

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: September 27, 2019

RE: Roof report and repair quotation
Rippowam Middle School
381 High Ridge Road
Stamford, CT 06905

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" and provide an evaluation of the various roofs. We also were to perform test cuts, if necessary, 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.



Roof moisture scan showing wet areas

The roofing at Rippowam School can be broken out into a few distinct areas. One area is being reroofed currently (summer of 2019) and is not included in this report. This report covers The Main Building (an EPDM roof with a solar panel installation) and the Rear Auditorium Building including two passageway connectors (gravel built-up-roofs).

The roof on the main building currently has an active 20-year warranty issued by Firestone. The Warranty (ROO17088 Job# FBPCO AB8611) was issued on 11-18-2006 and expires 11-18-2026. The roof is in good condition, but a number of wet areas and areas of lifting insulation are present. Most of the wet areas on the roof were caused by holes in the roof membrane. Holes and damage are not covered under the roof warranty. The insulation appears to be adhered to the deck. In a number of areas, we found that the insulation has cupped or curled and pulled away from the deck. This is a dangerous condition, as the insulation is no longer adhered from the deck and the membrane may also not be adhered to the insulation. Curling insulation from unrepaired leaks is also not covered under the warranty.

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The Auditorium and connector roofs are gravel surfaced Built-up-roofs. These roofs are in poor condition. One connector roof show wetness on approximately half the roof, and the auditorium roof shows wetness on a large part of the penthouse and large areas on the main and mid-level roof. It appears the auditorium has an active roof warranty issued by Hickman. The warranty is a 25-year warranty issued 9-28-2001 and it will expire 9-28-2026. Because the school has not performed maintenance on the roof and allowed large areas to get wet, we are not sure if the manufacturer will cover any leak repair work. Reroofing should be considered for the wet connector and penthouse due to the large areas of wetness. The main and raised roof have some large wet areas and should also be budgeted for replacement, however, repairs and maintenance may help stop any current leaks and slow down the roof degradation until reroofing can be performed.

Main EPDM Roof

As stated above, many of the wet areas noted on the infra-red scan can be tracked down to holes or punctures in the roof membrane.

Holes in the roof



Holes in the membrane were found at wet areas W1, W2, W5, W6, W10, W11, W12, and W14. Most of these holes have been patched.

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Some of the holes must have been present and unrepaired for a long time. The wet area #2 has spread to form a large area under a small hole.

Wet area #3



Wet area number 3 goes around a chimney. We did not see any holes that may be causing the leak and suspect that the leak is coming from the chimney; either the counterflashing or the EPDM base flashing.

Wet area #4



Wet area number 4 looks to be coming from a penetration pocket and or a hole. As with other holes or points of infiltration, it has spread to a large area.

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Wet area #7



Wet area number 7 looks to be coming from a shrunk filler or open flashing at a penetration pocket.

Wet area #8



Wet area 8 is found surrounding one of the units. The marked wet area is large. In addition, it appears that a large amount of water must have entered because the insulation has curled and pulled away from the deck and the roof membrane. The insulation on this roof has been adhered to the deck (we believe it is a tectum deck) using an insulation adhesive. If the facers of the insulation get wet from repeated or prolonged water infiltration, they can lose their integrity and come apart. Once unadhered from the deck or membrane the insulation can curl or cup as it continues to get wet. In this case it has grown and become unadhered in a large area.



There is another large area of cupped insulation in front of the penthouse door even though it is not marked as "wet" something happened in this area at one time to cause the insulation to cup and become unadhered. It should be replaced and repaired as if it were a wet area.

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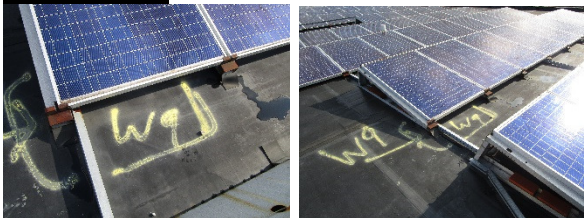
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Wet area #9



Wet area number 9 appears to be coming from holes by or under the corner of a solar panel. Assistance to lift the panel, (by the appropriate trade), may be needed to repair the leak and or replace the wet insulation at this location.

Wet area #13



No obvious hole was found at wet area 13. The old patch and lap need to be investigated further.

Other items on the EPDM roof not noted as wet on the EPDM roof but are potential sources of water infiltration.



We found other sources where water could be getting into the roofing system on the EPDM roof. Membrane flashing on the perimeter edge is cracked and joints between the metal are open, pipe flashing is starting to open, membrane has been affected by possible spills, cracks are present at the expansion joint flashing and penetration pockets are open. Comprehensive maintenance needs to be performed on this roof to seal all these issues and prevent water from getting in and causing problems.

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Auditorium Roof and connector roofs

Even though they appear to be under warranty the gravel surfaced built-up-roofs on the connectors and auditorium roof are in fair condition. The moisture scan revealed that one of the connectors and the penthouse roof have extensive moisture under the roof membrane. The wet areas are large enough that removal and replacement of the roof *may* be more cost effective than performing removal and replacement of the wet areas along with maintenance on the balance of those roofs. If requested, we can provide replacement costs for the wet connector and penthouse roofs.



Connector roof -Wet area #

Penthouse roof – Wet area #

Main lower level and mid-level roofs over auditorium

The main level lower level roof and mid-level roof over the auditorium each have one large wet area and a few smaller ones.



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Dried and lifting perimeter membrane



The membrane at the perimeter of the roof has dried. The ballast has been scoured off in areas as well. In some spots the membrane is not stuck to the metal flashing and water is getting in. This is causing some of the wet spots at the perimeter. In addition to repairing the perimeter wet areas, the entire perimeter of the roofs should be checked and any open membrane at metal joints repaired. Where the membrane is lifting it should be resealed and re-stripped.

Penetration flashing



Many of the penetration pockets have failed and split open. Those that haven't split have had their filler shrink. This has left paths for water to enter the system.

Curb flashing



All curb flashing needs to be checked. There are tears and worn out areas on some of the roof curbs. Holes, open corners, deteriorated membrane should be repaired.

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Roof Drains



All roof drains should be cleaned of debris and checked to see if the lead flashing is pitted or intact. Drains with marked wet areas should have the wet areas removed and be completely reflashed.

Small low row roof off mid-level roof



There is a small low roof on the side of the mid-level that has no drain or scupper. Water that builds up on it must flow over the edge. The brick on the walls below this roof shows signs of water damage. In addition, two marked wet areas, one at a drain, the other at a curb are close enough to this roof to be wet from water getting in the wall and traveling to the marked areas. A drainage scupper should be cut in the edge of this roof and a leader installed from the scupper to the lower roof to help stop water from cascading over the edge and possibly damaging and entering the wall.

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Miscellaneous items



There are also some miscellaneous items found on metal curbs. Some of these are just caulked to the curb and the caulk has worn out. These should be resealed with a PMMA membrane.

Recommended repairs and maintenance

The recommended repairs and maintenance for Rippowam School can be divided into the EPDM roof on the main area and the ballasted built-up-roofs on the auditorium area.

On the EPDM roof we would:

1. Cut out all marked wet areas, install new insulation and new Firestone EPDM membrane. The entire area covering the area containing wet areas 5, 6 7 and 8 would be cut out and replaced.
2. Either remove and replace the loose area by the penthouse door or overlay it with ½” insulation and new membrane.
3. Walk the roof and repair any hole we find not in a marked area.
4. Check and repair penetration pockets.
5. Check and repair curb flashings.
6. Cut out and replace (if necessary) or fasten and patch the cupped areas.
7. Check and repair the expansion joint flashing.
8. Check and repair the “stained” area.
9. With the assistance of the appropriate trade to move the solar panel and stand, repair the noted damage under the panel.

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It should be noted that work under the non-marked areas of the solar panels is not included. We could not get under them to inspect the membrane. When making the other repairs on the roof we can try to look under the panels and get an idea if extra work is needed in these areas. We would than notify the Construction manager which panels would have to be removed (by others) for us to make the repairs.

All work will be performed using Firestone materials and done in accordance with their published details in order to maintain the warranty.

There are a few options for the ballast side.

The first option is to perform basic repairs. These would include:

1. Check perimeter of roofs for unadhered membrane, cuts, breaks, worn out flashings, etc., Special attention shall be paid to marked areas (markings are already starting to fade from gravel,) to determine if an area needs to be cut out and replaced or only patched. Perimeter flashing shall be patched by:
Scraping back gravel, applying a layer of reinforcing fabric in roofing cement followed by a layer of granular surfaced modified bitumen membrane set in roofing cement. The perimeter of the repair would then be stripped in with strip of reinforcing fabric set in roofing cement followed by another coating of roofing cement. Ballast from the surrounding area would then be placed on the perimeter mastic stripping. The granular surface on the modified bitumen membrane would be the finish on that portion of the repair.
2. Scrape the gravel from the marked wet areas. Inspect membrane for cracks, breaks, splits to determine the source of the suspected wetness. Repair the found issues with a modified bitumen patch as described above. Small wet areas (#'s 22, 23, 21, 20, 18 and possibly 17), may be removed and new insulation and the above described modified bitumen membrane patch installed over the insulation. Large areas wet areas (#'s 15, 19 and 16) will not be removed, and will only have the problems in the membrane patched.
3. Check, repair, refill and reflash as needed, all penetration pockets.
4. Check and repair as needed, all curb flashings. using reinforcing fabric, roofing cement and modified bitumen membrane. A bituminous resin flashing and reinforcing fleece may be used instead of the modified membrane depending on the conditions.
5. Clear surface debris from all roof drains. Check all drain flashings and reflash drains with new lead if necessary.
6. Cut a scupper in the edging of the small low roof off the mid-level. Fabricate, install and flash a roof scupper. Furnish and install a leader from the scupper to the main roof. Lay a splash block under the leader.
7. Check, caulk and reseal items on the metal curbs.

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It is difficult to put a fixed price on performing the above type of repairs on a gravel surfaced built-up-roof. Many issues may be hidden by the ballast, and once you start scraping and moving the ballast at a repair area it is very common to find the issue extends out further under the ballast and a repair larger than expected is needed. For this reason, we would prefer to perform the repairs on the built-up-roof on a time and material basis. Our budget estimate for the outlined repair work is a 5-man crew spending 10 days performing the repairs.

We would keep time and material records for the repair work and if the repairs are performed quicker than anticipated our invoice would reflect the lower cost. If we see we are reaching the budget, the Construction Manager will be notified, and we will either find a stopping point, or give an idea of the expected additional costs to complete the repairs.

As we noted in the opening of the built-up-roof section, the majority of one of the connector roofs, the upper penthouse and a large area on the side of the main roof and mid-level roof are marked as wet. Only minor repairs would be performed on these roofs and a price to replace them roof can be provided upon request. Once we start repairs on the roof we can take test cuts and samples of these areas to see how wet they are along with the Construction Manager determine if a price to replace an area is needed or the above repairs will suffice.

All repairs on the built-up roof will be made with standard materials by Firestone, JM or GAF not by Hickman. Their materials are much more expensive and even though it appears that they still may have an "active" warranty on the roof, given the lack of maintenance and problems found on the roof I am not sure if it is worth it to use their materials, especially if replacements are planned in the future.

Please let us know if you have any questions or need additional pricing.

Respectfully,



David Lederman