M. Gottfried, Inc.

Roofing and Sheet Metal Contractors

89 Research Drive, P.O. Box 2218, Stamford, Connecticut 06906-0218
PHONE: (203) 323 8173 Website: mgottfried.com FAX: (203) 359 2498

TO: Viking Construction, Inc.
1387 Seaview Avenue
Bridgeport, CT 06607
ATTN: JoAnn Michaels

DATE: July 9, 2019

RE: Roof report and repair quotation
Hart Elementary School
61 Adams Avenue
Stamford, CT 06902

Dear Ms. Michaels,

As per your request we went to the above school to perform an inspection of the roofs, and, using the Infrared Thermographic Roof Moisture Analysis Report as a guide, look for possible sources of water leaks in the noted "wet areas". We also were to perform test cuts to verify the wetness and determine the roof components in those areas. We were also asked to provide pricing on replacing the wet areas, and to provide a recommendation and pricing for roof maintenance.

The roofs at Hart School can be divided up into four (4) areas. Roof A, the highest roof, is composed of a gravel surfaced built-up-roof over insulation over another built-up roof on a wood deck. Roof B is slightly lower then Roof A and is composed of a gravel surfaced built-up-roof over insulation over a built-up roof over steel deck. Roof C is the lowest roof. It is a gravel surfaced built-up-roof over insulation over another built-up-roof over a tectum deck. Roof D is higher than C and also is a gravel surfaced built-up-roof. We were shown one roof warranty for this school. Looking at the area size on the warranty it is possible that the warranty covered all the roofs. The warranty was for 20-years. The date on the warranty is very difficult to read, but it looks like September of 1998. This date makes sense because from the Stamford Public Schools website we found that the building was renovated in 1998. If the dates are correct, the warranty would have expired last year, in 2018.

In addition to the main roofs, there are small canopies and a decorative ledge that runs around the higher roofs. Though not discussed or shown on the infra-red report, we will discuss these items at the end of the report. Leaks at the top floor perimeter windows under the ledge were mentioned to us during our site visit.

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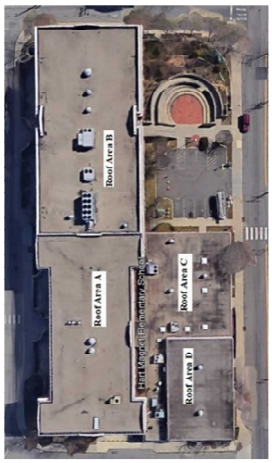
Wet areas of roof



Labeled plan


overlay showing wet areas


Infra-red wet area plan

The Infrared Thermographic Roof Moisture Analysis prepared by IR Analyzers showed 6 areas of wet roofing on their map. In the field, there are actually 7 areas marked out on the roof. A duplicate number 3 is marked on area B located between wet area #4 and the end of the building. All of the roof levels have wet areas except for area D.

"Wet" Roof Areas

There are three (3) wet areas on roof A.

Area #1 encompasses the area around the two roof drains and a vent pipe.

No clear splits or broken blisters are evident in the marked area. We can therefor assume that the drain and vent flashings are the problems. If the wet area is removed and replaced, these items will receive new flashing. That should take care of the water leaks at this location.

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Area #2
Wet area #2 lies toward the middle of part of the roof and has no roof penetrations.

We did not see any blisters or obvious breaks in this area. Further investigation and testing would be performed here to confirm that the area is wet. The ballast would be swept and scraped, multiple test cuts taken, and the surface area thoroughly inspected. If all the additional probes reveal no moisture, sample holes will be repaired and ballast reinstalled. If moisture is found, the area will be replaced. If when removing the area, the source of the water cannot be determined, we shall inspect the nearby base flashing and roof areas. Since two roofs are present, it is possible that water can get in at the walls or nearby area, travel on top of the underlying roof and pool/leak in the marked area.

Area #3 lies next to a parapet wall.

Water infiltration at this area may be from the wall flashing or cracks in the membrane. The area should be removed and replaced. The membrane of the parapet next to this area should be replaced as well.

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There are three (3) wet areas on roof B.
Area #4 lies at the corner of one of the roof top units and is around a vent pipe.

A test cut was performed in this area and the area was wet. The area should be cut out and replaced. Along with replacing the membrane and wet insulation, the vent would be reflashed, and we would also recommend reflashing the short and long side of the roof top unit curb that abuts the marked area.

Area #5 is a large area that goes form one side of a large unit out into the field of the roof.

The roof has been coated to try to prevent leaks (as it has in a number of the marked areas on this school). It is not possible to see the condition of the membrane under the coating, so removal/replacement is recommended. In addition to replacing the marked area, the side of the roof top unit curb should also be reflashed. As a precaution the unit itself should be looked at by a mechanical contractor to make sure the leak does not originate from the unit and travel under the roof. The unit curb extension covers must also be looked at.

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Area #3A

Area #3A (duplicate number 3 marked on the roof but omitted from the plan) lies a bit further down the roof from area #5. It also lies at the corner of a roof top unit.


In addition to removing and replacing the wet area we would also recommend reflashing the two sides of the roof top unit that abuts the area. This unit should be checked as well for leakage.

Area #6

Wet area # 6 lies on the lower roof level C and is surrounds a fan curb.


Any wet membrane/insulation around the curb should be removed and replaced and the curb reflashed.

Area#7

Wet area #7 lies in the corner of roof C against the wall of the higher part of the building.


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There are a number of things going on in this area.

Some of the wall counter flashing has come off, caulking at the counterflashing has shrunk and the base flashing is suspect. In addition to replacing this wet area the counter flashing needs to be repaired, replaced where missing, and recaulked.

Areas marked as wet on the Infrared report are found on three of the four roof areas. They are mainly found next to or around penetrations, curbs, walls, etc., items where the flashings may have failed. Tracking down the leaks in some spots may be challenging because they are not near penetrations, and water may be traveling between the two installed roofs from nearby flashings. The possibility that the water is coming from roof top units or their curbs also exists. To replace the wet areas, new materials need to be hoisted to the roof, the gravel over the areas swept away, the roof cut out, new insulation and coverboard installed and we would install a new 2-ply granular surfaced modified bitumen membrane patch. We would overlay the perimeter joint of the new membrane to the existing membrane with an overlayment of stripping of mastic and reinforcing fabric. All items that fall within the removed areas would get new flashing and sides of adjacent curbs or walls would be reflashed or repaired as mentioned above.

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Roof maintenance

Since all the roof levels of Hart school, are composed of gravel surfaced built-up-roofs, most of the details and items noted on one roof are most likely found and in need of maintenance on the other roofs.

Roof Area A

Open joints in base flashing

Open laps in the base flashing can let water into the roofing system. To repair an open flashing lap, we would scrape the gravel back at the roof and overlay the lap with two plies of mastic and reinforcing fabric.

Possible open flashing around scupper openings

We recommend installing a reinforced bituminous resin membrane flashing, (Alsan flashing or equal), From the wall base flashing, turning into the scupper opening. This will seal the edge of the base flashing where it is cut around the scupper opening.

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Open corners on curbs



Open corners at curbs will also let water into the roofing system. The corners and flashing of the roof hatch have shrunk and slipped enough to expose the wood blocking. All curbs must be checked, and any open corners repaired as described for base flashing laps. The entire roof hatch should be reflashed. recommended maintenance work found cover items more likely to problems Roof maintenance is designed to

Flashing on low canted parapets


Them membrane on the low canted parapets is showing its age. Cracks and splits are visible in all areas with this detail. To replace or overlay all of this flashing would be costly. At this point in time we would recommend only repairing the open laps or any holes found in the membrane. There are also blisters (bubbles) found in the membrane of this detail and some of the vertical base flashing. These should be cut and properly sealed and repaired. The area around the blisters should be checked for holes or openings that could have let moisture in.

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Roof Area B

Roof area B has similar details and needs as roof area A. in addition to those, we found:

Expansion joint


Roof B is lower than roof A. At the wall between them an expansion joint is installed between the end curb of roof b and the wall of roof A. the EPDM flashing at the joints of the expansion joint needs to be checked for cracks and breaks. If any are found, the area must be properly prepared and new EPDM flashing installed. In addition, all fasteners securing the flanges of the expansion joint should be checked, replaced if missing or loose and caulked if needed.

Pipes and penetrations


All penetration flashings should be checked and reflashed as necessary. We can assume that since coatings have been spread around the penetrations, leaks have occurred around them in the past. If a penetration flashing falls within the “wet areas” being replace, they will receive new flashing as part of

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that work. If they do not fall within a "wet area" they will be checked, topped off, and or restriped as part of the comprehensive maintenance work. Items such as the two insulated pipes shown will be checked to see whether the sealer in the pocket goes all the way to the pipes, or if it stops at the plastic and insulation. Since the plastic cover and insulation are typically not waterproof, if the sealer stops there the sealer, plastic and insulation will be removed, new sealer installed to the pipe, and the plastic covering and insulation reinstalled down to the filler.

Curb retrofit extensions

It appears that the roof top units have been previously replaced and installed on the old curbs. The new units are smaller then the old ones and metal covers were put on the ends of the old curbs to make up the sizing difference. These extensions have become collection points for debris. The debris needs to be removed. In addition, the covers need to be checked to see if there are any holes in them or if any of the seams or joints are open and could let water in. These cover extensions appear to be at the ends of the roof top unit curbs near the "wet areas". Checking and repairing this item straddles both the wet area work and maintenance work.

Roof Area C

Roof Area C is the main low roof. It has more curbs and different details and conditions than any of the other roofs.

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Curbs and penetration pockets

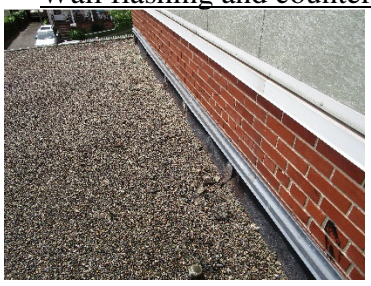


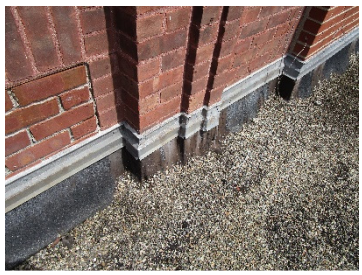

All curbs, penetration pockets, vents, etc., must be checked and repaired as necessary.

Tree trimming (by others)

The City should trim the branches of this tree where it overhangs the roof. Branches, can break and damage the roof, falling leaves can clog drains, animals can climb up the tree, on the roof and cause damage, etc.,

Wall flashing and counterflashing






Open base flashing needs to be repaired, caulking of the counter-flashing needs to be repaired/touched up, etc.,

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Roof Area D

Roof area D is the higher of the low roofs there are only two curbs on the roof, and we could see that water tends to pond on the roof.

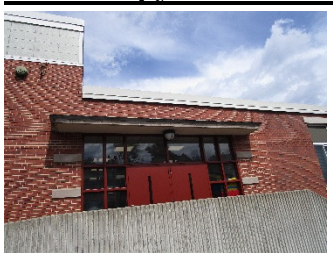
Curbs


Curb flashing needs to be checked and the open laps repaired.

Perimeter edging


Moss is growing along the edge detail of this roof. No action is to be taken to remove this as part of the maintenance, but the condition should be noted and possible investigated in the future. The dampness and ponding on this roof may be promoting this growth.

Low canopy roof over doors




The low canopy over the doors looks like it is in poor shape. We are not sure of the “importance” of this roof with regards to the overall issues mentioned above and have not included any maintenance work on it. Installing a new membrane can be quoted upon request.

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Roof shelf around upper main roof



When we performed our inspection of the roofs at Hart School, we were told of leaks that had been occurring above the windows of the top floor. The leaks do not always occur. We were also told that someone tried to repair the leaks by caulking the counterflashing above the shelf. This slowed down the leaks. We feel that these leaks are from the shelf, counterflashing above the shelf or the caulking of the counterflashing. If the leaks came from the roof, it would occur in almost all rains. In addition, if they came from the roof or parapet flashing, they would have shown up on the infrared test. On way to confirm this theory is to put a hose over the wall and water test the shelf and counterflashing. If the leak shows up, than the source comes from the components of the shelf. A possible repair could be to recaulk the shelf and counterflashing using an aerial lift. Testing and repairs are not included in this report, but we could furnish pricing upon request or the Construction manager can perform the work with their own forces or with a building caulker

There are many items that we saw during our inspection that should be repaired as part of performing comprehensive maintenance. This work would address obvious “potential problems and future likely points of water entry” before leaks, soaking of insulation and other costly problems develop. Performing preventative roof maintenance is no guarantee that leaks will not occur or that cracks or other issues will not develop but will help minimize the chances and help prolong the life of the roof.

As always, we advised and strongly recommend that you submit our report to the school’s design consultant to see if they feel any supplemental or different procedures should be performed or added to our interpretation of the necessary scope.