

INSPEC

Smart engineering of
roofs, walls, windows,
pavements and waterproofing

www.inspec.com

5801 Duluth Street
Minneapolis, MN 55422
Ph. 763-546-3434
Fax 763-546-8669

126 North Jefferson St.
Suite 120
Milwaukee, WI 53202
Ph. 414-744-6962
Fax 414-744-6981

8618 West Catalpa
Suites 1109-1110
Chicago, IL 60656
Ph. 773-444-0206
Fax 773-444-0221

PROJECT: 927-931 West Broadway
Minneapolis, MN 55411-2615

DATE: October 13, 2017
FILE NO.: RM0309

REPORTED TO:
City of Minneapolis
Community Planning and Economic Development
105 Fifth Avenue South-Suite 200
Minneapolis, Minnesota 55401-2521

Attn: James E. Terrel

ROOF MANAGEMENT REVIEW

GENERAL

On October 10, 2017, we conducted an updated roof review survey and evaluation of the modified cap sheet roof system for the above-mentioned project. The purpose of the roof survey was to evaluate the current roof conditions, make recommendations regarding remedial repair, and to anticipate the need for major repair and/or system replacement. Our services included visual observation of the roof surface condition, penetration conditions, sheet metal conditions, and conditional photographs of pertinent items. Photographs taken during the review and a CAD-generated sketch are included with this report for reference.

OBSERVATIONS

The roof system on main roof area on this facility is comprised of a smooth surface-single-ply modified cap sheet system over an OSB sheathing deck which covers the original wood plank deck (photos 1-2). Penetrations include various pipe penetrations and a roof hatch. Roof drainage is accomplished by a structurally sloped deck which slopes to the rear of the building with a gutter and downspout system which allows drainage away from the structure. To the rear of the structure is a fully adhered EPDM structurally sloped roof with a gutter and downspout system also (photo 3-4)

Roof leaks have been reported at the time of this survey. Roof abnormalities observed during our inspection include, but are not limited to, the following roof items:

- Open base flashing laps observed at various locations (photo 5).
- Base flashing holes observed at various locations (photo 6).
- Improper termination of base flashing at the chimney and parapet locations (photo 7-8).
- Deteriorated sealant at flashing locations (photo 9).
- Opening along membrane seams (photo 10).

- Deteriorated brick and mortar issues at parapet and chimney locations (photo 11).
- Wrinkles in the membrane impeding drainage of water from the roof (photo 12).
- Holes in the roof membrane due to nails puncturing the membrane underneath or physical damage have left the membrane in extremely poor condition allowing water to infiltrate the structure in multiple locations (photos 13-18).
- Deteriorated rain cap over the heat exhaust stack (photo 19).

ROOF SYSTEM DATA AREA A

Membrane Type:	Single-ply modified cap sheet	Approximate Sq. Ft.:	2700
Membrane Surfacing:	None	Year Installed:	2007 approximately
Insulation:	None	Manufacturer:	Unknown
Vapor Retarder:	None	Warranty Period:	Unknown
Roof Deck:	OSB sheathing/wood plank	Roofing Contractor:	Unknown
Membrane Flashing:	Single-ply modified cap sheet	Estimated Remaining Service Life:	0-1 years
Slope:	½"/ft. approximately		

ROOF SYSTEM DATA AREA B

Membrane Type:	60 mil fully adhered EPDM	Approximate Sq. Ft.:	450
Membrane Surfacing:	None	Year Installed:	2015 approximately
Insulation:	Unknown	Manufacturer:	Carlisle
Vapor Retarder:	Unknown	Warranty Period:	Unknown
Roof Deck:	Unknown	Roofing Contractor:	Unknown
Membrane Flashing:	60 mil EPDM	Estimated Remaining Service Life:	10+ years
Slope:	3/12		

The estimates for the remaining service life are based on industry expectations and the performance histories of similar types of systems under normal conditions. The actual remaining service life may vary depending on geographic locations, installation and material selection, environmental, and specific building factors. Routine preventative maintenance and annual inspections are recommended to maintain the existing service life. Annual roof updates for recommended maintenance, service life expectation, and possible replacement costs are recommended.

PREVENTIVE MAINTENANCE AND REPAIR

The following maintenance and/or repair items are recommended and should be completed to sustain weatherproofing performance. These items are referenced on the enclosed roof sketch at specific locations. Some of the repair items may be covered under warranty, verify with the roof system manufacturer or roofing contractor before proceeding.

1. Repair all open base flashing laps with alternating layers of plastic cement and fabric. Approximately 40 feet of repair is recommended.
2. Repair all base flashing holes with alternating layers of plastic cement and fabric. Approximately 10 feet of repair is recommended.
3. Repair all improper termination locations with termination bars attached to the parapets or chimneys with masonry anchors and seal open termination with alternating layers of plastic cement and fabric. Approximately 25 feet of repair is recommended.
4. Remove and replace deteriorated sealant at sheet metal flashing termination locations. Approximately 20 feet of repair is recommended.
5. Repair openings along membrane seams with alternating layers of plastic cement and fabric to ensure a water tight roof system. Approximately 30 feet of repair is recommended.
6. Monitor deteriorated brick and mortar at chimney and parapet locations for any leakage which may require repair prior reroofing.
7. Monitor wrinkles in the membrane for changes which may require repair prior to reroofing. Replace the membrane at the front of the building where the membrane has kinked and does not allow water to drain.
8. Remove all nails and objects under the roof membrane which have caused holes to occur or have the potential to occur. Repair these locations with alternating layers of plastic cement and fabric to ensure a watertight roof system until the time when reroofing can occur.
9. Replace deteriorated rain cap on heat stack.

CONCLUSIONS AND RECOMMENDATIONS

Based on our observations made during the roof survey, the roof system is performing poorly and no major repairs will extend the life of the roof for any lengthy period of time. The roof trusses appear to be in good condition at this time since a visual inspection was possible inside the structure. While repairing the holes in the roof system, we would recommend performing test openings where leakage has been observed to determine the condition of the roof deck.

While no soft spots were detected while walking on the roof, there may be deteriorated decking below which may cause structural issues as well as safety issues prior to reroofing.

To summarize, repair the open flashings , seams and holes in the membrane since each defect has a potential for leakage and replace rotten deck where needed. Patching the flashings and membrane is estimated to be approximately \$8,500. To replace rotted deck and install new membrane over the repaired deck and install new membrane over the repaired deck an additional \$10,000 would be estimated to complete the repairs.

To tear the existing roof membrane off and install a new built-up roof system is not a possibility since and insulated roof system is required by code.

To tear the existing roof membrane to the deck, replace rotted deck wood and installing a new built-up roof system with gravel surfacing to comply with existing code requirements would cost approximately \$2,200/square. A structural engineer would have to be incorporated into the design process to ensure the existing trusses supporting the deck could handle the additional load that a new built-up roof system can produce. The total cost for a built-up roof system is approximately \$60,000. From what the trend is for the city of Minneapolis, white single-ply PVC membranes are becoming more common. Our understanding for the city of Minneapolis installing these types of roof systems is to meet certain energy quotas and reducing carbon emissions. The cost for this type of roof system is \$1,800/square or approximately \$49,000. Again, a structural engineer would have to be used when designing this type of roof system to ensure the structure can sustain the load.

For the most effective approach to extend the life of the roof, we would recommend the repairs described in the report. We feel with the repairs made properly, the roof can maintain a watertight status for the requested minimum two year life span. After the repairs are made, we would recommend a representative from Inspec visit the site to evaluate the repairs and make recommendations for making final payment or have the contractor correct inadequate repairs.

REMARKS

This report is a summary of our updated roof survey and evaluation. Neither the survey nor this report is intended to cover structural or mold-related issues. If you should have any questions regarding this report or require additional information, assistance with remedial action, or information regarding our exterior services in exterior walls, waterproofing, or pavement areas, please feel free to call our office.

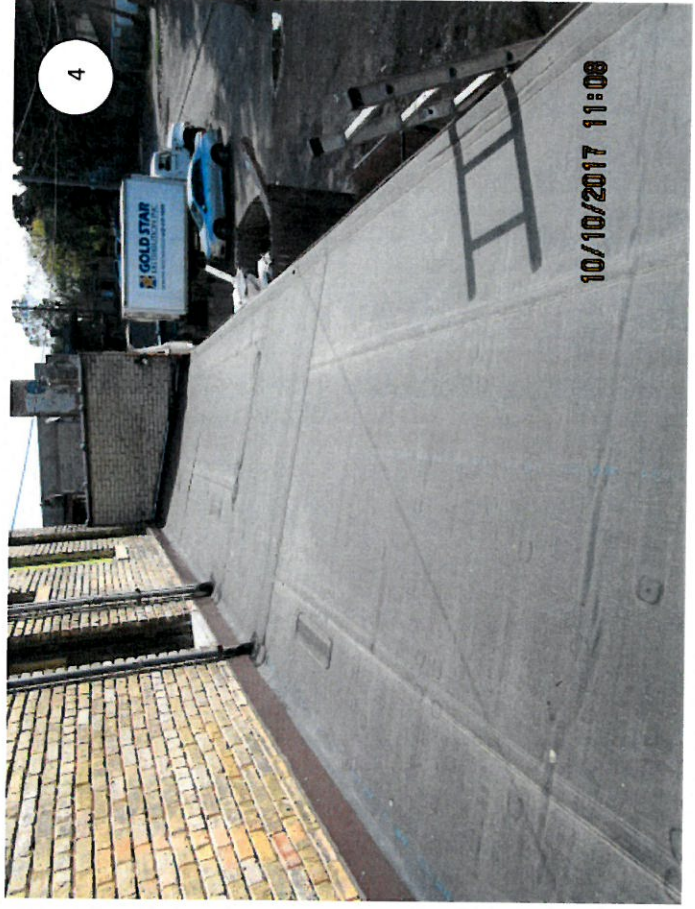
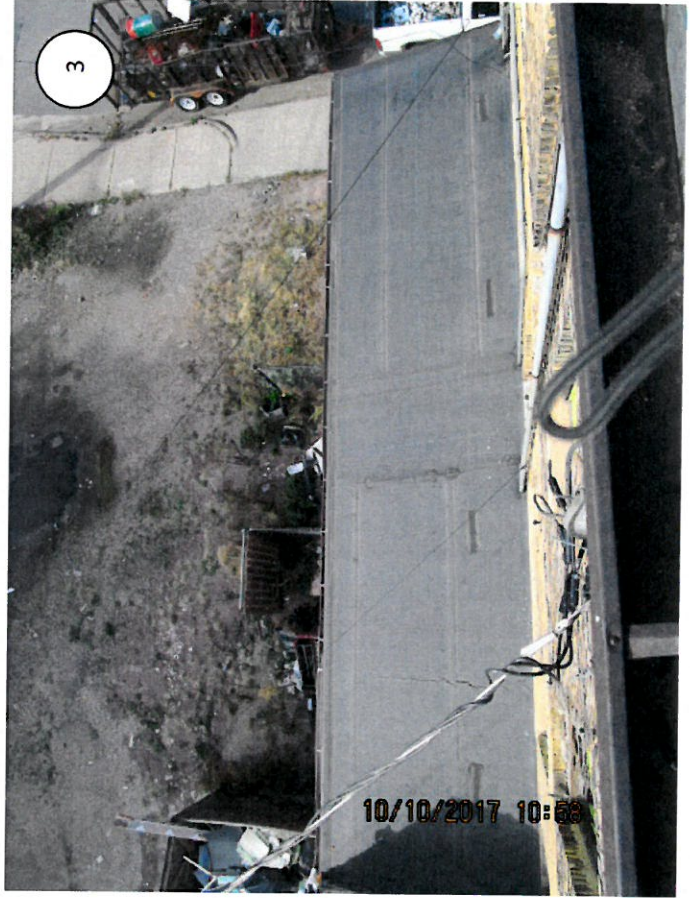
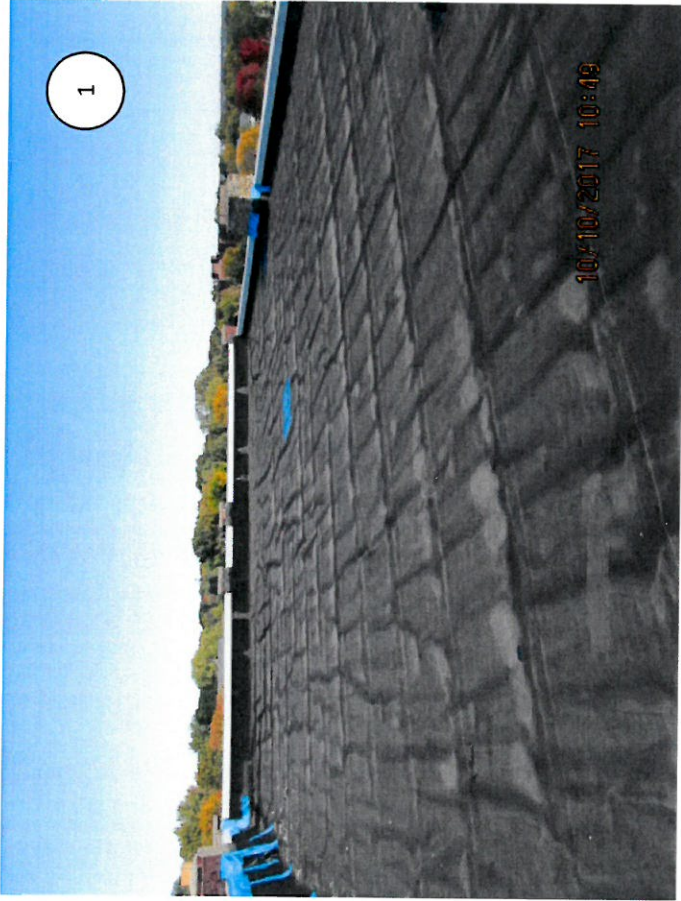
INSPEC

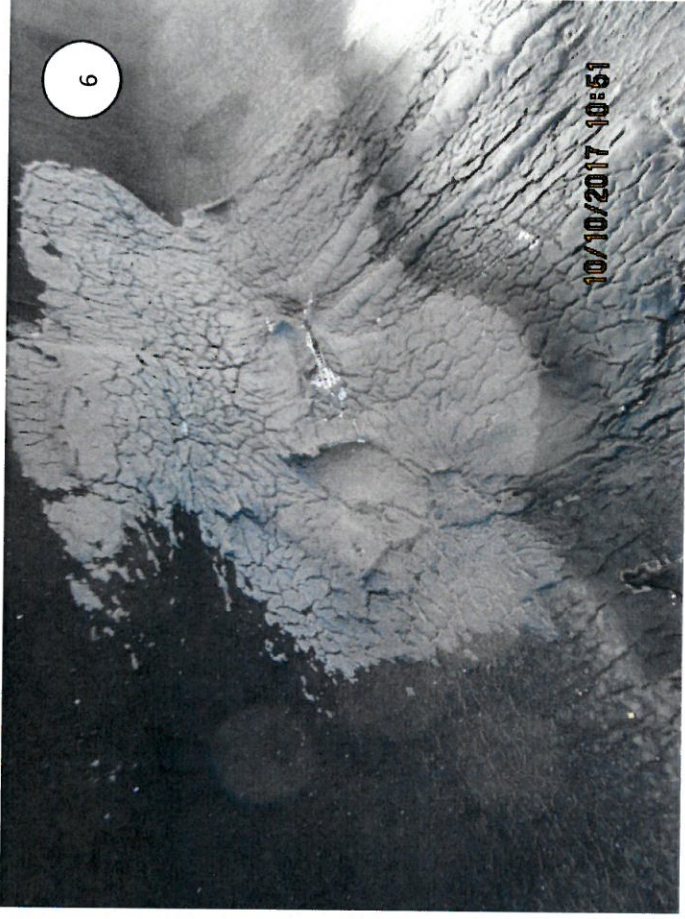
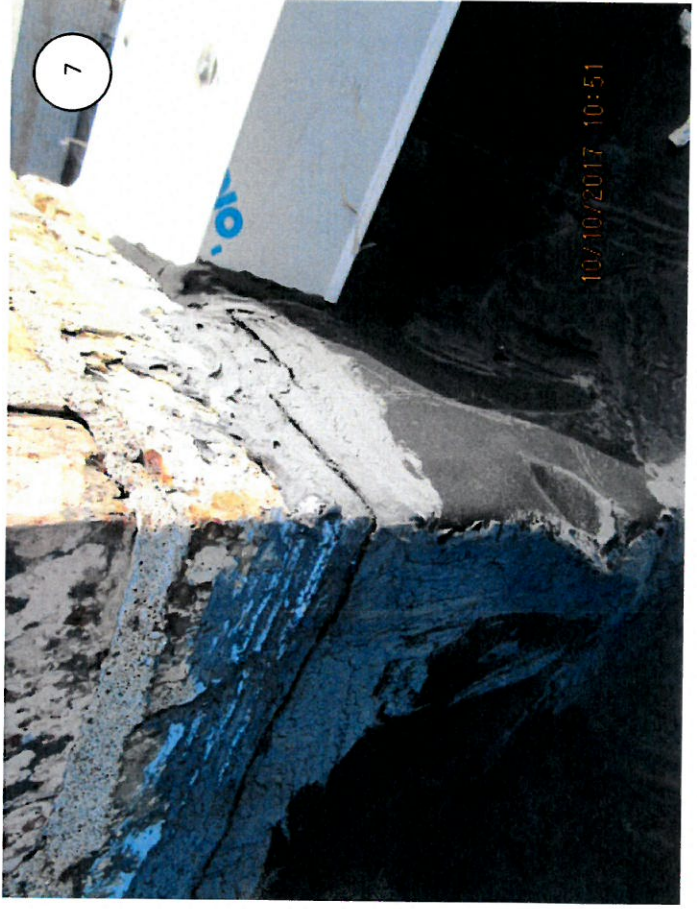
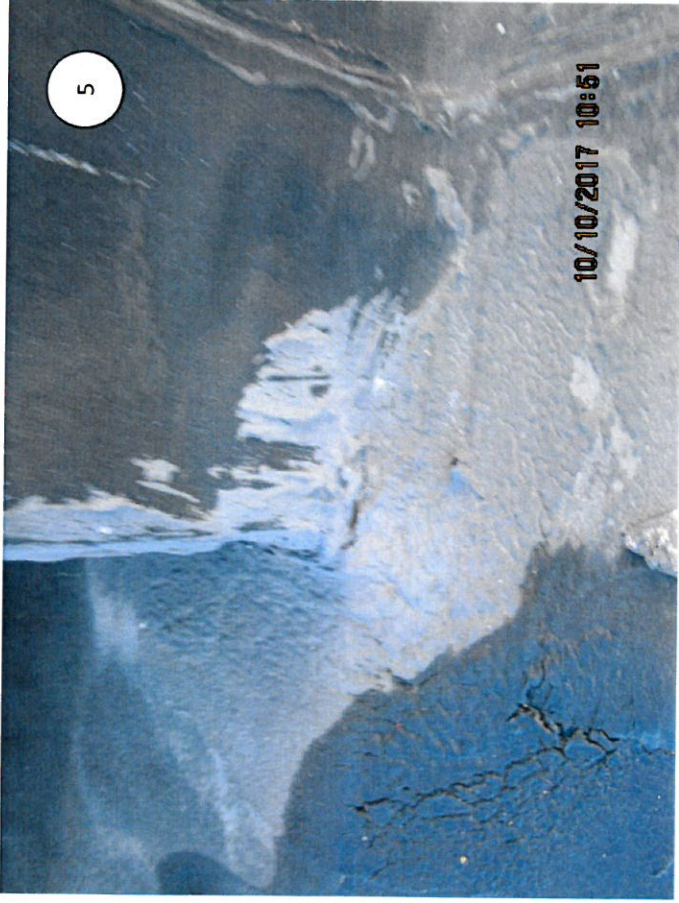
By:

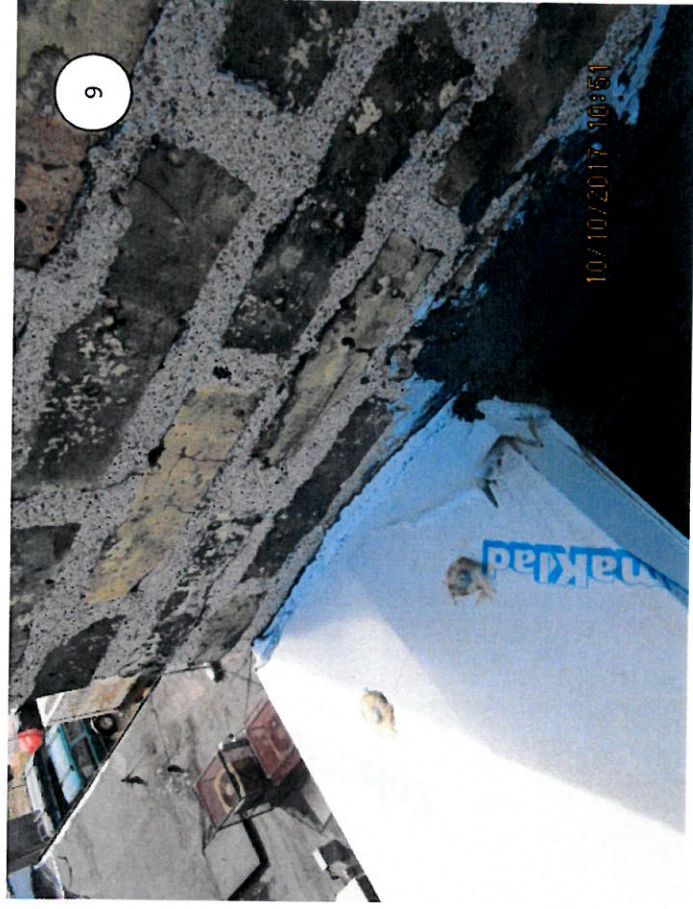

John Peterson

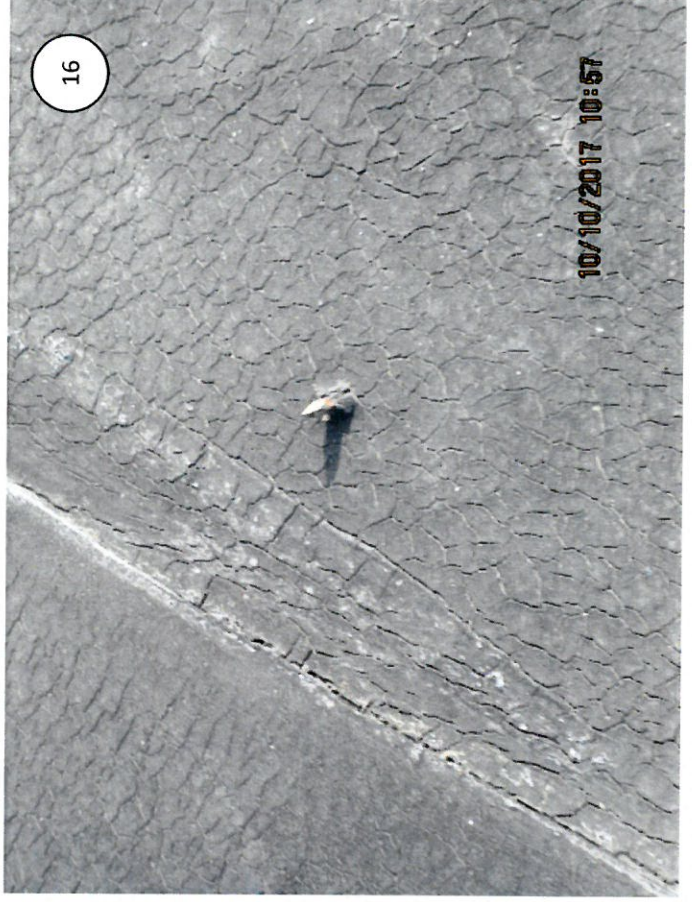
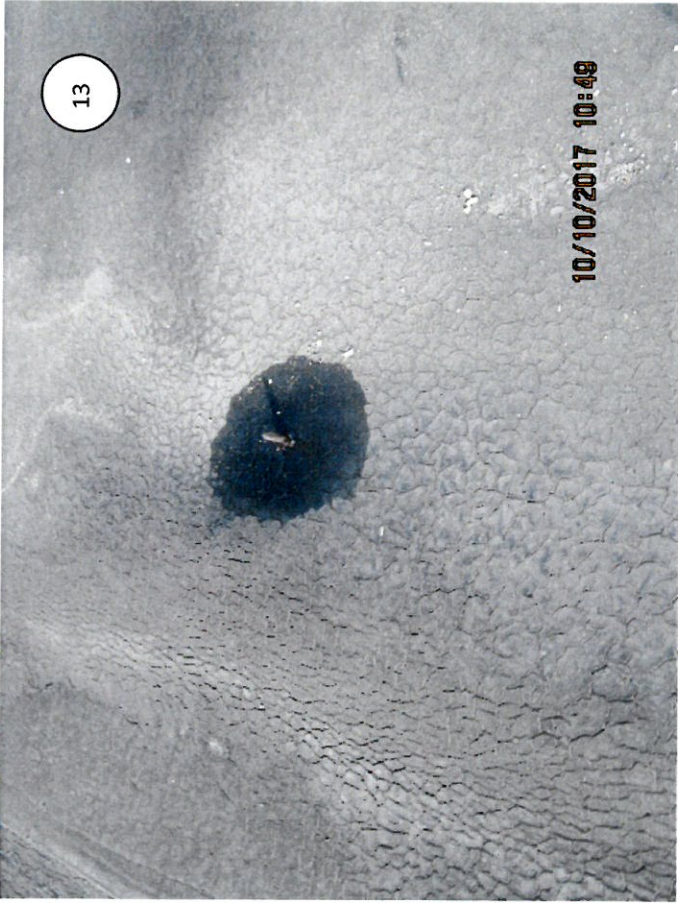
JP/nmm

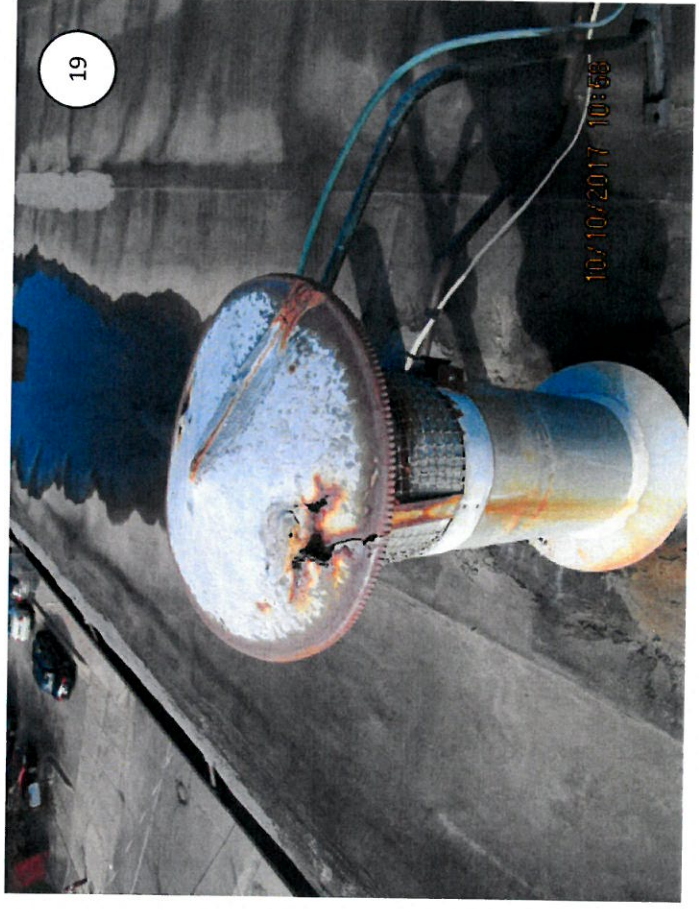
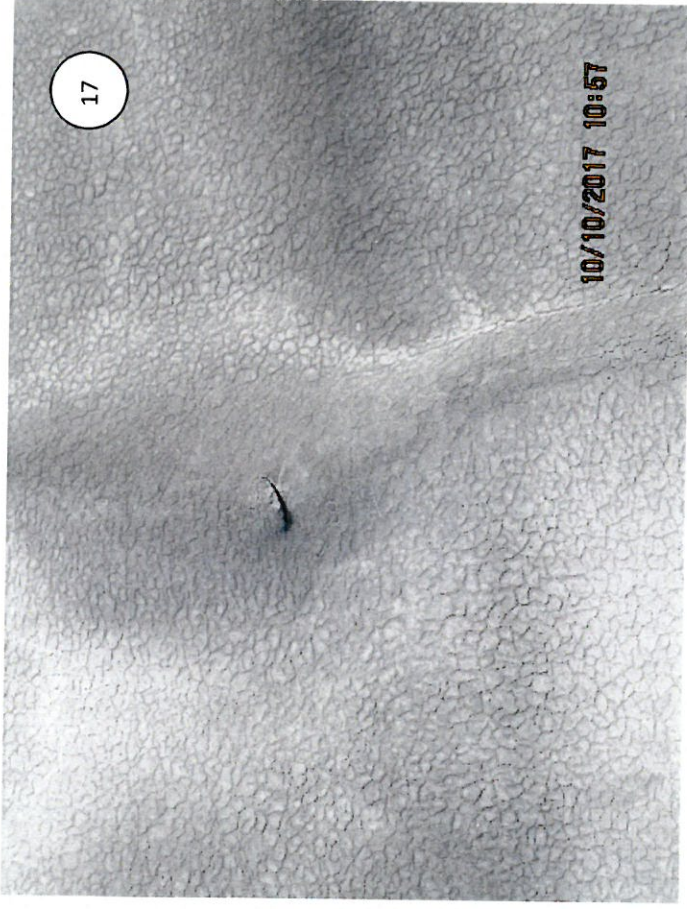
Enclosures: Photographs
Sketch





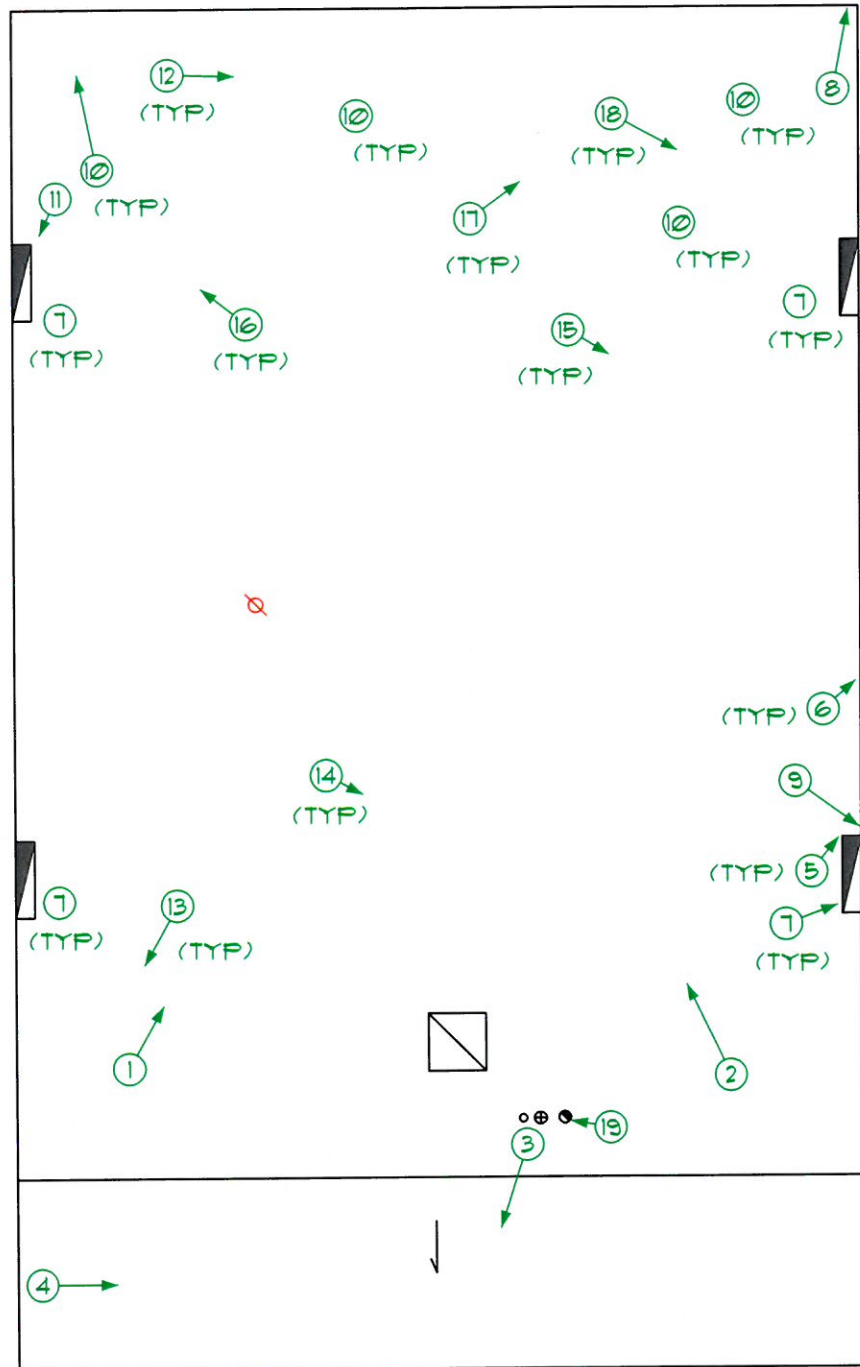






SYMBOLS KEY

- VENT STACK
- CHIMNEY
- ▣ ROOF HATCH
- HEAT STACK
- ⊕ FLASHED PENETRATION
- SLOPE DIRECTION
- ⊗ LEAK LOCATION
- ⑤ DEFECT-REPAIR
- (TYP) TYPICAL IN THE VICINITY
- ①②③④ OVERVIEW PHOTOS



ROOF PLAN



CITY OF MINNEAPOLIS
927/931 WEST BROADWAY

MINNEAPOLIS, MINNESOTA

PROJ. NO: RM10309

DATE: 10-12-17

LAST REVISED: N/A

PM: JP

DR: JP

FILE: CITY OF MINNEAPOLIS

