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Mantua Township Community Center Code Analysis

PREPARED FOR
Mantua Township Trustees

ISSUED: January 2022

Executive Summary

The Mantua Township Trustees retained CT Consultants, Inc. (CT) to perform an evaluation for the Community Center to determine required code based design upgrades and budgetary costs for the improvements. The building was a school until the August 2004 when it was purchased by the Mantua Township Trustees. The three-story masonry bearing wall and concrete floor building was built in 1914. The one-story masonry bearing wall and bar joist roof gymnasium addition was constructed in the mid-1960's. An elevator was recently added. Little else has changed in the last twenty years or longer.

The original Educational Use Group classification was changed on August 7, 2015 to Business and Storage Uses. The Certificate of Occupancy does not identify Assembly Use. This is cause for concern because we understand the gymnasium has been used for public events.

A detailed building code analysis was completed to determine design impacts to allow Assembly Use in both the three story building and the one story addition. A Change of Use requires varies elements to be evaluated including structural analysis for floor loads, life safety, accessibility, and fire protection systems. Please refer to the analysis/recommendation part of the report.

Budgetary costs were developed for upgrading code based deficiencies and for replacing outdated building systems. Budgetary costs should be considered preliminary and used to identify order of magnitude. Actual costs will vary with Consultant's opinion depending on the type of designs, materials, existing conditions and selected product manufactures'.

Analysis/Recommendations

The Ohio Building Code allows existing buildings to remain as is unless alterations are made. Changing occupancy of the building to include Assembly Use is an alteration and may require changes in structural, life safety, fire protection and accessibility systems. The code requires building alterations to comply with the current building code.

The live load carrying capacity of the floors will require additional structural evaluation. The original building classification was Educational. Current code floor live load for schools is 40 psf. To include Assembly Uses in the three story building will require the floors to be evaluated for 100 psf design live load capacity. Since the building was reclassified as Business Use we assumed the floor loads were evaluated for 50 psf live load. Also, corridor loading at 80 psf was considered for the second and third floors. The first floor is a slab on grade and the only floor where files and materials are stored. If second and third floor storage is being considered, then we recommend floors be evaluated for 125 psf live load.

Assembly use is one of the highest code risk. Assembly areas are often unfamiliar to the participants. Events in assembly areas can be noisy and distracting. Since the building is considered a higher risk than its current uses, the code requires additional life safety protection for the occupants. The current building code allows Assembly/Storage to be two stories high and Business use to be three stories high. There are two options to allow Assembly uses in the three story building.

Option 1. The building can be considered a separated mixed use building if a two-hour fire resistance rated assembly is provided between the 2nd and 3rd floors. Assembly/Storage uses will only be permitted on the first two floors. Business use will only be permitted on the third floor. The building code will require the Assembly area and the floor below to be fire suppressed. Therefore, at a minimum, a partial fire suppression system is required.

Option 2. The building can be considered a non-separated mixed use building if a fire suppression system is provided throughout the building. This approach will allow Assembly Use on all three floors. The 1960 addition may not require fire suppression if a fire barrier is provided between the single story and three story sections.

The building water supply is from a well. This system will not have the capacity to provide the needed fire suppression water demand. Since Assembly Use is required in the 1914 building then a water reservoir basin with a fire pump will be needed. An alternate consideration may be a water tower.

Manual or automatic fire alarms are required in assembly buildings with more than 300 or offices with more than 500 total occupants which is unlikely. Fire suppression and HVAC systems must be monitored. We recommend adding a fire alarm system with associated horns and strobe lights at this time.

Exiting from the third floor must be upgraded for life safety compliance. The open stairwells must be modified to provide a safe exit out of the building. The stairs must be enclosed in one-hour rated construction with rated self-closing doors. The 1914 building stairs design, in my opinion, are a serious hazard. The stair risers are 6-inches high and the tread are 10-inches deep. The guards are 34-inches high. The required stair enclosure will encroach on the stair landings. Current building code requires 7-inch risers, 11-inch treads, 42-inch guards, and 36-inch handrails with top and bottom extensions. Since modifications are so extensive, complete stairs replacement is recommended.

The 1914 building's public toilet facilities were on the first the first floor. The female toilet facility was abandoned during the elevator improvement. The male facility is not wheelchair accessible. The building code requires toilet facilities to be no more than one floor away. Since the building will be used has a Community Center and governmental offices, we recommend new toilet facilities be provided on the second and third floors.

At a minimum, two male and two female water closet fixtures, lavatories, service sink and drinking fountain will be needed on both floors. The first floor toilets facilities are for service department staff only and considered compliant. The 1960's addition toilet room can be made complaint with minor improvements.

Sanitary treatment plant capacity must be evaluated due to the increased quantity of plumbing fixtures and associated flow. We understand an evaluation of several township buildings is being performed. This work has not been considered in this report.

The federal government passed the Americans with Disability Act law in 1992. All public buildings must provide access to all parts of the building for individuals with disabilities. Accessible public toilet rooms have been addressed with the code requirement for providing fixtures on each floor. Wheelchair access between the 1914 building and 1960's addition must be provided. An interior ramp is required. Other minor accessible route issues can be addressed in detailed design. Please refer to the Accessibility checklist later in the report.

Additional Consideration

Constructing the code based improvements will provide a minimum level of protection for the occupants. This work does not address the overall poor condition of the building. Little has changed for numerous years. Wall, ceiling and floor finishes, asbestos abatement, HVAC system, lighting, receptacles, etc., will all need to be upgraded.

The building's layout does not lend itself to many different uses without major changes. We have not considered how to sub-divide the spaces but have included budget build-out costs of the second and third floors. We have not addressed roofs, windows, doors or exterior tuck-pointing but work may be needed within the next 10-years.

An asbestos report from Diamond Environmental date October 16, 2012 was provided by the Trustees. The 1914 building has minimal locations that tested positive for asbestos. The sampled walls, floors and ceiling materials have tested negative. The 1960's addition materials that tested positive for asbestos include resilient tile, tile mastic, glazing, and pipe fittings.

The report cited several exclusions. Areas not tested includes the roof, carpet adhesive, chalkboard adhesive, and concealed materials. We recommend additional testing be completed in areas where improvements are being considered.

The 1914 building boilers are 30 years old and in need of replacement. The air handling unit is assumed to be from the 1950's or earlier. There is no air conditioning in the building. Reuse of any of this equipment is unlikely. The 1960's addition mechanical room was locked so evaluation could not be completed. No air conditioning is assumed. We expect little has been updated and recommend new HVAC systems be installed throughout the building.

The kitchen does not meet the minimum County food service licensing requirements. A Community Center should consider having a full service kitchen with range, type 1 hood, make-up air, serving equipment, grease traps, etc.

Several new electrical panels were installed. There are a few older panels that need to be replaced. Lighting and receptacles were typical for an old school building. Typical office technologies require numerous outlets for each work space and improved lighting. Assembly spaces need several levels of lighting and technologies for meetings and presentations. The electric serve to the building may need to be upgraded.

Budgets costs were established based on a square foot method with minimal consideration for materials, lay-out or existing conditions. Budget costs should only be construed as preliminary and used to establish order of magnitude.

Actual costs will vary with Consultant's opinion depending on the types of design, materials, installation, types of products and manufactures' selected. The building was added to the National Registry of Historic Places in 2013. If federal funding is used, construction materials must be era appropriate thus increasing costs.

The conclusions and recommendations presented in this report are based on a brief review of available information, on-site field investigation, and discussions with the Trustees. No testing, exploratory probing, dismantling or evaluation of equipment or in depth studies were performed in this review. All work was performed by visual observation.

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CODE SUMMARY

SITE INFORMATION

Mantua Township Community Center (Former School Building) 11741 Mantua Center Road, Mantua, Ohio 44255
PP NO: 23-021-00-00-025-000

BUILDING CODE

2017 Ohio Building Code (OBC) based on 2015 International Building Code (IBC) with August 2018 Updates

2017 Ohio Plumbing Code (OPC) based on 2015 International Plumbing Code (IPC)

2017 Ohio Mechanical Code (OMC) based on 2015 International Building Code (IMC)

2015 International Fuel Gas Code

2017 National Electrical Code based on NFPA 70 - 2017 Edition

2017 Ohio Fire Code based on 2015 International Fire Code (IFC)

Accessibility Code: ICC A117.1 - 2009 Edition

BUILDING INFORMATION

Non-Separated Mixed Use Groups B and S-1 are identified on the Certificate of Occupancy. The intended use of the building is as follows:

Use Group A-3, Assembly

Use Group B, Business

Use Group S-1, Moderate-Hazard Storage

Construction Type IIB, Unprotected Non-Combustible is identified on the Certificate of Occupancy. Improvements were completed in several parts of the 1914 building.

Untreated wood was used for the partitions which is prohibited in a Type IIB construction. Therefore, we must reclassify the Construction Type to IIIB Unprotected Combustible/Non-Combustible.

CHAPTER 3: USE & OCCUPANCY CLASSIFICATION

- Section 303.1 A-3, Assembly Occupancy Group - Trustees/Public Meeting Rooms, Community Events, Private Events (Rentals).
- Section 303.1.2 Rooms with less than 50 occupants or less than 750 sf may be classified as Business.
- Section 304.1 B, Business Use - Township Administration and Support.
- Section 311.2 S-1, Moderate-Hazard Storage – Service Department Support.

CHAPTER 5: BUILDING HEIGHT, AREA & OCCUPANCY SEPARATIONS

- Table 504.3 Allowable building height for non-separated mixed Use Groups A-3, B, and S-1/Construction Type IIIB: 55-feet
- Table 504.4 Allowable number of stories for non-separated mixed Use Groups A-3, B, and S-1/Construction Type IIIB without a fire suppression system:
- A-3 and S-1 Uses: 2-stories
 - B Use: 3-stories
- Table 504.4 Allowable number of stories for non-separated mixed Use Groups A-3, B, and S-1/Construction Type IIIB with a fire suppression system through-out:
- A-3 and S-1 Uses: 3-stories
 - B Use: 4-stories

- Section 508.3.3 Non-Separated Use Groups may be permitted if the height and area limitations of the most restrictive Use Group as given in Tables 504.3, 504.4 and 506.2 can be applied to the entire building.
- Section 508.4.2 Separated Use Groups may be permitted if the height and area limitations in each story shall be such that the sum of the ratios of the actual building area of each separated occupancy divided by the allowable building area of each separated occupancy shall not exceed 1.
- Table 508.4 Fire separation wall rating between Business/Storage and Assembly Uses is two (2) hours.

CHAPTER 6: TYPES OF CONSTRUCTION

- Table 601 Construction Type IIIB, Unprotected Combustible/Non-Combustible Building and Non-Sprinkled Fire Resistance rating requirements for building elements:
- Primary Structural Frame – 0-Hours
 - Bearing Walls – Exterior – 2-Hours
 - Bearing Walls – Interior – 0-Hours
 - Non-Bearing Walls/Partitions Interior - 0-Hours - See Table 602
 - Floor Construction/Secondary Members – 0-Hours
 - Roof Construction/Secondary Members – 0-Hours

CHAPTER 7: SMOKE AND FIRE PROTECTION FEATURES

- Section 706 Fire walls between buildings must be constructed separate from building structure and must have sufficient stability to allow collapse

of construction on either side without collapse of the fire wall. Fire walls must be terminated tight to underside of noncombustible roof deck or must extend no less than 2'-6" above adjacent roof surfaces. Fire walls must be continuous and all openings must be protected. Wall must be constructed as a two (2) hour rated firewall in accordance with permitted methods in Section 703.3.

Section 706.6.1 Stepped buildings shall have not less than 1-hour fire-resistance rated construction from both sides for a distance of 15-feet above the lower roof or a 1-hour rated roof within 10-feet of the fire wall. The supporting roof construction shall have a 1-hour rating.

Sections 707.3.1 & 707.3.2 Fire barriers for shafts and stairways shall be enclosed minimum 2-hour rated assemblies when connection 4-stories or more and 1-hour rated assemblies when connecting less than 4-stories.

Section 707.3.8 Separated occupancies shall have a fire resistance rating of not less than that indicated in Table 508.4.

Section 707.3.10 Fire barriers separating a single occupancy into different fire areas shall have a two (2) hour rating for Business and Assembly and a three (3) hour rating for Storage in accordance with Table 707.3.10.

CHAPTER 9: FIRE PROTECTION SYSTEMS

Section 903.2.1.3 Automatic Sprinkler System shall be provided in A-3 Uses when exceeding 12,000 sf or areas located on floors other than the level of exit discharge.

Sections 906.1 and 3309.1, NFPA 10, IFC 1301:7-7-09.906

Portable fire extinguishers are required per the local fire official.
Provide Class 3A fire extinguisher at a coverage of one per 4,500 square feet.

NFPA Table 6.2.1.1 and IFC Section 906.5

Maximum travel distance to an extinguisher is 75-feet. IFC Section 906.5 - Locate extinguishers in conspicuous and readily accessible locations.

Section 907.2.1 Fire alarm system is required when the combined Assembly occupant load on all floors are 300 persons or more

Section 907.2.2 Fire alarm system is required when the combined Business occupant load on all floors are 500 persons or more and when the occupant load is more than 100 persons above or below the level of exit discharge.

CHAPTER 10: MEANS OF EGRESS

Table 1004.1.2 Maximum floor area per person is as follows:

1. Offices - 1/100 gross sf
2. Assembly, tables and chairs - 1/15 net sf
3. Warehouse - 1/500 gross sf

Section 1005.3.1 Stairway egress width shall be calculated as occupant load times means of egress factor of 0.3-inch per occupant.

Section 1005.3.2 All other egress widths shall be calculated as occupant load times means of egress factor of 0.2-inch per occupant.

- Section 1005.5 Regardless of the number of required exits, each means of egress shall be sized to accommodate 50-percent of the total occupant load.
- Section 1005.6 Stairs egress convergence allows for each floor to be calculated by them self.
- Section 1006.2.2.1 Two exits are required in Boiler/Furnace Rooms exceeding 500 s.f. and 400,000 BTUH equipment capacity.
- Section 1006.2.2.7 Two exits are required in electrical rooms having equipment rated 1,200 amperes or more.
- Section 1006.3.1 Each story shall have the minimum number of independent exits specified in Table 1006.3.1.
1. 1-500 occupant load/story: 2
 2. 501 - 1,000 occupant load/story: 3
 3. More than 1,000: 4
- Section 1007.1 Two exits are required for all spaces exceed 49 occupants and 100-feet travel distance.
- Section 1007.1.1 Exit door locations must be no closer than 1/2 the maximum diagonal dimension of the room/building.
- Section 1010.1 Means of egress door width shall accommodate the calculated occupant load but be no less than 32-inches.
- Section 1010.1.2.1 Pivot or side-hinged swinging doors shall swing in the direction of egress travel when serving an occupant load of 50 or more.

Section 1011.5	All stairs must have 11-inch minimum tread size and 7-inch maximum riser height.
Section 1014.6	Stairway handrail height shall be not less than 34 inches and not more than 38-inches. Top end of stairway handrails must extend horizontally no less than 12 inches beyond top riser; bottom ends must continue to slope for a depth equivalent to one tread width.
Sections 1015.3	Stair guards must be no less than 42-inches high and intermediate members shall be spaced no more than 4-inches apart.
Table 1017.2	Maximum travel distance to an exit without a sprinkler system is as follows: <ol style="list-style-type: none">1. Groups A-3 and S-1: 200-feet2. Group B: 200-feet
Table 1020.2	Minimum corridor widths are 36-inches with less than 50 occupants and 44-inches in all other spaces.
Section 1020.4	Dead end corridors shall not exceed 20-feet in length.
Section 1023.2	Interior exit stairways must be enclosed with fire barrier assemblies in accordance with Section 707 or horizontal assemblies' in accordance with Section 711 or both having a fire-resistance rating of not less than 2-hour rated assemblies when connection 4-stories or more and 1-hour rated assemblies when connecting less than 4-stories. Openings in stairway assemblies shall be protected in accordance with Section 716.

Section 1023.3 Interior exit stairways and ramps shall terminate at an exit discharge or a public way. Passageways, constructed in accordance with Sections 1023.2, 1023.3.1 and 1024 forming a continuous protected enclosure shall be permitted to extend an interior exit stairway.

Section 1024.3 Exit passageway enclosures shall have a one-hour fire resistance rating but not less than a connecting interior exit stairway fire resistance rating.

CHAPTER 11: ASSESSIBILITY

Section 1101.2 Alterations to an area containing a primary function shall be made so as to ensure the path of travel to the altered area, restrooms, telephones and drinking fountains are readily accessible (unless such alterations are disproportionate, greater than 20% to the overall cost) as required in OBC Section 3411.7.1.

Section 601: Public and common use toilet rooms must be accessible. All others must be adaptable to ADAAG conformance.

CHAPTER 16: STRUCTURAL DESIGN

Table 1607.1 The floor live load shall be as follows:

1. Business – 50 psf
2. First floor corridors – 100 psf
3. Office corridors above first floor – 80 psf
4. Assembly – 100 psf
5. Storage – 125 psf (light)
6. Stairs – 100 psf

CHAPTER 29: PLUMBING SYSTEMS

Section 2902.1 Unless specifically approved by the Chief Building Official, occupant load calculations from Table 1004.1.2 for exit purposes must be used for determination of plumbing fixture requirements.

Assembly Use

1. Water closets, male – 1 per 125
2. Water closets, female – 1 per 65
3. Lavatories – 1 per 200
4. Drinking Fountain – 1 per 500
5. Service sink - 1

Business Use

1. Male Water Closets/Urinals – 1 per 80
2. Lavatories – 1/40 for first 80 then 1/80 for remainder
3. Drinking Fountain – 1/100
4. Service sink - 1

Storage Use

1. Water closets/urinals – 1 per 100
2. Lavatories – 1 per 100
3. Drinking Fountain – 1 per 1000
4. Service sink - 1

Section 2902.3.2 Public toilet facilities shall be located not more than one-story above/below an occupied space. The maximum travel distance to public toilet facilities shall not exceed 500-feet.

CHAPTER 34: EXISTING BUILDINGS AND STRUCTURES

- Section 3404.1 Alterations to any building component shall comply with the requirements for new construction for egress, fire protection, etc. Portions of the building not altered are not required to comply with current code requirements.
- Section 3404.3.1 Where the alteration does not result in increased live load, existing gravity load-carrying structural elements shall be permitted to remain as is. Where the alteration results in increased design load, the live load required by Section 1607 shall be used.
- Section 3411.4.2 Where an entire building undergoes a change of occupancy it shall have the following accessible features:
1. At least one (1) accessible entrance;
 2. Accessible route from building entrance to primary function areas,
 3. Signage,
 4. Accessible parking,
 5. Accessible route from parking to accessible entrance.

Where it is technically infeasible to comply with new construction standards, the listed items shall conform to the maximum extent technically feasible.

CT Consultants
Mantua Township Community Center Building
Limited Accessible Survey
Review Date - 1/18/2022

Ref #	Parking	1914 Building			Comments	1960 Addition			Comments
		Y	N	NA		Y	N	NA	
1	Does the number of standard ADA designated spaces appear to be provided?	X				X			
2	Does the required number of van-accessible designated spaces appear to be provided?	X				X			
3	Are accessible spaces part of the shortest accessible route to an accessible building entrance?	X				X			
4	Is a sign with the International Symbol of Accessibility at the head of each space?	X				X			
5	Does each accessible space have an adjacent access aisle?	X				X			
6	Do parking spaces and access aisles appear to be relatively level and without obstruction?	X				X			
Ref #	Exterior Accessible Route	Y	N	NA	Comments	Y	N	NA	Comments
1	Is an accessible route present from public transportation stops and municipal sidewalks on the property?		X				X		
2	Are curb cut ramps present at transitions through curbs on an accessible route?		X				X		
3	Do the curb cut ramps appear to have the proper slope for all components?			X				X	
4	Do ramps on an accessible route appear to have a compliant slope?			X				X	
5	Do ramps on an accessible route appear to have a compliant length and width?			X				X	
6	Do ramps on an accessible route appear to have a compliant end and middle landings?			X				X	
7	Do ramps on an accessible route appear to have compliant handrails?			X				X	
Ref #	Building Entrance	Y	N	NA	Comments	Y	N	NA	Comments
1	Do a sufficient number of accessible entrances appear to be provided?	X			Historical Bldg. Exception	X			
2	If the main entrance is not accessible, is an alternate accessible entrance provided?	X						X	
3	Do doors at accessible entrances appear to have compliant clear floor area on each side?	X				X			
4	Do doors at accessible entrances appear to have compliant hardware?	X				X			
5	Do doors at accessible entrances appear to have compliant clear opening width?	X				X			
6	Do thresholds at accessible entrances appear to have a compliant height?	X				X			
7	Do pairs of accessible entrance doors in series have the minimum clear space between?			X				X	
Ref #	Accessible Route	Y	N	NA	Comments	Y	N	NA	Comments
1	Does an accessible route appear to connect with all public areas inside the building?		X				X		Lacks access to 1914 Bldg.
2	Do accessible routes appear free of obstructions and/or protruding objects?		X			X			
3	Do ramps on accessible routes appear to have a compliant slope?			X				X	
4	Do ramps on accessible routes appear to have a compliant length and width?			X				X	
5	Do ramps on accessible routes appear to have compliant end and intermediate landings?			X				X	
6	Do ramps on accessible routes appear to have compliant handrails?			X				X	
7	Are exit passageways and exit stairways identified with accessible signage?		X				X		
8	Do public transaction areas have an accessible lowered counter section?			X				X	
9	Do public telephones appear mounted with an accessible height and location?			X				X	

10	Does directional signage appears to be compliant?		X				X		
Ref #	Public Toilet Rooms	Y	N	NA	Comments	Y	N	NA	Comments
1	Do public accessible toilet rooms appear to have a minimum compliant floor area?		X		Toilet rooms are private type	X			
2	Does the lavatory appear to be mounted at a compliant height and with compliant knee area?		X			X			
3	Does the lavatory faucet have compliant handles?		X			X			
4	Is the plumbing piping under lavatories configured to protect against contact?		X			X			
5	Are grab bars provided at compliant locations around the toilet?		X			X			
6	Do toilet stall doors appear to provide the minimum compliant clear width?		X			X			
7	Do toilet stalls appear to provide the minimum compliant clear floor area?		X			X			
8	Do urinals appear to be mounted at a compliant height and with compliant approach width?		X			X			
9	Do accessories and mirrors appear to be mounted at a compliant height?		X			X			
10	Are accessible toilet rooms with-in one story		X					X	
Ref #	Interior Doors	Y	N	NA	Comments	Y	N	NA	Comments
1	Do doors at interior accessible routes appear to have compliant clear floor area on each side?	X				X			
2	Do doors at interior accessible routes appear to have compliant hardware?		X			X			
3	Do doors at interior accessible routes appear to have compliant opening force?	X				X			
4	Do doors at interior accessible routes appear to have compliant clear opening width?	X				X			
Ref #	Miscellaneous	Y	N	NA	Comments	Y	N	NA	Comments
1	Does seating in public spaces appear to be accessible?		X			X			
2	Has any ADA improvements been made since the original construction?	X					X		
3	Does drinking fountain appear to have proper clearances and operation?		X		None provided		X		None provided
Ref #	Elevator	Y	N	NA	Comments	Y	N	NA	Comments
1	Are hallway call buttons configured with the "UP" button above the "DOWN" button?	X						X	
2	Is accessible floor identification signage present on the hoistway sidewalls?	X						X	
3	Do the elevators have audible and visual arrival indicators at the entrances?	X						X	
4	Do the elevator hoistway and car interior appear to have a minimum compliant clear floor area?	X						X	
5	Do the elevator car doors have automatic re-opening devices to prevent closure on obstructions?	X						X	
6	Are tactile and braille characters mounted on the left of each elevator car control button?	X						X	
7	Are audible and visual floor position indicators provided in the elevator car?		X					X	
8	Is the emergency call system at the base of the control panel	X						X	