BLUE SKY ROOF INSPECTIONS

Plumbers Lic 25298

To: Primary School **Attention:** Charles Dickens

Today's date: 23 September 2014

Property address: Corner of Maths Street and History Lane, Preston. Victoria.

Job Number: N/A

Date of inspection: 12 September 2014

General information

Roof type: Colorbond 'Spandek' to new section. Galvanised 'Roldek over front entrance.

Roof pitch: See report.

Access: Single storey.

General condition of roof: New roof, good. Roof over entrance, average to poor.

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The purpose of this report is used to identify the cause of water ingress through various areas of the new building and also the front entrance area.

Findings (New building)

On inspection of the Colorbond 'Spandek' style roof to the most recently constructed building I found that there are a number of issues that have lead to water ingress.

There are and upper and a lower sections of roof (See below).

The box gutter at the rear of the upper section discharges onto the lower roof via spreader pipes (See photo above and on next page).

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In the past and according to the caretaker these spreader pipes have become blocked causing water to backup in the upper box gutter.
There are overflow outlets cut into the sole of the box gutter which discharge through the eaves lining (See below).

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There are however only two 90mm diameter overflow outlets in a box gutter that has for 100mm diameter downpipe outlets.
According to the 'Installation Code for Metal Roofing and Wall Cladding SAA HB 39-1997' (Page 37) issued by the Victorian building authority, overflow outlets must be equal to or greater in size than the cross-sectional area of the downpipes. These overflow outlets will work well in most situations because it is unlikely that all of the downpipes will become blocked with leaves and mud at the same time. However in the case of heavy hail turning to ice in the box gutter all of the downpipes would be blocked at the same time and the overflow outlets would need to take over which currently they would not be able to do.
The overflow outlets discharge water directly down onto the apron flashing of the lower roof as opposed to discharging compliantly clear of the building ('Installation Code for Metal Roofing and Wall Cladding SAA HB 39-1997' Page 37). This would be difficult to achieve however in my opinion downpipes could be connected to the overflow outlets in order to discharge the water further down the roof away from the flashings.
On inspection of the top end of the lower roof I found that the roof sheets are short meaning that the apron flashing only provides approximately 60 mm of cover over the weathered ends of the sheets (See below).

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The minimum compliant cover for a transverse apron flashing is 150mm, therefore the flashing does not comply ('Installation Code for Metal Roofing and Wall Cladding SAA HB 39-1997' Page 85).

I believe that this issue has been the main cause of water ingress especially when a spreader pipe has become blocked or the upper gutter is inundated causing water to flow out of the overflow outlets directly onto the undersized flashing. Driving rain would also be a contributing factor.

The first three spreader pipes from the left (Viewed from the rear of the building) are not compliant because they discharge water from a roof area larger than 15m² onto a lower roof ('Installation Code for Metal Roofing and Wall Cladding SAA HB 39-1997' Page 53).
A better way would have been to run the pipes all the way down the roof to discharge into the lower box gutter.

The parapet at the front of the lower box gutter is much lower than it is for the upper gutter and the roof ends are very exposed to driving rain (See below).

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At the end of the lower gutter there is a rain-head. The overflow outlet in the rain-head is not compliant because it does not at least equal the cross-sectional area of the downpipe outlet and therefore would be ineffective if the downpipe were to be blocked. In school yards balls often find their way into the gutters and downpipe outlets therefore this overflow outlet could be crucial.

Recommendations

- Install enough extra overflow outlets in the upper box gutter to be at least equal to the cross-sectional area of the downpipe outlets.
  There are also insufficient overflow outlets in the lower gutters.
- Install downpipes with spreaders to the underside of the overflow outlets in order to discharge the overflowing water down the roof and away from the apron flashings.
- Extend the downpipes all the way down the roof to discharge directly into the lower gutter via a 90° bend facing towards the nearest downpipe outlet.
- Install a new apron flashing between the lower roof and the wall of the upper level. Make sure that the minimum 150mm of cover is achieved. 200mm of cover would be preferred.
  It might be a good idea to install corrugated foam infill strip between the underside of the apron flashing and the top end of the roof sheets.
- To protect the open ends of the lower roof sheets and baffle flashing could be installed on the inside of the parapet wall extending up about 200mm.
  Alternatively a 200mm x 100mm angle flashing could be installed across the tops of the roof sheets overhanging the gutter. Make sure not to block off the flow of water from the roof sheets.

Note

These recommendations are based on 36 years experience in the Roofing Industry and may differ from other opinions. All repairs should comply with the relevant 'Roofing Code of Practice'. No responsibility will be taken for the workmanship of other trades that are employed to carry out any repair work.

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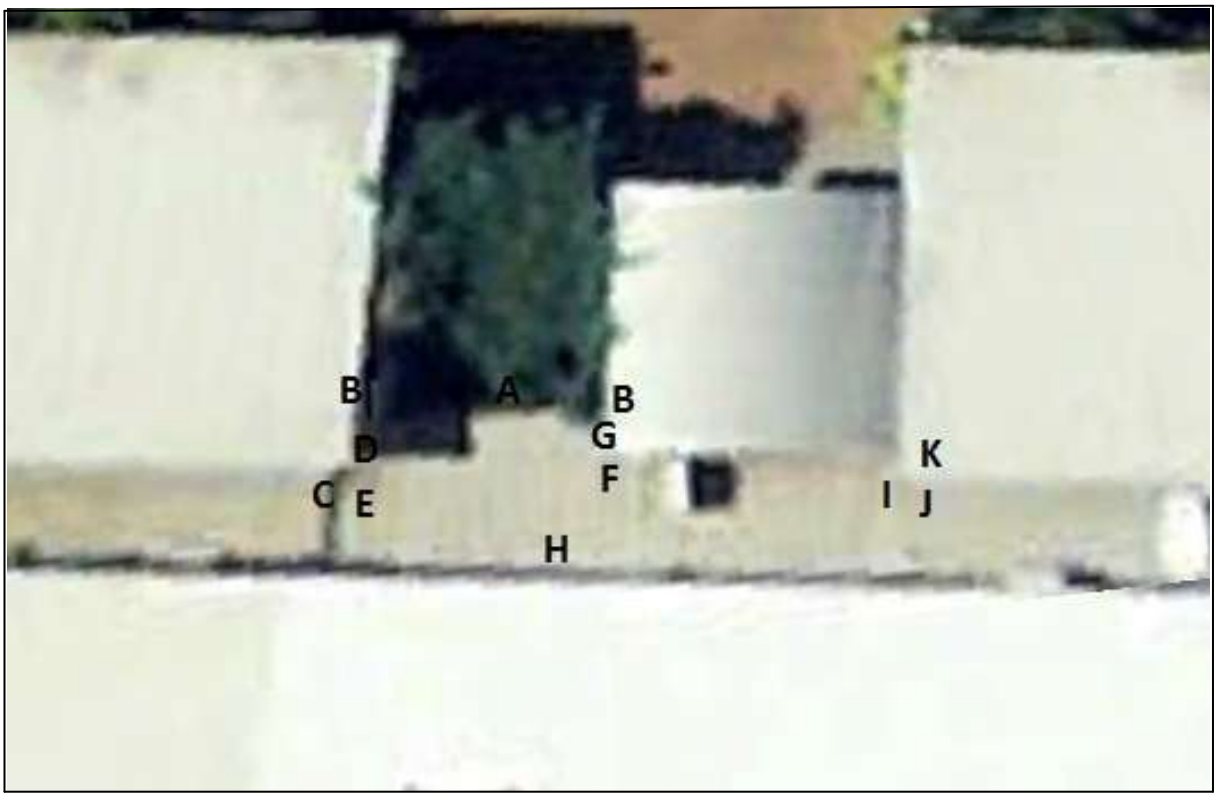
Front entrance area

This section of the report is to be read in conjunction with the diagram below.



The area above the front entrance of the school is part of the older original roof and various sections have been added on over the years. Unfortunately not much thought has been given to the roof drainage system when these additional sections of roof were added.

Area' A'

At area 'A' the gutter running across the front entrance is too small for the water that it now has to carry. The outlets at the end of the gutter have also become blocked with mud and leaves etc causing the gutter to overflow back into the soffit lining (See photos on next page).

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The gutter is also badly surface rusted (See photo below).

Recommendation

It would be a good idea to upsize the gutter to a Lysaght high front 'Sheerline' gutter and to install rain-heads at each end to provide provision for overflow (**Areas B** on the diagram).

At area C, all the water from the adjacent section of corridor roof discharges into the first roof tray which is likely to become inundated during very heavy rainfall (See photo below).

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Recommendation

In my opinion it would be a good idea to install a gutter across the ends of the roof which could discharge the water directly into the new rain-head.

Area D

At area D there is a counter flashing extending right down into the tray of the roof sheet and this has caused debris and mud to build up. This could then cause water ingress especially in its current state due to the volume of water being discharged into this roof tray (See below).

Recommendation

Cut back the counter flashing to the same level as the other flashing in the photo above.

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Area E

At area E the join in the flashings has come apart which could allow water ingress (See below).

This area has been sealed previously with silicone but has never been properly repaired.

Recommendation

Clean off all of the silicone and install a new galvanised flashing over the area which is riveted down.

Area F

At area F there is a flashing between the two levels of roof. The flashing is poorly secured and is loose (See photos on next page).

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Obviously the local fauna has used this area as a home in the past.

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Recommendation

Install a hopper flashing that is properly secured across the intersection between the two sections of roof.

Area G

At area G there is a downpipe from the upper gutter discharging onto the lower roof. There is no downpipe spreader to discharge the water properly (See photo below).

Recommendation

Install a 90mm diameter outlet and PVC downpipe and run the pipe across to discharge directly into the new rain-head.

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Area H

At area H there is a large hole in the up-stand of the galvanised apron flashing and in general the apron flashing is in poor condition (See photos below and on next page).

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As you can see the turn-downs of the flashing are not overly tight to the trays of the deck roof because some of the fixings to the ribs have been missed or have sheared off. This allows debris to build up in the stop-ends of the roof sheets which can cause water ingress during heavy rainfall.

Recommendation

Replace the flashing with a wider one that is security fixed to the ribs with screws (not rivets). The best way to do the turn-downs is to make them 70mm and to fix the flashing so that the turn downs are sprung tight to the trays of the deck roof at 45°.

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Area 'I'

At area 'I' the adjacent section of corridor roof once again discharges a large volume of water into the first roof tray (See below).

This entire area is poorly designed with regard to the volume of water it has to carry and as you can see in the above photo this is an obvious problem area.

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Recommendation

Install an apron flashing that will carry the water from the corridor roof across and into the second roof tray. Make sure that the up-stand of the flashing is fitted tight up under the overhanging deck roof sheets.

Area J

At area J the stop-end of the box gutter and flashings are very untidy and will be allowing water ingress in their current state (See below).

Recommendation

Replace all poorly installed flashings with new galvanised flashings making sure that no gap is left where water ingress can occur.

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Area K

At area K there is another outlet from the upper roof discharging onto a problem area without a proper downpipe or spreader (See below).

Recommendation

Connect a 90mm diameter PVC pipe to the outlet and run the pipe around the face of the wall to discharge into the closest of the new rain-heads. If the volume of water discharging into the undersized box gutter can be reduced in any way it will minimise the risk of the gutter overflowing during heavy rainfall.

Note

These recommendations are based on 36 years experience in the Roofing Industry and may differ from other opinions. All repairs should comply with the relevant 'Roofing Code of Practice'. No responsibility will be taken for the workmanship of other trades that are employed to carry out any repair work.

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Conclusion

As previously mentioned this area of the roof has been built/extended without proper consideration of the roof drainage however I believe that if my recommendations are carried out, the risk overflow in this area would be significantly reduced.

David Bishop.