combination of older linear fluorescent wraparound fixtures, recessed volumetric fluorescent fixtures, LED wall sconces, and incandescent fixtures. There are automatic lighting controls within the building with the majority of the lighting controlled by wall switches and occupancy sensors. There are older emergency battery units that appear to be over 30 years old and are not working.

b. The emergency lighting is provided by emergency battery units that are almost 30 years old and in poor condition. There are no emergency fixtures in the elevator machine room and inadequate emergency lighting in the stairs. There is no emergency lighting at the exterior egress points. There are some newer LED exit signs and many self-illuminated, non-powered radioactive exit signs.



c. The building mounted lighting is a combination of older lensed fixtures, spot lights, and wall packs. There is little site lighting.

RECOMMENDATIONS

1. The existing lighting is either fluorescent or incandescent and between 20 and 40 years old. It is recommended to replace the existing fluorescent and incandescent lighting. The new lighting systems will consist of energy efficient LED fixtures using the suggested below approaches:

Location	Illumination Level	Notes
Corridors	5-10 FC	1'x4' or 2'x 2' recessed "indirect"-style LED fixtures.
Private offices, small conference rooms	35-45 FC	Suspended direct/indirect LED fixtures.
Multipurpose/Exercise /Movie/ presentations	35-35 FC	Suspended direct/indirect LED fixtures.
Bathrooms	10-20 FC	LED Slot fixtures over mirror supplemented with recessed LED downlights
Mechanical and electrical rooms	30+ FC	LED strips, pendant or surface.
Stairway	10-15 FC	Wall-mounted direct/indirect LED fixtures, high impact polycarbonate lens.
Building Entrances	1 fc	Battery backup emergency egress fixtures.
Building Lighting	2-5 fc	LED wall packs
Site Lighting	2-5 fc	Walkway post top LED luminaire with dimming and integral photocell and motion sensor. Architectural bollards, architectural step lights at the former entrance.



2. Lighting controls are required for a level 3 alteration or in any space where lighting is renovated. It is recommended to provide new lighting controls throughout the building.
3. With the addition of energy efficient LED lighting and automatic lighting controls significant energy savings can be achieved with the majority of the lighting only in use when each space is occupied.
4. All lighting will be automatically controlled using a combination of ceiling occupancy sensors in multipurpose rooms, offices, and smaller spaces, and network programmable relays for larger spaces such as corridors and general circulation. Perimeter spaces will have closed loop light level sensors 12' from window for 2 zone dimming control of primary and secondary daylight zones.
5. The existing emergency lighting is not functional and there many radioactive signs in the building. It is recommended to replace the lighting and exit lighting to accommodate the new layout of the building. The emergency lighting will be provided with emergency battery backup integral to the luminaires located in the path of egress. Approximate 1/3 of the lighting in the path of egress will be equipped with an integral emergency battery. Exterior egress lighting is recommended at all egress doors.

FIRE ALARM

RECOMMENDATIONS

1. The existing fire alarm system will be removed and replaced with a new system.
2. The new system will consist of an addressable fire alarm control panel, automatic smoke and heat detectors, manual pull stations, voice and visible alarm signals, elevator recall, and connection to the Fire Department. The new fire alarm system will report to the Fire Department through a radio master box.
3. The fire alarm control panel will be located in the main electric room with an LCD remote annunciator located at the Main entrance where the fire department responds to an alarm condition.
4. Audio notification devices and visual high intensity strobes alarm devices will be installed per NFPA-72.
5. Smoke detectors will be provided throughout the building to provide full coverage. Interface and control modules will be provided for elevator recall, air handling unit shut down, gas shut off, door hold release, door hardware bypass, and any other systems requiring control under an alarm condition.

INTRODUCTION

This report is intended to address the acoustical design concept for the feasibility study of the Malden Center for Arts & Culture. In addition to addressing the acoustical impacts of space planning decisions, this report will outline the design concept for each acoustically sensitive space with respect to the three typical sub-disciplines of architectural acoustics; Room Acoustics, Sound Isolation, and Building Systems Noise Control. Our recommendations are intended to maximize the use of the programmed spaces.

PROJECT UNDERSTANDING

The concept study for the Malden Center for Arts & Culture envisions the facility as a cultural multimedia, visual, and performing arts center for use by the residents of Malden, MA.

SPACE PROGRAMMING

The current space planning provides four large (greater than 1,000 SF) programmed spaces; a **Black Box Theater**, a **Rehearsal Space**, a **Dance Studio**, and an **Art Studio**. Below we discuss the necessary acoustical considerations and existing space conditions that impact the primary space programming decisions. Subsequently, we provide two options for space programming that seek balance between design objectives, including the anticipated cost and ease of construction.

ACOUSTICAL CONSIDERATIONS

For the purposes of space programming, we must consider the disciplines of Room Acoustics and Sound Isolation. Room acoustics as a discipline pertains to room size, shaping, and need for sound-absorbing finishes. Sound isolation pertains to space adjacency and the design of demising construction assemblies to limit sound transfer between spaces.

ROOM ACOUSTICS

Black Box Theater – A black box theater requires an acoustical environment that supports speech intelligibility and clarity of music playback and other program audio. Sound-absorbing materials are provided at specific locations on the walls and ceiling to achieve a well controlled yet supportive acoustic environment. Additionally, theatrical and light rigging considerations typically require exposed ceilings.

Rehearsal Space – We understand this space will be used for a wide range of music and community activities, presumably including loud amplified sounds (rock band, electronic music) and softer unamplified music (classical chamber music, chorus).

A music rehearsal space requires careful consideration of two aspects that affect the room's acoustic response: the volume and dimensions, particularly height; and the layout of sound absorbing and reflecting surfaces or features.

A sufficient volume allows for an acoustic environment with the necessary dynamic range and control of loudness. To achieve suitable room acoustics, the design must incorporate a specific type and layout of acoustically absorptive and reflective materials. An ideal absorption scheme for a space is dependent on the specific programmed usage of the space. To accommodate the wide expected range of musical and other activities, the amount of absorption should be variable. This can be easily accommodated with the use of velour curtains located at the perimeter of the room.

Dance Studio – A dance studio requires an acoustical environment that supports speech intelligibility and music playback. Sound-absorbing materials are provided, often on the ceiling plane, to achieve this 'acoustically dry' environment. Additionally, the space is typically outfitted with a curtain along the mirror wall to allow greater user control and disallow a 'flutter-echo' from developing in the space during performances.

Art Studio – An art studio requires an acoustical environment that supports speech intelligibility for classroom or presentation uses, such as pinup or crit sessions. Sound-absorbing materials are provided, often on the ceiling plane, to achieve this 'acoustically dry' environment.

EXISTING CONDITIONS AND SOUND ISOLATION

Existing conditions of the Malden Courthouse building require these primary programmed spaces to be vertically adjacent. Additionally, the floor-to-floor heights are dissimilar on each level. The maximum available height dimension is understood to be 20 feet on the first floor, and 16 feet on the second floor.

These two constraints create a unique challenge for the design team to achieve a cost-effective and program-suitable design. Below we have provided a discussion of the acoustical pros and cons of two space programming options. Each option requires a different level of sound isolation between the vertically adjacent spaces. Both options locate the Black Box on the first floor, plan north side, which affords the greatest available height,

SPACE PROGRAMMING OPTION 1

Locate the Art Studio above the Black Box and locate the Dance Studio above the Rehearsal space.

Second Floor Space	Art Studio	Dance Studio
Vertical Sound Isolating Assembly	Thin (minimum 1/2") underlayment under finish floor per arch	<ul style="list-style-type: none"> - Resilient Dance Floor (per arch) - 6-7" Heavyweight Floating Sub-floor - Stiffened Structure (per engineer) - Sound Isolation Ceiling
First Floor Space	Black Box	Rehearsal Space

PROS

- Allows for greater internal volume for the two spaces with the most demanding acoustical environments: Black Box and Rehearsal Space.
- Requires minimal isolating construction between the Black Box and Art Studio.
- Provides robust sound and impact isolation between the Dance Studio and Rehearsal Space.

CONS

- Requires demolition and replacement of the ceiling within the existing first-floor courtroom to provide appropriate height and isolation for the Rehearsal Space.
- Requires thick and heavy floor assembly on the second-level Dance Studio, with associated structural measures.
- Requires additional acoustical isolation between Rehearsal Space and basement music studios.
- Some restrictions of art activities may be necessary during theatre activity: no loud machinery or heavy impact to the floor.

DEFINITIONS

Heavyweight Floating Floor – Concrete 4 ½” normal weight concrete slab, ½” plywood, 2” isolation system, total thickness 7”. Note: requires thorough coordination with the structural engineer.

(Dance floor system or other finish floor to be installed atop this subfloor.)

Sound Isolation Ceiling – 2 layers of minimum 5/8” GWB suspended from spring isolation devices, typical thickness with airspace is 11”, minimum thickness with airspace is 4 ¾”.

SPACE PROGRAMMING OPTION 2

Locate the Rehearsal Space above the Black Box and locate the Dance Studio above the Art Studio.

Second Floor Space	Rehearsal Space	Dance Studio
Vertical Sound Isolating Assembly	<ul style="list-style-type: none"> - 6-7” Heavyweight Floating Floor - Stiffened structure (per engineer) 	- Resilient Dance Floor with acoustical modifications*
First Floor Space	Black Box	Art Studio

PROS

- Allows for minimal isolation between the Dance Studio and the Art Studio.
- Allows for minimal isolation between the Art Studio and Music Rehearsal Rooms located in the Basement.
- Provides a robust level of sound and impact isolation between the Rehearsal Space and the Black Box.

CONS

- Requires structural analysis to accommodate the weight of the heavy-weight floating floor.
- Requires accommodation of the significant height of the heavy-weight floating floor.
- Minimizes the cubic volume within the Rehearsal Space.
- Cost & Invasiveness

DEFINITIONS

Heavyweight Floating Floor – Concrete 4 ½” normal weight concrete slab, ½” plywood, 2” isolation system, total thickness 7”. Note: requires thorough coordination with the structural engineer. (Dance floor system or other finish floor to be installed atop this subfloor.)

Resilient Dance Floor with Acoustical Modifications – Typically finish floor on 2 layers ¾” plywood on sleepers and 1-2” impact cushion pads.

RECOMMENDATIONS

Acoustically, both space programming options described above are favorable, though Option 1 is slightly preferable. As noted above, this requires vertical isolation measures between the first floor and the second floor, it additionally requires a vertical isolation construction between the first-floor Rehearsal Room and the music spaces in the basement below.

VERTICAL ISOLATION BETWEEN REHEARSAL SPACE AND BASEMENT MUSIC SPACES

Provide a lightweight floating floor in the Rehearsal Space; 2 layers of minimum 5/8” Cement Board situated above a 2” thick isolation system, total thickness of 3 ¼”. Finish floor per architect above.

Additionally, provide a minimum thickness sound isolation ceiling (as defined above) in the Basement Music Spaces.

BLACK BOX

Plan for a total area of 2-inch thick acoustically absorptive material equal to 1.5 times the floor area. Absorptive treatment shall cover 50% of the exposed structural deck. Plan to locate the remainder of the absorptive material evenly distributed along the available wall areas. The wall finish system is an opportunity for collaboration between architecture and acoustics, and we look forward to developing this scheme with you.

Wherever possible, entrances should be through sound & light locks/vestibules. Provide steel doors with surface-applied adjustable acoustic gasketing head, jamb, and astragal. Provide a surface applied or morticed automatic drop bottom and a flat raised threshold. Define the fire perimeter of the theatre at the outer doors of sound & light locks, so as to avoid locating panic hardware on the pair of doors that open directly into the performance space. The basis of design acoustic gasketing is Legacy Manufacturing #5077, #7563, and #7075.

At single point of entry doors (without sound & light locks), provide a factory-assembled sound transmission class (STC) door assembly with a minimum isolation rating of STC-55. Basis of design is Noise Barriers QuietSwing Doors. (This recommendation will be revisited as the floor plans develop.)

Loading Doors – Theatrical considerations are likely to require two large openings between the exterior, backstage space, and Black Box. These loading paths should be considered carefully to minimize sound transmission from outdoors or from noisy indoor spaces into the theatre. Specialty oversized acoustically rated doors may be required.

Provide a full-height acoustically isolating demising assembly between the black box and gallery space. The partition should consist of a double metal stud assembly with a 1" air gap between stud rows and two layers of minimum 5/8" gypsum board on both sides. The studs should be a minimum of 3 5/8" thick and be provided with full-height batt insulation. Do not allow rigid bracing between the two stud rows. Seal penetrations in a manner consistent with typical fire-rated details.

REHEARSAL SPACE

Acoustically favorable room proportions are typically about 4:3 length to width. This proportion works well for many user layouts as well.

Regardless of the final location of the Rehearsal Space, maximize the available ceiling height. Plan to provide a 2" thick acoustically absorptive treatment covering 75% of the total ceiling area. It may be beneficial to provide an array of suspended acoustically diffusive ceiling clouds. We look forward to working with you to develop the scheme of sound absorbing and reflecting surfaces and features.

Provide a 25 oz. weight velour fabric curtain system. Typically it is best to provide curtain at portions of two walls, to be determined by available wall areas and anticipated user layouts. The velour fabric shall be sewn to 100% fullness. The total surface area should be equivalent to no less than 75% of the total floor area.

It may be appropriate to include an acoustically rated entry door: specify a factory-assembled sound transmission class (STC) door assembly with a minimum isolation rating of STC-55. Basis of design is Noise Barriers QuietSwing Doors.

Glazing associated with the rehearsal space should be specified with consideration for sound isolation: double window systems may be appropriate.

It may be beneficial to provide articulated sound-diffusing wall features, in addition to the curtains described above. This will depend on the room dimensions and any further program information that becomes available.

Wherever the rehearsal space is horizontally adjacent to other occupied spaces, provide an insulated double stud assembly with two layers of minimum 5/8" gypsum board on one side of the assembly and three layers of minimum 5/8" gypsum board on the opposite side. Do not allow rigid contact between the two stud rows. Seal all penetrations in a manner consistent with typical fire-rated details. This double stud wall assembly is typically not required at corridor adjacencies, though this should be evaluated as the floor plan develops.

ART STUDIO

Plan for a wall-to-wall acoustic tile ceiling with a minimum noise reduction coefficient of NRC 0.75 within this space. Alternatively, if architectural requirements dictate an exposed ceiling plan, provide acoustically absorptive material with an NRC of 0.90 at the structural deck to cover 80% of the ceiling area.

If acceptable architecturally, provide a minimum ½” thick acoustically absorptive material along 75% of one long wall to prevent a flutter-echo from developing within the space.

The demising partition shall consist of a full-height single minimum 3 5/8” thick stud assembly with two layers of minimum 5/8” gypsum board on both sides of the insulated stud. Seal penetrations in a manner consistent with typical fire-rated details.

DANCE STUDIO

Plan for a wall-to-wall acoustic tile ceiling with a minimum noise reduction coefficient of NRC 0.75 within this space. Alternatively, if architectural requirements dictate an exposed ceiling plan, provide acoustically absorptive material with an NRC of 0.90 at the structural deck to cover 80% of the ceiling area.

Provide a minimum of 25 oz. weight velour curtain that is sewn to 100% fullness along the mirror wall to enable programmatic flexibility. Along the opposite long wall, provide a ½” thick acoustically absorptive material along 60% of the wall to disallow a flutter echo from developing within the space when the mirror is exposed.

The demising partition shall consist of a full-height single minimum 3 5/8” thick stud assembly with two layers of minimum 5/8” gypsum board on both sides of the insulated stud. Seal penetrations in a manner consistent with typical fire-rated details.

RECORDING AND MUSIC STUDIOS

Recording and Music Studios require the highest possible ceilings, considerable acoustically isolating constructions, and ample acoustically absorbing treatment. Further details are provided in the Acoustical Design Matrix provided in Appendix A of this report.

OTHER SPACES

Acoustical recommendations for the other programmed spaces are provided in the Acoustical Design Matrix provided in Appendix A of this report.

BUILDING SYSTEMS NOISE CONTROL

This section of the report discusses acoustical aspects relative to the building’s HVAC systems and provides conceptual design recommendations for achieving good conditions in the building. The guidelines below reference different sources of noise and vibration, which can be classified as follows:

- Airborne noise: Refers to noise radiated into the air by equipment sources such as fans and air handling units. Such noise may transmit through walls, floors, and ceilings to acoustically sensitive spaces.
- Structure-borne noise: Refers to equipment vibration that is mechanically coupled into the building structure and re-radiated into acoustically sensitive spaces as audible noise. Structure-borne noise may also be generated when a component of a building structure is exposed to high levels of airborne noise.
- Duct-borne noise: Refers to noise primarily by fans in air handling systems that transmit to acoustically sensitive spaces via ductwork, where it can either emanate from the duct termination or ‘break out’ of the duct prior to its termination.

ACOUSTIC DESIGN CRITERIA

The following criteria for maximum ambient noise levels due to the operation of the building’s HVAC, plumbing, and electrical systems have been established for the acoustically sensitive spaces on the project. These criteria are established in terms of Noise Criterion (NC) ratings as described in ASHRAE 2001 Fundamentals Handbook, Chapter 7 (Sound and Vibration).

Second Floor Space	Dance Studio
Black Box Theatre	NC-20
Large Rehearsal Space	NC-20
Recording Studio	NC-20
Music Studios	NC-25
Dance Studio	NC-30
Classroom/Workshop	NC-30
Large Art Workshop	NC-35
Art Studios	NC-35

AIR HANDLING UNITS

Select fans that operate as close to their rated peak efficiency as possible, when handling the required airflow and static pressure.

Design duct connections at both fan inlet and outlet that allow for uniform and straight airflow.

When using centrifugal fans, be sure to orient the fan rotation in the same direction as the first elbow from the fan discharge to avoid introducing excess turbulence when the rotational momentum of the airflow from the fan opposes the rotation of the first elbow.

TERMINAL DEVICES

- At the terminal end of the systems, rooms may be served by VAV boxes, induction units or split/indoor air conditioning systems. Following are recommendations for each of these options. More specific recommendations will follow once we review the proposed design for the building.

TERMINAL/VAV BOXES

- Terminal box noise is related to its fan (if the box is fan powered) and the pressure reducing valves. The noise transmits to the building via several paths: (1) discharging downstream through the duct and the diffuser to the room served, (2) radiating from the exterior of the casing into the space where the box is located, and (3) transmitting through the return air inlet of the fan powered box. For each path, the following measures should be taken:

PATH 1 – DISCHARGE NOISE

- For terminal boxes serving NC-35 spaces:
 - Internally line at least 5 feet of duct downstream the terminal box; or
 - Use a 3-ft. long silencer downstream of the terminal box (such as Vibro-Acoustics RD-MV-(medium F #)), selected with a pressure drop of maximum 0.08 inches; or
 - Use the manufacturer's standard attenuation section without film or foil facing; or
 - Use minimum 5 feet of flex duct (of the plastic covered wire helix type) at the diffuser connection.

- For terminal boxes serving NC-30 spaces:

- Use the 3-ft. long silencer described above, with a maximum pressure drop of 0.06 inches; **or**
- Use the manufacturer attenuation section described above plus 5 feet of internal lining or flex duct; **or**
- Internally line about 5 feet of duct downstream the terminal box and use minimum 5 feet of flex duct at the diffuser connection.

- For terminal boxes serving NC-25 spaces:

- Use a 3-ft. long silencer downstream of the terminal box, with a maximum pressure drop of 0.04 inches, and
- Either internally line about 5 feet of duct downstream the terminal box or use minimum 5 feet of flex duct at the diffuser connection.

PATHS 2 AND 3 – RADIATED AND INLET SOUND

- If the terminal box is fan powered, it should not be located above a space with a noise goal of NC-35 or lower. If located above corridors, it should be located at the very least above a mineral fiber ceiling tile or a gypsum board ceiling. If located above an NC-35 space or lower, it will likely need to be enclosed in a gypsum board enclosure.

- If the terminal box is not fan powered, it is still preferable to avoid locating it above a space with a noise goal of NC-35 or lower. However, depending on the box selection/pressure drop through the unit, it may be acceptable to locate the box above an occupied space, above a mineral fiber ceiling tile or gypsum board ceiling.

- In addition, for the inlet sound, often a lined elbow is provided at the inlet by the manufacturer; otherwise, it should be custom added in the field. The elbow should preferably face upward.

- Specific recommendations will be provided once we understand better the selected systems and evaluate their sound data.

INDOOR SPLIT OR VRF/VRV SYSTEMS

- These are alternative options to the traditional terminal box systems, used more extensively in recent years.

- These devices can often be selected for either exposed or concealed installations. Acoustically speaking, the exposed installations are typically acceptable in spaces that have background sound

level goals of NC-30 to NC-35, as long as the inlet static pressure is no higher than 0.6 inches of water. For spaces where the sound level goals are lower than NC-30, the concealed installation with ducted connections to the room can be designed to function well and meet the acoustical design goals. These ducted installations must still follow the recommendations included below.

AIRFLOW VELOCITIES THROUGH DUCTWORK

- Airflow velocities in supply and return systems serving acoustically sensitive spaces need to be suitably low to prevent the generation of excessive air turbulence noise in ducts. To this end, we have enclosed a copy of our Recommended Airflow Velocity Guidelines for unlined ducts. For internally lined ducts, the velocities can be about 20% higher than those listed in the attached guideline. Ductwork should be sized to meet the guideline velocities based on the noise goal of the space served and the position within the duct run. In the supply ductwork, these goals are particularly important downstream of the terminal box. We will review the ductwork sizing as the system develops to confirm that these airflow velocity goals are achieved.

- These goals may be somewhat increased if induction units are used, per manufacturer specifications.

DUCT LAYOUTS AND VOLUME DAMPERS

- While elbows conceptually help attenuate sound through the ductwork, the air turbulence resulting from having multiple elbows located very close to each other generates noise. Whenever possible, locate elbows or branch takeoffs at least 4 to 5 duct diameters away from each other.

- Operable damper noise occurs because the damper is an obstacle in the air stream and air turbulence increases as the damper closes, and also because of the resulting pressure drop through the damper. For space with a noise goal of NC-35 or lower, it is preferable to plan for a self-balanced air distribution duct system that eliminates the need for dampers. Also, diffusers with opposed blade dampers should not be used in spaces with a noise goal of NC-35 or lower.

- If a self-balanced, damper free layout is not possible, in order to control the noise contribution from these system elements to the occupied spaces, the following measures are necessary:

- For spaces with a noise goal of NC-30 to NC-35: locate dampers minimum 6 to 8 feet away from the diffuser. Internally line the duct downstream of the damper, or use a combination of internally lined and plastic-coated wire helix flexible duct.

- For spaces with a noise goal of NC-25: locate dampers at least 10 feet away from the diffusers, and internally line this length of duct or use a combination of internal lining and flex duct.

- In spaces with a noise goal of NC-20 or lower, make all efforts to eliminate the use of dampers, providing instead a duct layout that allows for a self-balanced distribution of the air.

DUCT LINING

- The internal duct lining should be specified with a Noise Reduction Coefficient (NRC) of minimum 0.70. In order to achieve this goal, closed cell foam lining or lining with any type of film or foil facing are not acceptable. We recommend a glass fiber product similar to Linacoustic RC by Johns Manville.

ROOM AIR DEVICES (DIFFUSERS, REGISTERS AND GRILLES)

- Proper selection of supply and return room air devices is one of the most critical aspects of HVAC noise control, since there is nothing beyond these devices to attenuate the noise they produce.

- Sound laboratory testing of these devices is done under ideal airflow conditions, which is not met in practice where duct turns, sharp transition or balancing dampers immediately preceding the diffusers and grilles are more often than not encountered. For this reason, the selection of these devices should be made with an NC rating that is at least 5 dB lower than the recommended NC goal for the space. When several diffusers or grilles are located in close proximity of each other, the NC selection should be up to 10 points below the NC goal for the space.

Please contact me directly if you have any questions or comments regarding this report, at mharlan@acentech.com or 617-499-8089.

Sincerely,



Mark Harlan

Senior Consultant, Acoustics

CC: Jonah Sacks, Principal

Encl: Appendix A – Acoustic Design Matrix

Space	Noise (NC)	Floor Construction, Finish Floor	Ceiling Construction, Ceiling Finish	Corridor Partition	Demising Partition	Acoustical Wall Treatment	Doors
Black Box Theater	20	Per arch, per arch	Exposed to structure, 50% Coverage 2" fiberglass duct liner	Double Stud, 4 total layers GWB	N/A	2-inch-thick absorptive panels (see above)	Acoustically Gasketed & STC-55 (see above)
Rehearsal Space/Community Room	20	Construction dependent on adjacency (see above), 'acoustically hard' finish per arch	Sound Isolation Ceiling, Suspended ceiling clouds (see above)	Double Stud, 4 total layers GWB	Double Stud, 5 total layers GWB (music spaces)	25 oz. velour curtains, 100% fullness, covering two perpendicular walls, Area total to ~75% room floor area	STC-55
Dance Studio	30	Per arch	Per arch, ACT w/ NRC 0.85 or exposed ceiling with equivalent absorption	Single Stud, 3 total layers GWB, Glazing: (see above)	Double Stud, 5 total layers GWB (music spaces)	<ul style="list-style-type: none"> 25 oz. velour curtain, 100% fullness at mirror wall ½" thick acoustic absorption on long wall (see above) 	Acoustically gasketed
Art Workshop, Large	35	Per arch	Per arch, ACT w/ NRC 0.75	Single Stud, 3 total layers GWB	Single Stud, 3 total layers GWB	½" thick absorptive panels on one long wall	Per arch
Classrooms/Workshops	30	Per arch, Carpet	Per arch, ACT w/ NRC 0.90	Single stud, 2 total layers GWB	Single stud, 3 total layers GWB	N/A	Per arch
Music Studios	25	Lightweight Isolation Floor at 2 nd level, Carpet	Low profile sound isolation ceiling*, ACT w/ NRC 0.90	Double Stud, 4 total layers GWB	Double Stud, 4 total layers GWB	<ul style="list-style-type: none"> 2-inch-thick absorptive panels on two non-perpendicular walls, corner bass absorbers 	STC-55
Recording Studio	20	Per arch (on grade), Carpet	Low profile sound isolation ceiling*, ACT or exposed w/ applied 4" fiberglass absorption	Double Stud, 4 total layers GWB	Double Stud, 4 total layers GWB	<ul style="list-style-type: none"> 2-inch-thick absorptive panels on two non-perpendicular walls corner bass absorbers 	STC-55
Control Room	20	Per arch (on grade), Carpet	Low profile sound isolation ceiling*, ACT or exposed w/ applied 4" fiberglass absorption	Double Stud, 4 total layers GWB	Double Stud, 4 total layers GWB	<ul style="list-style-type: none"> 2-inch-thick absorptive panels on two non-perpendicular walls corner bass absorbers 	STC-55
Art Studios	35	Per arch	Per arch, ACT w/ NRC >0.70	Single Stud, 2 total layers GWB	Single Stud, 3 total layers GWB		Per Arch

Sound Isolation Ceiling – Resilient gypsum board ceiling with minimum two layers of 5/8" gypsum board on spring isolators, thickness ~12".

Low Profile Sound Isolation Ceiling – Resilient gypsum board ceiling with minimum two layers of 5/8" gypsum board on low profile isolators, thickness ~5".

Lightweight Isolation Floor – 2" isolation system with two layers of 5/8" cement board below the architectural finish floor.

Doors: STC-55 – Factory Assembled Sound Transmission Class (STC) Door Assembly with a minimum rating of STC-55. BOD Noise Barriers Quiet Swing.

Doors: Acoustically Gasketed – Surface applied & adjustable acoustic gasket system and automatic drop bottom. BOD Legacy Manufacturing #5077, #7563, and #7075.

Corner Bass Absorbers – Acoustically absorptive unit for low-frequency management. Provided in all available room corners, approximately full height. BOD RealAcoustix BassMod Corner.

AUDIOVISUAL – FEASIBILITY STUDY

MALDEN CENTER FOR ARTS & CULTURE

636243

Malden, MA

July 21, 2023

Submitted by:

Ken Bourinot, CTS

Principle | Audiovisual, Telecommunications, Security

kbourinot@acentech.com

EXECUTIVE SUMMARY

PURPOSE OF REPORT

The purpose of this report is to provide a description and general summary of the audiovisual technology possible for the spaces in the Malden Center for Arts and Culture. This report contains preliminary program information and does not represent a final basis for design. Our goal in the report is to identify, in general terms, the spaces that will require audiovisual systems and to qualify the types of audiovisual systems that will be incorporated into the spaces. Our understanding based on the Concept Design Floor

Plans and conceptual design discussions is that the following spaces will require an audiovisual system:

1. Café
2. Classrooms (Typical of 2)
3. Large Music Studio/ Small Music Studio
4. Black Box Theater
5. Back Stage/ Green Room
6. Art Studio
7. Rehearsal Space
8. Dance Studio

METHODS USED

The preliminary designs presented are the result of an analysis of the spaces identified in the programming efforts to date. We have considered typical and planned usage, pedestrian flow, general sightline and space review, various display types, presentation modes, and flexible audiovisual infrastructure. Our design methods are based on audiovisual industry best practices which include detailed attention to image size, resolution and contrast, sound level, room lighting, acoustics, and mechanical background noise. In addition, our design team is aware of and includes new audiovisual technologies that are used in similar projects at universities globally.

BACKGROUND

Acentech is an independent consulting firm specializing in architectural acoustics, noise, and vibration control, and the design of technology systems to create advanced sound, audiovisual, multimedia, videoconferencing, and voice, and data systems. In order to provide unbiased consulting and design services, Acentech does not sell or install equipment and does not represent any dealer, distributor, or manufacturer.

BUDGET ESTIMATE SUMMARY

The following summary outlines the estimated costs for the based installed audiovisual systems described below. The estimate is based on the current level of design of the audiovisual systems at this time and is subject to change as designs are developed and refined. This budget provides a cost estimate for each system identified.

Description	QTY	Extended Estimate Price
Cafe	1	\$12,000
Classroom	2	\$55,000
LG/SM Music Studio	1	Refer to Narrative Regarding Music Studio Budget
Black Box Theatre	1	\$325,000
Back Stage/ Green Room	1	\$20,000
Art Studio	1	\$25,000
Rehearsal Space	1	\$10,000
Dance Studio	1	\$10,000
		<hr/> \$457,000

BUDGET NOTES

1. The budgets assume that the labor cost is 35% of the equipment cost (unless otherwise noted). A 15% markup is added for contingency and cost escalation.
2. The installation costs of the audiovisual systems are approximate. It assumes the use of new equipment professionally installed by a qualified audiovisual systems contractor, which is provided with as-built documentation and a one-year warranty covering parts and labor.
3. The estimate does not include costs for requirements such as electrical power, conduit, casework, or any special architectural requirements. Technical administration and staffing, as well as vendor-supplied system service and maintenance beyond the initial one-year parts and installation warranty, are not included in this estimate.
4. Other related systems and budgets such as network data distribution, furniture, millwork, and electrical and mechanical systems need to be reviewed in conjunction with this budget to provide a complete picture of the audiovisual system costs. The estimate does not include costs for requirements such as electrical power, conduit, casework, or any special architectural requirements.
5. This budget incorporates the costs associated with travel, installation, documentation, training, and on-site maintenance for one year. Installation cost is the greatest variable and is heavily dependent on factors such as site conditions, divisions of work between the audiovisual system contractor and other contractors, local market conditions, and requirements for union labor.
6. The estimate does not include any level of redundancy, if required the cost will increase accordingly.

INFRASTRUCTURE

Infrastructure is part of the building construction including, but not limited to, conduit, raceways, junction, and device boxes, and is not completely outlined in this program. Other infrastructure provisions, such as electrical power and grounding specified exclusively for audiovisual systems cabling and equipment may be required and should be carried in the electrical budget. Properly designed AV infrastructure allows for not only the installation of the initially specified equipment but for the evolution of the systems over many years. If proper infrastructure is provided, additional capabilities and equipment can be added later as technology progresses.

Elsewhere in this document, certain terms may be used to describe basic features or requirements for consideration. These references are only meant as an item for general consideration and will be developed in detail following formal programming sessions during the design development and/or construction documentation phases.

For example, the use of the term “floor box” here is a general term indicating a recessed device, flush-mounted on a floor that may provide access to audiovisual, data, and/or AC power connectivity. Floor boxes are available in a variety of types and styles which can be deployed in different construction environments, including but not limited to poured concrete, wood stage floor, and/or a raised “access” floor. The specific device type recommended will be appropriate for the environment and its anticipated use. References to other infrastructure features may exist within this document which will be further defined as the audiovisual system design proceeds.

AUDIOVISUAL SYSTEM TYPES

CAFÉ

The audiovisual system will comprise of the following sub-systems:

1. Display System

- a. Video Display: One (1) large format stand-alone commercial display will be mounted in the circulation space for digital signage. Size to be coordinated with the architect and owner.

2. Sound System

- a. Loudspeakers: A distributed loudspeaker system will be installed for program audio playback.

3. Miscellaneous: Miscellaneous equipment includes a floor-standing and lockable equipment rack, AC power distribution and sequencers in the rack, custom connection panels, and all cables, connectors, and additional hardware and labeling required to install the system.

CLASSROOM (TYPICAL OF 2)

The audiovisual system will comprise the following sub-systems:

1. Display System:

- a. Video Display: One (1) 75” large format stand-alone commercial display will be mounted on the presentation wall.

2. Sound System:

a. Two (2) wall surface-mounted loudspeakers will be installed at the presenter location on either side of the video display.

3. Control System: The user interface will consist of a wall-mounted button controller. The control panel will be able to control all functions of the audiovisual system, including source selection and media transport controls, and volume control.

4. Miscellaneous: Miscellaneous equipment includes a floor-standing and lockable equipment rack, AC power distribution and sequencers in the rack, custom connection panels, and all cables, connectors, and additional hardware and labeling required to install the system.

LARGE MUSIC STUDIO/ SMALL MUSIC STUDIO

1. Provide conduit pathways between Large Music Studio and Small Music Studio for future recording equipment and active audiovisual equipment.

BLACK BOX THEATER

The audiovisual system will comprise the following sub-systems:

1. Display System:

a. Projection System: A projector and projection screen will be installed based on the primary theater layout. The projection screen will be 108" (h) x 192" (w) or a 120" diagonal.

2. Camera System

a. PTZ Cameras: (2) PTZ cameras will be installed to provide video monitoring of the Black Box Theater and to provide video feeds for any video broadcast or streaming.

3. Sound System

a. Wireless Microphones: The system will include two (2) 4-channel wireless microphone systems for a total of eight (8) wireless microphone channels. Each channel will include an interchangeable handheld and lavalier (clip-on) microphone transmitter.

b. Audio Digital Signal Processor (DSP): An audio digital signal processor will be used to automatically mix the microphones, route and process audio signals, and equalize the loudspeakers.

c. Loudspeakers: Self-powered loudspeakers will be hung from the pipe grid and will provide program audio playback and speech reinforcement. Speakers shall be able to be relocated throughout the pipe grid. Additional loudspeakers may be added to the system.

d. Assistive Listening System: An FM or infrared-based wireless assistive listening system will be included to meet the requirements of the Americans with Disabilities Act. Portable receivers (i.e., headphones) will be stored centrally and issued to participants as required. These receivers are intended to be used by students with hearing impairments.

e. Audio Mixer: An audio mixer system will allow manual control of the audio for in-space events. The audio mixer system shall include an audio mix console and I/O box with a minimum of 32 analog audio inputs and 16 analog audio outputs.

4. Production Intercom

a. Wired Production Intercom System: A wired production intercom system shall be installed to provide a partyline communication system for technical and support staff. The system will include a master station in the control booth as well as wall stations in back-of-house spaces.

5. Control System: The control system will be used to simplify the operation of the audiovisual system by unifying the operation under one platform and user interface. The user interface will consist of wall-mounted 7" touch screens throughout the Black Box Theater and Control Booth. The control panel will be able to control all functions of the audiovisual system, including source selection and media transport controls, and volume control. This category also includes a Powerover-Ethernet (PoE) data switch that will be used by the AV control system.

6. Miscellaneous: Miscellaneous equipment includes a floor-standing and lockable equipment rack, AC power distribution and sequencers in the rack, custom connection panels, and all cables, connectors, and additional hardware and labeling required to install the system.

BACK STAGE/ GREEN ROOM

The audiovisual system will comprise the following sub-systems:

1. Display System

a. Video Display: One (1) 55" large format stand-alone commercial display will be mounted in the Green Room for video monitoring of the Black Box Theater.

2. Sound System

a. Loudspeakers: A distributed loudspeaker system will be installed for programming audio

playback and paging.

3. Production Intercom

a. Wired Production Intercom System: A wired wall station will be installed to connect to the Black Box Theater party line system.

5. Control System: The control system will be used to simplify the operation of the audiovisual system by unifying the operation under one platform and user interface. The user interface will consist of wall-mounted 7" touch screens throughout the Black Box Theater and Control Booth. The control panel will be able to control all functions of the audiovisual system, including source selection and media transport controls, and volume control. This category also includes a Powerover-Ethernet (PoE) data switch that will be used by the AV control system.

6. Miscellaneous: Miscellaneous equipment includes a floor-standing and lockable equipment rack, AC power distribution and sequencers in the rack, custom connection panels, and all cables, connectors, and additional hardware and labeling required to install the system.

ART STUDIO

The audiovisual system will comprise the following sub-systems:

1. Display System:

a. Video Display: One (1) 75" large format stand-alone commercial display will be mounted on the presentation wall.

2. Sound System:

a. Loudspeaker: Two (2) wall surface-mounted loudspeakers will be installed at the presenter location on either side of the video display.

b. Amplifier: An audio amplifier will be installed to power the loudspeakers.

3. Control System: The user interface will consist of a wall-mounted button controller. The control panel will be able to control all functions of the audiovisual system, including source selection and media transport controls, and volume control.

4. Miscellaneous: Miscellaneous equipment includes a floor-standing and lockable equipment rack, AC power distribution and sequencers in the rack, custom connection panels, and all cables, connectors, and additional hardware and labeling required to install the system.

REHEARSAL SPACE

The audiovisual system will comprise the following sub-systems:

1. Sound System:

a. Loudspeaker: Two (2) wall surface-mounted loudspeakers will be installed at the presenter location on either side of the video display.

b. Amplifier: An audio amplifier will be installed to power the loudspeakers.

2. Control System: The user interface will consist of a wall-mounted button controller. The control panel will be able to control all functions of the audiovisual system, including source selection and media transport controls, and volume control.

3. Miscellaneous: Miscellaneous equipment includes a floor-standing and lockable equipment rack, AC power distribution and sequencers in the rack, custom connection panels, and all cables, connectors, and additional hardware and labeling required to install the system.

DANCE STUDIO

The audiovisual system will comprise the following sub-systems:

1. Sound System

a. Loudspeaker: Two (2) wall surface-mounted loudspeakers will be installed at the presenter location on either side of the video display.

b. Amplifier: An audio amplifier will be installed to power the loudspeakers.

2. Control System: The user interface will consist of a wall-mounted button controller. The control panel will be able to control all functions of the audiovisual system, including source selection and media transport controls, and volume control.

3. Miscellaneous: Miscellaneous equipment includes a floor-standing and lockable equipment rack, AC power distribution and sequencers in the rack, custom connection panels, and all cables, connectors, and additional hardware and labeling required to install the system.

ARCHITECTURAL, MECHANICAL, AND ELECTRICAL CONSIDERATIONS

ARCHITECTURAL

The following items should be considered for proper coordination between audiovisual system components and other trades:

1. Installed loudspeaker and microphone coverage must not be obstructed.
2. Structure will be necessary to ensure that loudspeakers and the projection screen can be ceiling-mounted at recommended locations.
3. Location of antennas for the assistive listening system and wireless microphones will be coordinated with the architect.
4. Wall-mounted connection panel locations will require coordination.
5. AV Equipment Racks:
 - a. Equipment racks will require coordination for space and cooling/airflow requirements. This will include floor-standing equipment racks and any small equipment racks that may be installed within millwork.
 - b. Floor-standing AV equipment racks shall be fixed in position and will require front access for day-to-day operational needs. They will also require rear access for service. Clearances must be maintained around the AV equipment racks to comply with the requirements of the Americans with Disabilities Act.
 - c. AV equipment rack rooms may require oversized doors.
6. Video Projection:
 - a. Ceiling-mounted video projectors must be free from vibration.
 - b. To optimize the viewing experience and achieve the minimum recommended video display contrast ratio, ambient lighting within the spaces with projection should be as follows during video projection presentations:
 - c. The Black Box Theater should have no more than 3-foot candles.
 - d. Overhead lighting should be zoned so that lighting areas directly above the projection screen surfaces can be switched off during presentations.

7. Blocking will be required at all wall-mounted video display panels and loudspeaker locations.

MECHANICAL/ ELECTRICAL

The following items should be considered for proper coordination between the audiovisual system components and other trades:

1. The AC power system will be designed and specified by the electrical engineer and will include a dedicated power panel, transient voltage surge suppression, and AC outlets.
2. Electrical outlets will be required at the equipment racks, mix location floor-box, and wall-mounted receptacle panels.
3. IT data drops are strongly recommended at the equipment racks and all AV receptacle panels.
4. If lighting control is desired from the audiovisual system control touch panel, the lighting system will require an interface for communication with the control system.
5. If shade control is desired from the audiovisual system control touch panel, the shading system will require an interface for communication with the control system.
6. Heat Loads:
 - a. The estimated heat loads will be provided as part of the final programming review.

Project: **Adaptive Reuse Concepts**
 Owner: **Malden Center for the Arts**
 Design: **UX Architecture/STA Design**
 Phase: **Concept**

Total Project		26,961 sf	Date:	9/8/2023
01000	Site Services 2% of hard cost		\$7.18	193,682
02000	Site Prep & Demolition		\$13.65	367,912
03000	Concrete		\$5.41	145,728
04000	Masonry		\$6.77	182,484
05000	Metals		\$8.02	216,350
06000	Wood & Plastic		\$28.27	762,300
07000	Thermal & Moisture		\$12.75	343,766
08000	Doors & Windows		\$24.94	672,525
09000	Drywall & Ceilings		\$18.01	485,515
09500	Paint & Wallcovering		\$2.67	71,915
09700	Flooring & Tile		\$13.22	356,369
10000	Specialties		\$3.16	85,140
11000	Equipment		\$3.92	105,700
11500	Casework		\$3.70	99,750
14000	Elevators		\$11.13	300,000
21000	Fire Supression		\$8.48	228,727
22000	Plumbing		\$29.81	803,750
23000	HVAC		\$92.18	2,485,165
26000	Electrical		\$64.59	1,741,305
31000	Earthwork		\$1.01	27,200
32000	Site Construction		\$2.04	55,000
32010	Landscape		\$1.21	32,500
33000	Site Utilities		\$4.27	115,000
Subtotal			\$366.37	\$9,877,783
01010	GC Labor			460,000
	GC Overhead & Profit	10.0%		987,778
	Bond	1.5%		148,167
	Insurance	2.0%		197,556
	Permit	1.0%		98,778
	Construction Contingency	5.0%		493,889
	Design Contingency	5.0%		493,889
	Escalation - 2 years to midpoint 4% ann.	8.0%		790,223
Total Construction			\$502.51	\$13,548,062

Area Summary:	Total Building	Phase 1	Phase 2
Lower Level	9,381	4,176	5,205
1st	8,868	5,947	2,921
2nd	8,712	5,811	2,901
Total	26,961	15,934	11,027

Total Project		Quantity	Unit	Unit price	Total
01010	GC Labor				
1	Project Manager	50	wk	\$4,600.00	230,000
2	Superintendent	50	wk	\$4,600.00	230,000
3					0
	Subtotal				460,000
02000	Site Prep & Demolition				
1	Demolition - Lower Level Misc Rem.	9,381	sf	\$7.00	65,667
2	1st Level	9,193	sf	\$7.00	64,351
3	2nd Level	8,712	sf	\$7.00	60,984
4	Doors	96	ea	\$125.00	12,000
5	Partitions	1,674	lf	\$10.00	16,740
6	Masonry Partitions	141	lf	\$25.00	3,525
7	Stairs per flight	4	ea	\$3,500.00	14,000
8	Misc Stairs & Ramps	5	ea	\$1,500.00	7,500
9	Windows	6	ea	\$250.00	1,500
10	Demo Interior Supported floor - Shoring	302	sf	\$10.00	3,020
11	Demolition Team 6 men/Equipment	5	Crew Day	\$6,500.00	32,500
12	Demo Exterior Wall - Masonry 2 Wythe	4	Crew Day	\$6,500.00	26,000
13	Roof Headhouse Structure	1	Crew Day	\$10,000.00	10,000
14	Demo Ramp - Walls 100 lf	3	Crew Day	\$6,500.00	19,500
15	Slab 275 sf	2	Crew Day	\$6,500.00	13,000
16	Demo Roof - Cutout Slab	2	Crew Day	\$6,000.00	12,000
17	Partial Roofing Demolition	4,500	sf	\$1.25	5,625
18					0
	Subtotal			\$13.65	367,912
03000	Concrete				
1	Entry Court - Wall Foundations	120	lf	\$75.00	9,000
2	Walls	960	sf	\$100.00	96,000
3	Slab	983	sf	\$16.00	15,728
4	Ext Wall - Pier Footings	5	ea	\$1,500.00	7,500
5	Trench/Patch @ Ext Ramp slab	1	Crew Day	\$3,500.00	3,500
6	Misc Structural Slab Infill	65	sf	\$100.00	6,500
7	Patch @ Demolished Piping	3	Crew Day	\$2,500.00	7,500
	Subtotal			\$5.41	145,728
04000	Masonry				
1	Ext. Wall - Temp Lintel @ Demo area	36	lf	\$75.00	2,700
2	Lintel @ Ramp Opening	36	lf	\$125.00	4,500
3	Finish Veneer @ Entry Court Walls	798	sf	\$75.00	59,850
4	Interior Historic Stone Renovation allow	1	ls	\$100,000.00	100,000
5	Powerwash Ext Brick	15,434	sf	\$1.00	15,434
	Subtotal			\$6.77	182,484

Total Project		Quantity	Unit	Unit price	Total
05000	Metals				
1	Misc Reframing @ demolition	1	ls	\$30,000.00	30,000
2	Main Stair - per Flight LL/Ground	2	ea	\$25,000.00	50,000
3	Communicating Stair Level 2	1	ea	\$15,000.00	15,000
4	Roof	1	ea	\$15,000.00	15,000
5	Elevator Steel	1	ls	\$5,000.00	5,000
6	Entry Court - Wall Mt Handrails	70	lf	\$125.00	8,750
7	Roof Terrace - Perimeter Guardrail	192	lf	\$250.00	48,000
8	Decoratve Interior Guardrail/Handrail	60	lf	\$400.00	24,000
9	Exterior Egress Handrails	103	lf	\$200.00	20,600
	Subtotal			\$8.02	216,350
06000	Wood & Plastic				
1	Temp Closure - Window/Door Openings	1	ls	\$15,000.00	15,000
2	Roof Protection @ Slab openings	1	ls	\$7,500.00	7,500
3	Fall Protection	1	ls	\$10,000.00	10,000
4	Framing - Headhouse Walls & Roof	490	sf	\$45.00	22,050
5	Sprung Floor - Dance Studio	1,510	sf	\$25.00	37,750
6	Sound Isolation - Dance Studio	1	ls	\$20,000.00	20,000
7	Music Studio	7	ea	\$50,000.00	350,000
8	Theater	1	ea	\$150,000.00	150,000
9	Community Rehearsal	1	ea	\$150,000.00	150,000
	Subtotal			\$28.27	762,300
07000	Thermal & Moisture				
1	Roofing - Parapet Coping	250	lf	\$100.00	25,000
2	Insulation - 6" Tapered	4,700	sf	\$12.00	56,400
3	Membrane & Coverboard	4,700	sf	\$10.00	47,000
4	Flashing/Penetrations	1	ls	\$1,500.00	1,500
5	Flashing/Base Cant	250	lf	\$25.00	6,250
6	Terrace Pedestal Paver system	4,000	sf	\$25.00	100,000
7	Headhouse - Walls/Metal Panel	1,320	sf	\$65.00	85,800
8	Caulking - Existing Window Perimeters	1,818	lf	\$12.00	21,816
9	Terrace Pedestal Paver system	4,000	sf	\$25.00	100,000
	Subtotal			\$12.75	343,766

Total Project		Quantity	Unit	Unit price	Total
07000	Thermal & Moisture				
1	Roofing - Parapet Coping	250	lf	\$100.00	25,000
2	Insulation - 6" Tapered	4,700	sf	\$12.00	56,400
3	Membrane & Coverboard	4,700	sf	\$10.00	47,000
4	Flashing/Penetrations	1	ls	\$1,500.00	1,500
5	Flashing/Base Cant	250	lf	\$25.00	6,250
6	Terrace Pedestal Paver system	4,000	sf	\$25.00	See Phase 2
7	Headhouse - Walls/Metal Panel	1,320	sf	\$65.00	85,800
8	Caulking - Existing Window Perimeters	1,818	lf	\$12.00	21,816
9	Terrace Pedestal Paver system	4,000	sf	\$25.00	100,000
	Subtotal			\$12.75	343,766
08000	Doors & Windows				
1	Doors - SC Wood/Single/Decorative	49	ea	\$2,500.00	122,500
2	Repair Allowance @ Existing Doors	11	ea	\$500.00	5,500
3	Interior Storefront - Glazing	2,169	sf	\$100.00	216,900
4	Glass Door/Double	8	pr	\$7,500.00	60,000
5	Glass Door/Single	6	ea	\$4,500.00	27,000
6	Exterior Glazing - Storefront	324	sf	\$125.00	40,500
7	Glass Door/Double	1	pr	\$7,500.00	7,500
8	Headhouse Glass Wall	153	sf	\$125.00	19,125
9	Headhouse Ext Glass Door/Single	1	ea	\$4,500.00	4,500
10	Exterior Window Replacement	1	ls	-	Excluded
11	Doors - SC Wood/Single	29	ea	\$2,500.00	72,500
12	SC Wood/Double	2	pr	\$4,500.00	9,000
13	Interior Storefront - Glazing	650	sf	\$100.00	65,000
14	Glass Door/Double	3	pr	\$7,500.00	22,500
	Subtotal			\$24.94	672,525
09000	Drywall & Ceilings				
1	Partitions - New	320	lf	\$175.00	56,000
2	Furred Walls	108	lf	\$75.00	8,100
3	Patching @ Existing	1,772	lf	\$5.00	8,860
4	Infill Openings	12	ea	\$1,500.00	18,000
5	Ceilings - ACT	10,124	sf	\$10.00	101,240
6	Bulkhead	380	lf	\$40.00	15,200
7	Slab Edge Bulkhead	85	lf	\$75.00	6,375
8	DW Ceilings	1,900	sf	\$15.00	28,500
9	Coordinate Exposed Structure	1,500	sf	\$5.00	7,500
10	Partitions - New	560	lf	\$175.00	98,000
11	Furred Walls	614	lf	\$75.00	46,050
12	Patching @ Existing	300	lf	\$5.00	1,500
13	Infill Openings	10	ea	\$1,500.00	15,000
14	Ceilings - ACT/Standard	2,088	sf	\$10.00	20,880
15	Acoustical Ceilings (see Equipment Allow)	5,031	lf	\$10.00	50,310
16	Bulkhead	100	lf	\$40.00	4,000
17					0
	Subtotal			\$18.01	485,515

MALDEN CENTER FOR ARTS &
CULTURE

89 SUMMER STREET,

MALDEN, MA 02148

Total Project		Quantity	Unit	Unit price	Total
09500	Paint & Wallcovering				
1	Walls - Paint	25,200	sf	\$1.00	25,200
2	Misc Ceiling Painting	1	ls	\$7,500.00	7,500
3	Doors/Frames	60	ea	\$125.00	7,500
4	Walls - Paint	20,340	sf	\$1.00	20,340
5	Misc Ceiling Painting	1	ls	\$7,500.00	7,500
6	Doors/Frames	31	ea	\$125.00	3,875
	Subtotal				71,915
09700	Flooring & Tile				
1	Flooring - Lobby/Café/Corridor	7,494	sf	\$20.00	149,880
2	Classroom/Storage	4,277	sf	\$8.00	34,216
3	Tile Flooring	1,763	sf	\$25.00	44,075
4	Base - Resilient	1,930	lf	\$5.00	9,650
5	Tile Base	590	lf	\$25.00	14,750
6	Flooring - Corridors	3,000	sf	\$20.00	60,000
7	Studio	5,031	sf	\$8.00	40,248
8	Base - Resilient	710	lf	\$5.00	3,550
	Subtotal				356,369
10000	Specialties				
1	FE Cabinets	10	ea	\$650.00	6,500
2	Toilet Accessories - Gang	3	ea	\$12,500.00	37,500
3	Single	2	ea	\$1,000.00	2,000
4	Signage - Room ID	30	ea	\$450.00	13,500
5	Building ID/Exterior	1	ls	\$5,000.00	5,000
6	Code/Wayfinding	26,961	sf	\$0.25	6,740
6	FE Cabinets	6	ea	\$650.00	3,900
6	Toilet Accessories - Gang	0	ea	\$12,500.00	0
6	Single	1	ea	\$1,000.00	1,000
6	Signage - Room ID	20	ea	\$450.00	9,000
	Subtotal				85,140
11000	Equipment				
1	Classroom Equipment - Per Room	5	ea	\$2,500.00	12,500
2	Art Studio Equipment	1	ls	\$10,000.00	10,000
3	Café Equipment	1	ls	\$10,000.00	10,000
4	Kitchen/Food Lab Equipment	1	ls	\$20,000.00	20,000
5	Lockers	13	ea	\$350.00	4,550
6	Dance Studio Equipment - Barre	70	lf	\$75.00	5,250
7	Mirrors 8' ht.	560	sf	\$15.00	8,400
8	Sound Equipment	1	ls	\$10,000.00	10,000
9	Music Studio Equipment	1	ls	-	Excluded
10	Art Studio Equipment	1	ls	\$25,000.00	25,000
	Subtotal				\$105,700

MALDEN CENTER FOR ARTS & CULTURE

89 SUMMER STREET,

MALDEN, MA 02148

	Total Project	Quantity	Unit	Unit price	Total
11500	Casework				
1	Café - Counter	30	lf	\$1,500.00	45,000
2	Back Bar	16	lf	\$750.00	12,000
3	Dance Studio - Bench	25	lf	\$750.00	18,750
4	Restroom - Vanity	30	lf	\$300.00	9,000
5	Moveable Wall Sections	1	ls	\$15,000.00	15,000
	Subtotal				99,750
14000	Elevators				
1	Elevator Upgrade Allowance	1	ls	\$300,000.00	300,000
	Subtotal				300,000
21000	Fire Supression				
1	Sprinklers	26,961	sf	\$7.00	188,727
2	Standpipe - Per Floor	4	ea	\$10,000.00	40,000
	Subtotal			\$8.48	228,727
22000	Plumbing				
1	Plumbing Allowance - Main Service/BFP/Meter	1	ls	-	Existing to Rem.
2	Fixture/WC	37	ea	\$8,500.00	314,500
3	Fixture/Lav	24	ea	\$8,500.00	204,000
4	Fixture/Sink	5	ea	\$8,500.00	42,500
5	Equipment Connection	6	ea	\$8,500.00	51,000
6	Water Heater/Recirc	1	ea	\$25,000.00	25,000
7	HVAC Connections	1	ls	\$5,000.00	5,000
8	Roof Drain System Replacement	9,650	sf	\$15.00	144,750
9	Fixture/WC	1	ea	\$8,500.00	8,500

Total Project		Quantity	Unit	Unit price	Total
23000	HVAC				
1	Demolition - Cut/Drop All Systems	26,961	sf	\$1.25	33,701
2	Equipment - HP1 - 100 TN DX Chiller	1	ea	\$95,000.00	95,000
3	Pumps/CHW/HW	4	ea	\$100,000.00	400,000
4	AHU 1 - 13,000 CFM	1	ea	\$195,000.00	195,000
5	AHU 2 - 10,000 CFM	1	ea	\$150,000.00	150,000
6	Piping - Mech Room	1	ls	\$150,000.00	150,000
7	Exhaust Fans - Toilet Room/Gang	3	ea	\$2,500.00	7,500
8	Toilet Room/Small	2	ea	\$1,000.00	2,000
9	Mech Room	1	ea	\$2,000.00	2,000
10	Unit Heater	2	ea	\$2,000.00	4,000
11	VAV's	22	ea	\$3,500.00	77,000
12	Duct - Sheetmetal	40,442	lb	\$15.00	606,623
13	Insulation	27,096	sf	\$10.00	270,958
14	Grilles/Diffusers/Dampers	270	ea	\$300.00	80,883
15	BMS/Per Point - Chiller	25	points	\$1,500.00	37,500
16	Pumps	20	points	\$1,500.00	30,000
17	AHU	56	points	\$1,500.00	84,000
18	VAV's	66	points	\$1,500.00	99,000
19	Misc	10	ea	\$1,500.00	15,000
20	Test and Balance	160	Hrs	\$150.00	24,000
21	Commissioning Support	160	Hrs	\$150.00	24,000
22	Coordination Meetings	10	ea	\$900.00	9,000
23					0
24	VAV's	11	ea	\$3,500.00	38,500
25	BMS Per Point/VAV	33	points	\$1,500.00	49,500
	Subtotal			92.18	2,485,165

	Total Project	Quantity	Unit	Unit price	Total
26000	Electrical				
1	Demolition - Cut/Drop All Systems	26,961	sf	\$1.25	33,701
2	Transformer	1	ea	-	By Utility
3	Primary Feeder Allowance	100	lf	\$250.00	25,000
4	Secondary Feeder Allowance	1	ea	\$500.00	500
5	Main Gear - Service entrance	1	ea	\$5,000.00	5,000
6	Substation Allowance	26,961	sf	\$8.00	215,688
7	Branch Panels	14	ea	\$4,000.00	56,000
8	Feeders	14	ea	\$3,500.00	49,000
9	Mechanical - Chiller/AHU	3	ea	\$7,500.00	22,500
10	VAV Reheat	22	ea	\$1,500.00	33,000
11	Pumps	4	ea	\$3,500.00	14,000
12	Fans	6	ea	\$1,000.00	6,000
13	Unit heaters	2	ea	\$1,000.00	2,000
14	Elevator Feed	1	ls	\$15,000.00	15,000
15	Convenience Power - Outlets	212	ea	\$200.00	42,491
16	Lighting - Fixtures	15,934	sf	\$18.00	286,812
17	Controls	1	ls	\$50,000.00	50,000
18	Fire Alarm	26,961	sf	\$7.00	188,727
19	Low Voltage - Data Wiring per Drop	100	ea	\$700.00	70,000
20	Access Control - Per Door	15	ea	\$5,000.00	75,000
21	Cameras & Recording	10	ea	\$4,500.00	45,000
22	AV Systems - Classrooms	5	ea	\$20,000.00	100,000
23	Sound System - Dance	1	ls	\$10,000.00	10,000
24	Gallery	1	ls	\$20,000.00	20,000
25					0
26	Branch Panels	3	ea	\$4,000.00	12,000
27	Feeders	3	ea	\$3,500.00	10,500
28	Mechanical - VAV/Reheat	11	ea	\$1,500.00	16,500
29	Fans	1	ea	\$1,000.00	1,000
30	Convenience Power - Outlets	147	ea	\$200.00	29,400
31	Lighting - Fixtures	11,027	sf	\$18.00	198,486
32	Controls	1	ls	\$15,000.00	15,000
33	Low Voltage - Data Wiring per Drop	20	ea	\$700.00	14,000
34	Studio Wiring - Recording	1	ls	\$50,000.00	50,000
35	Access Control - Per Door	4	ea	\$5,000.00	20,000
36	Cameras & Recording	2	ea	\$4,500.00	9,000
37	AV Systems - Theater/Community	1	ls	-	Excluded
38	Sound Systems - Theater/Community	1	ls	-	Excluded
	Subtotal			64.59	1,741,305

	Total Project		Quantity	Unit	Unit price	Total
31000	Earthwork					
1	Excavation - Entry Court	180 CY Cut	5	Crew day	\$4,000.00	20,000
2	Excavation Support		800	sf	\$9.00	7,200
	Subtotal					27,200
32000	Site Construction					
1	Grand Entry Stair Modifications		1	ls	\$50,000.00	50,000
2	Bicycle Parking Allowance		1	ls	\$5,000.00	5,000
3	Sculpture Park - Installation Allowance		1	ls		Excluded
	Subtotal					55,000
32010	Landscape					
1	Landscape - Planters @ Entry Court		1	ls	\$7,500.00	7,500
2	Misc Landscaping		1	ls	\$25,000.00	25,000
	Subtotal					32,500
33000	Site Utilities					
1	Entry Court - Sump pit		1	ls	\$15,000.00	15,000
2	Storm Water Management		1	ls	\$100,000.00	100,000
3	Electrical - Primary Ductbank		1	ls		See electrical
4	Sanitary Leader		1	ls		Excluded
5	Water Leader		1	ls		Excluded
	Subtotal					115,000

Project: **Adaptive Reuse Concepts**
Owner: **Malden Center for the Arts**
Design: **UX Architecture/STA Design**
Phase: **Concept**

Phase 1		15,934 sf	Date:	9/8/2023
01000	Site Services 2% of hard cost		\$8.67	138,130
02000	Site Prep & Demolition		\$22.46	357,912
03000	Concrete		\$9.15	145,728
04000	Masonry		\$11.45	182,484
05000	Metals		\$9.31	148,350
06000	Wood & Plastic		\$4.57	72,750
07000	Thermal & Moisture		\$0.00	0
08000	Doors & Windows		\$29.65	472,400
09000	Drywall & Ceilings		\$15.68	249,775
09500	Paint & Wallcovering		\$2.52	40,200
09700	Flooring & Tile		\$15.85	252,571
10000	Specialties		\$4.30	68,484
11000	Equipment		\$5.06	80,700
11500	Casework		\$6.26	99,750
14000	Elevators		\$0.00	0
21000	Fire Supression		\$14.35	228,727
22000	Plumbing		\$49.38	786,750
23000	HVAC		\$133.35	2,124,798
26000	Electrical		\$85.69	1,365,419
31000	Earthwork		\$1.71	27,200
32000	Site Construction		\$3.45	55,000
32010	Landscape		\$2.04	32,500
33000	Site Utilities		\$7.22	115,000
Subtotal			\$442.11	\$7,044,627
01010	GC Labor			460,000
	GC Overhead & Profit	10.0%		704,463
	Bond	1.5%		105,669
	Insurance	2.0%		140,893
	Permit	1.0%		70,446
	Construction Contingency	5.0%		352,231
	Design Contingency	5.0%		352,231
	Escalation - 2 years to midpoint 4% ann.	8.0%		563,570
Total Construction			\$614.67	\$9,794,131

Area Summary:	Total Building	Phase 1	Phase 2
Lower Level	9,381	4,176	5,205
1st	8,868	5,947	2,921
2nd	8,712	5,811	2,901
Total	26,961	15,934	11,027

Phase 1		Quantity	Unit	Unit price	Total
01010	GC Labor				
1	Project Manager	50	wk	\$4,600.00	230,000
2	Superintendent	50	wk	\$4,600.00	230,000
	Subtotal				460,000
02000	Site Prep & Demolition				
1	Demolition - Lower Level Misc Rem.	9,381	sf	\$7.00	65,667
2	1st Level	9,193	sf	\$7.00	64,351
3	2nd Level	8,712	sf	\$7.00	60,984
4	Doors	96	ea	\$125.00	12,000
5	Partitions	1,674	lf	\$10.00	16,740
6	Masonry Partitions	141	lf	\$25.00	3,525
7	Stairs per flight	4	ea	\$3,500.00	14,000
8	Misc Stairs & Ramps	5	ea	\$1,500.00	7,500
9	Windows	6	ea	\$250.00	1,500
10	Demo Interior Supported floor - Shoring	302	sf	\$10.00	3,020
11	Demolition Team 6 men/Equipment	5	Crew Day	\$6,500.00	32,500
12	Demo Exterior Wall - Masonry 2 Wythe	4	Crew Day	\$6,500.00	26,000
13	Demo Ramp - Walls 100 lf	3	Crew Day	\$6,500.00	19,500
14	Slab 275 sf	2	Crew Day	\$6,500.00	13,000
15	Demo Roof - Cutout Slab	2	Crew Day	\$6,000.00	12,000
16	Partial Roofing Demolition	4,500	sf	\$1.25	5,625
	Subtotal			\$22.46	357,912
03000	Concrete				
1	Entry Court - Wall Foundations	120	lf	\$75.00	9,000
2	Walls	960	sf	\$100.00	96,000
3	Slab	983	sf	\$16.00	15,728
4	Ext Wall - Pier Footings	5	ea	\$1,500.00	7,500
5	Trench/Patch @ Ext Ramp slab	1	Crew Day	\$3,500.00	3,500
6	Misc Structural Slab Infill	65	sf	\$100.00	6,500
7	Patch @ Demolished Piping	3	Crew Day	\$2,500.00	7,500
	Subtotal			\$9.15	145,728
04000	Masonry				
1	Ext. Wall - Temp Lintel @ Demo area	36	lf	\$75.00	2,700
2	Lintel @ Ramp Opening	36	lf	\$125.00	4,500
3	Finish Veneer @ Entry Court Walls	798	sf	\$75.00	59,850
4	Interior Historic Stone Renovation allow	1	ls	\$100,000.00	100,000
5	Powerwash Ext Brick	15,434	sf	\$1.00	15,434
	Subtotal			\$11.45	182,484

	Phase 1	Quantity	Unit	Unit price	Total
05000	Metals				
1	Misc Reframing @ demolition	1	ls	\$30,000.00	30,000
2	Main Stair - per Flight LL/Ground	2	ea	\$25,000.00	50,000
3	Communicating Stair Level 2	1	ea	\$15,000.00	15,000
4	Entry Court - Wall Mt Handrails	70	lf	\$125.00	8,750
5	Decoratve Interior Guardrail/Handrail	60	lf	\$400.00	24,000
6	Exterior Egress Handrails	103	lf	\$200.00	20,600
	Subtotal			\$9.31	148,350
06000	Wood & Plastic				
1	Temp Closure - Window/Door Openings	1	ls	\$15,000.00	15,000
2	Sprung Floor - Dance Studio	1,510	sf	\$25.00	37,750
3	Sound Isolation - Dance Studio	1	ls	\$20,000.00	20,000
	Subtotal			\$4.57	72,750
08000	Doors & Windows				
1	Doors - SC Wood/Single/Decorative	49	ea	\$2,500.00	122,500
2	Repair Allowance @ Existing Doors	11	ea	\$500.00	5,500
3	Interior Storefront - Glazing	2,169	sf	\$100.00	216,900
4	Glass Door/Double	8	pr	\$7,500.00	60,000
5	Glass Door/Single	6	ea	\$4,500.00	27,000
6	Exterior Glazing - Storefront	324	sf	\$125.00	40,500
7	Exterior Window Replacement	1	ls	-	Excluded
	Subtotal			\$29.65	472,400
09000	Drywall & Ceilings				
1	Partitions - New	320	lf	\$175.00	56,000
2	Furred Walls	108	lf	\$75.00	8,100
3	Patching @ Existing	1,772	lf	\$5.00	8,860
4	Infill Openings	12	ea	\$1,500.00	18,000
5	Ceilings - ACT	10,124	sf	\$10.00	101,240
6	Bulkhead	380	lf	\$40.00	15,200
7	Slab Edge Bulkhead	85	lf	\$75.00	6,375
8	DW Ceilings	1,900	sf	\$15.00	28,500
9	Coordinate Exposed Structure	1,500	sf	\$5.00	7,500
	Subtotal			\$15.68	249,775

Phase 1		Quantity	Unit	Unit price	Total
09500	Paint & Wallcovering				
1	Walls - Paint	25,200	sf	\$1.00	25,200
2	Misc Ceiling Painting	1	ls	\$7,500.00	7,500
3	Doors/Frames	60	ea	\$125.00	7,500
	Subtotal				40,200
09700	Flooring & Tile				
1	Flooring - Lobby/Café/Corridor	7,494	sf	\$20.00	149,880
2	Classroom/Storage	4,277	sf	\$8.00	34,216
3	Tile Flooring	1,763	sf	\$25.00	44,075
4	Base - Resilient	1,930	lf	\$5.00	9,650
5	Tile Base	590	lf	\$25.00	14,750
	Subtotal				252,571
10000	Specialties				
1	FE Cabinets	10	ea	\$650.00	6,500
2	Toilet Accessories - Gang	3	ea	\$12,500.00	37,500
3	Single	2	ea	\$1,000.00	2,000
4	Signage - Room ID	30	ea	\$450.00	13,500
5	Building ID/Exterior	1	ls	\$5,000.00	5,000
6	Code/Wayfinding	15,934	sf	\$0.25	3,984
	Subtotal				68,484
11000	Equipment				
1	Classroom Equipment - Per Room	5	ea	\$2,500.00	12,500
2	Art Studio Equipment	1	ls	\$10,000.00	10,000
3	Café Equipment	1	ls	\$10,000.00	10,000
4	Kitchen/Food Lab Equipment	1	ls	\$20,000.00	20,000
5	Lockers	13	ea	\$350.00	4,550
6	Dance Studio Equipment - Barre	70	lf	\$75.00	5,250
7	Mirrors 8' ht.	560	sf	\$15.00	8,400
8	Sound Equipment	1	ls	\$10,000.00	10,000
	Subtotal				\$80,700

	Phase 1	Quantity	Unit	Unit price	Total
11500	Casework				
1	Café - Counter	30	lf	\$1,500.00	45,000
2	Back Bar	16	lf	\$750.00	12,000
3	Dance Studio - Bench	25	lf	\$750.00	18,750
4	Restroom - Vanity	30	lf	\$300.00	9,000
5	Moveable Wall Sections	1	ls	\$15,000.00	15,000
	Subtotal				99,750
21000	Fire Supression				
1	Sprinklers	26,961	sf	\$7.00	188,727
2	Standpipe - Per Floor	4	ea	\$10,000.00	40,000
	Subtotal			\$14.35	228,727
22000	Plumbing				
1	Plumbing Allowance - Main Service/BFP/Meter	1	ls	-	Existing to Rem.
2	Fixture/WC	37	ea	\$8,500.00	314,500
3	Fixture/Lav	24	ea	\$8,500.00	204,000
4	Fixture/Sink	5	ea	\$8,500.00	42,500
5	Equipment Connection	6	ea	\$8,500.00	51,000
6	Water Heater/Recirc	1	ea	\$25,000.00	25,000
7	HVAC Connections	1	ls	\$5,000.00	5,000
8	Roof Drain System Replacement	9,650	sf	\$15.00	144,750
	Subtotal			\$49.38	786,750

	Phase 1	Quantity	Unit	Unit price	Total
23000	HVAC				
1	Demolition - Cut/Drop All Systems	26,961	sf	\$1.25	33,701
2	Equipment - HP1 - 100 TN DX Chiller	1	ea	\$95,000.00	95,000
3	Pumps/CHW/HW	4	ea	\$100,000.00	400,000
4	AHU 1 - 13,000 CFM	1	ea	\$195,000.00	195,000
5	AHU 2 - 10,000 CFM	1	ea	\$150,000.00	150,000
6	Piping - Mech Room	1	ls	\$150,000.00	150,000
7	Exhaust Fans - Toilet Room/Gang	3	ea	\$2,500.00	7,500
8	Toilet Room/Small	2	ea	\$1,000.00	2,000
9	Mech Room	1	ea	\$2,000.00	2,000
10	Unit Heater	2	ea	\$2,000.00	4,000
11	VAV's	22	ea	\$3,500.00	77,000
12	Duct - Sheetmetal	29,415	lb	\$15.00	441,218
13	Insulation	19,708	sf	\$10.00	197,077
14	Grilles/Diffusers/Dampers	159	ea	\$300.00	47,802
15	BMS/Per Point - Chiller	25	points	\$1,500.00	37,500
16	Pumps	20	points	\$1,500.00	30,000
17	AHU	56	points	\$1,500.00	84,000
18	VAV's	66	points	\$1,500.00	99,000
19	Misc	10	ea	\$1,500.00	15,000
20	Test and Balance	160	Hrs	\$150.00	24,000
21	Commissioning Support	160	Hrs	\$150.00	24,000
22	Coordination Meetings	10	ea	\$900.00	9,000
	Subtotal			133.35	2,124,798

26000	Electrical				
1	Demolition - Cut/Drop All Systems	26,961	sf	\$1.25	33,701
2	Transformer	1	ea	-	By Utility
3	Primary Feeder Allowance	100	lf	\$250.00	25,000
4	Secondary Feeder Allowance	1	ea	\$500.00	500
5	Main Gear - Service entrance	1	ea	\$5,000.00	5,000
6	Substation Allowance	26,961	sf	\$8.00	215,688
7	Branch Panels	14	ea	\$4,000.00	56,000
8	Feeders	14	ea	\$3,500.00	49,000
9	Mechanical - Chiller/AHU	3	ea	\$7,500.00	22,500
10	VAV Reheat	22	ea	\$1,500.00	33,000
11	Pumps	4	ea	\$3,500.00	14,000
12	Fans	6	ea	\$1,000.00	6,000
13	Unit heaters	2	ea	\$1,000.00	2,000
14	Elevator Feed	1	ls	\$15,000.00	15,000
15	Convenience Power - Outlets	212	ea	\$200.00	42,491
16	Lighting - Fixtures	15,934	sf	\$18.00	286,812
17	Controls	1	ls	\$50,000.00	50,000
18	Fire Alarm	26,961	sf	\$7.00	188,727
19	Low Voltage - Data Wiring per Drop	100	ea	\$700.00	70,000
20	Access Control - Per Door	15	ea	\$5,000.00	75,000
21	Cameras & Recording	10	ea	\$4,500.00	45,000
22	AV Systems - Classrooms	5	ea	\$20,000.00	100,000
23	Sound System - Dance	1	ls	\$10,000.00	10,000
24	Gallery	1	ls	\$20,000.00	20,000
	Subtotal			85.69	1,365,419

MALDEN CENTER FOR ARTS &
CULTURE

89 SUMMER STREET,

MALDEN, MA 02148

	Phase 1		Quantity	Unit	Unit price	Total
31000	Earthwork					
1	Excavation - Entry Court	180 CY Cut	5	Crew day	\$4,000.00	20,000
2	Excavation Support		800	sf	\$9.00	7,200
	Subtotal					27,200
32000	Site Construction					
1	Grand Entry Stair Modifications		1	ls	\$50,000.00	50,000
2	Bicycle Parking Allowance		1	ls	\$5,000.00	5,000
3	Sculpture Park - Installation Allowance		1	ls		Excluded
	Subtotal					55,000
32010	Landscape					
1	Landscape - Planters @ Entry Court		1	ls	\$7,500.00	7,500
2	Misc Landscaping		1	ls	\$25,000.00	25,000
	Subtotal					32,500
33000	Site Utilities					
1	Entry Court - Sump pit		1	ls	\$15,000.00	15,000
2	Storm Water Management		1	ls	\$100,000.00	100,000
3	Electrical - Primary Ductbank		1	ls		See electrical
4	Sanitary Leader		1	ls		Excluded
5	Water Leader		1	ls		Excluded
	Subtotal					115,000

Project: **Adaptive Reuse Concepts**
Owner: **Malden Center for the Arts**
Design: **UX Architecture/STA Design**
Phase: **Concept**

Phase 2		11,027 sf	Date:	9/8/2023
01000	Site Services 2% of hard cost		\$4.90	53,992
02000	Site Prep & Demolition		\$0.00	0
03000	Concrete		\$0.00	0
04000	Masonry		\$0.00	0
05000	Metals		\$0.00	0
06000	Wood & Plastic		\$62.53	689,550
07000	Thermal & Moisture		\$31.17	343,766
08000	Doors & Windows		\$18.15	200,125
09000	Drywall & Ceilings		\$21.38	235,740
09500	Paint & Wallcovering		\$2.88	31,715
09700	Flooring & Tile		\$9.41	103,798
10000	Specialties		\$1.51	16,657
11000	Equipment		\$2.27	25,000
11500	Casework		\$0.00	0
14000	Elevators		\$27.21	300,000
21000	Fire Supression		\$0.00	0
22000	Plumbing		\$1.54	17,000
23000	HVAC		\$32.68	360,367
26000	Electrical		\$34.09	375,886
31000	Earthwork		\$0.00	0
32000	Site Construction		\$0.00	0
32010	Landscape		\$0.00	0
33000	Site Utilities		\$0.00	0
	Subtotal		\$249.71	\$2,753,596
01010	GC Labor	8.7%		239,016
	GC Overhead & Profit	10.0%		275,360
	Bond	1.5%		41,304
	Insurance	2.0%		55,072
	Permit	1.0%		27,536
	Construction Contingency	5.0%		137,680
	Design Contingency	5.0%		137,680
	Escalation -4 years to midpoint 4% ann.	16.0%		440,575
	Total Construction		\$372.52	\$4,107,818

Phase 2		Quantity	Unit	Unit price	Total
01010	GC Labor				
1	Project Manager	26	wk	\$4,600.00	119,508
2	Superintendent	26	wk	\$4,600.00	119,508
	Subtotal				239,016
<hr/>					
02000	Site Prep & Demolition				
1	Roof Headhouse Structure	1	Crew Day	\$10,000.00	10,000
	Subtotal				10,000
<hr/>					
05000	Metals				
1	Roof	1	ea	\$15,000.00	15,000
2	Elevator Steel	1	ls	\$5,000.00	5,000
3	Roof Terrace - Perimeter Guardrail	192	lf	\$250.00	48,000
	Subtotal			\$6.17	68,000
<hr/>					
06000	Wood & Plastic				
1	Music Studio	7	ea	\$50,000.00	350,000
2	Theater	1	ea	\$150,000.00	150,000
3	Coumminty Rehearsal	1	ea	\$150,000.00	150,000
4	Roof Protection @ Slab openings	1	ls	\$7,500.00	7,500
5	Fall Protection	1	ls	\$10,000.00	10,000
6	Framing - Headhouse Walls & Roof	490	sf	\$45.00	22,050
	Subtotal			\$62.53	689,550
<hr/>					
07000	Thermal & Moisture				
1	Terrace Pedestal Paver system	4,000	sf	\$25.00	100,000
2	Roofing - Parapet Coping	250	lf	\$100.00	25,000
3	Insulation - 6" Tapered	4,700	sf	\$12.00	56,400
4	Membrane & Coverboard	4,700	sf	\$10.00	47,000
5	Flashing/Penetrations	1	ls	\$1,500.00	1,500
6	Flashing/Base Cant	250	lf	\$25.00	6,250
8	Headhouse - Walls/Metal Panel	1,320	sf	\$65.00	85,800
9	Caulking - Existing Window Perimeters	1,818	lf	\$12.00	21,816
	Subtotal			\$31.17	343,766

	Phase 2	Quantity	Unit	Unit price	Total
08000	Doors & Windows				
1	Doors - SC Wood/Single	29	ea	\$2,500.00	72,500
2	SC Wood/Double	2	pr	\$4,500.00	9,000
3	Interior Storefront - Glazing	650	sf	\$100.00	65,000
4	Glass Door/Double	3	pr	\$7,500.00	22,500
5	Glass Door/Double	1	pr	\$7,500.00	7,500
6	Headhouse Glass Wall	153	sf	\$125.00	19,125
7	Headhouse Ext Glass Door/Single	1	ea	\$4,500.00	4,500
	Subtotal			\$18.15	200,125
09000	Drywall & Ceilings				
1	Partitions - New	560	lf	\$175.00	98,000
2	Furred Walls	614	lf	\$75.00	46,050
3	Patching @ Existing	300	lf	\$5.00	1,500
4	Infill Openings	10	ea	\$1,500.00	15,000
5	Ceilings - ACT/Standard	2,088	sf	\$10.00	20,880
6	Acoustical Ceilings (see Equipment Allow)	5,031	lf	\$10.00	50,310
7	Bulkhead	100	lf	\$40.00	4,000
	Subtotal			\$21.38	235,740
09500	Paint & Wallcovering				
1	Walls - Paint	20,340	sf	\$1.00	20,340
2	Misc Ceiling Painting	1	ls	\$7,500.00	7,500
3	Doors/Frames	31	ea	\$125.00	3,875
	Subtotal				31,715
09700	Flooring & Tile				
1	Flooring - Corridors	3,000	sf	\$20.00	60,000
2	Studio	5,031	sf	\$8.00	40,248
3	Base - Resilient	710	lf	\$5.00	3,550
	Subtotal				103,798
10000	Specialties				
1	FE Cabinets	6	ea	\$650.00	3,900
2	Toilet Accessories - Gang	0	ea	\$12,500.00	0
3	Single	1	ea	\$1,000.00	1,000
4	Signage - Room ID	20	ea	\$450.00	9,000
5	Code/Wayfinding	11,027	sf	\$0.25	2,757
	Subtotal				16,657

	Phase 2	Quantity	Unit	Unit price	Total
11000	Equipment				
1	Music Studio Equipment	1	ls	-	Excluded
2	Art Studio Equipment	1	ls	\$25,000.00	25,000
	Subtotal				\$25,000
14000	Elevators				
120	Elevator Upgrade Allowance	1	ls	\$300,000.00	300,000
	Subtotal				300,000
21000	Fire Supression				
1					0
2					0
	Subtotal			\$0.00	0
22000	Plumbing				
1	Fixture/WC	1	ea	\$8,500.00	8,500
2	Fixture/Lav	1	ea	\$8,500.00	8,500
	Subtotal			\$1.54	17,000
23000	HVAC				
1	VAV's	11	ea	\$3,500.00	38,500
2	Duct - Sheetmetal	11,027	lb	\$15.00	165,405
3	Insulation	7,388	sf	\$10.00	73,881
4	Grilles/Diffusers/Dampers	110	ea	\$300.00	33,081
5	BMS Per Point/VAV	33	points	\$1,500.00	49,500
	Subtotal			32.68	360,367

Phase 2		Quantity	Unit	Unit price	Total
26000	Electrical				
1	Branch Panels	3	ea	\$4,000.00	12,000
2	Feeders	3	ea	\$3,500.00	10,500
3	Mechanical - VAV/Reheat	11	ea	\$1,500.00	16,500
4	Fans	1	ea	\$1,000.00	1,000
5	Convenience Power - Outlets	147	ea	\$200.00	29,400
6	Lighting - Fixtures	11,027	sf	\$18.00	198,486
7	Controls	1	ls	\$15,000.00	15,000
8	Low Voltage - Data Wiring per Drop	20	ea	\$700.00	14,000
9	Studio Wiring - Recording	1	ls	\$50,000.00	50,000
10	Access Control - Per Door	4	ea	\$5,000.00	20,000
11	Cameras & Recording	2	ea	\$4,500.00	9,000
12	AV Systems - Theater/Community	1	ls	-	Excluded
13	Sound Systems - Theater/Community	1	ls	-	Excluded
	Subtotal			34.09	375,886



RKG

Malden, MA

Cultural Facility Market Study & Operating Pro Forma

PREPARED BY

RKG

MAY 31, 2023

DRAFT



O4

Operations Pro Forma



MALDEN CENTER FOR ARTS &
CULTURE

89 SUMMER STREET,

MALDEN, MA 02148



REUSE SCENARIO

Space	Count	Total sqft
Café	1	950
Classroom/Workshop	6	2,380
Kitchen/Food Lab	1	350
Small Music Studio	4	430
Large Music Studio	4	1,060
Pop-Up Retail/Gallery	1	-
Office	2	400
Black Box Theater	1	1,350
Community Room/Rehearsal Space	1	1,410
Backstage/Green Room	1	440
Art Studio	8	890
Dance Studio	1	1,460
Art Classroom	1	1,450
Gallery	1	-
Roof Terrace	1	-
TOTAL	33	12,570

REUSE SCENARIO - OPTION 3



BASEMENT FLOOR PLAN
PROGRAM LEGEND
CAFÉ
KITCHEN
STUDIOS
THEATER
COMMON SPACE
PROGRAM SPACE
SUPPORT SPACE
1/8\"/>

MALDEN CENTER FOR ARTS & CULTURE CONCEPT DESIGN
MARCH 2023



REUSE SCENARIO - OPTION 3



SECOND FLOOR PLAN
PROGRAM LEGEND
CLASSROOM
STUDIO
REHEARSAL
COMMON SPACE
PROGRAM SPACE
SUPPORT SPACE
1/8\"/>

MALDEN CENTER FOR ARTS & CULTURE CONCEPT DESIGN
MARCH 2023



REUSE SCENARIO - OPTION 3

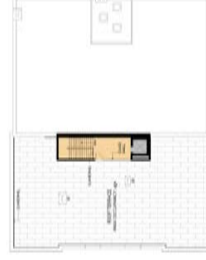


FIRST FLOOR PLAN
PROGRAM LEGEND
COMMUNITY ROOM
THEATER
STUDIOS
COMMON SPACE
PROGRAM SPACE
SUPPORT SPACE
1/8\"/>

MALDEN CENTER FOR ARTS & CULTURE CONCEPT DESIGN
MARCH 2023



REUSE SCENARIO - OPTION 3



ROOF PLAN
PROGRAM LEGEND
ROOF TERRACE
COMMON SPACE
PROGRAM SPACE
SUPPORT SPACE
1/8\"/>

MALDEN CENTER FOR ARTS & CULTURE CONCEPT DESIGN
MARCH 2023



Source: UX Architecture Studio, Silverman Trykowski Associates



Operating Pro Forma Summary

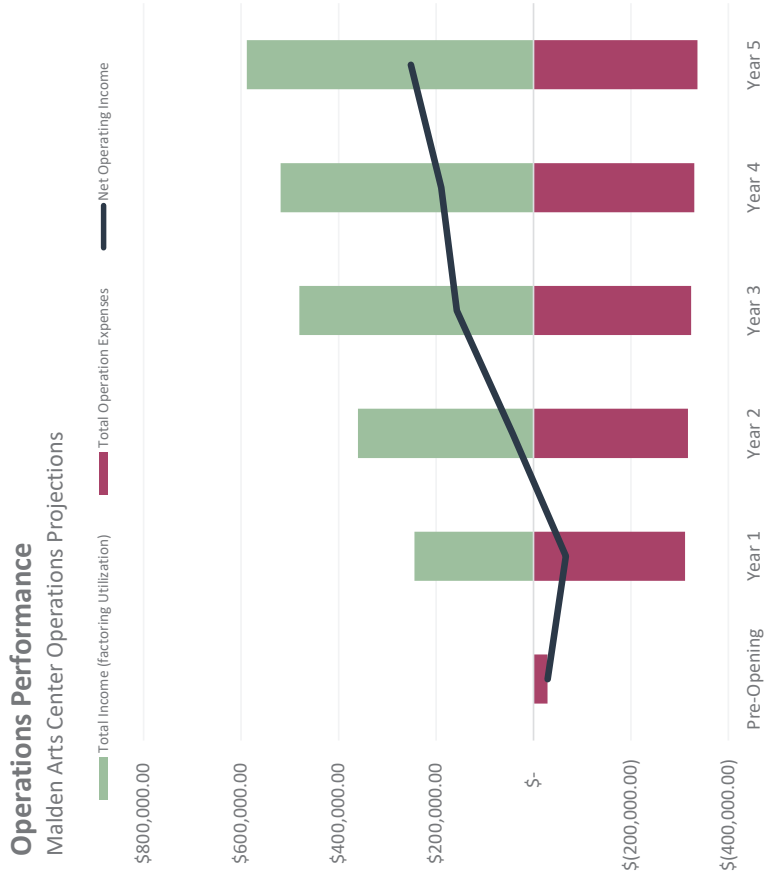
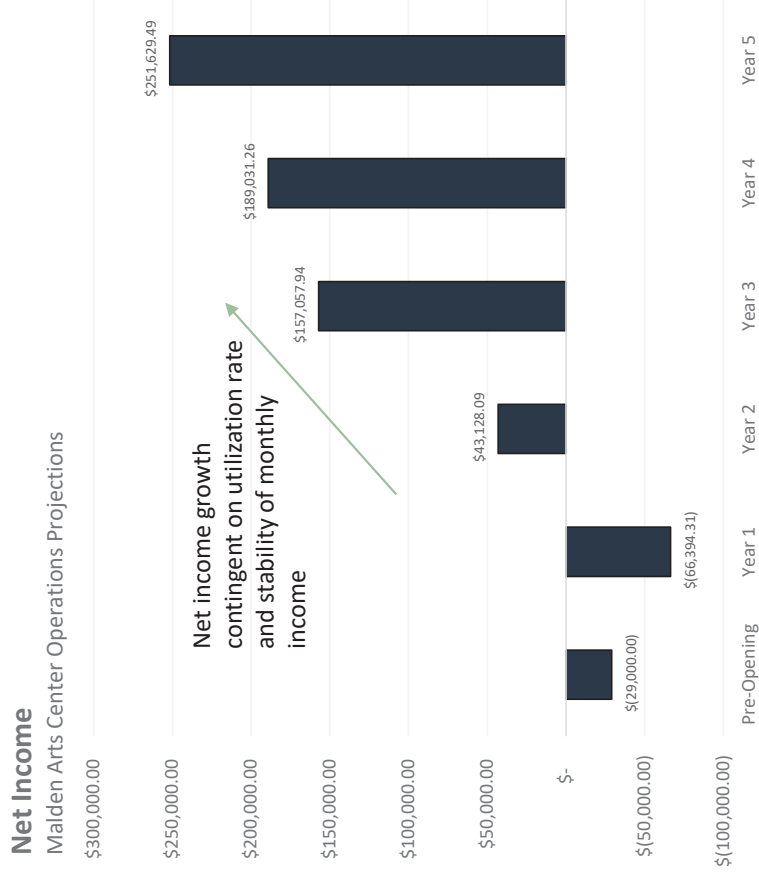
BUDGET SUMMARY						
	Pre-Opening	Year 1	Year 2	Year 3	Year 4	Year 5
Earned Income						
Ticket Sales	\$ -	\$ 6,378.75	\$ 6,506.33	\$ 6,636.45	\$ 6,769.18	\$ 6,904.56
Rental Income	\$ -	\$ 34,687.50	\$ 35,381.25	\$ 36,088.88	\$ 36,810.65	\$ 37,546.87
User Fees	\$ -	\$ 489,980.00	\$ 499,779.60	\$ 509,775.19	\$ 519,970.70	\$ 530,370.11
Food & Beverage	\$ -	\$ 7,087.50	\$ 7,229.25	\$ 7,373.84	\$ 7,521.31	\$ 7,671.74
Other Income	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Contributed Income						
Annual Membership Income	\$ -	\$ 5,250.00	\$ 5,355.00	\$ 5,462.10	\$ 5,571.34	\$ 5,682.77
Event Sponsorship	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Grant Programs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Individual Contributions	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Corporate Contributions	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total Income (factoring Utilization)	\$ -	\$ 244,522.69	\$ 360,263.43	\$ 480,535.99	\$ 518,978.86	\$ 588,176.05
Operating Expenses						
Staff	\$ -	\$ (155,262.00)	\$ (158,367.24)	\$ (161,534.58)	\$ (164,765.28)	\$ (168,060.58)
Programming Costs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Fundraising Expenses	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Administration	\$ (29,000.00)	\$ (24,480.00)	\$ (24,969.60)	\$ (25,468.99)	\$ (25,978.37)	\$ (26,497.94)
Occupancy Costs	\$ -	\$ (131,175.00)	\$ (133,798.50)	\$ (136,474.47)	\$ (139,203.96)	\$ (141,988.04)
Total Operation Expenses	\$ (29,000.00)	\$ (310,917.00)	\$ (317,135.34)	\$ (323,478.05)	\$ (329,947.61)	\$ (336,546.56)
Net Operating Income	\$ (29,000.00)	\$ (66,394.31)	\$ 43,128.09	\$ 157,057.94	\$ 189,031.26	\$ 251,629.49
Operating Expense/Earned Income (OER)		127%	88%	67%	64%	57%

Note: Operating Expense Ratio (OER) refers to cost to operate compared to income.

Source: Moody's, Arts Center Comps, 990 Tax Filings, LoopNet



Operating Pro Forma Summary



Notes: Construction costs associated with pre-opening & debt payments not factored into the model. Contributions, grants and associated fundraising costs are also not included in the model estimates.

Source: Moody's, Arts Center Comps, 990 Tax Filings, LoopNet



Arts Center Comps: How does the model's results compare?

	The Malden Arts Center	The Cambridge Foundry	Center for the Arts at the Armory	Arlington Center for the Arts	The New Art Center (Newton)	The Marion Art Center	The Boston Center for the Arts	ArtSpace Maynard	Northampton Center for the Arts
Space (Square Feet)	26,500	50,000	20,585	30,964	10,978	4,288	172,346	55,000	20,212
Staffing Levels	-	-	-	-	-	-	-	-	-
Payroll Expenses	(\$160,060)	-	(\$19,384)	(\$358,769)	(\$408,844)	(\$74,697)	(\$1,337,937)	(\$103,108)	(\$66,146)
Payroll Expenses as a % of Operating Expenses	49.9%	-	28.1%	50.3%	34.5%	40.5%	37.2%	36.6%	38.6%
Year of Budget*	*Year 5	-	2015*	2019	2019	2019	2019	2019	2019
Program Services	\$588,176	-	\$0	\$611,624	\$979,360	\$88,576	\$1,945,246	\$311,615	\$107,592
Contributed Income % of Total Revenue	-	-	\$56,608 51.7%	\$136,218 18.2%	\$262,392 21.1%	\$87,754 37.3%	\$27,779,566 92.5%	\$2,408 0.7%	\$39,355 26.1%
Other Revenue	-	-	\$1,365	\$0	-	\$0	\$0	\$15,697	\$2,540
Total Income	\$588,176	-	\$109,500	\$748,224	\$1,241,752	\$235,356	\$30,030,016	\$331,406	\$150,738
Total Operating Expenses	(\$336,546)	-	(\$69,001)	(\$713,892)	(\$1,185,390)	(\$184,476)	(\$3,592,553)	(\$282,050)	(\$171,153)
Net Income	\$251,629	-	\$40,499	\$34,332	\$56,362	\$50,880	\$26,437,463	\$49,356	(\$20,415)

Notes: *The Center for the Arts at the Armory has some missing filings in the public database from 2016 – 2019 so 2015 is the most recent pre-COVID filing.

Source: ESRI Business Analyst, MassGIS Assessment Database, IRS Form 990

MALDEN CENTER FOR ARTS & CULTURE

89 SUMMER STREET,

MALDEN, MA 02148



Operating Pro Forma Modeling Takeaways

Further discussion points based on the initial modeling phase.

Café

- In the current model design, the café is factored in as monthly rental income. Given the neighboring coffee shop and the relative likelihood of a profitable café tenant; more revenue could be generating from uses such as a pop-up brewery/concessions stand for performances, weekend events etc.

Art Studios

- All art studios are modeled as monthly rental income, where we assume at least 6 will be consistently occupied throughout the year (does this seem reasonable?).

Performances

- The current model estimates roughly 30 performances, or about 2 performances a month in the black box theater. An inventory/survey of existing performance companies, bands and other theater arts organizations could give a better gauge of number of shows and performances.

Programming and Fundraising Costs/Revenues

- Not factored into the model are any costs associated with promotion of the space, fundraising events or any contributions from public or private donors or from other grant programs.

Operating Expense/Earned Income (OER)

- Typical OERs for arts and cultural centers fall between 60% - 80% based on comps, with most around 70% - 75%. This means our current assumptions are fairly optimistic which could be the result of other expenses not factored in, construction costs AND/OR optimistic utilization rates in the first five years.

Construction Costs

- Not currently factored into the model are construction costs, which will be contingent on the terms, lender and any provided by grants, no interest rate loans, or city/state sources.