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Fulda Fire Department Study

Fulda, Minnesota

July 2, 2018



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Acknowledgements

BKV Group would like to thank the Fulda Volunteer Fire Department project team for their time during the preparation of this study.

Dave, Scott, Ryan, Darby, Willy

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Executive Summary

BKV Group was retained in early 2018 to review the conditions of the Fulda Fire Department facilities, assess the future needs of the Department, and provide recommendations about how to move forward.

The intent of this study is to provide tools enabling City and Department leadership to make informed decisions. This report will assist the Department in identifying solutions to current facility issues and support the Department in providing services that are responsive, efficient, safe, and provided in an economically responsible manner.

Discovery

The study started with a discovery process where BKV Group obtained basic information about the Department and the existing facilities. The next step in the study was an on-site assessment of the building by BKV Group, which occurred on March 15, 2018.

Facility Assessment

The building was reviewed for physical and functional issues. Any issues discovered were documented with text and photographs. Many issues are simple to correct – some of the more complicated issues are listed below.

The building was built in 1957 and the apparatus bays were expanded in the early 1980s to accommodate more and larger apparatus. The roof was replaced in 2008 and the boilers were replaced in 2016. It is a single-story building of approximately 5,400 square feet, of which 3,350 square feet is occupied exclusively by the fire department.

The building does not contain decontamination facilities for personnel or for equipment, which leads to continued

exposure to carcinogens from the fireground. The building does not have doors large enough to fit modern fire apparatus. There is no exhaust removal system in the apparatus bays, so firefighters breathe in diesel exhaust fumes and off gassing of fireground contaminants. There is no separate storage facility for personal protective equipment, so it gets exposed to diesel exhaust and UV light, which shortens its useful life. Double-scheduling of the City Hall meeting room leads to difficulty organizing training activities that can be both classroom and hands-on. Parking in the vicinity of City Hall is frequently filled for events at the Park, Library or City Hall, so firefighters cannot park immediately adjacent to the fire station, increasing response times.

Capital Improvement Estimate

Based upon findings during the facility assessment, BKV Group estimated the costs to rectify the maintenance, repair, and safety issues. Each issue was categorized as urgent, short-term (1 to 2 years), medium-term (3 to 5 years), or long-term (5+ years). These estimates do not include major building additions or renovations that might be necessary to address functional concerns.

The Fire Station building is estimated to have ~\$10,000 of urgent issues, ~\$25,000 of short-term issues, ~\$110,000 of medium-term issues, and ~\$105,000 of long-term issues.

These estimates are conceptual only and will vary for several reasons, including construction escalation, bidding conditions, the exact approach to solving the issue, etc. Cost estimates should be checked prior to commencement of the work.

Space Programming

BKV Group assessed the Fire Department's space requirements based on national standards, interviews with Department leadership, and demographic trends. To operate in full compliance with national standards and best practices for the next 20 years, we recommend a station of ~12,800 square feet.

Because first costs are an important consideration, BKV Group also provided an option for a 10,984 square foot station. This option comes with significant sacrifices, but some of the missing spaces could be added onto the building later.

Master Planning Concepts

BKV Group explored, at a high level, five Master Planning options. Option 1 explored repurposing the Ambulance and Police building as the Fire Station – this idea will not work. Option 2 explored adding on to the existing City Hall – this is the least-cost option but does not solve some important functional concerns. Option 3 and 3A explore locating the station along Columbia Avenue south of Front Street – these are the highest-cost options and expose the fire department to high levels of risk due to the fuel depot next door. Option 4 explored locating the station on a greenfield site – this is a strong option that allows an optimal building layout. Option 5 explored locating the fire station on the site of the current St. Lawrence School, which would be demolished – this is a strong option that may be less expensive than a greenfield site depending on purchase price and site development costs.

Total estimated project costs vary between ~\$2,500,000 and ~\$3,800,000 depending on the type of building (steel-framed, wood-framed, pre-engineered) and the program option selected. These numbers will be affected by construction escalation if the project is not immediately pursued and by the amount of volunteer labor and/or

donated materials that the members of the community can provide.

Action Steps

Next steps for the Fulda Fire Department should include:

- Review the option for the townships served by the fire department to share the cost of the project.
- Review and establish a time frame for when the project will be constructed.
- Further define what / if any of the construction could be done by local volunteers.
- Have an open house with the public to state the requirements for the fire station, the City's and Department's goals, and potential tax impact.

Department Description

Department Name	Fulda Fire Department
Agency type	Municipality – City of Fulda
Headquarters location	102 3rd Street NE Fulda, MN 56131
Fire stations (please list by name)	Fulda Fire Station
Other facilities (please list by name)	None
ISO rating, date	ISO 6
Area in square miles	172.25 square miles Including the City of Fulda and the villages of Dundee, Wirock, and Lime Creek
% Urban	0.4%
% Rural	99.6%

Staffing

Department Leadership	Chief Dave Baumhoefner 1st Assistant Chief Ted Dierks 2nd Assistant Chief Doug Canfield Secretary/Treasurer Mike Milbrath
Total Members (actual and allowed)	22 members, 30 allowed by ordinance

Demographics

Population	2,268
Number of residential structures	
Number of business structures	

Numbers of Alarms

(most recent complete year)

Fires	10
Property value exposed to fire	
Property value lost to fire	
Rupture or explosion	0
EMS	Not applicable
Rescues	1
Hazardous condition	0
Service call	0
Good intent call	2
False call	0
Severe weather	0
Other	0
Total	13

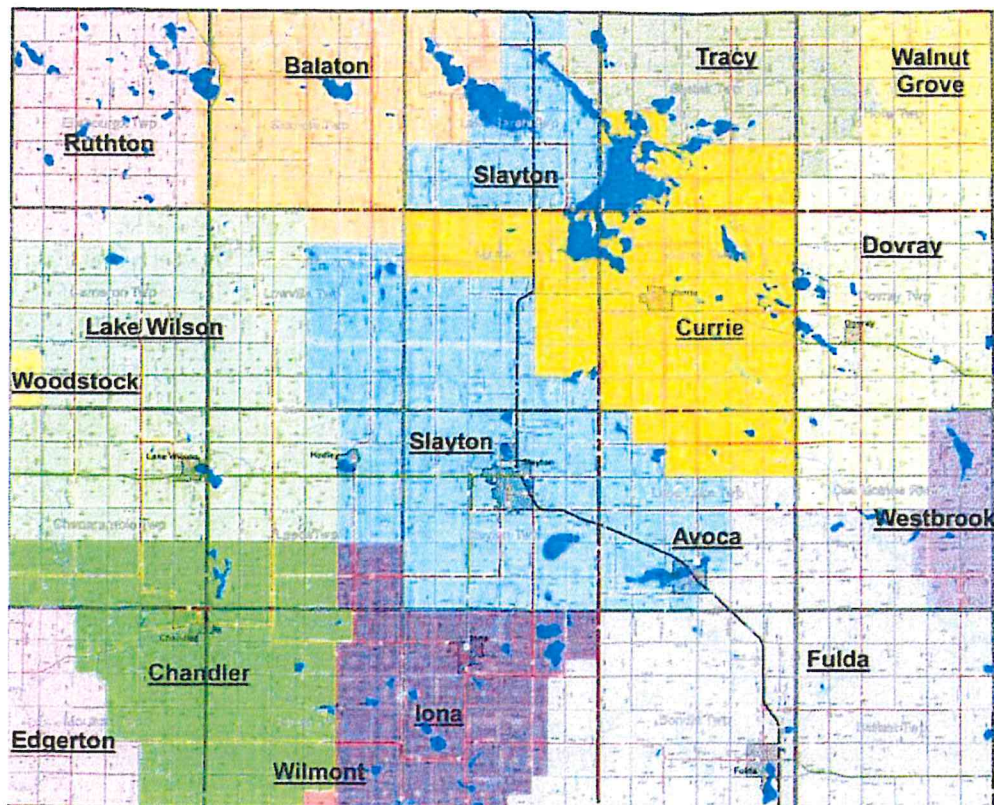
Numbers of Mutual Aid Responses

(most recent complete year)

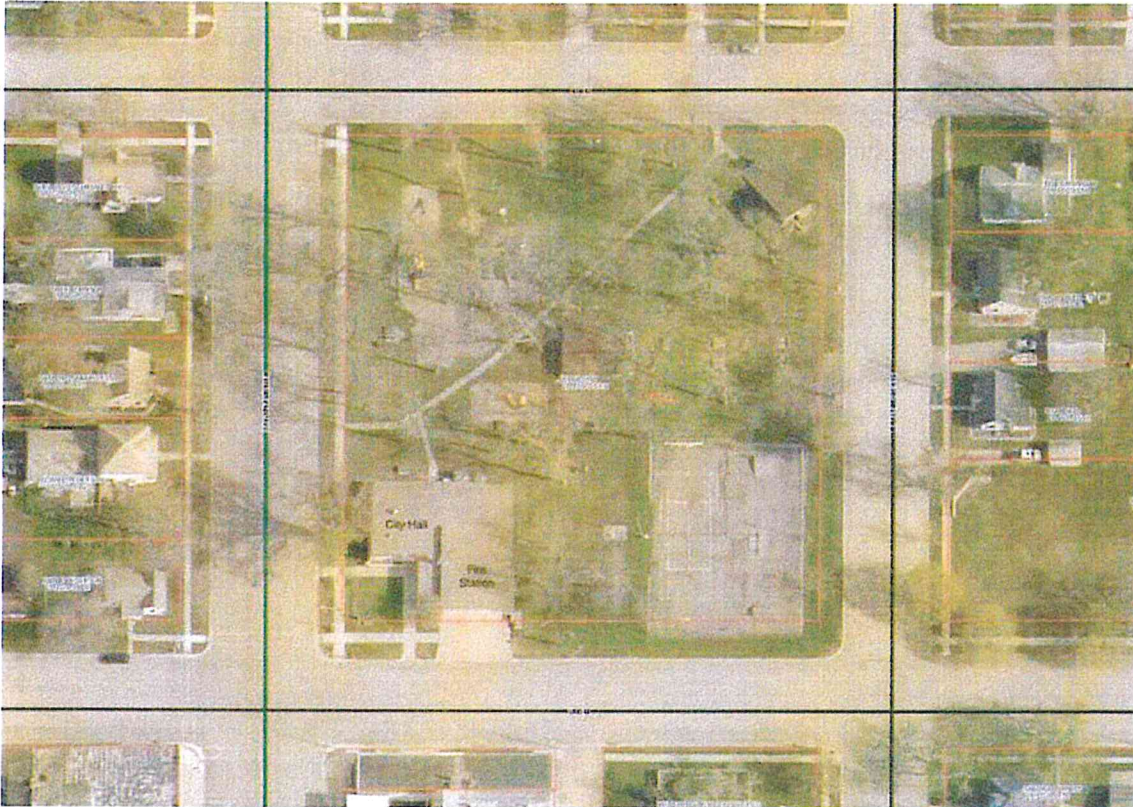
Given	0
Received	0

Apparatus

Year, Make, Type	Length	Width (to mirrors)	Height	Inside Turning Radius
1993 Ford Rescue Truck	24'-0"	~9'-0"	9'-3"	
1975 Chevy Pumper	26'-6"	~9'-0"	8'-10"	
2001 Freightliner FL80 Tanker (2011 tank)	27'-4"	~9'-0"	9'-0"	
1988 Ford Tanker	25'-0"	~9'-0"	8'-6"	
2000 Ford F250 Wildland	20'-6"	8'-0"	7'-3"	
2000 Freightliner FL70 Pumper (crew cab)	32'-0"	~9'-0"	9'-3"	
Trailer – Water Pump	14'-0"	4'-0"	6'-0"	
Trailer – Water Auger	24'-0"	6'-0"	12'-0"	
Trailer – UTV	TBD	TBD	TBD	



Facility Assessments



The purpose of this section of the Study is to document the condition of the current Fire Station. This information provides the necessary data to enable the Department to make informed decisions regarding how to best address any repairs, upgrades and/or replacements. There are two components to the Assessment:

An on-site *Physical Condition Assessment* of the building was performed to determine maintenance issues, safety and code concerns, building systems and finishes that have exceeded their useful life, and to review how current conditions affect building system operations and energy costs.

A *Functional Assessment* was performed through visual observations and discussions with key staff. It determined how existing building conditions are affecting staff operations and the ability to serve the community. The Functional Assessment also examined how present operations and workflows compare to current recommended best practices in the industry.

The assessments are intended to provide an indication of the capital maintenance requirements, potential code and regulatory required upgrades, and other building conditions which should be considered as part of the facility's general upkeep as well as part of any building project. This study does not address areas of the building that are concealed behind walls or locked doors.

A building element or system listed as being in "good" condition should be interpreted to mean that it is in the first part of its anticipated useful life or that it is aging but has been maintained exceptionally well such that its useful life is extended beyond normal expectations. With the exception of motor-driven equipment and finishes exposed to hard wear, "good" systems and elements are not expected to need replacement for 15 or more years.

A building element or system listed as being in "average" condition should be interpreted to mean that it is in the middle part of its anticipated useful life. "Average" systems and elements are not expected to need replacement within the next 15 years.

A building element or system listed as being in "poor" condition should be interpreted to mean that it is in the last part of its anticipated useful life and that the need for replacement is imminent.

The facility assessments were conducted on November 7, 2017 by the following individuals:

- Bruce Schwartzman, AIA
Partner, BKV Group
- Craig Carter, AIA
Associate Partner, BKV Group

A Note on Facility Assessments for Fire Stations:

Firefighters are at significantly higher risk than the general population to develop cancer (21% higher colon cancer risk, 32% higher brain cancer risk, 39% higher skin cancer risk, 102% higher testicular cancer risk, etc.). This risk is a direct result of their firefighting activities – they are frequently exposed to highly toxic and carcinogenic compounds at the fireground (arsenic, benzene, acrylonitrile, polycyclic aromatic hydrocarbons, etc.), and they bring those compounds back to the fire station on every hose, ladder, fire truck, and piece of personal protective equipment that was anywhere near the fire. In addition, operating diesel fire trucks inside the fire station for years has resulted in massive amounts of diesel particulates permeating the apparatus bay (one large study showed a typical apparatus bay has 16x above EPA Standards). Both the fireground toxins and the diesel particulates are so small that they hang suspended in the air for long periods of time, so the risk does not go away between calls but rather is consistent every time the apparatus bay is entered. Apparatus Bays are not a safe place to work, not a safe place to store equipment and supplies (especially absorptive materials like paper products), and not a safe place to walk through to gain access to adjoining spaces. Any adjoining space that is not properly protected through air pressure differentials and air locks also becomes contaminated. The increased risk of cancer becomes a major factor in evaluating the functionality of a fire station, and it will be covered in detail.

A. Building Description

1. Past and Current Use

1. The Fire Station and City Hall was built in 1957. The apparatus bays were lengthened in the early 1980's to accommodate additional apparatus. The roof was replaced in 2008.

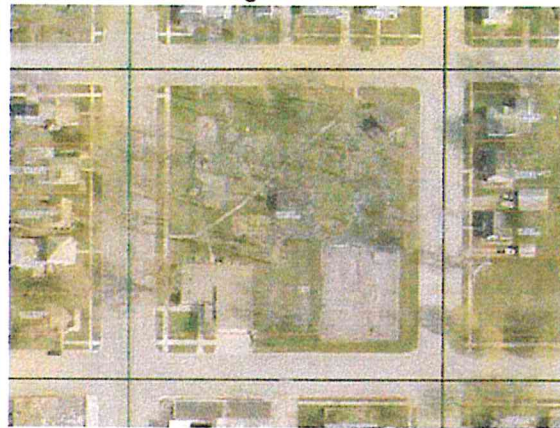
2. Size

1. The building is approximately 5,400 square feet and 15 feet tall. The fire department has sole occupancy of approximately 3,350 square feet. The parcel is not subdivided from a full-block City park.

Figure A.1.1



Figure A.2.1



B. Site

1. Topography

1. There is a slight downward slope from the southwest corner of the site to the northeast corner of the building.

2. Storm Water Drainage

1. The canopy above the apparatus doors drains to an open-faced downspout and discharges at grade east of the building.
2. The roof drain from the apparatus bay roof discharges at the east side of the building.
3. The apparatus bay addition drains over the parapet into an open-faced downspout at the north side of the building
4. The roof above the office and boiler room is served by a single roof drain that discharges to the west of the apparatus bay doors along the apparatus apron.

3. Paving and concrete

1. The asphalt paving in the 3rd Street right-of-way is in poor condition. We estimate that replacement will be necessary within five years.
2. The concrete apron is in good condition with minor cracking and limited cosmetic staining.
3. The concrete sidewalks are in good condition.

4. Landscaping and Site Elements

1. Plantings were not observed due to snow cover.

5. Water Utility

1. Water enters the building below grade along the west wall. The water meter is directly inside this location. A backflow preventer was not observed.
6. Electric Utility
 1. Electrical comes to the SE corner of the building overhead from a pole located at roughly the centerline of the block.
 2. The service entrance and electric meter are at the south end of the east wall of the apparatus bays.
 3. There is no building backup generator.
7. Natural Gas Utility
 1. The gas meter is located at the south wall of the building, west of the apparatus bays.
8. Sanitary Sewer Utility
 1. Sanitary sewer location was not observed.
9. Storm Sewer Utility
 1. There is no storm sewer piping on site.
10. Communications Utility
 1. Communications comes both overhead and below grade to the southeast corner of the building.
 2. There is a pole-mounted radio antenna at the southeast corner of the building.

Figure B.2.1a



Figure B.2.1b



Figure 60B.2.2a



Figure B.2.2b



Figure B.2.2c



Figure B.2.3a



Figure B.2.3b



Figure B.2.4a



Figure B.2.4b

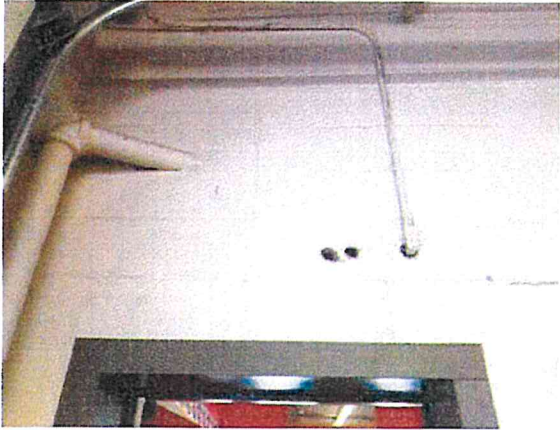


Figure B.2.4c



Figure B.3.1



Figure B.3.2a



Figure B.3.2b

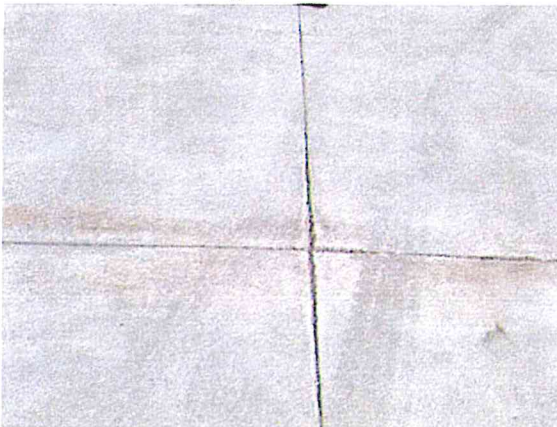


Figure B.3.2c

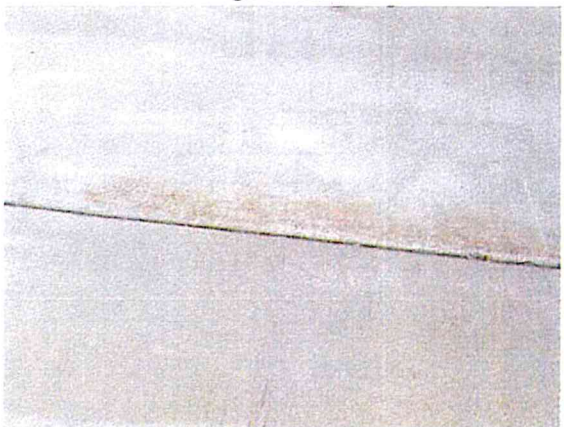


Figure B.3.3a



Figure B.3.3b



Figure B.5.1



Figure B.5.1



Figure B.6.1



Figure B.6.2



Figure B.7.1



Figure B.10.1



C. Structural Frame

1. Foundation
 1. The foundation appears to be in good condition as there is no evidence of building settlement.
2. Slab-on-grade
 1. Where visible, the slab appears to be in generally good condition.
 - (1) There are minor cracks in the apparatus bay floor as is expected where there are no control joints.
 - (2) There is patching of the apparatus bay floor where the original office was removed during the apparatus bay expansion.
 2. The joint between the original Bay floor and the Bay Addition floor is in good condition.
3. Superstructure
 1. The exterior bearing walls are concrete masonry and are generally in good condition.
 - (1) There is continuous vertical cracking at the southeast corner of the Bays.
 - (2) There is continuous vertical cracking at the east side of the Bays.
 2. The interior bearing walls are concrete masonry and brick-faced concrete masonry at the Bay addition. They are in generally good condition.
 - (1) There is continuous vertical cracking just south of the original north wall of the apparatus bays.
 - (2) There is continuous vertical cracking just south of the door connecting the Bays with the City Hall lobby.
 3. The original roof structure is cement decking over steel trusses and the 1980's addition roof structure is metal deck over steel trusses. All appears in generally good condition.
 - (1) There is minor cracking at some of the cement decking.

Figure C.2.1



Figure C.2.1.1



Figure C.2.1.2



Figure C.2.2



Figure C.3.1.1

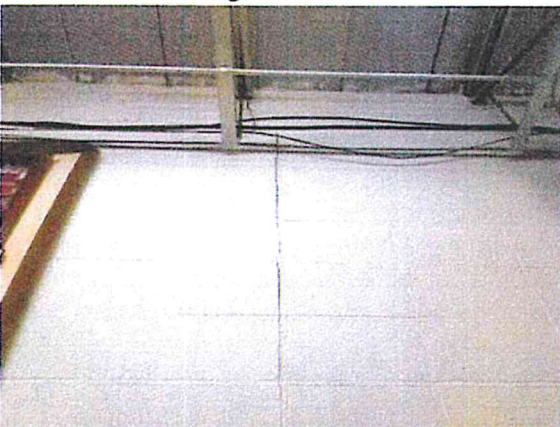


Figure C.3.1.2



Figure C.3.2.1

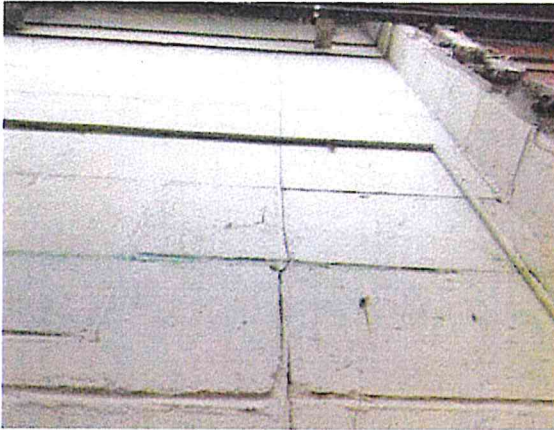


Figure C.3.2.2



Figure C.3.3



Figure C.3.3.1



D. Exterior Enclosure

1. Exterior walls

1. The exterior walls are of standard brick and are in generally good condition.
 - (1) There are some locations along the west wall of the boiler room where the mortar has separated from the bricks. This should be tuckpointed.
 - (2) The brick at the southwest corner of the office is spalled.
 - (3) There is no sealant at the base of the wall where it meets a concrete sidewalk.
 - (4) There is no evidence of flashing at the base of the wall. The construction of the wall might be such that the flashing is not required, but it is typically installed as a best practice.
 - (5) The corbelled brick at south wall is chipped and spalled in many locations.
 - (6) The brick at the base of the corbelled brick at the southeast corner is missing.
 - (7) There is a crack at the east wall that has been sealed. We anticipate that sealants will need to be replaced within five years.
 - (8) There are bricks at the northeast corner of the apparatus bays that are cracked or spalled and should be repaired.

2. There are no expansion joints in the brick except where the addition ties into the original building.
 - (1) The brick expansion joint sealant between the original building and the addition is in good condition. We anticipate that sealants will need to be replaced within five years.
3. The brick wall above the electrical service is stained. This is a cosmetic issue.
4. The infill walls clad in vinyl siding are in good condition.
5. The piping and conduit penetrations through the exterior wall are in generally good condition. We anticipate that sealants will need to be replaced within five years.
2. Windows and Doors
 1. The apparatus doors are in good condition.
 - (1) The weatherstripping at the apparatus doors is in poor condition and should be replaced.
 - (2) The steel angles at the apparatus door jambs are scraped and beginning to show signs of rust.
 - (3) The limestone surround at the west side of the center apparatus door is severely cracked and should be repaired to prevent further degradation.
 - (4) The sill at the east apparatus door has spalled and should be repaired.
 2. The exterior man door into the Boiler Room has faded and is beginning to show signs of rust. We recommend scraping off the rust and loose paint and painting with a rust-inhibiting paint.
 - (1) The limestone surround at the man door into the Boiler Room is missing mortar at the joints or is cracked between the mortar and the limestone. This should be tuckpointed.
 3. The louver into the Boiler Room has faded and is beginning to show signs of rust.
 - (1) The rowlock brick sill at the louver into the Boiler Room is in good condition.
 4. The glass block window into the Boiler Room is in average condition.
 - (1) The limestone sill at the glass block window into the Boiler Room is missing mortar is cracked between the mortar and the limestone. This should be raked back 1/2" and filled with sealant.
 5. The exterior man door into the office is in good condition.
 - (1) The limestone surround at the man door into the Office is spalled in one section and is missing mortar at one joint and should be tuckpointed.
 - (2) The hollow metal frame at the man door into the Office is showing signs of rust. We recommend scraping off the rust and loose paint and painting with a rust-inhibiting paint.
 6. The exterior man door into the Bays is in good condition.
 7. The exterior vinyl windows are reported to have been replaced in 2015 and are in good condition.
3. Roof
 1. The ballasted roof was installed in 2008 and is reported to be in good condition.
 - (1) The membrane shrank and pulled a portion of the apparatus bay parapet onto the roof. This was repaired under warranty.
 2. The metal parapet caps and flashings are in excellent condition.
 - (1) We anticipate that sealants will need to be replaced within five years.
 3. The stucco soffit under the apparatus bay canopy is in good condition with some minor cracking.

Figure D.1.1



Figure D.1.1.1



Figure D.1.1.2



Figure D.1.1.3



Figure D.1.1.4



Figure D.1.1.5a



Figure D.1.1.5b



Figure D.1.1.6



Figure D.1.1.7

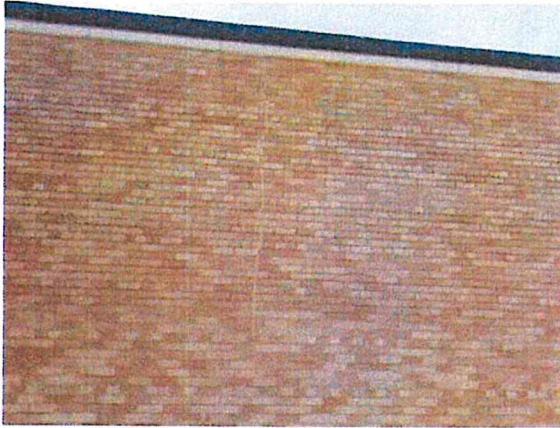


Figure D.1.1.8



Figure D.1.2.1a



Figure D.1.2.1b



Figure D.1.3



Figure D.1.4



Figure D.2.1



Figure D.2.1.1a



Figure D.2.1.1b



Figure D.2.1.2a



Figure D.2.1.2b



Figure D.2.1.3



Figure D.2.1.4

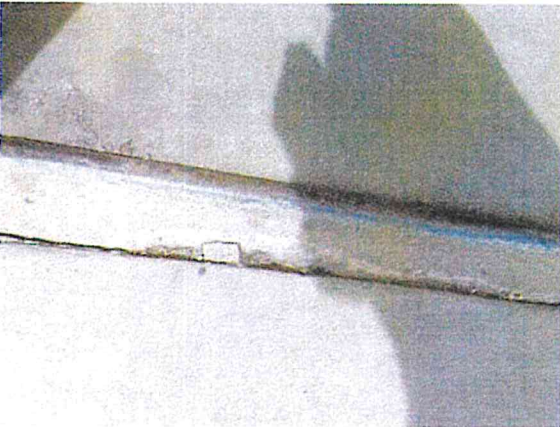


Figure D.2.2



Figure D.2.2.1



Figure D.2.3



Figure D.2.3.1



Figure D.2.4

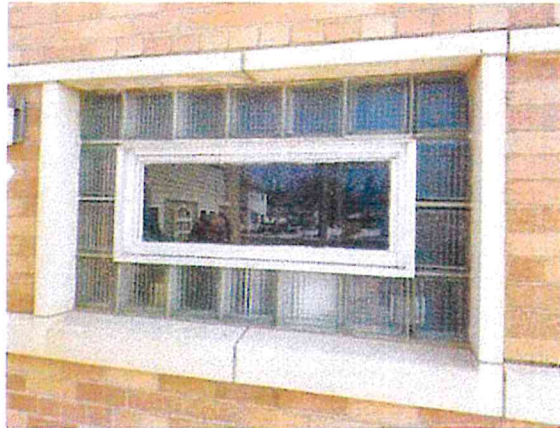


Figure D.2.4.1



Figure D.2.5



Figure D.2.5.1a



Figure D.2.5.1b



Figure D.2.5.2



Figure D.2.6



Figure D.2.7



Figure D.3.1a



Figure D.3.1b



Figure D.3.1c



Figure D.3.1.1



Figure D.3.2



Figure D.3.2.1



Figure D.3.3



E. Interior Elements

1. Flooring
 1. The epoxy flooring in the office is in average condition with bleed-through from imperfections in the concrete slab-on-grade.
2. Walls
 1. The cement block walls in the Apparatus Bay are in generally good condition.
 - (1) There is vertical cracking in the non-bearing wall where the roof drain runs down the exterior wall.
 - (2) There is significant horizontal cracking where the ceiling joists pass through the wall separating the City Hall storage room from the Apparatus Bay. This is caused by normal building movement like the deflection of the roof structure under heavy snow loads.
 2. The gypsum board walls in the office are in good condition.
3. Doors and Windows
 1. The man door between the apparatus bays and the office is in good condition.
 - (1) The smoke seals are in good condition.

2. The man door between the apparatus bays and the City Hall lobby is in good condition.
4. Ceilings
 1. The gypsum board ceiling in the Office is in good condition.
 2. The ceiling in the Boiler Room is in poor condition with portions of plaster loose around the roof drain.
5. Casework
 1. The wall cabinets in the Office are beyond their expected service life but are in good condition.
 2. The work counter in the Office is in good condition.
 3. The enclosed cabinets in the Apparatus Bay are in average condition.
 4. The open shelving in the Apparatus Bay is in poor condition with too much weight bending the shelves.
 5. The turnout gear lockers are in good condition.
 6. The counter and shelves at the radio storage area are in poor condition.
6. Equipment
 1. The ceiling fan in the office is in good condition.
 2. The Pepsi machine appears to be in good condition.
 3. The refrigerator in the Apparatus Bay is in poor condition.
 4. The drawbar-type overhead door openers are in good condition.
 5. The Mako SCBA cascade and fill station is in good condition.
 6. The Bauer SCBA compressor is in good condition and has an exterior air intake.

Figure E.1.1

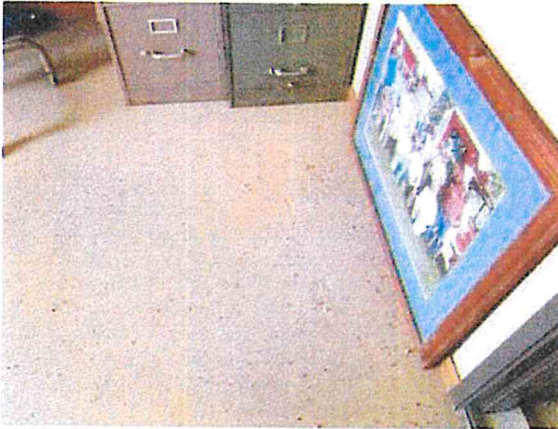


Figure E.2.1.1



Figure E.2.1.2a



Figure E.2.1.2b



Figure E.2.1.2c



Figure E.2.1.2d



Figure E.3.1



Figure E.3.1.1



Figure E.3.2



Figure E.4.1



Figure E.4.2



Figure E.5.1



Figure E.5.2

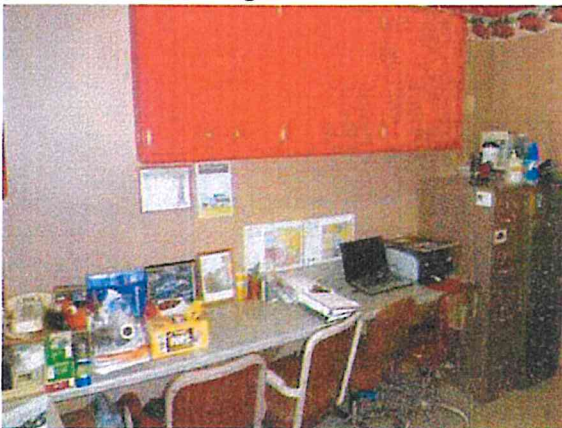


Figure E.5.3



Figure E.5.4



Figure E.5.5



Figure E.5.6



Figure E.6.1



Figure E.6.2



Figure E.6.4a



Figure E.6.4b



Figure E.6.5



Figure E.6.6



F. Vertical Transportation

1. There is no vertical circulation in the building.

G. Fire Protection

1. There is no fire sprinkler system installed in the building.

H. Plumbing

1. Domestic Water
 1. The cold water pipe crosses the apparatus bay above the trucks for tank-fill then enters the boiler room.
 2. A 34 kBTU 40-gallon gas fired water heater is installed in the Boiler Room
2. Sanitary Sewer
 1. The sanitary sewer system was not observed.
3. Compressed Air
 1. A 60-gallon air compressor is located in the boiler room and is in good condition.

2. Compressed air piping consists of 3/4" PVC routed from the air compressor overhead to drops at each apparatus with air brakes.
4. Fixtures
 1. There is one floor drain in the Boiler Room.
 2. There are hot and cold hose bibbs in the Apparatus Bay.
 3. There is one catch basin in the Apparatus Bay floor.

Figure H.1.1a

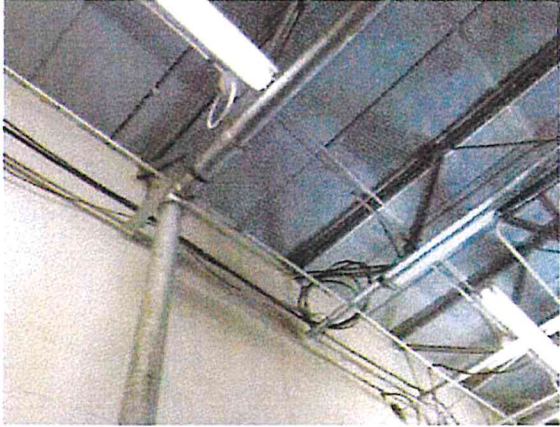


Figure H.1.1b



Figure H.1.1c



Figure H.1.2a



Figure H.1.2b

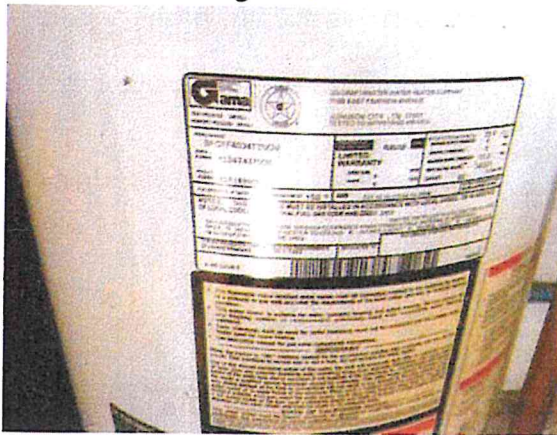


Figure H.3.1



Figure H.3.2



Figure H.4.1

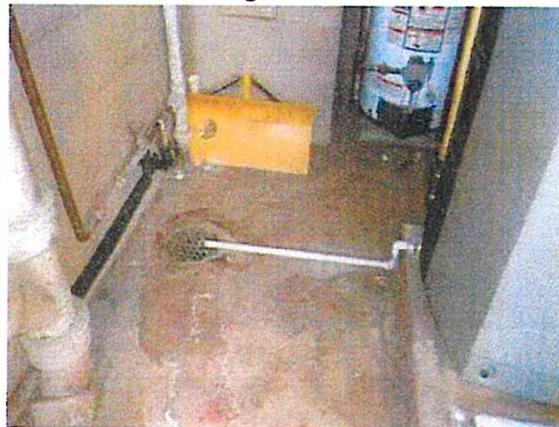


Figure H.4.2



Figure H.4.3

