

## **2 Building Analysis**

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# West Acton Baptist Church

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Master Plan

## A. Architectural Report



June 21, 2013

## West Acton Baptist Church Building Condition Analysis

The West Acton Baptist Church located on 592 Massachusetts Ave. in West Acton Center was built in 1854. A classroom addition was added to the back of the Church in 1955. The purpose of this study is to focus on the conditions in the 1854 church building; however some comments will pertain to the 1955 addition where egress and systems are tied between the buildings. The original church is considered a historic landmark by the Town of Acton. The main historic features of the existing church consist of stained glass windows and a gold domed belfry on the exterior. The interior of the church contains the original wooden pews and a pressed steel panel ceiling in the Sanctuary.



### Exterior Analysis

The wood framed church is a two story structure. The church is mostly clad in vinyl siding, it is not known exactly when the siding was applied but member of the church believe that this occurred in the early 70's. The belfry still has the original wood siding. The roof has 3 tab asphalt shingles which appears to be in fair condition. Granite stairs lead up to the front doors from Massachusetts Avenue. The original wooden doors, pediment canopy and architectural wood detailing are an important historic feature of the church and may want to be refurbished. The existing entry doors need new hardware for security and operational functioning. The black painted iron guard

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railings need to be restored and refinished. Code compliant handrails should be added to the exterior stair.

The west side entry of the building adjacent to the parking lot appears to be the most heavily used. The entry has 2 steps up and is not accessible from grade. The door is the proper width but it does not have compliant hardware and the approach to the door does not have the proper accessible clearance on the latch side of the opening.

A small elevator enclosure was applied to the west side of the church. This structure consists of the elevator shaft, with elevator machine room on the south side of the shaft and a canopy to the north side of the shaft for the west entry doors. The elevator has 3 stops, an outside stop at grade, a main level stop at Fellowship Hall and a 3<sup>rd</sup> stop at the upper level Sanctuary. The elevator does not meet current accessibility codes but the elevator is operating correctly and can serve disable visitors with the proper assistance.

The east side of the building has an entry along Central Street. The entry is not accessible as there is one step up to the entry from grade and one step up at the door threshold. The double doors are less than 30" wide and do not have code compliant hardware.

## Points:

### Siding and Trim

- Vinyl siding installed in the 70's is in fair condition, suggest cleaning and minor restorations
- Wood canopy and trim located around exterior doors may want to be restored and painted
- Existing Belfry will be restored in the Fall 2013



## Windows and Doors

- Storm window enclosures over existing stain glass windows (operable sash for ventilation)
- Main entry wood doors appear to be the original doors, may need refurbishment and new hardware
- Wood doors on east side entry are not the proper size and may want to be replaced with accessible hardware
- Wood door on west side entry is the proper size but does not have required latch side clearance on the pull side of the door and could benefit with new compliant hardware



## Roof

- 3 tab asphalt roof appears to be in good condition. Water does leak around the belfry, however this will be restored in the Fall 2013. At this time there is no need to replace the roof shingles.

## Interior Analysis

The first level of the two story building contains a large 1300 s.f. meeting hall (Fellowship Hall), library, and commercial grade kitchen and toilet rooms. The second floor of the church is the sanctuary which has a raised altar in the front of the sanctuary and a raised choir loft in the back of the sanctuary. The library, meeting hall, and sanctuary have multipurpose uses for the congregation and for the community. The spaces are mostly used as assembly areas for meetings, weddings, performances and other events. The 1955 addition is attached to the church at a split level. The church offices and classroom spaces are within the 1955 addition along with the classrooms for the Acton Cooperative School. There are 4 entrances into the building. The main entry to the church off of Massachusetts Ave. is approached at a mid level with half a flight of stairs up from the outside and another half of flight of stairs up to the sanctuary from the inside. There are two formal stairways from the main entry landing. The West entry into the church has a large lobby and a central stair to access the main entry doors and formal stairways to the sanctuary. The East entry on Central Street has a smaller lobby and direct access to the interior stair in the 1955 addition. There is also an entry into the 1955 addition on the west side of the building. This entry is for the Coop School program during the week and serves as a service entry to the kitchen when school is not in session.

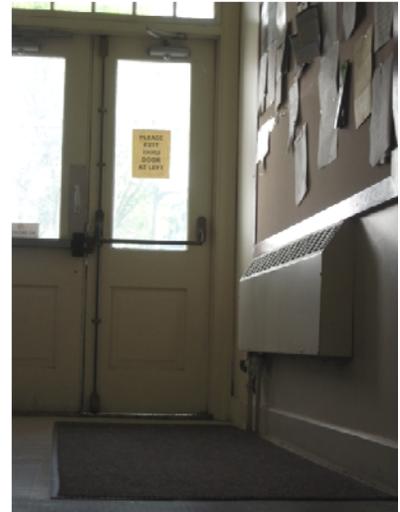
The interior finishes are in poor to fair condition. The building has been well maintained but active use throughout the years has worn out many finishes. The acoustics in Fellowship Hall and the Library are in need of improvement. The kitchen equipment is outdated and many of the kitchen finishes do not meet the current Board of Health requirements. The flooring in the sanctuary is in need of being restored. The battleship linoleum below the pews is dried and cracked and the carpet in the aisles is worn. The paint on the pressed steel ceiling panels in the sanctuary needs to be restored. Handrails at all stairs should be restored.

### Points:

#### Interior Conditions at Main Level

##### Floors

- Carpeted west side entry and stairs, suggest replacing with a more durable finish.
- VCT floor over reconstructed subfloor in Fellowship Hall is in fair condition.
- Library floor is VCT (may be a better meeting space if carpeted)
- Reorganize custodial and storage room for more efficient use of space



## Walls

- Existing plaster walls (patch and paint as required)
- Wall between Fellowship Hall and Library could be rebuilt with insulation for better acoustical separation
- Acoustical wall panels could be added to Fellowship Hall to provide better acoustics.

## Ceilings

- Fellowship Hall and Library have plaster ceilings with surface mounted fluorescent lights. It is possible to install an acoustical ceiling tile system (ACT) with recessed lights to improve the acoustics in this space.
- New sprinkler heads would need to be installed (change from upright to semi-recessed)



## Interior Conditions at Kitchen & Basement

### Floors

- Kitchen: Sheet flooring may need to be updated to meet current Board of Health requirements
- Basement: Partial concrete and dirt floor allows water to flow through basement at times. Installation of better sump would improve condition (or installation of a perimeter foundation drain system).

### Walls

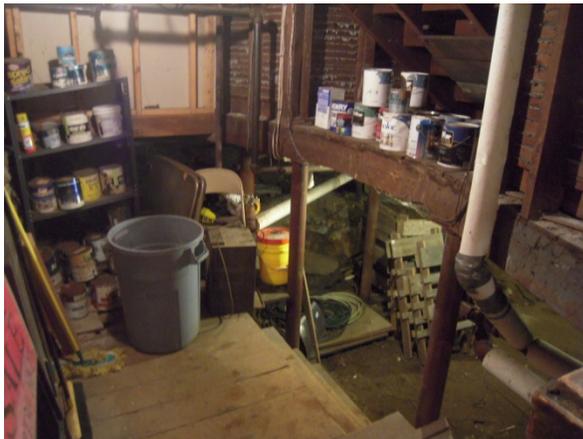
- Kitchen: existing walls have ceramic tile and wall paper. Wall paper would need to be replaced with tile or coated panels to meet current codes
- Basement: has rubble foundation walls in reasonable condition

### Ceilings

- Kitchen: ACT ceiling is stained and not coated, Board of Health would require clean room tiles in this space if it is to be brought up to code.
- Basement: Exposed wood floor joists and no fixed lighting. Adding permanent lights would be helpful but are not required by the state building code.

### Equipment

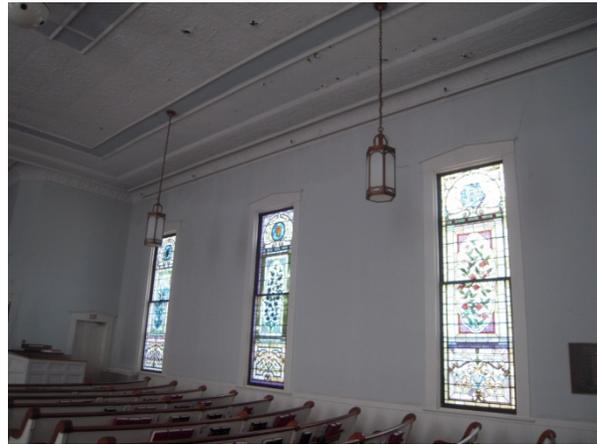
- Kitchen Hood should be tested and replaced or restored as required
- Counters may need to be replaced (suggest stainless steel countertops)



## Interior Conditions at Sanctuary

### Floors

- Carpeted aisles and old linoleum flooring under pews. The wood plank floor appears to be the structural subfloor and most likely cannot be refinished as a hardwood floor if the linoleum was removed. Suggest using a new flooring system over the existing wood planks.



### Walls

- Plaster walls in the sanctuary have stress cracks along the exterior walls, but there are no signs of leaks or water damage. Should be patched and repainted.



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## Ceilings

- Steel ceiling appears to be part of the original architecture. Signs of water damage are apparent in the ceiling and paint is peeling. Ceiling could be refurbished to maintain historic character



## Other Features

- Existing wooden pews are in good condition
- Stain glass windows should be reviewed by a professional restoration contractor
- Minor restorations on stain glass window units may be needed
- Retractable treads at choir appear to be in good condition



## Code Compliance

### Exterior Accessibility

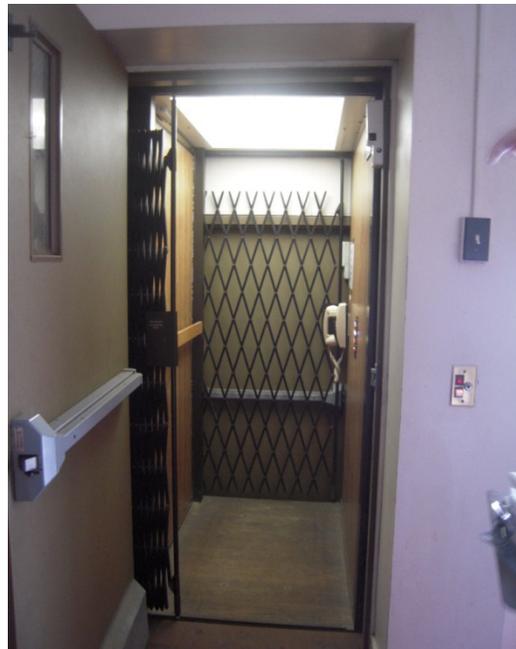
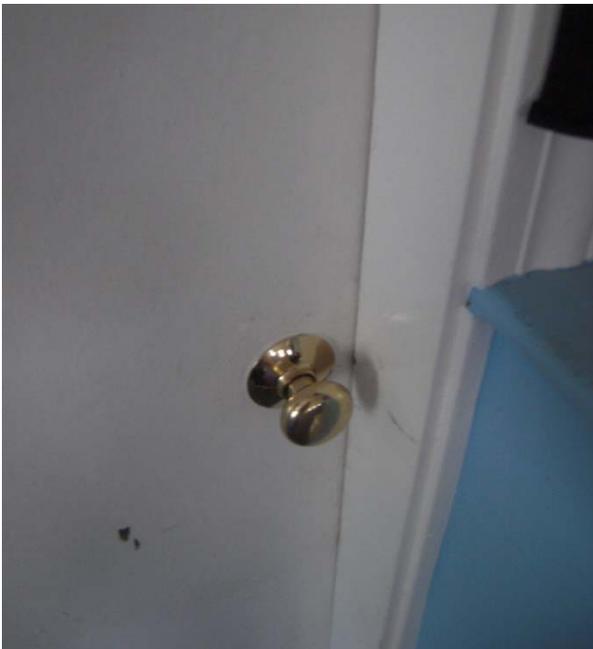
- Public entrances are not handicapped accessible
- The existing elevator on the west side of the building provides access from the parking lot to the main and upper levels. (Elevator does not meet current accessibility requirements)



- Many doors lack proper hardware, push and pull-side clearances, and minimum width requirements
  - West entry doors does not have proper clearances on pull side of door
  - East entry door are not the proper width
  - Main entry doors have no door closers
  - Exterior elevator door does not have proper pull clearances and door hardware
  - Exit signs are not installed at the exterior doors (not required at main entry doors)
  - All exterior doors have a step or steps at the exterior and are not accessible from grade.

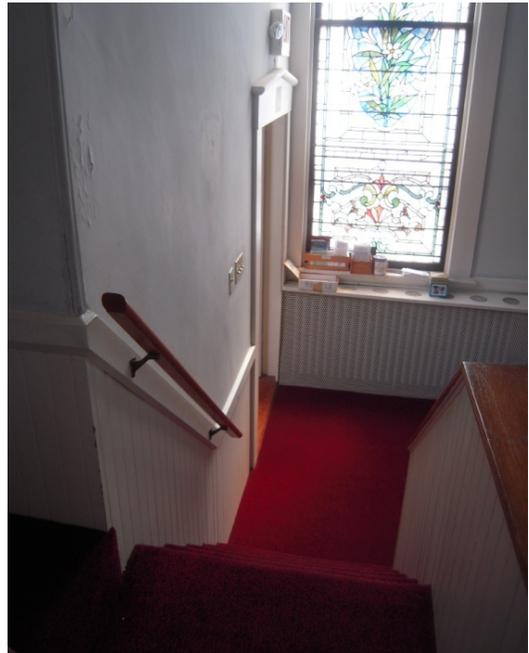
## Interior Accessibility

- Outdated door hardware may need to be replaced. Door closers exceed the required pressure to operate
- Some of the exterior exit signs are not illuminated
- Some interior egress doors do not have the proper clearances
- Many of the doors have “door knobs” instead of compliant lever handles
- Access door to belfry does not open 90 degrees
- Stair access to belfry is not safe (restore and add railings for safety)
- Illumination in belfry access could be improved



## Stair Accessibility

- Stairs and stair handrails do not meet current accessibility or building code requirements.
  - Stair tread height is over 7"
  - Most railings exceed 1 ½" width and are not located at least 1 ½" away from the wall
  - hand railings are not set at the proper height, some railing brackets are not properly fastened to the wall (blocking should be added and bracket should be reinstalled at the proper height)
  - Stairs do not have visual transition at bottom and top tread
  - Stairs to baptismal do not have hand rails or proper landing size at doorways
  - Railings do not extend the proper length beyond top and bottom tread





**B. Structural Report**



## MEMORANDUM

**TO:** OMR Architects, Inc. (OMR)  
Attn: Lisa Pecora-Ryan

**FROM:** Foley Buhl Roberts & Associates, Inc. (FBRA)  
Jon Buhl 

**REFERENCE:** West Acton Baptist Church  
592 Massachusetts Ave., West Acton, MA

**SUBJECT:** June 25, 2013 Structural Observations

**DATE:** July 19, 2013

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At the request of OMR Architects, Inc. I visited the West Acton Baptist Church on June 25, 2013 to review structural conditions. The duration of my visit was approximately two hours. A considerable portion of the floor and roof structure was obscured by finishes; however, there were areas where observations were possible. No exploratory demolition or structural materials testing was conducted in conjunction with our review.

Architectural/Structural Drawings for the 1955 addition were forwarded to FBRA by OMR Architects and have been reviewed in the preparation of this report.

### **I. GENERAL DESCRIPTION**

The original West Acton Baptist Church is a two-story (plus a Basement/high crawl space), wood framed structure with a timber truss sloping roof, constructed in 1854. The building is approximately 6,000 square feet in area. A two-story (plus Basement/Lower Level), wood framed, flat roof addition was built in 1955 on the south end of the original church, partially wrapping around the east and west sides.

Program elements in the original church include a high crawl space at the Lower Level (storage use), the Fellowship Hall at the Main Level and the Sanctuary at the Upper Level. Access to the wood framed Belfry is by a stairway, located at the back of the Sanctuary (North/Massachusetts Avenue side of the building).

The 1955 addition provided office and classroom spaces for the church (Pre-School Program), along with Multi-Purpose Rooms at the Upper Level. The floors of this addition do not align with those of the original church, creating accessibility issues. An elevator located at the northwest corner of the original church services the Main and Upper Levels (Fellowship Hall and Sanctuary).

The original church and the addition are fully sprinklered.

## **II. STRUCTURAL SYSTEMS DESCRIPTION**

### **Original Church**

Main Level floor construction in the original church (Fellowship Hall) consists of full 2x8 joists, typically spaced at 20½" +/- o.c. spanning 12½ +/- feet in the east-west direction and mortised (flush-framed) into 8"W x 9"D timber beams. Timber beams span in the north-south direction (13 +/- feet; spans vary) to 5½" OD steel pipe columns resting on 3'x3' concrete spread footings in the high crawl space (concrete/dirt floor).

Upper Level floor construction in the original church (Sanctuary) was covered by finishes; however, it is expected to be similar to the Main Level Floor construction. The Upper Level floor is supported by 2½" OD steel pipe columns in the Fellowship Hall, that align with the steel columns in the crawl space.

Sloped (gable) roof construction consists of 3"x5" common rafters, typically spaced at 2'-6" o.c., spanning up the slope to timber purlins. Timber purlins (two on each side of the ridge) span across the slope of the roof and are supported by Queen Post timber trusses (three trusses, equally spaced). Top and bottom truss chords are 8" x 12" timbers; the bottom chord is suspended by two steel rods. Roof trusses clear span the Sanctuary below (east-west direction, approximately 38 feet). Roofing is asphalt shingles; reportedly 10 to 15 years old.

Exterior walls are wood framed (approximately 8" thick) and rest on 10"x10" +/- timber sills atop stone foundation walls. Walls/soffits are typically clad with aluminum; except for the (enclosed) Belfry, which has wood siding.

### **Addition**

Lower Level floor construction is a concrete slab on grade; thickness unknown. Typical foundation walls appear to be 8" thick concrete construction.

Main Level and Upper Level floor construction at the south (Multi-Purpose/Classroom) end of the addition consists of 2 x 12 joists, spaced at 16" o.c., spanning 19'-10" +/- in the north-south direction to a wood stud bearing wall (located along the south side of the corridor). This bearing wall is supported by steel beams and columns at the Lower Level. Floor framing along the east side of the addition is 2 x 8 joists, spaced at 16" o.c., spanning 11'-10" +/- to a wood stud bearing wall. Corridor joists, are 2 x 6 @ 16" o.c., spanning 6'-2" +/-.

Flat roof construction in the addition is similar to floor construction and is pitched for drainage (1/8" per foot). Roofing is a rubber membrane (age unknown).

Exterior wall construction is wood framed (2x4 @ 16" o.c.) and is load bearing for floor and roof joists. Walls/soffits are clad with aluminum.

## **III. STRUCTURAL OBSERVATIONS/COMMENTS**

The condition of the building structure was briefly reviewed during the June 25, 2013 visit to the site. Generally speaking, the condition of the building superstructure and foundations appears to be satisfactory. There were no signs of excessive foundation settlement. Floor and roof construction appears to be functioning as intended; there were no signs of distress, which would suggest a significant overload condition or failure. Our observations, comments and recommendations are noted below. Photographs of selected conditions are included at the end of this Memorandum.

1. The exterior walls of the building (original church and addition) appear to be relatively plumb.

2. The Belfry also appears to be relatively plumb (Photo No. 1). The aspect ratio (height to width) is relatively low. Belfry construction was briefly reviewed during the site visit. The Belfry appears to be well constructed, with rational, gravity load and lateral (wind) load systems. Reportedly, there have been some leaks and there may be areas where localized deterioration of framing members has occurred. FBRA understands that a Contractor has been retained to inspect the framing and to conduct any repairs to the roof and structure that may be required.
3. The condition of the trussed roof construction over the Sanctuary appears to be satisfactory. Truss joints appear tight and it does not appear that any significant out of plane movement has occurred (Photo No. 2). The capacity of the roof structure was not determined; however, it appears to be performing satisfactorily. No prominent sags or dips in the roof construction were observed from the building exterior (Photo No. 1). As the original (presumably slate) roof has been replaced by the current (lighter), asphalt shingle roof, the review of roof member anchorage is recommended.
4. 2 x 12 floor construction in the addition (spanning 19'-10" +/-) is relatively flexible. Structural calculations confirm that adequate structural capacity exists for present, Office/Classroom use; however, the deflections under that loading are higher than generally accepted limits. There are no safety concerns.
5. The live load capacity of the wood framed floor construction at the Main Level of the original church (and presumably the Upper Level as well) appears to be marginal; perhaps as low as 40 to 50 psf (governed by the capacity of the supporting beams). The present building code (8<sup>th</sup> Edition) would require a 100 psf live load for the open (public assembly) Fellowship Hall space and a 60 psf live load capacity for the (fixed seating) Sanctuary. Further review is recommended. The addition of supplemental beam supports in the crawl space would serve to increase the live load capacity.
6. A number of Main Level joists in the original church have been repaired by sistering; joist hangers have also been added where splits have developed at the mortised connections to the supporting beams (a common condition for this type of construction). FBRA recommends that hangers be provided at all Main Level joist/beam connections. Similar conditions may be present at the Upper Level floor construction as well; further review is recommended (Photo No. 3).
7. Wood subflooring of the Main Level has been replaced by  $\frac{3}{4}$ " plywood in some locations; this is structurally acceptable (Photo No. 3).
8. Steel pipe columns in the Fellowship Hall, which support the Sanctuary floor above are 2 $\frac{1}{2}$ " OD and have an unbraced length of approximately 9 $\frac{1}{2}$  feet (relatively slender). The capacity of these columns is somewhat marginal, but acceptable for the fixed seating Sanctuary use (Photo No. 4).
9. The crawl space of the original church is damp; conditions are reportedly (and understandably) worse during the Spring months. Prolonged exposure to damp conditions may ultimately damage wood framing, steel columns and/or the stone foundation walls. Consideration should be given to the installation of drains/pumps. The condition of the sill plate was not determined during the site visit; FBRA recommends that the sill plate be drilled at periodic intervals to check its condition.
10. The bases/base plates of steel columns in the crawl space have corroded, due to the above-mentioned damp conditions. FBRA recommends that these areas be mechanically cleaned and evaluated to determine if there are any structural concerns (Photo No. 5).

**IV. PHOTOGRAPHS**



Photo No. 1: Belfry and Sanctuary Roof



Photo No. 2: Queen Post Truss Joints



Photo No. 3: Fellowship Hall Floor – Sistered Joists, Plywood Subfloor and Added Joist Hangers



Photo No. 4: Slender Columns in Fellowship Hall



Photo No. 5: Corroded Column Base and Base Plate in Crawl Space

**END OF MEMORANDUM**



**C. Fire Protection Report**



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## **FIRE PROTECTION**

### **Executive Summary**

The existing building is fully sprinklered with an automatic dry type sprinkler system. The piping is generally exposed in all the finish spaces.

### **Existing Conditions:**

- The fire service enters the dirt floor basement from Central Street. The fire service is controlled by an exterior post indicating valve (PIV). The PIV is not monitored by the fire alarm system and does not have a padlock. The service has a check valve and 6" dry alarm valve. The service is not protected with a code required double check valve assembly.



*Fire service and dry alarm valve*



*Air compressor*



*Post indicator valve*

- Sprinkler piping is black steel with threaded joints. Piping is generally exposed throughout the building.
- Sprinklers are solder type, upright or vertical sidewall, heads and several show sign of corrosion.

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*Basement sprinkler*



*Vertical sidewall sprinkler*

**Recommendations**

- Due to the age of the system we would recommend full replacement. This would include new double check valve assembly on incoming service, new dry type alarm valve and air compressor.
- Due to the potential of corrosion inherent in dry sprinkler systems, we would recommend use of galvanized pipe and fitting for new systems.
- All new sprinkler heads should be quick response type in accordance with NFPA 13 standard.

**D. Plumbing Report**



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## **PLUMBING**

### **Executive Summary:**

Presently, the Plumbing Systems serving the building are cold water, hot water, sanitary, waste and vent system, and natural gas. A septic system and municipal water services the Building.

The majority of the plumbing systems are original to the building. Portions of the system have been updated as part of building renovation and upgrade projects. The plumbing fixtures are in fair condition. Attempts have been made to make bathroom fixtures accessible, however, the majority of fixtures do not meet current accessibility codes. Current Access Code requires accessible fixtures wherever plumbing is provided. In terms of the water conservation fixtures, their use is governed by the provisions of the Plumbing and Building Code. Essentially, the code does not require these fixtures to be upgraded, but where new fixtures are installed, as may be required by other codes or concerns, the new fixtures need to be water conserving type fixtures.

Cast iron is used for sanitary drainage. Majority of sanitary piping in basement looks to have been replaced at some point in past. Where visible, the cast iron pipe appears to be in fair condition. Smaller pipe sizes appear to be copper. In general, the drainage piping can be reused where adequately sized for the intended new use.

### **Fixtures:**

- The water closets are floor mounted vitreous china with flush tanks.
- Urinals are wall hung vitreous china with manually operated flush valves.
- Lavatories are wall hung vitreous china. Some lavatories have been retrofitted with metering sensor faucets. Other lavatories are fitted with hot and cold water handle faucets.
- Service sink and classroom sinks are wall mounted laundry basins. Sinks are fitted with hot and cold water deck mounted handle faucets
- Kitchen area fixtures are in fair condition. There is a pre-rinse sink and dishwasher, with both discharged to a grease interceptor. The dishwasher includes an electric booster heater (RUUD 9kW, 240 volt, 10 gallon booster heater).

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*Floor mounted tank type toilet*



*Wall hung urinal*



*Lavatory with sensor faucet*



*Kitchen sink*



*Wall hung laundry tubs*

### **Water Systems:**

The main domestic water service is located in the dirt crawl space. Water service appears to be  $\frac{3}{4}$ " in size. Service is fed from Central Street. Distribution pipe is 1" in size.

Majority of domestic water is copper tubing with sweat joints.

The garden area has an irrigation system. Irrigation system does include a reduced pressure backflow preventer for cross connection control.



*Water service & meter*

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Domestic hot water is generated by a natural gas fired tank type water heater. Water heater has a gas input of 40,000 BTUH and 40 gallons of water storage. There is no thermostatic mixing valve to prevent scalding and no expansion tank.

**Gas:**

- The building is serviced by natural gas. The gas meter is located on the exterior, on the east side of the building. The gas service appears to be supplied from Central Street.
- Gas piping is black steel with threaded joints.
- Gas supplies the water heater and kitchen oven.



*Gas meter*



*Water heater*

**Drainage Systems:**

- Cast iron is used for sanitary drainage. Where visible in crawl space it appears original cast iron piping has been replaced with no-hub cast iron pipe with no-hub coupling s. The new piping connects to the existing sanitary service which exists on the west side of the crawl space.
- There is a simplex sump pump located in the crawl space. Pump discharge is thru a flex hose then galvanized pipe. Sump is not properly covered or vented.

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- In general, the cast iron drainage piping can be reused even in a major renovation where adequately sized for the intended new use. Video inspection of any buried piping intended for reuse is recommended.



*New no-hub cast iron*



*Crawl space sump pump*

## **RECOMMENDATIONS**

- Provide new high efficiency low flow plumbing fixtures throughout building.
- Due to age of existing piping, it is recommended to install new domestic water piping throughout the building.
- Provide new gas-fired high efficiency condensing water heater with thermostatic mixing valve and expansion tank.
- Provide proper backflow prevention at Janitor's cleaning solution systems.

**E. HVAC Report**



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## HVAC

### Heating Plant:

- The heating plant consists of two gas fired steam cast iron boilers. The primary boiler is of the Peerless manufacture and the backup boiler is of the HB Smith manufacture. Both boilers have fire tube style burners. All safety components appear to be installed. Both boilers appear to be in fair condition. Each boiler has a separate breeching system utilizing galvanized sheet metal. Both exit the building through the masonry chimney. Supply and return piping appears to be schedule 40 black steel and travels throughout the building feeding fin tube radiation and cast iron radiators. Condensate return travels back to the boiler room and into a duplex pump condensate receiver which feeds into the boilers. None of the piping within the boiler room is insulated. The the crawl space piping system is not completely insulated and some of the existing insulation appears worn and damaged. Throughout the building within individual rooms, insulation is utilized; however, it is unclear whether the insulation is fiberglass or asbestos. This should be tested and verified. The majority of the insulation throughout the building is in poor condition and replacement with fiberglass insulation should be considered. Combustion air for the boilers appears to be through one opening located low on one of the walls which communicates directly to the outdoors through the use of a galvanized sheet metal duct. This one opening does not appear to be sized properly and may not be code compliant.



*Steam Boilers*



*Condensate Receiver w/ Duplex Pumps*

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*Boiler Breeching*



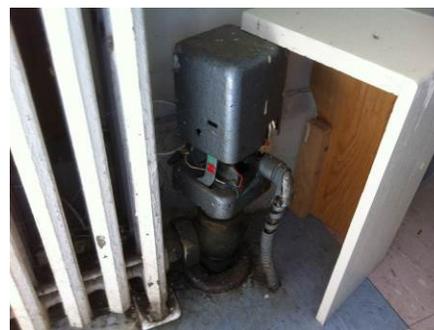
*Combustion Air Vent*

### **Control System:**

- The existing control system for each boiler is handled through the boiler manufacturer independent control panel. The boilers operate based on steam pressure and maintain 3 PSI within the system. Temperature control for individual rooms is handled through electronic wall-mounted thermostats which operate electronic control valves located on the supply side of each piece of fin tube radiation or cast iron radiator. These valves open/close based on space temperature and space set point. These settings are programmed into the thermostats and operate automatically. The majority of thermostats are of different manufacture and some appear antiquated as well as the control valves. Some of the control valves do not appear to be functioning properly due to their antiquated state.



*Typical Wall Mounted Thermostat*



*Typical Control Valve*

### **Lower Level Heating:**

- On the lower level, fin tube radiation is utilized throughout the Nursery, Classrooms and stairwells as the main heat source. Wall-mounted thermostats are located in each space and are associated with electronic control valves located within the fin tube cover. The fin tube cover and element appeared to be in fair condition. Piping insulation was soiled and damaged in many locations.

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*Typical Fin Tube Radiation*



*Typical Exposed Soiled Insulation*

**Main Level Heating:**

- On the main level, fin tube radiation is utilized throughout the offices, classrooms and bathrooms as the main heat source. Within the Fellowship Hall, storage and lower entry, cast iron radiators are utilized as the main heat source. Wall-mounted thermostats are located in each space and are associated with electronic control valves located within the fin tube cover or adjacent to the cast iron radiators. The fin tube cover and element appear to be in fair condition. The cast iron radiators appear to be in fair condition; however, consideration should be given to removal and replacement with fin tube radiation for a more even heat distribution within the space. Piping insulation was soiled and damaged in many locations. Custom wooden boxes were made to conceal the control valves associated the cast iron radiators in the Fellowship Hall. These boxes are not fastened down and could potentially allow damage to be done to the already antiquated control valves.



*Typical Cast Iron Radiator*



*Typical Fin Tube Radiation*

- Within the bathrooms, residential style ceiling exhaust fans are being utilized to provide ventilation. The fans are dirty which could affect its performance. The fans should be cleaned regularly to maintain proper air flow.

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*Typical Bathroom Radiator*



*Typical Bathroom Exhaust Fan*

### **Upper Level Heating:**

- On the upper level, fin tube radiation is utilized throughout classrooms and stairwells as the main heat source. In the sanctuary cast iron radiators, which are concealed with a perforated metal casing, are utilized as the main heat source. Wall-mounted thermostats are located in each space which are associated with electronic control valves located within the fin tube cover or adjacent to the cast iron radiators. The fin tube cover and element appeared to be in fair condition. The cast iron radiators appeared to be in fair condition; however, consideration should be given to removal and replacement with fin tube radiation for a more even heat distribution within the space. There was no piping insulation on any of the heating piping on this level.



*Typical Sanctuary Radiator*



*Typical Fin Tube Radiation*

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## **RECOMMENDATIONS**

- Provide 1-1/2" fiberglass insulation on all piping in the boiler room, crawl space, and within each space. An insulation cover should be provided in spaces where the piping system is exposed to prevent damage to the insulation.
- Consideration should be given to converting the entire steam system to hot water. The current boilers can be converted, however, pumps and an expansion tank would be required for hot water circulation and hot water expansion. All steam traps would have to be removed from the piping system to allow flow throughout the piping system.
- The entire control system should be modified to new electronic control valves which provide accurate temperature control. A standalone electronic control system can be provided which would include new wall-mounted thermostats and control valves. The accuracy and effectiveness of the newer style valves and thermostats would provide better temperature control throughout.
- Areas utilizing cast iron radiators should be upgraded to fin tube radiation. This would provide a more even heat distribution throughout the space and allow exterior infiltration to be captured at the wall.



**F. Electrical Report**



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## **ELECTRICAL**

### **Electrical Distribution System:**

- An overhead service lateral feeds the existing electrical service equipment located in the basement. The service entrance cable runs through the crawl space and terminates on a 200 amp, 120/240 volt fused switch. The main electrical service equipment is rated at 200 amps, 120/240 volt, 1 phase, 4 wire. The service equipment is in poor condition. The equipment is manufactured by Murray.



*Main Switch*



*Overhead Service Lateral*

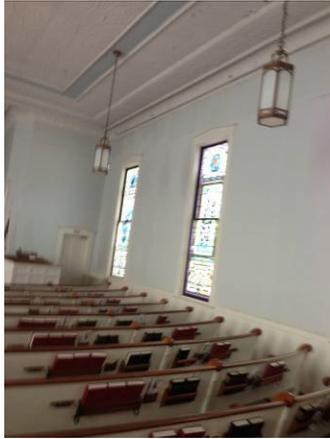
- The building is on a single meter. The equipment is obsolete and in poor condition.
- The continuous service capacity (80% of rated capacity) is 160 amperes or 38.4 kVA. The service capacity is not adequate for the addition of elevator, air conditioning or any other significant loads.
- Lighting and power panels consist of Edison base fuses and circuit breaker load centers. The equipment is obsolete.

### **Interior Lighting System:**

- Existing lighting generally consists of incandescent fixtures in the basement level. The worship area lighting is in fair condition and can be refurbished with new wiring and lamp sockets, however, the lighting level appears low. The light level appears to be below IES-NA (Illumination Engineering Society Standards – North America). Worship spaces should have lighting level between 5 to 10 footcandles. The existing light level appears to be below the 5 foot candle level. However, daylight was present during the survey. The existing light level can be increased by changing of lamps and sockets as part of refurbishment.

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- The sanctuary has switch controls for decorative lanterns. The light level appears low.



*Worship Area Lighting*



*Early Childhood Area Lighting*

- Surface fluorescent type fixtures are present in the classroom area, function room, office and adjacent spaces. The light level appears low but there is table lighting present.



*Spot Lighting at Alter*

- There are spot lights serving the alter. The lighting is in fair condition.

### **Emergency Lighting System:**

- Emergency lighting is present through battery units and illuminated exit signs. There are areas that have non-illuminated exit signs. There are also spaces with only a single head emergency light fixture. Life safety code does not allow a single bulb in an area in the event the bulb burns out.
- There is no exit discharge lighting present at egress doors.

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**Wiring Devices/Branch Circuits:**

- The majority of existing receptacles are non-grounding type. The present quantity of outlets is minimal. Light switches are loose in operation and should be replaced.



*Romex Wiring*



*Open Junction Boxes*

- The existing wiring consists of conduit, BX cable, Romex and cloth insulated cables and should be replaced. Romex is not allowed as a wiring method in places of assembly.
- Kitchen receptacles are not ground fault type.
- Light switches in worship area are in mounted at 58 1/2 inches the max height by ADA is 48 inches.

**Fire Alarm System:**

- There is a sprinkler supervisory system present. Notification is thorough an outside bell. Smoke detectors present are local type only.



*Sprinkler Supervisory System*



*Master Box*

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- CO detector and smoke detectors present are local type and not connected to the fire alarm system.

## **RECOMMENDATIONS**

### **Electrical Distribution System:**

- The existing main service needs to be completely upgraded.

### **Interior Lighting System:**

- The existing interior lighting system is in fair condition. It may not be advantageous to replace existing lighting without changes to ceilings or finishes in the spaces. The worship space fixtures shall be refurbished which includes new wiring, sockets and polishing of finish.

### **Emergency Lighting System:**

- A new emergency battery system should be provided with sufficient capacity to serve emergency lighting and exit signs. The exit signs should be provided with LED lamps installed.
- New emergency light fixtures should be installed in all egress areas such as corridors, intervening spaces, toilets and above exterior doors.

### **Wiring Devices:**

- New receptacles and switches should be installed as areas are renovated.

### **Fire Alarm System:**

- A new addressable fire alarm panel should be installed. The new system should be ADA compliant. Speaker/strobe appliances should be installed in Assembly Spaces per code requirements. Toilet rooms must be provided with fire alarm strobe lights for ADA compliance.
- The new control panel must have voice capability; fire annunciation, etc. to comply with local Fire Department requirements.

**G. Code Review and Attachments**



Meeting Date: 10 July 2013

Location: WABC

Project Name: West Acton Baptist Church

Subject: WABC Code Review Meeting

Project Number: 1213.00

Reported by: LPR

Project File:

---

Attendees: Hal Cutler – Code Consultant  
Lisa Pecora-Ryan - OMR

cc: AD

The following was discussed:

WABC Code Review Meeting:

1. 2 story wood structure building construction type is compliant because it is fully sprinklered
2. 1950's addition may be considered 2 stories even though it has 3 floors. The lowest floor could be considered a basement if:
  - a. There is less than 6' from the finish grade to the floor above
  - b. Or, taking the average grade every 5' around the building and determining if the lowest grade is within 6' of the basement level
3. Plumbing count appears to be appropriate, increased number of plumbing fixtures would only be required if an addition was added to the building that would increase the occupancy
4. Only plumbing issue is in the code requirements for the early childhood program which requires staff to have their own toilet room. The staff currently uses the single occupancy ADA toilet room adjacent to Fellowship Hall
5. Existing conditions do not need to be code compliant if the new work is less than 30% of value of the building
  - a. Less than \$100,000 of work requires only new work to be code compliant

## Meeting Report

- b. More than \$100,000 of work requires new work to be code compliant and need to provide an accessible entry, accessible toilet, (and accessible drinking fountain and phone and other items if provided for public use)
6. Over 30% of the value of the building will require full code compliance to the entire building
7. Value of building is obtained by Town Assessor (typically lower than actual value and not updated because taxes are not obtained on property). However with permission a licensed appraiser can provide an appraisal if permission is granted by the Town Authorities
8. The International Existing Building Code (IEBC) has three options for evaluating existing buildings
  - a. Prescriptive approach – Make a space comply
  - b. Work Area Approach – Space needs to comply with chapter 4 through 12 (note: Chapter 11 pertains to historic buildings)
  - c. Alternate compliance method (approach not used as much)
9. Refer to Massachusetts amendments for 2009 IEBC
10. Reconfiguration of a space will need to be complaint if more than 50% of the space is altered
  - a. Level 1 = 0% changes
  - b. Level 2 50% changes or less (don't need to make everything accessible)
  - c. Level 3 more than 50% need to be 100% accessible
11. Stairs and railings:
  - a. Can recommend to set railings at proper height but not required by code based on IEBC 705.9.1
  - b. Capacity of exits can remain at 36" wide if occupancy load does not exceed 50 (narrow stairs at the baptismal should meet code compliance.
  - c. 50 or more occupants needs to have a 44" wide stair
12. Variances are achievable when the following applies:
  - a. Physically difficulty in making a condition compliant
  - b. Economical hardships

## Meeting Report

- c. Cost benefit ratio
- 13. Repair work such as painting and wall patching should not be part of the renovation cost for the 30% ratio (if it does not need a building permit then it is considered "repair" work)
- 14. Refer to 521 CMR 3.3.1B, for ratio requirements, MEP work can be omitted if only MEP is being upgraded
- 15. Storage rooms cannot be added to the stairwells unless they open directly into a room and not into the stair
- 16. 2 story stair can remain as unenclosed at the main entry

The foregoing discussions of this meeting are recorded as understood by the writer, who should be notified of any omission or correction. Unless the writer is notified to the contrary, this report is presumed correct.

## **Applicability of Existing Building Code of MA**

This section will document the basic concepts of the application of the Existing Building Code of Massachusetts (EBCM) to existing building renovation or alteration projects. The chain of references concerning such projects begins in the Eighth Edition of the Massachusetts State Building Code (MSBC8) that consists of the 2009 Edition of the International Building Code (IBC-09) together with the MA amendments to the IBC-09.

In accordance with MSBC8 Section 3401.1, the alteration, repair, addition, and change of occupancy of existing buildings shall be controlled by the provisions of the International Existing Building Code 2009 (IEBC 2009) and its appendices as modified by Massachusetts Amendments. Those documents, taken together, are identified as the Existing Building Code of Massachusetts (EBCM). The requirements of the EBCM except those related to the structural and electrical systems are summarized below.

### **Basic EBCM Requirements**

The EBCM offers three alternatives for regulation of work in existing buildings: (1) the “Prescriptive Compliance Method”, (2) “Work Area Compliance Method” and (3) the “Performance Compliance Method”. These three approaches are considered mutually exclusive: that is, the design team must select one method and complete the requirements applicable to that method.

The first method is the “Prescriptive Compliance Method” in which repairs, alterations, additions and changes of occupancy complying with Chapter 3 of the EBCM and also complying with the International Fire Code shall be considered in compliance with the provisions of this code. In essence, this method requires that the entire work area be brought into compliance with the new building requirements of the MSBC8. For example, the fire protection systems required by MSBC8 Chapter 9, determined by the overall building aggregate area in Table 903.2, must be provided throughout the work area.

The second method is the “Work Area Compliance Method” that requires that repairs, alterations, additions, changes in occupancy and relocated buildings shall comply with the applicable requirements of Chapters 4 through 12 of the code. The Work Area Compliance Method focuses upon upgrading of the work area itself with only limited requirements outside the work area. A basic concept of this method is that the required upgrades shall be based on the level of work being done in the work area. The work area concept is discussed in detail below.

The third option is the “Performance Compliance Method” in which repairs, alterations, additions, changes in occupancy and relocated buildings shall comply with Chapter 13 of the code. The Performance Compliance Method may be considered a quantitative compliance alternative method in which a point or values system is used to evaluate the

total safety of the building. In that system, the points assigned for a feature of the building that exceeds the minimum requirements of the code for new construction is recognized as compensating for features that fall below the minimum required by strict new code compliance.

The Performance Compliance Method is most appropriately applied when some major feature of the building cannot be made to comply with the code for new construction and also when it is appropriate and easy to make a complete inventory of conditions throughout the building. The Performance Compliance Method would be unnecessarily complicated for the work in the Westfield schools.

The Work Area Compliance Method would be the most appropriate of the three options for the WABC project. That approach requires analysis of a limited number of specific existing and proposed features that must satisfy the minimum requirements specified by the Work Area Compliance Method. The details of application of that method to the current project are summarized below.

In accordance with the Massachusetts amendments to the IEBC in Section 101.5, compliance alternatives to strict code requirements for new construction may be offered by the project team and accepted by the building official.

### **Work Area and Level of Alteration Concepts**

This concept of work area and the effect of the work area on the determination of the alteration level of the EBCM are discussed below.

The three levels of alteration are defined as follows:

403.1 Scope. Level 1 alterations include the removal and replacement or the covering of existing materials, elements, equipment, or fixtures using new materials, elements, equipment, or fixtures that serve the same purpose.

404.1 Scope. Level 2 alterations include the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment.

405.1 Scope. Level 3 alterations apply where the work area exceeds 50 percent of the aggregate area of the building.

Work area is defined as follows:

**WORK AREA.** That portion or portions of a building consisting of all reconfigured spaces as indicated on the construction documents.

Work area excludes other portions of the building where incidental work entailed by the intended work must be performed and portions of the building where work not initially intended by the owner is specifically required by this code.

The phrase "excludes other portions of the building where incidental work entailed by the intended work must be performed" is intended to avoid inclusion of locations such as electrical rooms outside a work area where new connections are made for circuits in the work area where physical reconfiguration of a space takes place.

Level 1 alterations do not create work areas because, by definition, no reconfiguration of an existing building is permitted in a Level 1 project. Level 2 and 3 alterations normally involve physical reconfiguration of building spaces. The primary difference between Level 2 and 3 alterations is the size of the work area.

An ICC publications called "2009 International Existing Building Code Q&A" states the following concerning this definition:

Q1: Is a work area defined by surrounding walls of a room or space?

A1: Not necessarily. First, work area is addressed as a Level 2 or 3 alteration only. The code requires that the design professional identify the work area. The work area is the area where a space is being reconfigured. Reconfigured spaces are a rearrangement of elements of certain components within a space such as the reconstruction of walls, mechanical, or plumbing systems; filling in windows or floor spaces; and other similar reconfigurations. See Figure 2-9(1). If the owner chooses to remove a window and fill the space with solid construction closing the opening, the alteration would then be considered a Level 2 alteration due to the reconfiguration of the exterior wall. See Figure 2-9(2). [2-9]

Q2: The entire HVAC system in a building is being replaced, and the replacement will include certain changes from previous system. Is this a Level 2 alteration because it involves "reconfiguration or extension of any system"?

A2: Yes, this would be considered a Level 2 alteration in accordance with Section 404.1 since this is a reconfiguration of a system and not work-area specific. [4-9]

Q3: When a renovator is replacing an HVAC system or other system that extends throughout the building, how is the work area defined? For instance, can only an above-ceiling area be considered the work

area, or only the mechanical room, or is the entire building the work area because the system serves the entire facility?

A3: In this example, the provisions in the code related to work area do not apply. Work area applies to altered spaces of the building only, not systems such as mechanical and plumbing. Further, the identified work would be classified as a Level 2 alteration in accordance with Section 404.1. [4-10]

The referenced figures from the 2009 International Existing Building Code Q&A document are provided in Figure No. 1.

The answer to Question 3 above appears to remove areas in which only mechanical, electrical and similar work is taking place from the work area. In addition, the International Existing Building Code *Commentary* seems, in its comments on this subject, to focus on "reconfiguration" as the primary element of a work area.

Based on the definitions and discussion of the work area concept summarized above, it is concluded that the alteration level for the WABC projects will fall into Level 2. Specifically, a project that involves one-for-one replacement of windows, replacement of the heating plant and replacement of the heating system distribution equipment would be a Level 1 alteration. If the project involves creation or elimination of a window or door, demolition or construction of a wall or installation of new equipment, the project would be classified as a Level 2 alteration.

Based on the potential addition of new equipment some of which utilizes different technical concepts rather than simple replacement of equipment in kind, it is concluded that the projects in all schools will be Level 2 Alterations. The requirements of EBCM Chapter 6 concerning Level 1 Alterations are summarized in Section 3. The requirements of EBCM Chapter 7 concerning Level 2 Alterations are summarized in Section 4.

Under no circumstances is it anticipated that any of the school projects would rise to the level of a Level 3 alteration.

### **Other Work Area Compliance Method Requirements**

The "Work Area Compliance Method" requires that repairs, alterations, additions, changes in occupancy and relocated buildings shall comply with the applicable requirements of Chapters 4 through 12 of the code. The provisions of Chapter 4 (classification of work), Chapter 6 (Level 1 alterations) and Chapter 7 (Level 2 alterations) except those requirements related to the structural system are summarized above and in Sections 3 and 4.

Requirements concerning the structural system for Level 2 work are provided in Sections 606 and 707. Both of those sections are modified by the MSBC8 amendments of the IEBC.

The applicability of the requirements of the other chapters of the Work Area Compliance Method are summarized below:

- Chapter 5 concerning repairs will be applicable to existing building features that are to be simply maintained as part of the current project.
- Chapter 8 concerning Level 3 Alterations is not applicable because the current project does not involve more than 50% of the areas of the individual building.
- Chapter 9 concerning change of occupancy is not applicable as there will be no change of occupancy in any of the buildings as a result of the current project.
- Chapter 10 is not applicable as there will currently no addition to any of the buildings as part of the current project.
- Chapter 11 is applicable as the buildings is a historic building.
- Chapter 12 is not applicable as the as none of the buildings is to be moved or relocated.

## Applicability of Accessibility Requirements

The regulations of the Massachusetts Architectural Access Board (MAAB) are found in 521 Code of Massachusetts Regulations (521 CMR). This analysis is based on the edition of those regulations dated January 27, 2006.

The WABC project team will appoint a person who will be responsible for enforcement of the Massachusetts access regulations. Variances from the regulation or appeals of the decisions of the inspector may be made to the state Architectural Access Board.

Two sections of the regulation combine to determine the extent of upgrading of the space required. That determination is based on the dollar cost of the work being done in the building and on the full and fair cash value of the building. In some cases, the type of work being done is also a factor.

The full and fair cash value of the building is defined in 521 CMR as the 100% equalized assessed valuation. Where the assessed value is inaccurate or out of date, an alternative basis for determining the full and fair cash values of a building may be allowed but must be confirmed by the Architectural Access Board.

The criteria from Section 521 CMR 3.3 for determining the applicability of the regulations are as follow:

3.3.1 If the work being performed amounts to less than 30% of the *full and fair cash value* of the *building* and

a. if the work costs less than \$100,000, then only the work being performed is required to comply with 521 CMR

or

b. if the work costs \$100,000 or more, then the work being performed is required to comply with 521 CMR. In addition, an accessible public entrance and an accessible toilet room, telephone, drinking fountain (if toilets, telephones and drinking fountains are provided) shall also be provided in compliance with 521 CMR.

Exception 1: General maintenance and on-going upkeep of existing, underground transit facilities will not trigger the requirement for an accessible entrance and toilet unless the cost of the work exceeds \$500,000 or unless work is being performed on the entrance or toilet.

Exception 2: Whether performed alone or in combination with each other, the following types of alterations are not subject to 521 CMR 3.3.1, unless the cost of the work exceeds \$500,000 or unless work is being performed on the entrance or toilet. (When performing exempted work, a memo stating the exempted work and its costs

must be filed with the permit application or a separate building permit must be obtained.)

- a. Curb Cuts: The construction of curb cuts shall comply with 521 CMR 21.00: CURB CUTS.
- b. Alteration work which is limited solely to electrical mechanical, or plumbing systems; to abatement of hazardous materials; or retrofit of automatic sprinklers and does not involve the alteration of any elements or spaces required to be accessible under 521 CMR. Where electrical outlets and controls are altered, they must comply with 521 CMR.
- c. Roof repair or replacement, window repair or replacement, repointing and masonry repair work.
- d. Work relating to septic system repairs, (including Title V, 310 CMR 15.00, improvements) site utilities and landscaping.

3.3.2 If the work performed, including the exempted work, amounts to 30% or more of the full and fair cash value (see 521 CMR 5.00) of the building the entire building is required to comply with 521 CMR.

- a. Where the cost of constructing an addition to a building amounts to 30% or more of the full and fair cash value of the existing building, both the addition and the existing building must be fully accessible.

521 CMR: ARCHITECTURAL ACCESS BOARD

521 CMR 3.00: **JURISDICTION**

**3.1 SCOPE**

All work performed on *public buildings or facilities* (see **521 CMR 5.00: DEFINITIONS**), including *construction, reconstruction, alterations, remodeling, additions, and changes of use* shall conform to 521 CMR.

3.1.1 To determine the scope of compliance, refer to **521 CMR 3.2, New Construction** and **521 CMR 3.3, Existing Buildings**. In the absence of jurisdiction by 521 CMR, 780 CMR: the State Building Code may apply.

**3.2 NEW CONSTRUCTION**

All new construction of *public buildings/facilities* shall comply fully with 521 CMR.

**3.3 EXISTING BUILDINGS**

All *additions to, reconstruction, remodeling, and alterations or repairs* of existing *public buildings or facilities*, which require a building permit or which are so defined by a state or local inspector, shall be governed by all applicable subsections in **521 CMR 3.00: JURISDICTION**.

For specific applicability of 521 CMR to existing multiple dwellings undergoing renovations, see **521 CMR 9.2.1**.

3.3.1 If the work being performed amounts to less than 30% of the *full and fair cash value* of the *building* and

a. if the work costs less than \$100,000, then only the work being performed is required to comply with 521 CMR

or

b. if the work costs \$100,000 or more, then the work being performed is required to comply with 521 CMR. In addition, an *accessible public entrance* and an *accessible toilet room, telephone, drinking fountain* (if toilets, telephones and drinking fountains are provided) shall also be provided in compliance with 521 CMR.

Exception: General maintenance and on-going upkeep of existing, underground transit facilities will not trigger the requirement for an *accessible entrance* and toilet unless the cost of the work exceeds \$500,000 or unless work is being performed on the *entrance* or toilet.

Exception: Whether performed alone or in combination with each other, the following types of *alterations* are not subject to **521 CMR 3.3.1**, unless the cost of the work exceeds \$500,000 or unless work is being performed on the entrance or toilet. (When performing exempted work, a memo stating the exempted work and its costs must be filed with the permit application or a separate building permit must be obtained.)

a. Curb Cuts: The construction of *curb cuts* shall comply with **521 CMR 21.00: CURB CUTS**.

## 521 CMR: ARCHITECTURAL ACCESS BOARD

## 3.00: JURISDICTION

- b. *Alteration* work which is limited solely to electrical mechanical, or plumbing systems; to abatement of hazardous materials; or retrofit of automatic sprinklers **and** does not involve the *alteration* of any *elements* or *spaces* required to be *accessible* under 521 CMR. Where electrical outlets and controls are altered, they must comply with 521 CMR.
- c. Roof repair or replacement, window repair or replacement, repointing and masonry repair work.
- d. Work relating to septic system repairs, (including Title V, 310 CMR 15.00, improvements) site utilities and landscaping.

3.3.2 If the work performed, including the exempted work, amounts to 30% or more of the *full and fair cash value* (see **521 CMR 5.00**) of the *building* the entire *building* is required to comply with 521 CMR.

- a. Where the cost of constructing an *addition* to a building amounts to 30% or more of the *full and fair cash value* of the existing *building*, both the *addition* and the existing *building* must be fully *accessible*.

3.3.3 Alterations by a tenant do not trigger the requirements of **521 CMR 3.3.1b and 3.3.2** for other tenants. However, *alterations, reconstruction, remodeling, repairs, construction, and changes in use* falling within **521 CMR 3.3.1b and 3.3.2**, will trigger compliance with **521 CMR** in areas of *public use*, for the owner of the *building*.

3.3.4 No *alteration* shall be undertaken which decreases or has the effect of decreasing accessibility or usability of a *building* or *facility* below the requirements for new *construction*.

3.3.5 If *alterations* of single *elements*, when considered together, amount to an alteration of a room or *space* in a *building* or *facility*, that *space* shall be made *accessible*.

3.3.6 No *alteration* of an existing *element*, *space*, or area of a *building* or *facility* shall impose a requirement for greater accessibility than that which would be required for new *construction*.

### 3.4 CHANGE IN USE

When the use of a *building* changes from a private use to one that is open to and used by the public, an *accessible entrance* must be provided, even if no work is being performed. When a portion of a *building* changes use from a private use to one that is open to and used by the public, then an *accessible route* must be provided from an *accessible entrance* even if no work is being performed.

3.4.1 RESERVED FOR FUTURE ACTION: Changes in use, from private to public, in private residential homes where no work is being performed.

### 3.5 WORK PERFORMED OVER TIME

When the work performed on a *building* is divided into separate phases or projects or is under separate *building* permits, the total cost of such work in any 36 month period shall be added together in applying **521 CMR 3.3, Existing Buildings**.

## 521 CMR: ARCHITECTURAL ACCESS BOARD

## 3.00: JURISDICTION

## 3.6 MULTIPLE USES

When a *building* is occupied by two or more uses, the Regulations which apply to each use shall apply to such parts of the *building* within that *use*.

3.6.1 521 CMR 3.3, Existing Buildings shall apply based upon each *use* and not on the entire *building*.

Example: If a three story *building* valued at \$300,000 has one floor of retail *use* and two floors of residential *use*, the *full and fair cash value* of the retail portion shall be 1/3 of the total value which would be \$100,000.

## 3.7 PARTIAL APPLICATION

When only a portion of a *building* is subject to 521 CMR, the *full and fair cash value* shall be prorated by the ratio of the square footage of that portion to the square footage of the whole *building*.

Example: Where the whole *building* is 100,000 square feet, the *full and fair cash value* is \$1,000,000, and the part subject to 521 CMR is 10,000 square feet (one-tenth of the total), then the *full and fair cash value* of the part subject to 521 CMR would be one-tenth of \$1,000,000 or \$100,000.

3.7.1 If the *Board* determines that such prorating would cause an inequitable result, the *Board* may otherwise calculate the *full and fair cash value* of the portion of the *building*.

## 3.8 OUTDOOR FACILITIES

For facilities where the *primary function areas* are outdoors, including but not limited to beaches, parks, picnic areas, playgrounds, and campsites, the *full and fair cash value* shall include the value of the land as well as any *buildings* or *facilities* on the land.

## 3.9 HISTORIC BUILDINGS

An historic *building* or *facility* that is listed or is eligible for listing in the National or State Register of Historic Places or is designated as historic under appropriate state or local laws may be granted a *variance* by the *Board* to allow alternate accessibility. If a *variance* is requested on the basis of historical significance, then consultation with the Massachusetts Historical Commission is required in order to determine whether a building or facility is eligible for listing or listed in the National or State Register of Historic Places. The Massachusetts Historical Commission may request a copy of the proposed *variance* request and supporting documentation to substantiate the *variance* request and its effect on historic resources. A written statement from the Massachusetts Historical Commission is required with the application for *variance*.

West  
Entry

## 3.10 TEMPORARY STRUCTURES

Temporary *buildings* or *facilities*, including but not limited to reviewing stands, temporary classrooms, bleacher areas, exhibit areas, temporary banking facilities, temporary health screening services, or temporary pedestrian passageways around a *construction site*, shall comply with 521 CMR. Structures, *sites* and equipment directly associated with the actual processes of *construction*, such as scaffolding, bridging, materials hoists, or *construction* trailers, need not apply.

**3.00: JURISDICTION**

**3.11 SECURITY STRUCTURES**

Accessibility is not required to observation galleries used primarily for security purposes.

**3.12 NON-OCCUPIABLE SPACES**

Spaces accessed only by ladders, catwalks, crawl spaces, or freight (non-passenger) elevators, and frequented only by service personnel for repair purposes, are exempt. Such spaces may include, but are not limited to, elevator pits, elevator penthouses, piping or equipment catwalks.

521 CMR: ARCHITECTURAL ACCESS BOARD

521 CMR 25.00: ENTRANCES

25.1 GENERAL

All public *entrance(s)* of a *building* or tenancy in a *building* shall be *accessible*. Public *entrances* are any *entrances* that are not solely *service entrances*, *loading entrances*, or *entrances* restricted to employee use only.

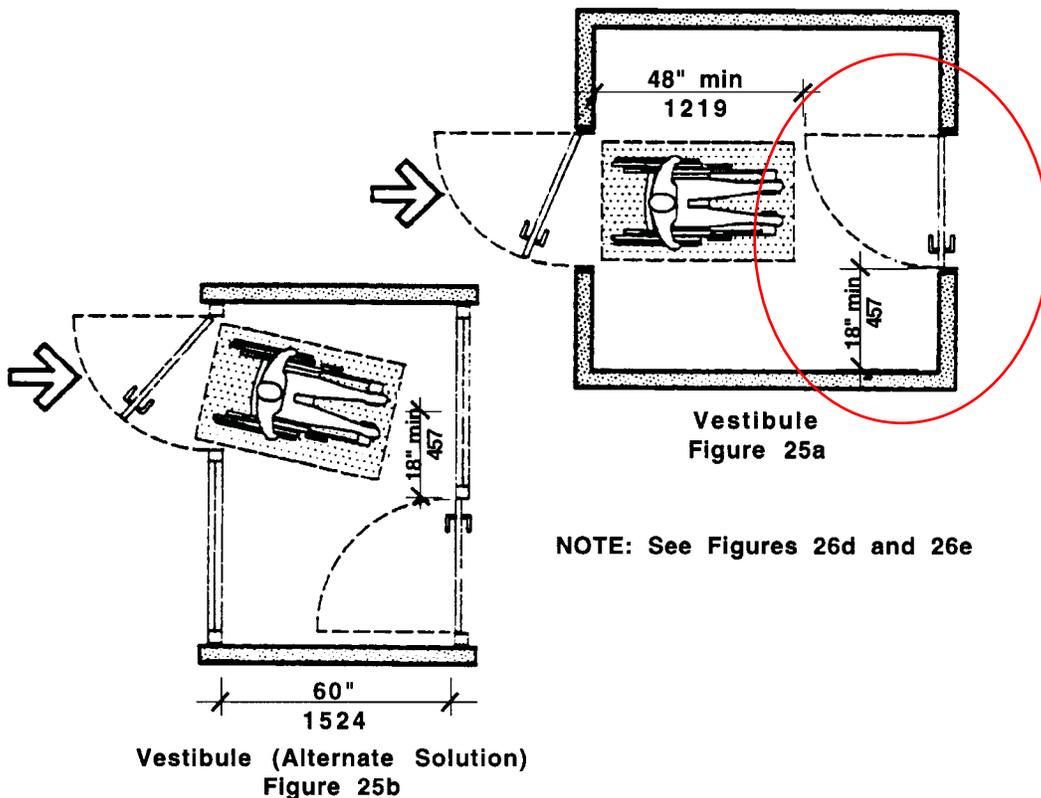
25.1.1 *Service entrances*: If the only *entrance* to a *building*, or tenancy in a *facility*, is a *service entrance*, that *entrance* shall be *accessible*.

25.2 APPROACH

The approach to an *accessible entrance* shall be a paved *walk* or *ramp* with a slip resistant surface, uninterrupted by steps. *Entrance(s)* shall have a *level space* on the interior and exterior of the *entrance doors* complying with **Fig. 25a and 25b**.

25.3 VESTIBULES

Between any two hinged or pivoted doors, there shall be a minimum of 48 inches (48" = 1219mm) plus the width of any door swinging into the space. See **Fig. 25a and 25b**.

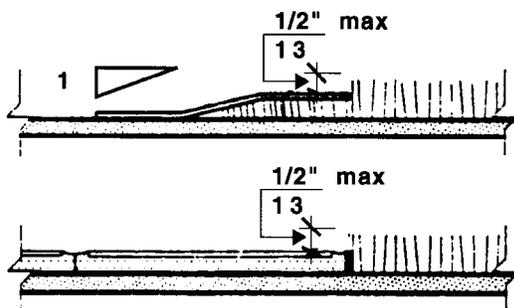
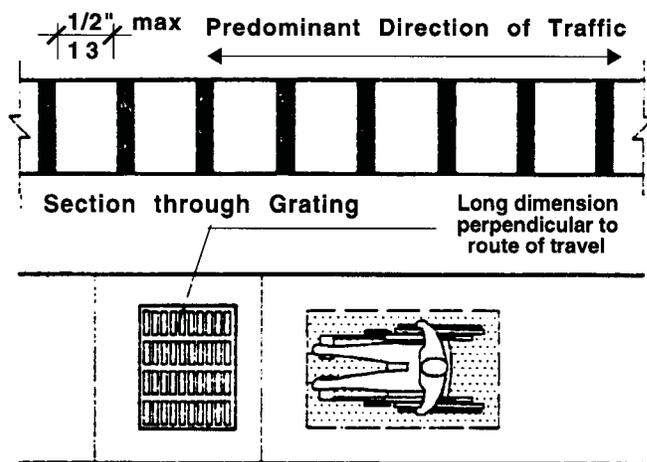


521 CMR: ARCHITECTURAL ACCESS BOARD

25.00: ENTRANCES

25.4 MATS AND GRATES

Door mats ½ inch (½" = 13mm) thick or less shall be securely anchored at all edges to avoid tripping. Door mats between ¼ inch (¼" = 6mm) and ½ inch (½" = 13mm) thick must be secured with beveled edging that slopes no more than 1:2 (50%). Door mats thicker than ½ inch (½" = 13mm) shall be recessed. Grates shall have openings not exceeding ½ inch (½" = 13mm) in the path of travel. See Fig. 25c.



Grates and Mats  
Figure 25c

25.5 PROTRUDING OBJECTS

Objects that protrude into entranceways, (suspended lights, signs, fixtures, door closers, etc.) shall comply with 521 CMR 20.6, Protruding Objects.

25.6 SIGNAGE

Any entrance/exit of a facility not accessible by persons in wheelchairs shall have a sign clearly indicating the location of the accessible entrance/exit.

521 CMR: ARCHITECTURAL ACCESS BOARD

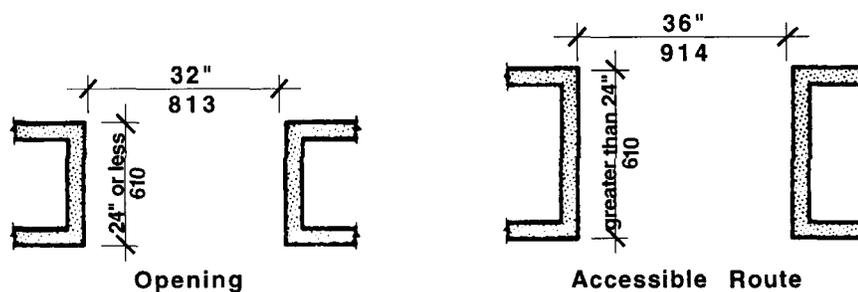
521 CMR 26.00: **DOORS AND DOORWAYS**

26.1 **GENERAL**

All doors and openings along *accessible routes* shall comply with the following requirements.

26.1.1 Gates, including ticket gates, shall also comply with 521 CMR 26.00.

Exceptions: Openings greater than 24 inches (24" = 610mm) in depth are not doorways but may be part of an *accessible route*, in which case they shall comply with **521 CMR 20.00: ACCESSIBLE ROUTES** and **521 CMR 24.00: RAMPS** (See **Fig. 26a**). Doors not requiring full user passage, such as shallow closets, may have the *clear* opening reduced to 20 inches (20" = 508mm) minimum, See **521 CMR 9.5.8, Closets**.



**Openings and Accessible Routes**  
**Figure 26a**

26.1.2 In buildings classified in the assembly use and educational use (See **780 CMR 302.0**) with an occupancy of over 150 (See **521 CMR 14.1.1**), all required egress doors which lead directly to the outside at grade, shall be made accessible at the exterior as well as the interior so as to provide a safe path of travel to a public way for persons who are disabled. Such egress doors shall be provided with illuminated signage identifying accessibility by the use of the international symbol contained within the "exit" sign (See **521 CMR 41.1.3**)

West  
Entry

26.2 **REVOLVING DOORS**

Revolving doors shall not be the only means of passage at an *accessible entrance* or along an *accessible route* unless the revolving door is also *accessible*. An *accessible* door shall be provided adjacent to a revolving door and shall permit the same use pattern.

26.2.1 Whenever the revolving doors are unlocked, the adjacent *accessible* door shall be unlocked.

26.2.2 The adjacent *accessible* door must have hardware that allows *entrance* into the building as well as *egress*.

26.3 **TURNSTILES**

Turnstiles shall not be the only means of passage at an *accessible entrance* or along an *accessible route*. An *accessible* gate shall be provided adjacent to the turnstile and shall be designed to permit the same use pattern, complying with **521 CMR 26.2.1** and **26.2.2**.

521 CMR: ARCHITECTURAL ACCESS BOARD

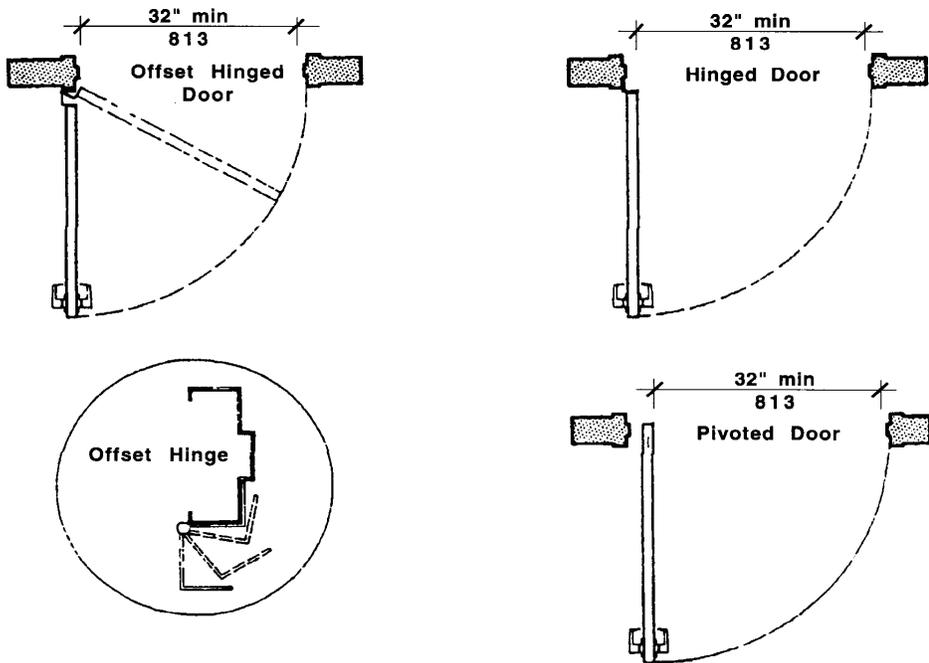
26.00: DOORS AND DOORWAYS

26.4 **DOUBLE-LEAF DOORWAYS**

A doorway having two independently operated door leaves shall have at least one leaf that meets the requirements of **521 CMR 26.5, Width** and **521 CMR 26.6, Maneuvering Clearance**. That leaf shall be an active leaf.

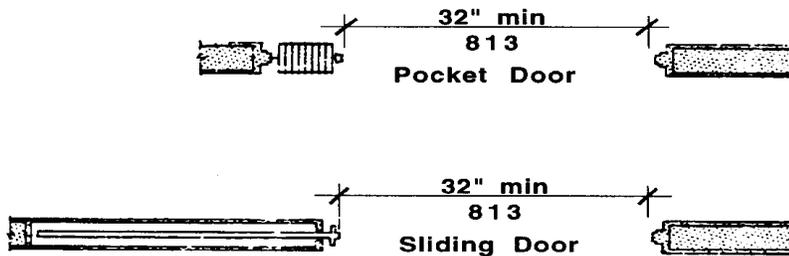
26.5 **WIDTH**

All doorways and openings that are required to be *accessible* shall have a *clear* opening of not less than 32 inches (32" = 813mm). *Clear* opening of a door is measured from the face of the stop on the latch side to the face of the door when the door is open 90 degrees. For door types such as bifold, accordion, and pocket, the *clear* opening is measured when the door is in its most fully open position. See **Fig. 26b** and **26c**.



Clear Opening  
Figure 26b

NOTE: A standard 36 inch (36" = 914mm) door with a standard hinge, will produce a *clear* opening of at least 32 inches (32" = 813mm).



Clear Opening - sliding doors  
Figure 26c

521 CMR: ARCHITECTURAL ACCESS BOARD

26.00: DOORS AND DOORWAYS

26.6 MANEUVERING CLEARANCE

A minimum *clear* floor area shall be provided on both sides of all doors and gates.

Exception: Doors equipped with automatic opening devices are exempt from 521 CMR 26.6.3, 26.6.4 and 26.8

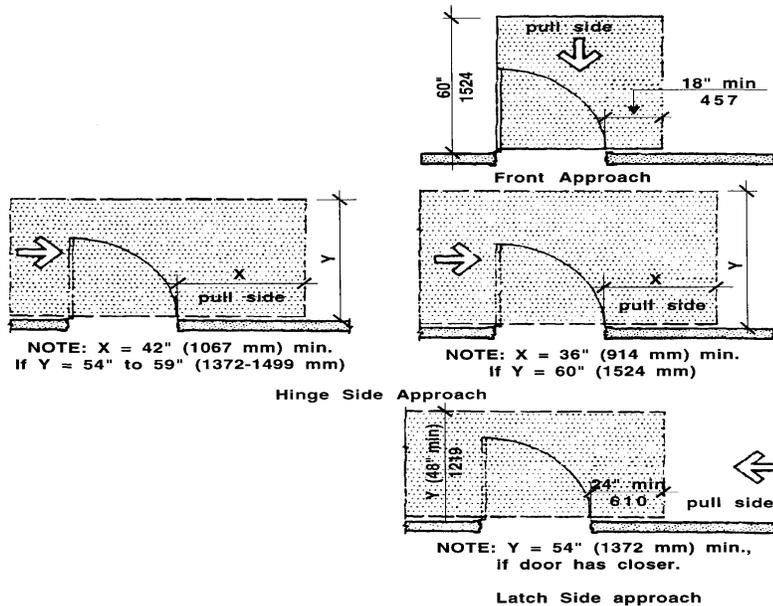
26.6.1 The floor or ground area within the required clearances shall be *level*.

26.6.2 Doors located in a recess of more than 6 inches (6"=152mm) deep shall have *clear floor space* as required in **521 CMR, Section 26.6.3 and 521 CMR Section 26.6.4**. Said *clear floor space* shall be measured within 6 inches (6"=152mm) of the door.

26.6.3 Pull side clearance shall comply with the following:

- a. A minimum of 18 inches (18" = 457mm) of *clear floor space* shall be provided on the latch, pull side of the door when the *clear floor space* in front of the door is a minimum of 60 inches (60" = 1524mm). see **Fig. 26d**.
- b. A minimum of 42 inches (42" = 10667mm) of *clear floor space* shall be provided on the latch, pull side of the door when the *clear floor space* in front of the door is more than 54 inches (54" = 1372mm) but less than 60 inches (60" = 1524mm) see **Fig. 26g**.
- c. A minimum of 24 inches (24" = 610mm) of clear floor space shall be provided on the latch, pull side of the door when the clear floor space in front of the door is a minimum of 54 inches (54"= 1372mm) and the door has a closer. see **Fig. 26d**.

Pull side clearance shall comply with **Fig. 26d**.



NOTE: X = 42" (1067 mm) min.  
If Y = 54" to 59" (1372-1499 mm)

NOTE: X = 36" (914 mm) min.  
If Y = 60" (1524 mm)

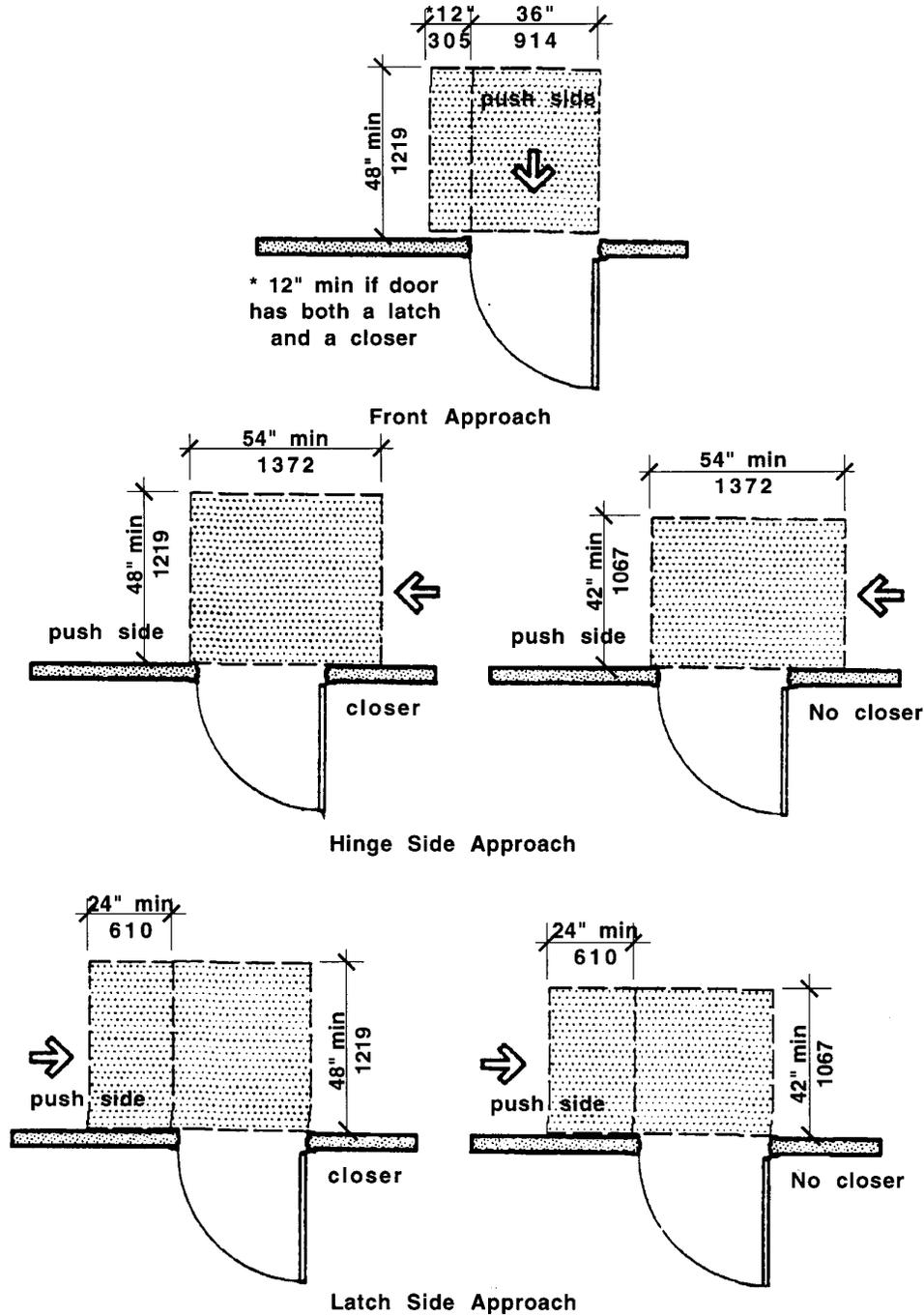
NOTE: Y = 54" (1372 mm) min.,  
if door has closer.

Maneuvering Clearance at Doors (Pull Side)  
Figure 26d

521 CMR: ARCHITECTURAL ACCESS BOARD

26.00: DOORS AND DOORWAYS

26.6.4 Push side clearance shall comply with Fig. 26e.

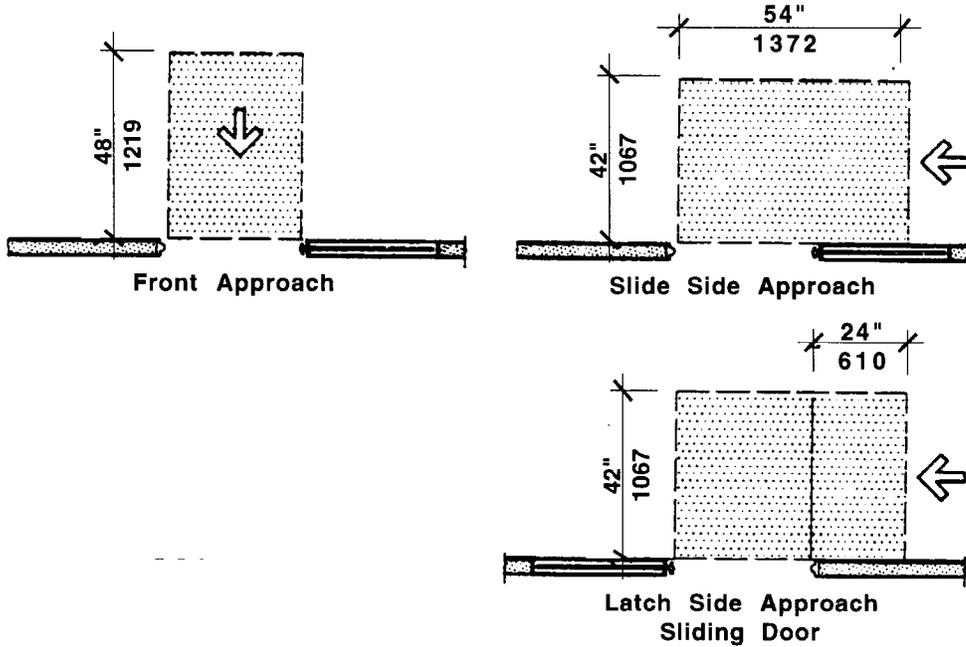


Maneuvering Clearance at Doors (Push Side)  
Figure 26e

521 CMR: ARCHITECTURAL ACCESS BOARD

26.00: DOORS AND DOORWAYS

26.6.5 Clearance for sliding door shall comply with **Fig. 26f**.



**Maneuvering Clearances at Sliding Doors  
Figure 26f**

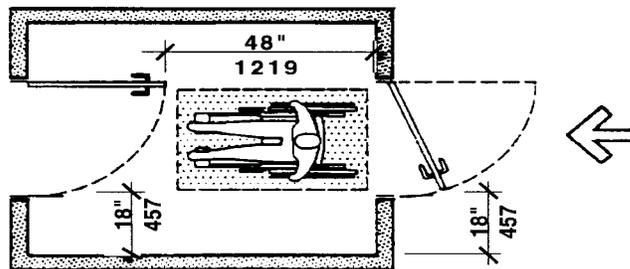
26.6 **MANEUVERING CLEARANCE**

A minimum *clear* floor area shall be provided on both sides of all doors and gates:

Exception: Doors equipped with automatic opening devices are exempt from **521 CMR 26.6.3, 26.6.4 and 26.8**

26.7 **TWO DOORS IN SERIES**

The minimum *space* between two hinged or pivoted doors in series shall be 48 inches (48" = 1219mm) plus the width of any door swinging into the *space*. Doors in series shall swing either in the same direction or away from the *space* between the doors. See **Fig. 26g**.



**Vestibule Clearances  
Figure 26g**

## 521 CMR: ARCHITECTURAL ACCESS BOARD

## 26.00: DOORS AND DOORWAYS

## 26.8 DOOR OPENING FORCE

The maximum force for pushing or pulling open a door shall be as follows:

26.8.1 Doors: These forces apply only to opening the door, not to the effort required to retract latch bolts or disengage other devices that may hold the door in a closed position.

- a. exterior hinged doors: 15 lbs.
- b. interior hinged doors: five lbs.
- c. sliding or folding doors: five lbs.

Exception: Fire doors shall have the minimum opening force allowable by the appropriate *administrative authority*.

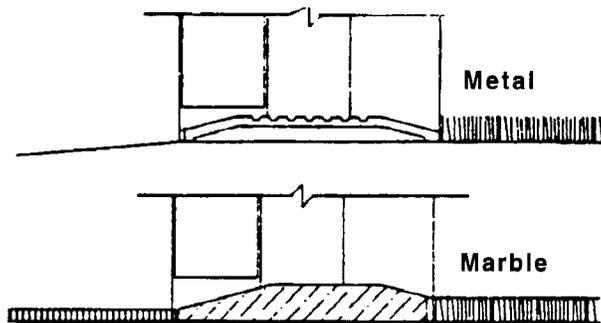
26.8.2 Compensating devices: Doors requiring greater force shall be equipped with compensating devices to reduce the operating force, or shall be equipped with automatic opening devices.

## 26.9 DOOR CLOSERS

If a door has a closer, then the sweep period of the closer shall be adjusted so that from an open position of 90 degrees, the door will take at least six seconds to close.

## 26.10 THRESHOLDS

Thresholds at doorways shall comply with the following (*See Fig. 26h*):



**Thresholds**  
**Figure 26h**

26.10.1 Thresholds shall not exceed  $\frac{1}{2}$  inch ( $\frac{1}{2}$ " = 13mm) in height and shall be beveled on both sides with a slope no greater than one-in-two (1:2) (50%).

26.10.2 Changes in floor finish materials shall have an edge strip or threshold that is beveled at a ratio of one-in-two (1:2) (50%).

521 CMR: ARCHITECTURAL ACCESS BOARD

**26.00: DOORS AND DOORWAYS**

26.10.3 Exterior sliding door thresholds shall not exceed  $\frac{3}{4}$  of an inch ( $\frac{3}{4}$ " = 19mm) in height and shall be beveled both sides with a slope no greater than one-in-four (1:4) (25%).

**26.11 DOOR HARDWARE**

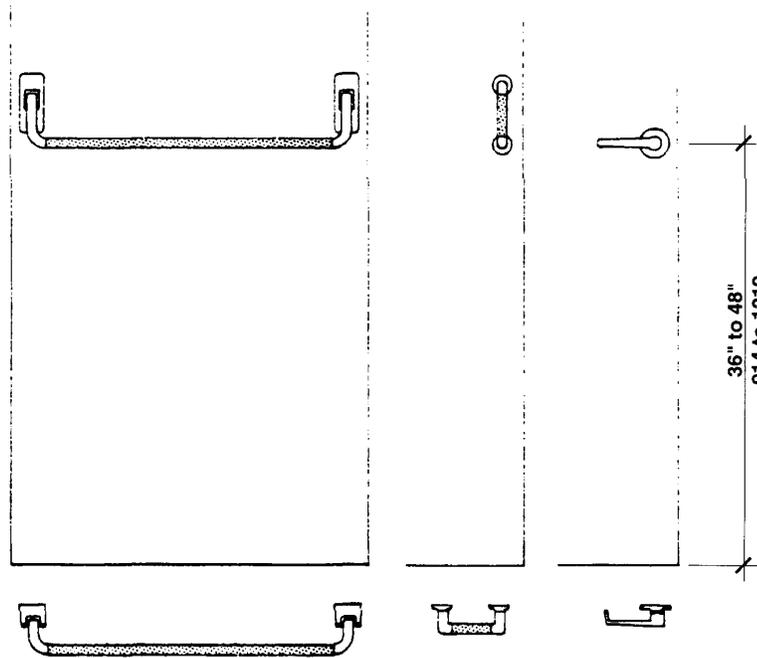
Shall comply with the following:

26.11.1 Type: Handles, pulls, latches, locks, and other operating devices on *accessible* doors shall have a shape that is easy to operate with one hand and that does not require tight grasping, tight pinching, or twisting of the wrist to operate. Lever-operated mechanisms, push-type mechanisms, and U-shaped handles are acceptable designs. When sliding doors are fully open, operating hardware shall be exposed and usable from both sides.

26.11.2 Height: Hand-operated door opening hardware shall be located 36 inches to 48 inches (36" to 48" = 914mm to 1219mm) above the floor. See **Fig. 26i**

26.11.3 Operation: Doors in the *means of egress* shall be operable with one hand and with a single effort. Doors in the paths of ingress shall be able to be unlocked and opened with one hand.

26.11.4 Special hardware: Doors opening into hazardous areas shall have door-opening hardware which is knurled or has a roughened surface to give tactile warning to persons with visual impairments. Hazardous areas shall include but not be limited to loading platforms, boiler rooms, and electrical equipment rooms.



Door Hardware  
Figure 26i

521 CMR: ARCHITECTURAL ACCESS BOARD

521 CMR 16.00: **HOUSES OF WORSHIP**

16.1 **GENERAL**

Houses of worship shall comply with 521 CMR, except as specified or modified in 521 CMR 16.00. Houses of worship include but are not limited to churches, chapels, temples, synagogues and mosques. *Spaces* that must be accessible include those areas open to the congregation, administrative offices, and religious meeting halls and classrooms.

Exception: Day care centers located in houses of worship are educational facilities and shall comply with **521 CMR 12.00: EDUCATIONAL FACILITIES**.

16.2 **NUMBER OF ACCESSIBLE SEATS**

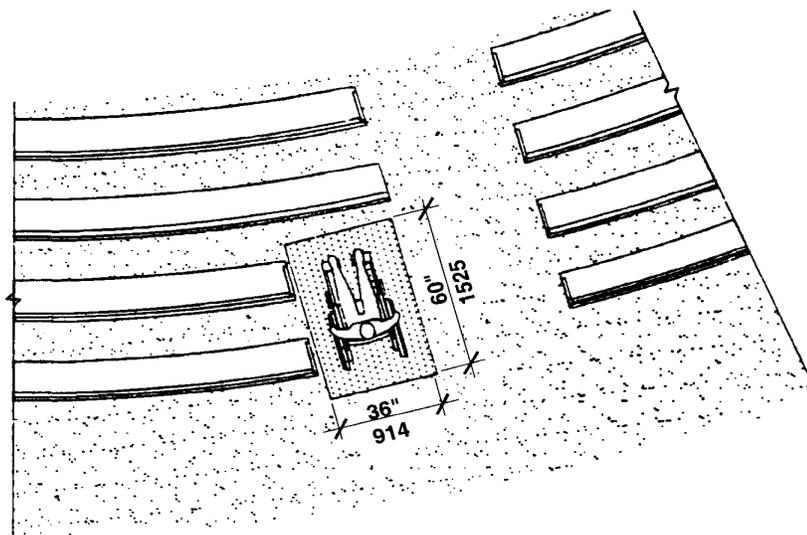
Shall comply with the following:

16.2.1 *Wheelchair spaces:* In houses of worship with fixed seating, the minimum number of *accessible spaces* shall be computed in accordance with the following table.

<u>Total Seating</u>	<u>Wheelchair Spaces</u>
4 to 25	1
26 to 50	2
51 to 300	4
301 to 500	6
over 500	6, plus 1 additional space for each seating capacity increase of 100

16.3 **ACCESSIBLE SPACE**

Each wheelchair *space* shall be 60 inches (60" = 1524mm) long and 36 inches (36" = 914mm) wide, shall be *level*, and shall comply with **521 CMR 29.00: FLOOR SURFACES**. See Fig. 16a.



**Wheelchair Seating Spaces**  
**Figure 16a**

## 521 CMR: ARCHITECTURAL ACCESS BOARD

16.00: **HOUSES OF WORSHIP**16.4 **PLACEMENT OF WHEELCHAIR SPACES**

Wheelchair *spaces* shall be an integral part of any fixed seating plan.

16.4.1 **Distribution:** Wheelchair spaces shall be proportionally distributed to provide people with physical disabilities a choice of lines of sight comparable to those for members of the general public.

16.4.2 **Accessible Route:** Wheelchair *spaces* shall adjoin, but in no way interfere with, an *accessible route* that also serves as a *means of egress* in case of emergency.

16.4.3 **Companion seats:** At least one companion fixed seat shall be provided next to each wheelchair seating area.

16.4.4 **Removable seats or pews:** Readily removable seats or sections of pews may be installed in wheelchair *spaces* when the spaces are not required to accommodate wheelchair users.

16.5 **ASSISTIVE LISTENING SYSTEMS**

Where audible communication is integral to the *use* of the *space*, the *space* shall comply with the following:

16.5.1 An *assembly* area shall have a permanently installed *assistive listening system* if:

- a. the *assembly* area accommodates at least 50 persons, has an audio-amplification system; and
- b. it has fixed seating.

16.5.2 For other *assembly* areas, a permanently installed *assistive listening system*, or a portable listening system and an adequate number of electrical outlets or other supplementary wiring necessary to support a portable assistive listening system, shall be provided. The minimum number of receivers to be provided shall be equal to 4% of the total number of seats, but in no case less than two receivers.

16.5.3 **Placement of Assistive Listening Systems:** If the *assistive listening system* serves individual fixed seats, then such seats shall be located within a 50 foot (50' = 15m) viewing distance of the speaker's podium and shall have a complete view of the podium. The *assistive listening system* should serve all participants whether seated in balconies, among the general audience or upon the altar and the podium areas.

16.5.4 **Signage** shall be installed to notify patrons of the availability of a listening system and shall comply with **521 CMR 41.00: SIGNAGE**.



Chapter

**6**

**Physical Facilities**

**Parts**

- 6-1 MATERIALS FOR CONSTRUCTION AND REPAIR
- 6-2 DESIGN, CONSTRUCTION, AND INSTALLATION
- 6-3 NUMBERS AND CAPACITIES
- 6-4 LOCATION AND PLACEMENT
- 6-5 MAINTENANCE AND OPERATION

**6-1 MATERIALS FOR CONSTRUCTION AND REPAIR**

**Subparts**

- 6-101 Indoor Areas
- 6-102 Outdoor Areas

**Indoor Areas**

**6-101.11 Surface Characteristics.**

(A) Except as specified in ¶ (B) of this section, materials for indoor floor, wall, and ceiling surfaces under conditions of normal use shall be:

- (1) SMOOTH, durable, and EASILY CLEANABLE for areas where FOOD ESTABLISHMENT operations are conducted;
- (2) Closely woven and EASILY CLEANABLE carpet for carpeted areas; and
- (3) Nonabsorbent for areas subject to moisture such as FOOD preparation areas, walk-in refrigerators, WAREWASHING areas, toilet rooms, mobile FOOD ESTABLISHMENT SERVICING AREAS, and areas subject to flushing or spray cleaning methods.

**REFERENCE FOR COMMERCIAL KITCHEN REQUIREMENTS**

*(1) If graded to drain, a floor may be concrete, machine-laid asphalt, or dirt or gravel if it is covered with mats, removable platforms, duckboards, or other suitable APPROVED materials that are effectively treated to control dust and mud; and*

*(2) Walls and ceilings may be constructed of a material that protects the interior from the weather and windblown dust and debris.*

**Outdoor Areas**

**6-102.11 Surface Characteristics.**

**(A) The outdoor walking and driving areas shall be surfaced with concrete, asphalt, or gravel or other materials that have been effectively treated to minimize dust, facilitate maintenance, and prevent muddy conditions.**

**(B) Exterior surfaces of buildings and mobile FOOD ESTABLISHMENTS shall be of weather-resistant materials and shall comply with LAW.**

**(C) Outdoor storage areas for REFUSE, recyclables, or returnables shall be of materials specified under §§ 5-501.11 and 5-501.12.**

<b>6-2</b>	<b>DESIGN, CONSTRUCTION, AND INSTALLATION</b>	
	<i>Subparts</i>	
	<b>6-201</b>	<b>Cleanability</b>
	<b>6-202</b>	<b>Functionality</b>

**Cleanability**

**6-201.11 Floors, Walls, and Ceilings.**

**Except as specified under § 6-201.14, the floors, floor coverings, walls, wall coverings, and ceilings shall be designed, constructed, and installed so they are SMOOTH and EASILY CLEANABLE, except that antislip floor coverings or applications may be used for safety reasons.**

**6-201.12 Floors, Walls, and Ceilings, Utility Lines.**

(A) Utility service lines and pipes may not be unnecessarily exposed.

(B) Exposed utility service lines and pipes shall be installed so they do not obstruct or prevent cleaning of the floors, walls, or ceilings.

(C) Exposed horizontal utility service lines and pipes may not be installed on the floor.

**6-201.13 Floor and Wall Junctures, Coved, and Enclosed or Sealed.**

(A) In FOOD ESTABLISHMENTS in which cleaning methods other than water flushing are used for cleaning floors, the floor and wall junctures shall be coved and closed to no larger than 1 mm (one thirty-second inch).

(B) The floors in FOOD ESTABLISHMENTS in which water flush cleaning methods are used shall be provided with drains and be graded to drain, and the floor and wall junctures shall be coved and SEALED.

**6-201.14 Floor Carpeting, Restrictions and Installation.**

(A) A floor covering such as carpeting or similar material may not be installed as a floor covering in FOOD preparation areas, walk-in refrigerators, WAREWASHING areas, toilet room areas where handwashing lavatories, toilets, and urinals are located, REFUSE storage rooms, or other areas where the floor is subject to moisture, flushing, or spray cleaning methods.

(B) If carpeting is installed as a floor covering in areas other than those specified under ¶ (A) of this section, it shall be:

(1) Securely attached to the floor with a durable mastic, by using a stretch and tack method, or by another method; and

(2) Installed tightly against the wall under the coving or installed away from the wall with a space between the carpet and the wall and with the edges of the carpet secured by metal stripping or some other means.

REFERENCE FOR COMMERCIAL KITCHEN REQUIREMENTS

**6-201.15 Floor Covering, Mats and Duckboards.**

Mats and duckboards shall be designed to be removable and EASILY CLEANABLE.

**6-201.16 Wall and Ceiling Coverings and Coatings.**

(A) Wall and ceiling covering materials shall be attached so that they are EASILY CLEANABLE.

(B) *Except in areas used only for dry storage*, concrete, porous blocks, or bricks used for indoor wall construction shall be finished and SEALED to provide a SMOOTH, nonabsorbent, EASILY CLEANABLE surface.

**6-201.17 Walls and Ceilings, Attachments.**

(A) Except as specified in ¶ (B) of this section, attachments to walls and ceilings such as light fixtures, mechanical room ventilation system components, vent covers, wall mounted fans, decorative items, and other attachments shall be EASILY CLEANABLE.

(B) *In a CONSUMER area, wall and ceiling surfaces and decorative items and attachments that are provided for ambiance need not meet this requirement if they are kept clean.*

**6-201.18 Walls and Ceilings, Studs, Joists, and Rafters.**

Studs, joists, and rafters may not be exposed in areas subject to moisture. *This requirement does not apply to TEMPORARY FOOD ESTABLISHMENTS.*

*Functionality*

**6-202.11 Light Bulbs, Protective Shielding.**

(A) Except as specified in ¶ (B) of this section, light bulbs shall be shielded, coated, or otherwise shatter-resistant in areas where there is exposed FOOD; clean EQUIPMENT, UTENSILS, and LINENS; or unwrapped SINGLE-SERVICE and SINGLE-USE ARTICLES.

## REFERENCE FOR COMMERCIAL KITCHEN REQUIREMENTS

**(B) Shielded, coated, or otherwise shatter-resistant bulbs need not be used in areas used only for storing FOOD in unopened packages, if:**

**(1) The integrity of the packages can not be affected by broken glass falling onto them; and**

**(2) The packages are capable of being cleaned of debris from broken bulbs before the packages are opened.**

**(C) An infrared or other heat lamp shall be protected against breakage by a shield surrounding and extending beyond the bulb so that only the face of the bulb is exposed.**

### **6-202.12 Heating, Ventilating, Air Conditioning System Vents.**

**Heating, ventilating, and air conditioning systems shall be designed and installed so that make-up air intake and exhaust vents do not cause contamination of FOOD, FOOD-CONTACT SURFACES, EQUIPMENT, or UTENSILS.**

### **6-202.13 Insect Control Devices, Design and Installation.**

**(A) Insect control devices that are used to electrocute or stun flying insects shall be designed to retain the insect within the device.**

**(B) Insect control devices shall be installed so that:**

**(1) The devices are not located over a FOOD preparation area; and**

**(2) Dead insects and insect fragments are prevented from being impelled onto or falling on exposed FOOD; clean EQUIPMENT, UTENSILS, and LINENS; and unwrapped SINGLE-SERVICE and SINGLE-USE ARTICLES.**

### **6-202.14 Toilet Rooms, Enclosed.**

**A toilet room located on the PREMISES shall be completely enclosed and provided with a tight-fitting and self-closing door *except that this requirement does not apply to a toilet room that is located outside a***

**REFERENCE FOR COMMERCIAL KITCHEN REQUIREMENTS**

*FOOD ESTABLISHMENT and does not open directly into the FOOD ESTABLISHMENT such as a toilet room that is provided by the management of a shopping mall.*

**6-202.15 Outer Openings, Protected.**

**(A)** Except as specified in ¶¶ (B), (C), and (E) and under ¶ (D) of this section, outer openings of a FOOD ESTABLISHMENT shall be protected against the entry of insects and rodents by:

- (1) Filling or closing holes and other gaps along floors, walls, and ceilings;
- (2) Closed, tight-fitting windows; and
- (3) Solid, self-closing, tight-fitting doors.

**(B)** Paragraph (A) of this section does not apply if a FOOD ESTABLISHMENT opens into a larger structure, such as a mall, airport, or office building, or into an attached structure, such as a porch, and the outer openings from the larger or attached structure are protected against the entry of insects and rodents.

**(C)** Exterior doors used as exits need not be self-closing if they are:

- (1) Solid and tight-fitting;
- (2) Designated for use only when an emergency exists, by the fire protection authority that has jurisdiction over the FOOD ESTABLISHMENT; and
- (3) Restricted so they are not used for entrance or exit from the building for purposes other than the designated emergency exit use.

**(D)** Except as specified in ¶¶ (B) and (E) of this section, if the windows or doors of a FOOD ESTABLISHMENT, or of a larger structure within which a FOOD ESTABLISHMENT is located, are kept open for ventilation or other purposes or a TEMPORARY FOOD ESTABLISHMENT is not provided with windows and doors as specified under ¶ (A) of this section, the openings shall be protected against the entry of insects and rodents by:

- (1) 16 mesh to 25.4mm (16 mesh to 1 inch) screens;

**REFERENCE FOR COMMERCIAL KITCHEN REQUIREMENTS**

(2) Properly designed and installed air curtains; or

(3) Other effective means.

*(E) Paragraph (D) of this section does not apply if flying insects and other pests are absent due to the location of the ESTABLISHMENT, the weather, or other limiting condition.*

**6-202.16 Exterior Walls and Roofs, Protective Barrier.**

Perimeter walls and roofs of a FOOD ESTABLISHMENT shall effectively protect the establishment from the weather and the entry of insects, rodents, and other animals.

**6-202.17 Outdoor Food Vending Areas, Overhead Protection.**

If located outside, a machine used to vend FOOD shall be provided with overhead protection *except that machines vending canned BEVERAGES need not meet this requirement.*

**6-202.18 Outdoor Servicing Areas, Overhead Protection.**

SERVICING AREAS shall be provided with overhead protection *except that areas used only for the loading of water or the discharge of SEWAGE and other liquid waste, through the use of a closed system of hoses, need not be provided with overhead protection.*

**6-202.19 Outdoor Walking and Driving Surfaces, Graded to Drain.**

Exterior walking and driving surfaces shall be graded to drain.

**6-202.110 Outdoor Refuse Areas, Curbed and Graded to Drain.**

Outdoor REFUSE areas shall be constructed in accordance with LAW and shall be curbed and graded to drain to collect and dispose of liquid waste that results from the REFUSE and from cleaning the area and waste receptacles.