

# Code Review

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## Project Summary

This project proposes the addition of 136 units of housing to the Eastern Market core in Detroit while providing a space for the market to continue and shared community spaces to be utilized by the residents of Eastern Market. The project aims to create a leisure hill upon which performances, classes, picnics, and other events as well as relaxation may take place.

### Building

#### Analysis

Building Height	108'-0"
Building Area	261,150sf

#### Occupancy

Communal Kitchens	B	14,300sf	
Market	M	36,845sf	levels = 2
Parking	S2	83,535sf	levels = 3
Residential Apartments	R2	180,425sf	levels = 6
Multi-Use Space	A3	25,590sf	levels = 3
Retail Space	B	12,620sf	levels = 2
Residential Lobby	B	3,116sf	levels = 1

#### Construction Types

Residential	Type IV
Parking	Type II
Market	Type IV
Community Center	Type IV

#### Structural Systems

Parking will use reinforced concrete structure, housing will use CLT shear wall and slab system, and the market will use a glulam beam on steel columns with a CLT decking.

#### Structure Summary

The overall building construction type is Type IV - HT which allows for a building height of 85'-0", and a building area of 82,000sf under R2 classification.

According to § 510.4 if the ground floor of the an R2 classification is a parking (S-2) the maximum building height shall be calculated from the floor above.

There is no separation between R occupancies with Type IV Construction.

There must be a 1 hour separation between the Market and the Residential, and Business occupancy.

The exterior walls of the Type IV construction must may be unrated if they are sheathed in non-combustable material, fire treated wood cladding, or gyp board.

The building is fully sprinkled with an NFPA 13 system. This is used to gain an area increase per

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## Chapter 3

### Section 302 Classification

#### Assembly

##### Group A-3

Assembly Group A occupancy includes, among others, the use of a building or structure, or a portion thereof, for the gathering of persons for purposes such as civic, social or religious functions; recreation, food or drink consumption; or awaiting transportation.

Restaurants and Bars in Commercial Areas, Considered Group A-2. Gymnasium, Considered Group A-3.

Community kitchens located in R-2 classification that do not exceed 50 occupants are classified as B.

#### Business

##### Group B

Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. This includes laundries, professional services, training and skill development not in a school, etc.

Community kitchens located in R-2 classification that do not exceed 50 occupants are classified as B.  
Ground office space.

#### Mercantile

##### Group M

Occupancy includes, among others, buildings and structures or a portion thereof, for the display and sale of merchandise, and involves stocks of goods, wares or merchandise incidental to such purpose and accessible to the public.

Ground floor market space is considered under group M as well as retail areas.

**Residential**

Group R  
Residential Group R includes, among others, the use of a building or structure, or a portion thereof, for sleeping purpose when not classified as an Institution Group I or when not regulated by the Residential Code in accordance with Section 101.2.

Apartment Residence,  
Considered R-2

**Storage**

Group S  
Storage Group S occupancy includes, among others, the use of a building or structure, or a portion thereof, for storage that is not classified as a hazardous occupancy.

Parking garages and produce storage is considered Low-risk S-2 Group

**Section 302.3 Mixed Occupancies**

Where a building is occupied by two or more uses not included in the same occupancy classification, the building or portion thereof shall comply with Section 302.3.1 or 302.3.2 or a combination of these sections.

Mixed use of Group R-2, B, M, S-2, and A-3

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**Chapter 5**

**Section 503 General Height and Area Limitations**

0 hours	Horizontal separation between kitchen and serving/dining area at level one.
1 hour     (1 hour)	Between B, S, and R classifications
2 hour     (1 hour)	Between A-3, and M

**Section 506 Area Modifications**

Each portion of the building shall be individually classified as to use and shall be completely separated from adjacent areas by fire barrier wall or horizontal assemblies or both having a fire-resistance rating determined in accordance with Table 302.3.2 for uses being separated. Each fire area shall comply with this code based on the use of that space. Each fire area shall comply with the height limitations based on the use of that space and the type of construction classification. In each story, the building area shall be such that the sum of the ratios of the floor area of each use divided by the allowable area for each use shall not exceed one.

The exception under 302.3.2 separated uses allows these numbers to be reduced by 1 hour in a fully sprinklered building.

Chapter 6

Types of Construction

Type II	Types I and II construction are those types of construction in which the building elements listed in Table 601 are of noncombustible materials, except as permitted in Section 603 and elsewhere in this code.	Post-tensioned reinforced concrete parking garage.
	Type II B Structure	0 hours
Type IV	Type IV construction (Heavy Timber, HT) is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of solid or laminated wood without concealed spaces. The details of Type IV construction shall comply with the provisions of this section and Section 2304.11. Exterior walls complying with Section 602.4.1 or 602.4.2 shall be permitted. Minimum solid sawn nominal dimensions are required for structures built using Type IV construction (HT). For glued-laminated members and structural composite lumber (SCL) members, the equivalent net finished width and depths corresponding to the minimum nominal width and depths of solid sawn lumber are required as specified in Table 602.4. Cross-laminated timber (CLT) dimensions used in this section are actual dimensions.	Heavy timber CLT shear wall and floor slab system in R-2. CLT roof system and Gluelam column and beam system in M and A-3 spaces.
	Type IV Bearing Walls EXT	2 hours
	Type IV Bearing Walls INT	1 hours
	Type IV Floor	1 hour or less
	Type IV Roof	1 hour or less

Chapter 7

Fire Resistance Rated Construction

702	Fire Separation Distance	Fire Separation Distance 10–30 ft, the Required Rating is 2 Hours
	The distance measured from the building face to the closest interior lot line, to the centerline of a street, alley or public way, or to an imaginary line between two buildings on the lot. The distance shall be measured at right angles from the face of the wall.	

## Exterior Walls

**704.8 Allowable Opening Area for Exterior Walls**  
Openings in exterior walls in adjacent stories shall be separated vertically to protect against fire spread on the exterior of the buildings where the openings are within 5 feet of each other horizontally and the opening in the lower story is not a protected opening in accordance with Section 715.4.8. Such openings shall be separated vertically by 3 feet by spandrels girders, exterior walls or other similar assemblies that have a fire-resistance rating of at least 1 hour.

All areas of the building perimeter have a fire separation distance of greater than 20 feet.

## Automatic Sprinkler System

**704.8.1 Allowable Opening Area for Exterior Walls**  
In buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the maximum allowable area of unprotected openings in occupancies other than Groups H-1, H-2, and H-3 shall be the same as the tabulated limitations for protected openings.

All areas of the building perimeter have a fire separation distance of greater than 20 feet.

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## Chapter 10

### Means of Egress

**Table 1004.1.2 Floor Area Allowances per Occupant by Occupancy Group**

Assembly: 15 net  
Business: 100 gross  
Day care: 35 net  
Classrooms: 20 net  
Kitchens: 200 gross  
Residential: 200 gross  
Parking Garages: 200 gross  
Closed Mall: Section 402.8.2.1

**402.8.2.1 Occupant Formula**  
Occupant Load Factor (OLF) =  $0.00007 \text{ (Gross Leasable area)} + 25$

Occupancy Load:  
 $0.00007(36,845\text{sf}) + 25 = 27 \text{ sf/person}$

$36,845 / (27\text{sf/person}) = 1,364 \text{ occupants}$

1005.1	<p><b>Egress Width</b></p> <p>The means of egress shall not be less than required by this section. The total width of means of egress in inches shall not be less than the total occupant load served by the means of egress multiplied by the factors in Table 1005.1 and not less than specified elsewhere in this code. Multiple means of egress shall be sized such that the loss of any one means of egress shall not reduce the available capacity to less than 50 percent of the required capacity. The maximum capacity required from any story of a building shall be maintained to termination of the means of egress.</p>	<p>Stairways: 0.3 inches per occupant. Other egress: 0.2 inches per occupant.</p>
1007.2.1	<p><b>Accessible Means of Egress</b></p> <p>Buildings with four or more stories. In buildings where a required accessible floor is four or more stories above or below a level of exit discharge, at least one required accessible means of egress shall be an elevator complying with Section 1007.4.</p>	<p>Required to Have One, One / Two are Provided in Each Building</p>
1007.3	<p><b>Enclosed Exit Stairways</b></p> <p>Enclosed exit stairways. An enclosed exit stairway, to be considered part of an accessible means of egress, shall have a clear width of 48 inches minimum between hand rails and shall either incorporate an area of refuge within an enlarged floor-level landing or shall be accessed from either an area of refuge complying with Section 1007.6 or a horizontal exit.</p>	<p>60" between handrails with 72" landing depths.</p>
1008.1.1	<p><b>Door Sizing</b></p> <p>Size of doors. The minimum width of each door opening shall be sufficient for the occupant load thereof and shall provide a clear width of not less than 32 inches. Clear openings of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees. Where this section requires a minimum clear width of 32 inches and a door opening includes two door leaves without a mullion, one leaf shall provide a clear opening width of 32 inches. The maximum width of a swinging door leaf shall be 48 inches nominal. Means of egress doors in an occupancy in Group I-2 used for the</p>	<p>Door width is 36"</p>

movement of beds shall provide a clear width not less than 41 1/2 inches. The height of doors shall not be less than 80 inches.

1011.2	<b>Stairway Width</b> Stairway width. The width of stairways shall be determined as specified in Section 1005.1, but such width shall not be less than 44 inches. See Section 1007.3 for accessible means of egress stairways.	60" stair width
1011.3	<b>Headroom</b> Headroom. Stairways shall have a minimum headroom clearance of 80 inches measured vertically from a line connecting the edge of the nosing. Such headroom shall be continuous above the stairway to the point where the line intersects the landing below, one tread depth beyond the bottom riser. The minimum clearance shall be maintained the full width of the stairway and landing.	Headroom is 108 inches
1011.5	<b>Stair Treads and Risers</b> Stair treads and risers. Stair riser heights shall be 7 inches maximum and 4 inches minimum. Stair tread depths shall be 11 inches minimum. The riser height shall be measured vertically between the leading edges of adjacent treads.	Stairs are 7" high and 12" deep
1011.8	<b>Vertical Rise</b> Vertical rise. A flight of stairs shall not have a vertical rise greater than 12 feet between floor levels or landings.	Vertical rise of stairs is 8 feet.
1011.11	<b>Handrails</b> Handrails. Stairways shall have handrails on each side. Handrails shall be adequate in strength and attachment in accordance with Section 1607.7. Handrails for ramps, where required by Section 1010.8, shall comply with this section.	Handrails are 42" high.
1016	<b>Exit Access</b> Egress Through Intervening Spaces Egress through intervening spaces. Egress from a room or space shall not pass through adjoining or intervening rooms or areas, except where such adjoining rooms or areas are accessory to the area served; are not	Handrails are 42" high.

high-hazard occupancy and provide a discernible path of egress travel to an exit. Egress shall not pass through kitchens, storage rooms, closets or spaces used for similar purposes. An exit access shall not pass through a room that can be locked to prevent access. Means of egress from dwelling units or sleeping units shall not lead through other sleeping areas, toilet rooms or bathrooms.

1013.3	<b>Common Path of Egress Travel</b> Common path of egress travel. In occupancies other than Groups H-1, H-2, and H-3, the common path of egress travel shall not exceed 75 feet. In occupancies in Groups H-1, H-2, and H-3, the common path of egress travel shall not exceed 25 feet.	Longest common path of travel is 54 feet.
1022.2	<b>Exit Access Doorways</b> Exit or exit access doorways required. Two exits or exit access doorways from any space shall be provided where one of the following conditions exists: 1. The occupant load of the space exceeds the values in Table 1014.1.	Min. 2 per space
1014.1	<b>Number of Exits</b> Number of Exits. An occupant in a basement and on a story above the first story shall have access to not less than two separate exits from the basement or story.	8 exits and 4 with roof access

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## Chapter 11

### Accessibility

#### Multilevel Buildings and Facilities

1104.4	<b>Multilevel buildings and facilities.</b> At least one accessible route shall connect each accessible level, including mezzanines, in multilevel buildings and facilities.	1 Accessible route connects each level of the building.
1107.6.2.1.1	<b>Type A units.</b> In occupancies in Group R-2 containing more than 20 dwelling units or sleeping units, at least 2 percent, but not less than one, of the units shall be a Type A unit. All units on a site shall be considered to determine the total number of units and the required number of Type A units. Type A units shall be dispersed among the various classes of units.	10% of Type A units are available.