



Mays Consulting & Evaluation Services, Inc.

A Professional Consulting & Engineering Organization

BUILDING ENVELOPE ASSESSMENT

COLUMBUS METROPOLITAN LIBRARY

WHETSTONE BRANCH

COLUMBUS, OHIO

DECEMBER 19, 2018

MAYS PROJECT # COH44-011





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1.0 ABSTRACT

Mays Consulting and Evaluation Services, Inc., (Mays Consulting) was retained by the Columbus Metropolitan Library (CML) to perform a Building Envelope Assessment (BEA) of the Whetstone Branch Library facility, located at 3909 N. High Street, Columbus, Ohio 43214.

The intent of the BEA is to visually determine general overall conditions of the building envelope components, identify any deficiency items, and provide recommendations for corrective action.

Joey Bartlett performed the BEA for Mays Consulting on December 19, 2018, and has authored this report.

This report is not all-inclusive but describes the conditions observed during the BEA. As described in the findings of this report, there were deficiencies observed in the various building envelope system components that could allow moisture to penetrate the building's interior. Note that the recommendations for corrective actions are typically general and may require additional investigation and/or research for the final repair design.

Supplied elevation drawings and roof plan were used to identify deficient areas during the BEA.



2.0 General Conditions

Walls:

- The main wall areas consist of brick and steel tubes. Overall condition of the brick walls and steel tubes is good with minor needed repairs. There is a plaster soffit for ceiling area at front entrance, as well as at other locations. The plaster soffit is also in good condition with minor needed repairs.
- The sealant joint between the masonry walls and the concrete sidewalk is in poor condition at numerous areas.
- There are cracked or deteriorated mortar joints between bricks at areas. Some of this issue can be attributed to leaking gutter joints and end caps that is allowing water to migrate down the masonry walls. It can also be found where the steel tubes horizontally penetrate the masonry walls.
- There are several mortar joints in the masonry wall that have had sealant repairs.
- There are several broken bricks on building.
- There is vegetation growing on several walls. This could cause issues with some of the building components in the long term if left in place.
- The foundation under north window at east elevation is in poor condition. This issue should be further investigated.
- There is a tree that has branches growing into masonry walls on east elevation.
- There are cracked/shrunk sealant joints between the masonry walls and the inset downspouts.
- There are several missing sealant joints, or poor sealant joints, where penetrations stub through the masonry walls.
- Several cracks and some staining were observed on the plaster soffit ceiling at the front entrance area.
- There are cracked/shrunk sealant joints where the steel tubes horizontally penetrate through the masonry walls. Also, there is a sealant joint between a steel column and a brick base that is in poor condition.
- There is a pipe penetration through masonry wall at north end of west elevation that is discharging liquid down the wall and staining the brick.

Windows:

- There are storefront and awning windows in place on the building. These windows consist of both fixed and operable types. These windows are in overall fair condition at most locations, but several windows need various repairs. There are translucent windows located at the clerestory area. These windows are in overall fair condition.



- There is a combined total of 18 different window sets for all wall elevations consisting of approximately 1,914 SF of window area.

| | <u>Window Quantity</u> | <u>Window Size</u> | <u>Window Sq. Ft.</u> |
|---------------|------------------------|--------------------|-----------------------|
| | 1 | 18'-3" x 9'-5" | 171.9 |
| | 1 | 11'-5" x 8'-0" | 91.3 |
| | 1 | 18'-8" x 2'-8" | 49.8 |
| | 6 | 18'-6" x 3'-10" | 425.5 |
| | 1 | 18'-6" x 7'-2" | 132.6 |
| | 1 | 4'-0" x 10'-0" | 40 |
| | 2 | 18'-3" x 10'-0" | 365 |
| | 1 | 20'-0" x 10'-0" | 200 |
| | 1 | 24'-4" x 10'-0" | 243.3 |
| | 1 | 8'-6" x 10'-0" | 85 |
| | 1 | 7'-2" x 10'-0" | 71.7 |
| | 1 | 3'-10" x 10'-0" | 38.3 |
| Totals | 18 | | 1914 |

- The sealant joints between the masonry and the window frames are in poor condition at various locations.
- The sealing joint between the window glass and frame is cracking and deteriorated at several window locations.
- There is corrosion at many window lintels around the building.
- There is a piece of trim metal installed between the large and small window sets at several window areas. The trim is loose and the wood member behind the metal could be observed.
- There are joints between the masonry and the window frames that do not have sealant.
- There are large window sets at the east and south elevations that have severely corroded steel members at bottom of window sets where they set at ground level to the brick. This issue should be further investigated.
- There is a window set at west side of south elevation that has multiple issues. Issues range from poor sealant joints, damaged window frame, fasteners through window pressure plate, heavy sealants at pressure plate joints, and heavy sealants at joint between pressure plates and glass. It is not known why this window set has so many deficiencies.

Doors:

- Doors are singles and a double, and are constructed of either glass or steel. The overall condition of these doors was good.
- Corrosion was observed at the bottoms of some of the steel door frames and doors.



Roofing:

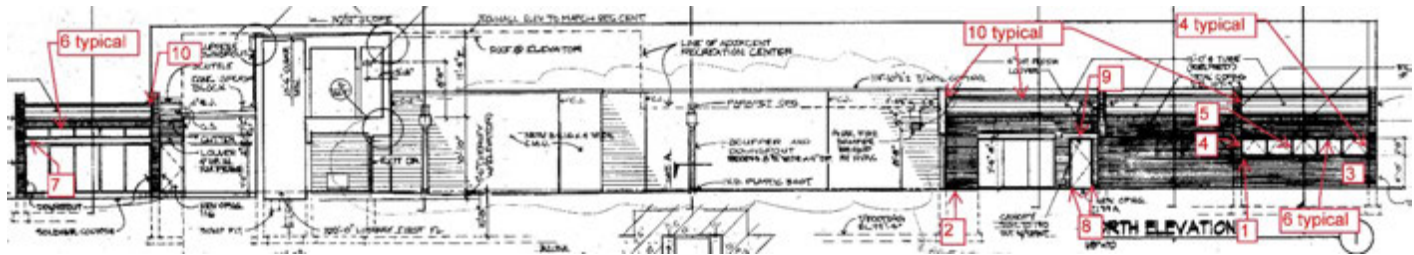
- Roofing system(s) consist of an adhered EPDM roofing membrane for low-sloped roofing areas, and metal roof panels for the steep-sloped roofing areas. The roof(s) drain via gutters, scupper boxes, and downspouts. The overall condition of the EPDM roofs is fair. With minor repairs these roofs should provide additional years of serviceable life but should be considered for replacement within the next 5-10 years due to age. The metal roof panels appear to have been coated/painted at some point over the years. They appear to still look good overall, and could provide up to 10+ years of serviceable life if properly maintained.
- The condition of the metal roof panels is fair. Many of the panels are showing some corrosion, particularly at the joints. There is a small penetration in the metal roof panels that is leaking downspout to gutter joints. Several gutter joints are showing some corrosion from leakage.
- There is a small canopy roof over man door at north elevation that has a steel fascia. The steel was observed to have corrosion where the paint has flaked off.
- There are several laps/seams in the EPDM roofing that are starting to come unglued and are slightly open.
- The lap sealant used to caulk around the flashings is starting to crack and deteriorate.
- There is a penetration that is relying on silicone sealant as a means of flashing.

NOT IN SCOPE



3.0 Findings and Recommendations

Walls Windows and Doors - North Elevation





1. Finding – Masonry Mortar Joints: The mortar joints between the bricks are deteriorated at areas adjacent to the inset downspouts. It looks as if the gutters or downspouts may be leaking and the water is tracking down the wall and over time it has caused the damage.

Recommendation – Masonry Mortar Joints: Fix the gutter and downspout issues to stop the water from tracking down the walls. Grind out and tuckpoint the mortar joints at bad locations. Clean staining from bricks when complete.



1a. Deteriorated mortar joints (see #1 on elevation photo for location).



1b. Deteriorated mortar joints (see #1 on elevation photo for location).

2. Finding – Wall to Sidewalk Sealant Joints: The sealant joint between the masonry wall and the concrete sidewalk is cracked/shrunk at numerous locations.

Recommendation – Wall to Sidewalk Sealant Joints: Remove existing sealant, clean and prep joints, and install backer rod and sealant as needed.



2a. Cracked/shrunk sealant joint between masonry wall and concrete sidewalk (see #2 on elevation photo for location).

3. Finding – Vegetation on Walls: There is vegetation growing on masonry walls at several locations. This can be detrimental to building components if left in place long term.

Recommendation – Vegetation on Walls: Remove the vegetation from the walls.



3a. Vegetation growth on walls (see #3 on elevation photo for typical location).

4. Finding – Masonry to Window Frame Sealant Joints: The sealant joint between the masonry wall and the window frames is cracked/shrunk at many locations.

Recommendation – Masonry to Window Frame Sealant Joints: Remove the existing sealant, clean and prep the joint, then install backer rod and sealant as needed.



4a. Cracked/shrunk sealant joint (see #4 on elevation photo for typical locations).



4b. Cracked/shrunk sealant joint (see #4 on elevation photo for typical locations).



#5 NOT IN SCOPE

5. Finding – Window gasket/sealant, joint, or a sealant joint was top applied at joint over the window glass and frame is deteriorated and/or missing sealant.

the window glass is deteriorated and/or missing sealant if this was the original gasket/sealant, joint, or a sealant joint was top applied at joint over the years.

Recommendation – Window Gaskets/Sealant: Due to the inconclusive finding of this issue, a window installer should be consulted on an appropriate fix for these windows.



5a. Deteriorated and/or missing sealant between window glass and frame (see #5 on elevation photo for location).



5b. Deteriorated and/or missing sealant between window glass and frame (see #5 on elevation photo for location).

6. Finding – Window Lintels: The window lintels at numerous locations were observed to have moderate corrosion where viewable.

Recommendation – Window Lintels: Remediate the corrosion and apply a rust inhibiting paint to protect.



6a. Corrosion on window lintel (see #6 on elevation photo for typical locations).



6b. Corrosion on window lintel (see #6 on elevation photo for typical locations).



7. Finding – Window Trim Metal: The window sets that consist of small windows in place over larger windows have a metal trim flashing installed between the window sets. The metal trim flashing was noted to be loose and the wood substrate behind the window trim flashing was observable.

Recommendation – Window Trim Metal: Verify the wood substrate is in good condition or make any necessary repairs, then re-secure the window trim metal.



7a. Loose window trim metal between window sets (see #7 on elevation photo for location).



7b. Loose window trim metal between window sets. Wood could be observed behind the loose metal (see #7 on elevation photo for location).

8. Finding – Door and Frame: The door frame, and the door itself, were observed to have moderate corrosion.

Recommendation – Door and Frame: Remediate the corrosion and apply a rust inhibiting paint to protect.



8a. Corrosion at door frame (see #8 on elevation photo for location).



8b. Corrosion at door and door frame (see #8 on elevation photo for location).

9. Finding – Canopy: The canopy over the man door at the west side of north elevation has a painted steel fascia. The paint has flaked off at areas and the steel is showing some moderate corrosion.

Recommendation – Canopy: Remediate the corrosion and apply a rust inhibiting paint to protect.



9a. Corrosion at canopy fascia (see #9 on elevation photo for location).

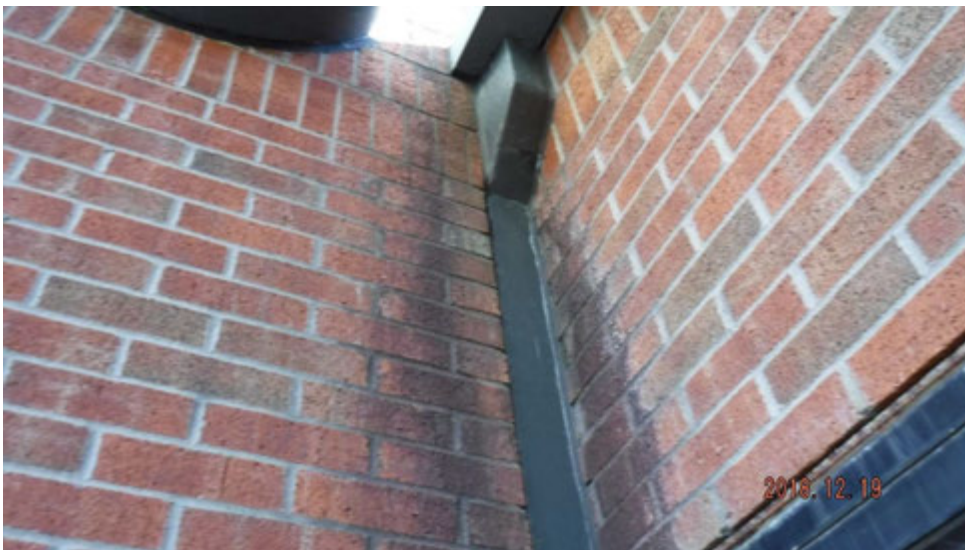


9b. Corrosion at canopy fascia (see #9 on elevation photo for location).



10. Finding – Gutters and Downspouts: The gutters and downspouts were noted to have leaks at numerous locations. The leaks are coming mostly at gutter joints and end caps. Some of the leaks also appear to be where the downspouts connect to the gutters. As the downspouts are inset in the wall, they were difficult to get an accurate view of conditions. The water migrating down the walls at these leak areas has stained the masonry, and in some cases caused the mortar joints to deteriorate.

Recommendation – Gutters and Downspouts: Clean and prep the various joints at gutters and downspouts. Re-seal these joints to stop the leaks. Clean the masonry walls of the staining.



10a. Staining of masonry due to gutter and/or downspout leaks (see #10 on elevation photo for typical locations).



10b. Leaking gutter joint causing staining on masonry (see #10 on elevation photo for typical locations).



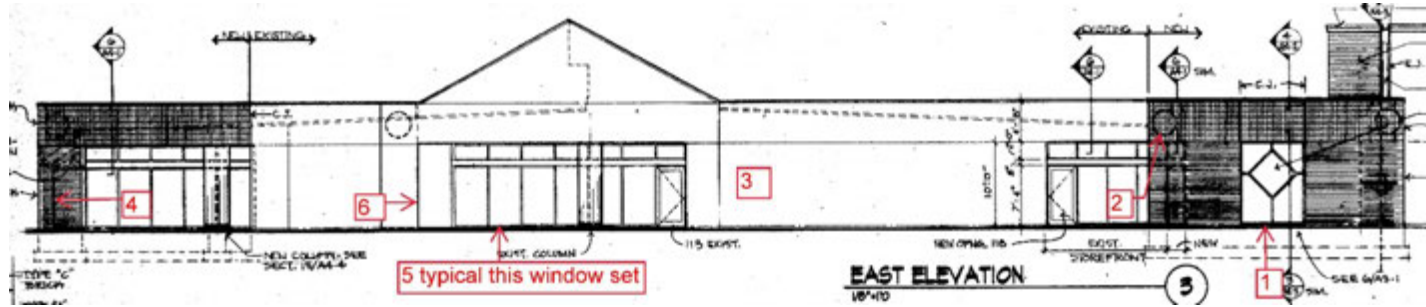
10c. Leaking gutter end cap (see #10 on elevation photo for typical locations).



10d. Leaking gutter end cap and/or connection to downspout (see #10 on elevation photo for typical locations).



Walls Windows and Doors - East Elevation



NOT IN SCOPE

1. Finding – Foundation: The foundation below the north window at east elevation is in poor/deficient condition.

Recommendation – Foundation: An engineer may be needed to look at current conditions. Make needed repairs to stabilize and fix the foundation.



1a. Poor/deficient foundation below window (see #1 on elevation photo for location).



1b. Poor/deficient foundation below window (see #1 on elevation photo for location).



2. Finding – Masonry Mortar Joints: The mortar joints between the bricks located where the steel tube(s) horizontally penetrate the masonry walls appear to be showing some deterioration. It looks as if the brick is absorbing water in these areas and not drying out properly.

Recommendation – Masonry Mortar Joints: Grind out and tuckpoint the mortar joints at bad locations. Clean staining from bricks when complete. Consider applying a masonry sealer to impede the absorption of water into the masonry.



2a. Deteriorated mortar joints (see #2 on elevation photo for location).



2b. Masonry appears to be holding moisture and not drying out as needed (see #2 on elevation photo for location).

3. Finding – Tree Branches: There are tree branches at the east elevation that are growing into the masonry walls.

Recommendation – Tree Branches: Cut the tree branches back as needed so that they do not come into contact with the building.



3a. Tree branches growing into masonry walls (see #3 on elevation photo for location).

4. Finding – Masonry Wall to Window Frame Joint: There is a joint between the masonry wall and a window frame that does not have sealant.

Recommendation – Masonry Wall to Window Frame Joint: Clean and prep the joint, then install backer rod and sealant as needed.



4a. Open joint between masonry wall and window frame (see #4 on elevation photo for location).



4b. Open joint between masonry wall and window frame (see #4 on elevation photo for location).

- 5. Finding – Window Foundation:** There is a large window set at the east elevation where the steel member(s) at base of window is severely corroded. This steel member(s) is at ground level. This condition is found at different locations for this window set.

Recommendation – Window Foundation: A further investigation should be made for this finding. An engineer may need to be obtained to review these conditions and then recommend a structural fix.



5a. Corroded steel member(s) at base of window where it sets at ground level (see #5 on elevation photo for location).



5b. Corroded steel member(s) at base of window where it sets at ground level (see #5 on elevation photo for location).



5c. Corroded steel member(s) at base of window where it sets at ground level (see #5 on elevation photo for location).



5d. Corroded steel member at base of window where it sets at ground level (see #5 on elevation photo for location).

6. Finding – Masonry Wall to Downspout Joint: The sealant joint between the masonry wall and the inset downspout was found to be cracked/shrunk.

Recommendation – Masonry Wall to Downspout Joint: Remove the sealant, clean and prep the joint, then install backer rod and sealant as needed.



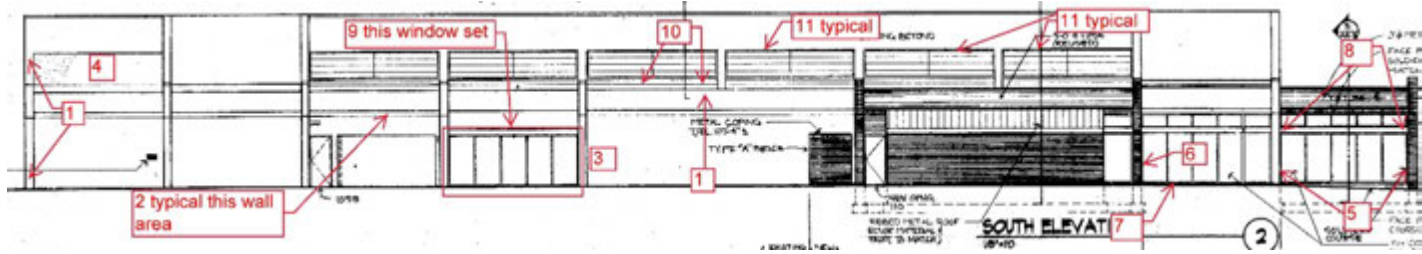
6a. Cracked/shrunk sealant joint (see #6 on elevation photo for location).



6b. Cracked/shrunk sealant joint (see #6 on elevation photo for location).



Walls Windows and Doors - South Elevation

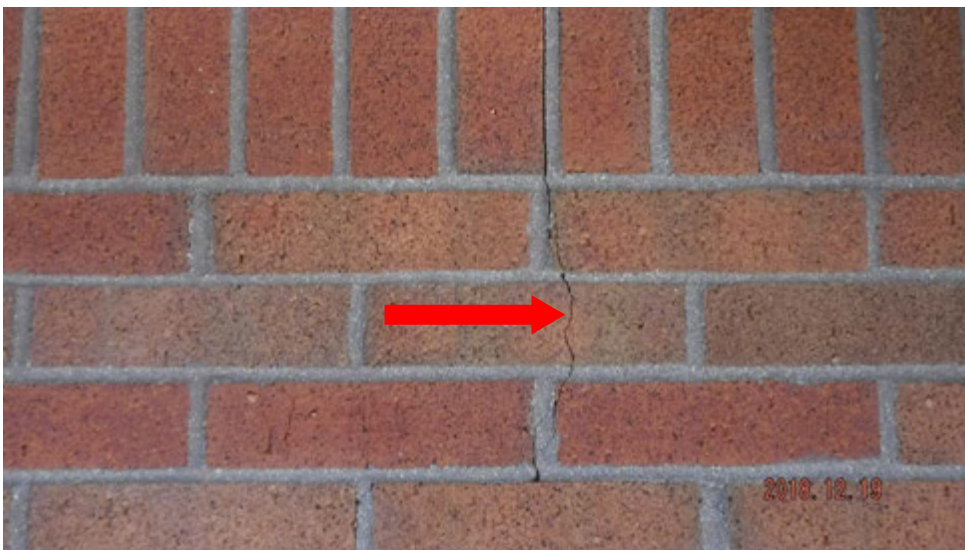


1. Finding – Masonry Brick and Mortar Joints: There are several broken bricks on the south elevation. There are also cracked/shrunk mortar joints between the bricks at various areas.

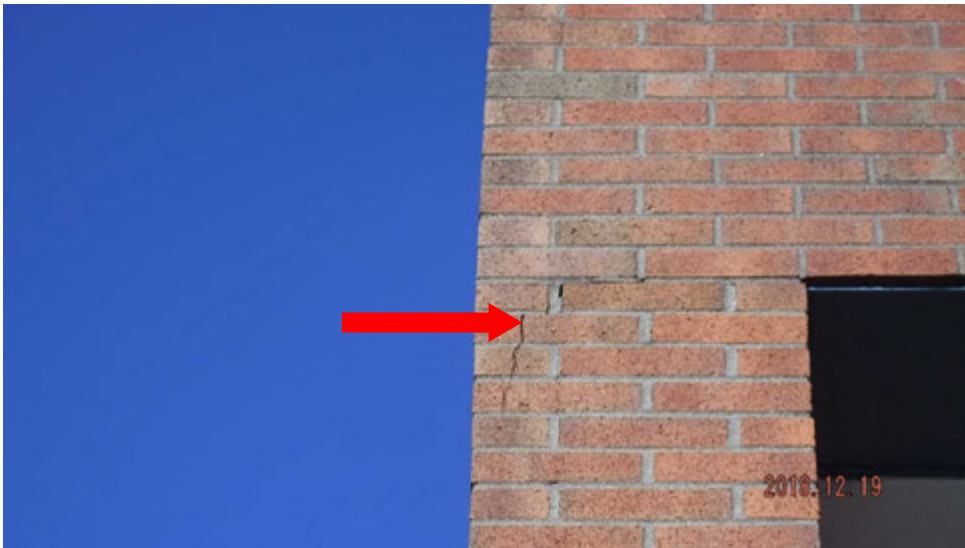
Recommendation – Masonry Brick and Mortar Joints: Replace the broken bricks. Grind out the cracked/shrunk mortar joints and tuckpoint as needed.



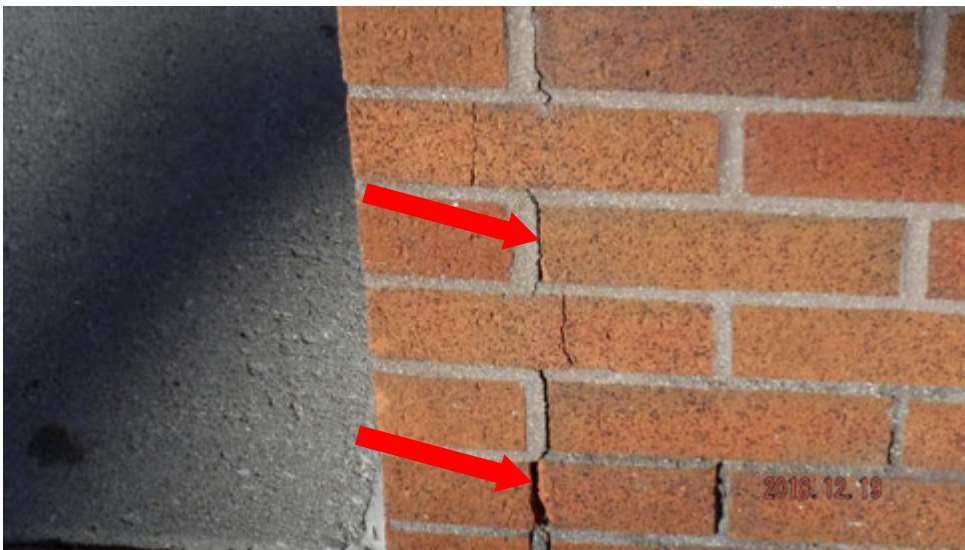
1a. Cracked/shrunk mortar joints (see #1 on elevation photo for location).



1b. Cracked/shrunk mortar joints and broken brick (see #1 on elevation photo for location).



1c. Cracked/shrunk mortar joints and broken bricks (see #1 on elevation photo for location).



1d. Cracked/shrunk mortar joints and broken bricks (see #1 on elevation photo for location).



2. Finding – Wall Penetrations: There are several penetrations through the masonry wall that are either unsealed, or poorly sealed.

Recommendation – Wall Penetrations: Clean existing sealant from joint (if there is sealant), clean and prep joint, and install backer rod and sealant as needed.



2a. Missing sealant joint (see #2 on elevation photo for typical location).



2b. Poor and/or missing sealant joints (see #2 on elevation photo for typical location).

3. Finding – Vegetation on Walls: There is vegetation growing on masonry walls at several locations. This can be detrimental to building components if left in place long term.

Recommendation – Vegetation on Walls: Remove the vegetation from the walls.



3a. Vegetation growth on walls (see #3 on elevation photo for typical location).

4. Finding – Plaster Soffit Ceiling: The open sided entranceway to the front doors of the building has a plaster soffit ceiling. The ceiling has cracks in it at areas, as well as some staining.

Recommendation – Plaster Soffit Ceiling: Repair the cracks and remove the staining.



4a. Crack in plaster ceiling (see #4 on elevation photo for location). Hard to see in picture but is there.



4b. Crack in plaster ceiling (see #4 on elevation photo for location).



4c. Staining on plaster ceiling (see #4 on elevation photo for location).

5. Finding – Masonry Wall to Window Frame Joint: There are joints between the masonry walls and window frame that does not have sealant.

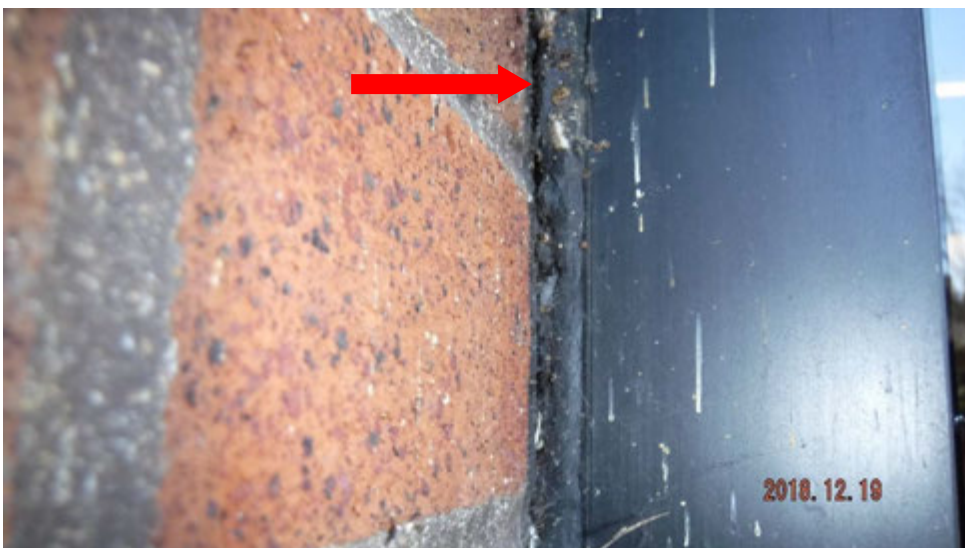
Recommendation – Masonry Wall to Window Frame Joint: Clean and prep the joints, then install backer rod and sealant as needed.



5a. Open joint between masonry wall and window frame (see #5 on elevation photo for location).

6. Finding – Masonry to Window Frame Sealant Joints: The sealant joints between the masonry walls and the window frames are cracked/shrunk at many locations.

Recommendation – Masonry to Window Frame Sealant Joints: Remove the existing sealant, clean and prep the joint, then install backer rod and sealant as needed.



6a. Cracked/shrunk sealant joint (see #6 on elevation photo for typical locations).



6b. Cracked/shrunk sealant joint (see #6 on elevation photo for typical locations).

7. Finding – Window Foundation: There is a large window set at the south elevation where the steel member(s) at base of window is severely corroded. This steel member(s) is at ground level. This condition is found at different locations for this window set.

Recommendation – Window Foundation: A further investigation should be made for this finding. An engineer may need to be obtained to review these conditions and then recommend a structural fix.



7a. Corroded steel member(s) at base of window where it sets at ground level (see #7 on elevation photo for location).



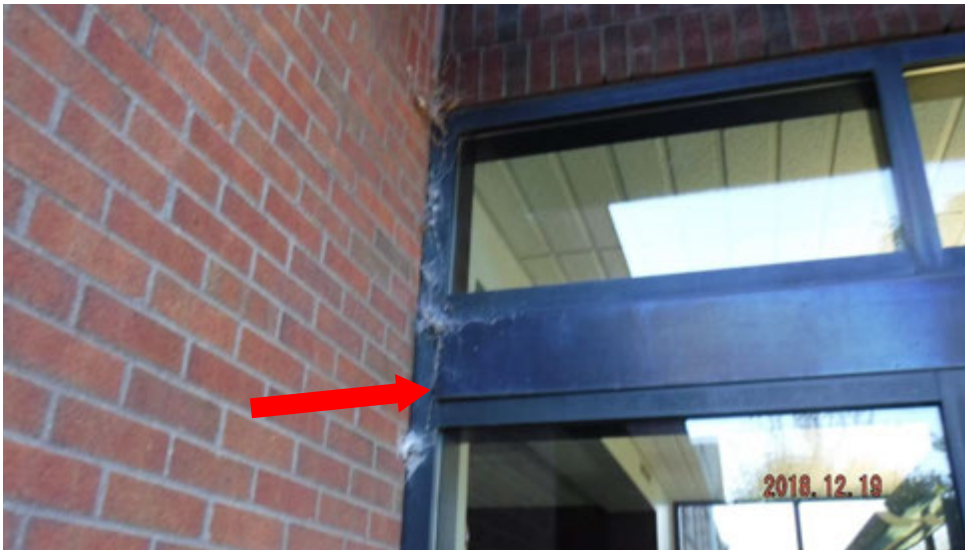
7b. Corroded steel member(s) at base of window where it sets at ground level (see #7 on elevation photo for location).



7c. Corroded steel member(s) at base of window where it sets at ground level (see #7 on elevation photo for location).

8. Finding – Window Trim Metal: The window sets that consist of small windows in place over larger windows have a metal trim flashing installed between the window sets. The metal trim flashing was noted to be loose and the wood substrate behind the window trim flashing was observable.

Recommendation – Window Trim Metal: Verify the wood substrate is in good condition or make any necessary repairs, then re-secure the window trim metal.



8a. Loose window trim metal between window sets (see #8 on elevation photo for location).



8b. Loose window trim metal between window sets. Wood could be observed behind the loose metal (see #8 on elevation photo for location).



8c. Loose window trim metal between window sets. (see #8 on elevation photo for location).

- 9. Finding – Window Issues:** There is a window set at west end of south elevation that has multiple deficiencies. These deficiencies range from, but are not limited to, cracked/shrunk sealant joints, damage to window frame, fasteners through window frame/pressure plate, top caulking at window frame/pressure plate joints, and top caulking between pressure plates and glass. It is unknown why this window set has so many issues and repairs.

Recommendation – Window Issues: Consult with a window installer and determine from a cost-effective approach to either make long term repairs to bring window set up to standards or replace window set.



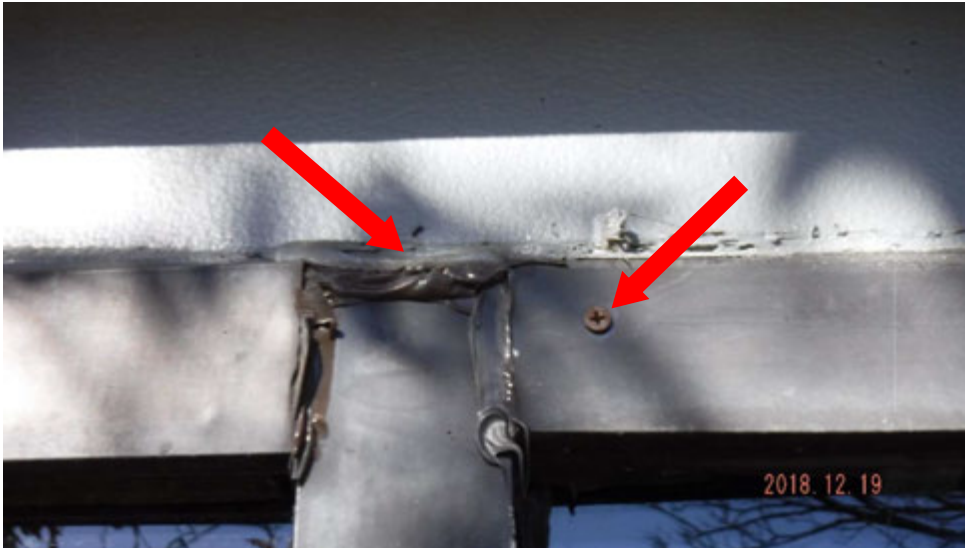
9a. Cracked/shrunk sealant joint (see #9 on elevation photo for location).



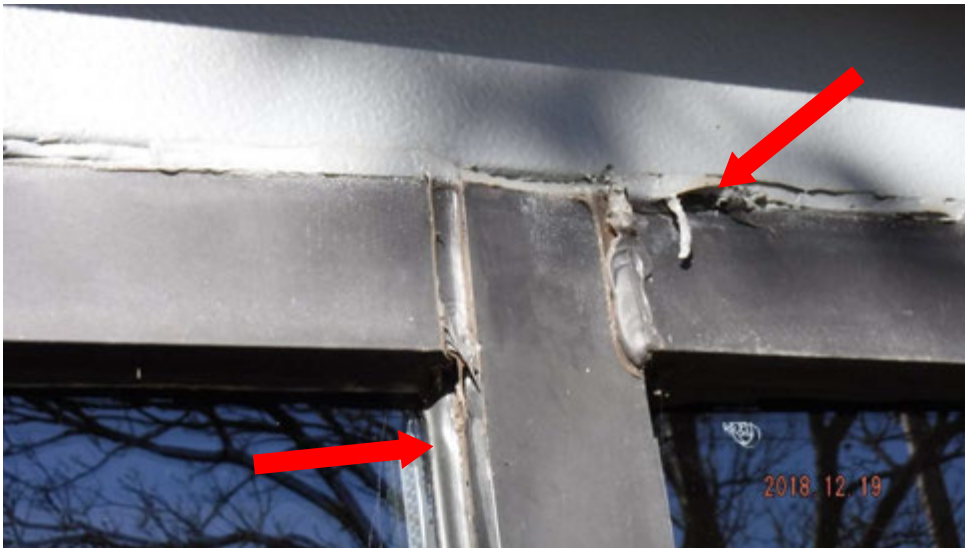
9b. Cracked/shrunk sealant joint and damage to window frame/pressure plate (see #9 on elevation photo for location).



9c. Heavy top caulking over window frame/pressure plate joints (see #9 on elevation photo for location).



9d. Heavy top caulking over window frame/pressure plate joints and a through fastened screw (see #9 on elevation photo for location).



9e. Heavy top caulking over window frame/pressure plate joints (see #9 on elevation photo for location). Top caulking peeling off at areas.



9f. Cracked/shrunk sealant joint (see #9 on elevation photo for location).

10. Finding – Gutter Joints: The gutter joints are leaking at locations. The water migrating down the walls at some of these leak areas has stained the masonry, and in other cases is causing masonry issues such as cracked mortar joints or cracked brick. Several of these gutter joints are showing corrosion as well.

Recommendation – Gutter Joints: Clean and prep the gutter joints. Re-seal these joints to stop the leaks. Remediate the corrosion on the gutters and apply a rust inhibiting paint. Make any necessary masonry repairs and clean the masonry walls of the staining.



10a. Leaking gutter joint. The gutter is showing corrosion and water migrating down wall is causing masonry issues as well (see #10 on elevation photo for typical locations).

11. Finding – Window Lintels: The lintels above the translucent windows were observed to have moderate to heavy corrosion.

Recommendation – Window Lintels: Remediate the corrosion and apply a rust inhibiting paint to protect.



11a. Corrosion on window lintel (see #11 on elevation photo for typical locations).



11b. Corrosion on window lintel (see #11 on elevation photo for typical locations).



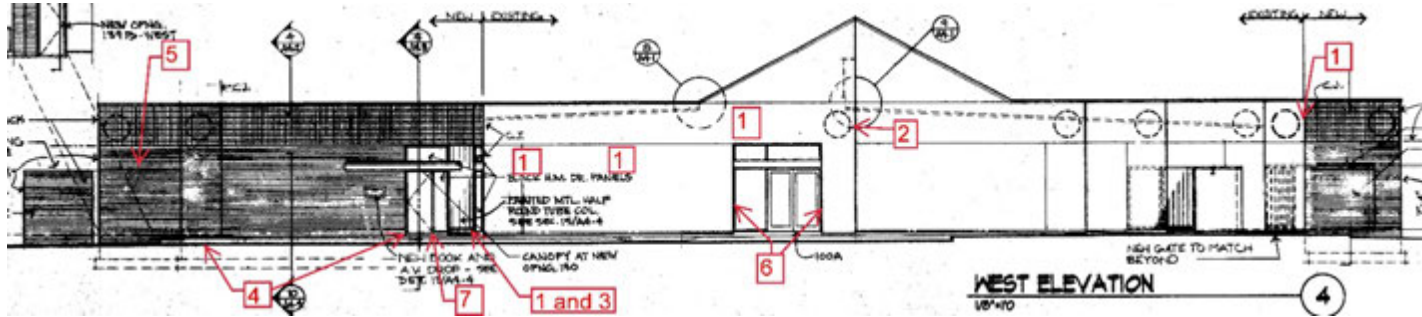
11c. Corrosion on window lintel (see #11 on elevation photo for typical locations).



11d. Corrosion on window lintel (see #11 on elevation photo for typical locations).



Walls Windows and Doors - West Elevation





1. Finding – Masonry Mortar Joints: There are several cracked/shrunk or deteriorated mortar joints in the brick walls and at the brick base of a steel tube. Sealant was also observed at various mortar joint areas where it is apparently being used as a repair.

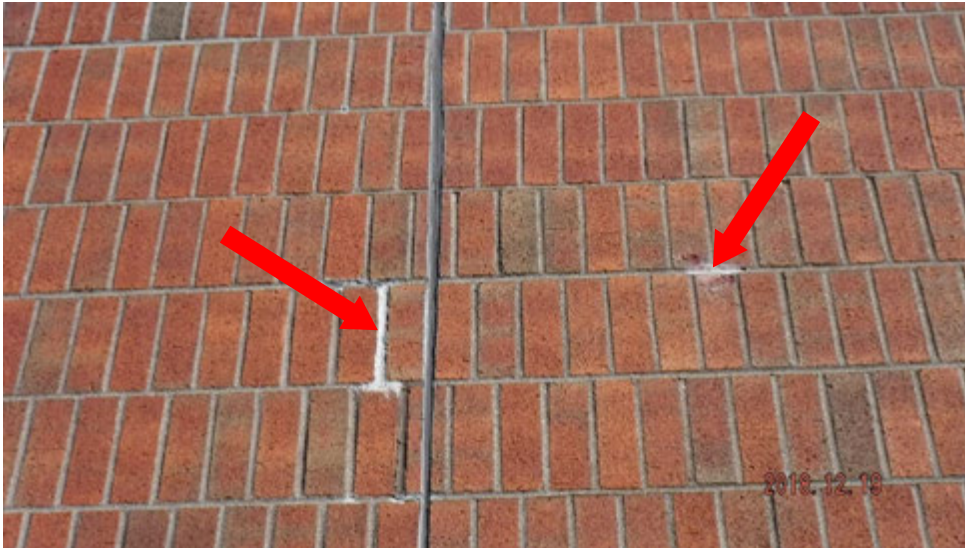
Recommendation – Masonry Mortar Joints: Grind out the cracked/shrunk and deteriorated mortar joint areas and tuckpoint as needed. Also, grind out the areas that have had sealant repairs and tuckpoint as needed.



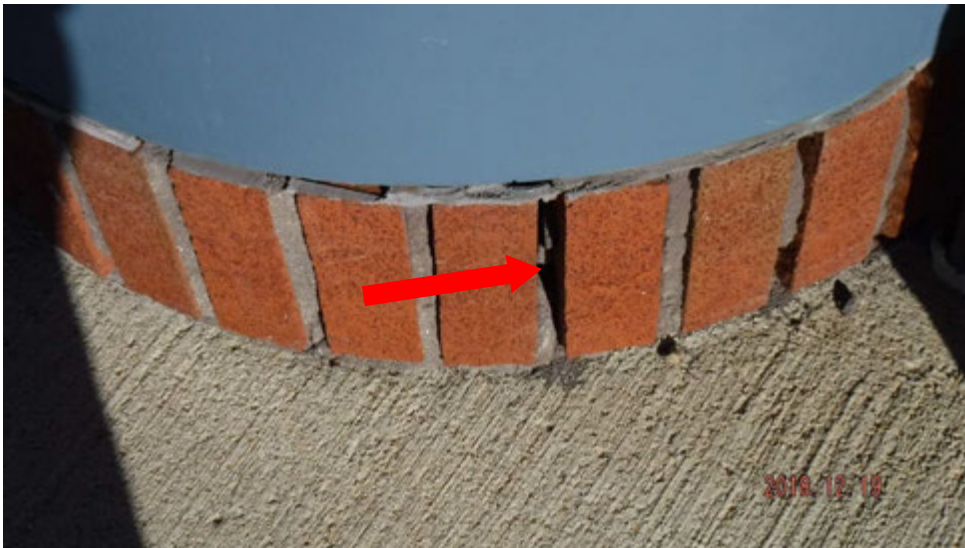
1a. Cracked/shrunk mortar joint (see #1 on elevation photo for location).



1b. Cracked/shrunk mortar joints (see #1 on elevation photo for location).



1c. Sealant repairs on mortar joints (see #1 on elevation photo for location).



1d. Deteriorated mortar joints (see #1 on elevation photo for location).

2. Finding – Masonry Wall to Steel Tube Joints: The sealant joint between the brick and the steel tube is cracked/shrunk at areas.

Recommendation – Masonry Wall to Steel Tube Joints: Remove the sealant, clean and prep the joint, then install backer rod and sealant as needed.



2a. Cracked/shrunk sealant joint (see #2 on elevation photo for location).



2b. Cracked/shrunk sealant joint (see #2 on elevation photo for location).

- 3. Finding – Masonry Base to Steel Tube Column Joint:** The sealant joint between the brick and the steel tube column is cracked/shrunk at areas.

Recommendation – Masonry Base to Steel Tube Column Joint: Remove the sealant, clean and prep the joint, then install backer rod and sealant as needed.



3a. Cracked/shrunk sealant joint (see #3 on elevation photo for location).

- 4. Finding – Wall to Sidewalk Sealant Joints:** The sealant joint between the masonry wall and the concrete sidewalk is cracked/shrunk at numerous locations.

Recommendation – Wall to Sidewalk Sealant Joints: Remove existing sealant, clean and prep joints, and install backer rod and sealant as needed.



4a. Cracked/shrunk sealant joint between masonry wall and concrete sidewalk (see #4 on elevation photo for location).



4b. Cracked/shrunken sealant joint between masonry wall and concrete sidewalk (see #4 on elevation photo for location).



4c. Cracked/shrunken sealant joint between masonry wall and concrete sidewalk (see #4 on elevation photo for location).



5. Finding – Through Wall Pipe: There is a pipe that penetrates through a masonry wall that is discharging something which is streaking down the brick wall and causing the brick to stain.

Recommendation – Through Wall Pipe: If possible, install additional piping to this through wall pipe and direct it directly to the ground to prevent further streaking on wall. Clean the brick as needed.

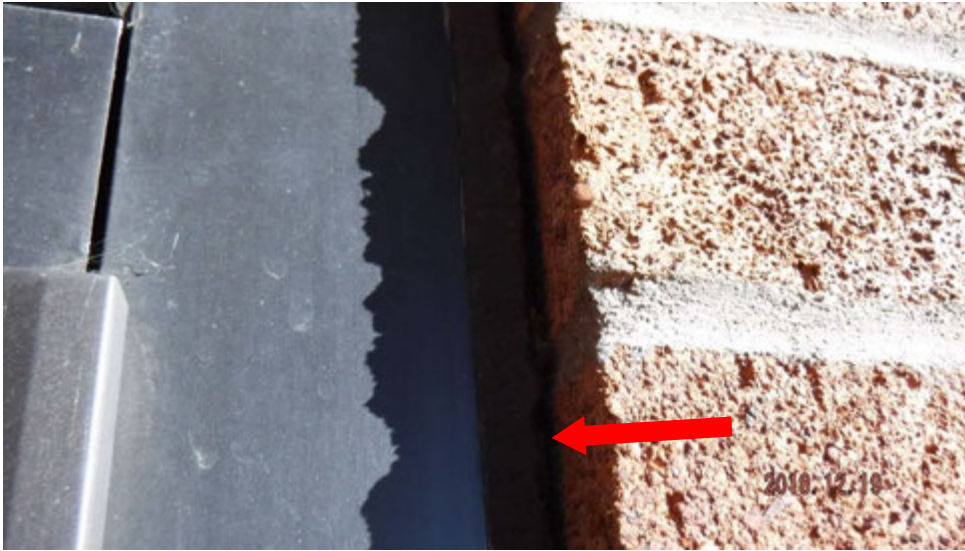


5a. Through wall pipe discharging down wall and staining the brick (see #5 on elevation photo for location).



6. Finding – Masonry to Window Frame Sealant Joints: The sealant joint between the masonry wall and the window frames is cracked/shrunk at many locations.

Recommendation – Masonry to Window Frame Sealant Joints: Remove the existing sealant, clean and prep the joint, then install backer rod and sealant as needed.



6a. Cracked/shrunk sealant joint (see #6 on elevation photo for typical locations).



6b. Cracked/shrunk sealant joint (see #6 on elevation photo for typical locations).



6c. Cracked/shrunken sealant joint (see #6 on elevation photo for typical locations).



6d. Cracked/shrunken sealant joint (see #6 on elevation photo for typical locations).

7. Finding – Door and Frame: The door frame, and the door itself, were observed to have moderate corrosion.

Recommendation – Door and Frame: Remediate the corrosion and apply a rust inhibiting paint to protect.



7a. Corrosion at door frame (see #7 on elevation photo for location).



7b. Corrosion at door and door frame (see #7 on elevation photo for location).