

**HI-LAND**  
**ROOFING & CLADDING**  
“Metal Specialists”

PO Box 1444  
Squamish, BC  
V8B 0A9  
E-mail [info@hilandroofing.com](mailto:info@hilandroofing.com)

Telephone 604-815-8795

Fax 604-898-3211

Tel: 604-815-898-5100  
Cell: 604-803-4315  
778-387-4595  
Email: [Hildreth@telus.net](mailto:Hildreth@telus.net)  
[priest@squamishanglicanchurch.ca](mailto:priest@squamishanglicanchurch.ca)  
[rainvale@shaw.ca](mailto:rainvale@shaw.ca)

Site Address: Anglican Church/Parish of St.John the Divine  
#1930 Diamond rd.  
Garibaldi Estates  
Squamish, BC

**Electronic Copy**

Attention: David/Cameron and Karen

Aug03/2022

**BELL TOWER- EXTRAS REPORT #5**

Re: **Extras: Hidden Damages Report and Summary @ Upper Structure**

During the work process several things were discovered that need to be addressed. This “scope of work and damages” details pertain to (2) separate concerns. The interior, above the “old” skylight elevation as well as the exterior and structural damages. All of these are outside of the original “scope of work” and “contract agreement”. These are deemed to be extras and shall be charge as such.



**Problem:** As seen in the work recently completed “below” the existing skylight elevation there are structural framing issues.

The existing frame stud work is sporadic and does not align with each other. This is a direct contradiction to The BC Building Codes. This is part of the tower “swing” problem.

**Solution:** Reframe and upgrade to meet all required structural requirements and BC Building Codes.

**Problem:** As seen in the lower tower elevations, the current frame work has been installed lying on the flat. This is at the lowest strength residence and allows for the wood to ``bow`` compound this with the details mentioned above and this all contributes to the heavy structural movement and fatigue.



**Solution:** Reframe and upgrade to meet all required structural requirements and BC Building Codes.

**Problem:** Due the longevity of water ingress over the years the existing structural framing at and below the timber work has sustained heavy damages. Saturation and dry rot has replaced the once strong fibres in the wood.

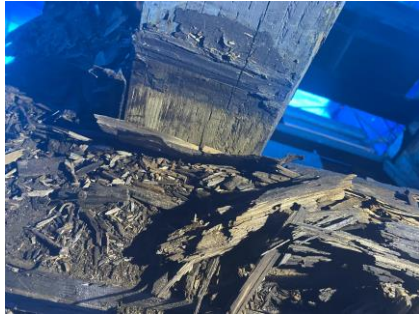
Some areas have turned to dust. While others have become brittle and are at a full failure capacity. All corners have sustained heavy damages.(x4).



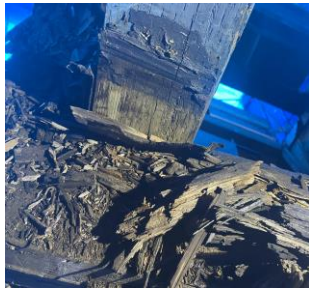












**Solution:** Reframe and upgrade to meet all required structural requirements and BC Building Codes.

**Problem:** The damages at the top of the bell tower wall assembly are significant. The upper wall has had water ingress in several areas, this has led to these damages. The biggest culprit to these elevations demise is the poor detailing at all the timber to parapet junctions.

Over time there had been attempts to stop the flow of water from entering into the structure. This was mostly to no avail.



**Solution:** Reframe and upgrade to meet all required structural requirements and BC Building Codes.

**Problem:** There are heavy damages at the south window elevations.

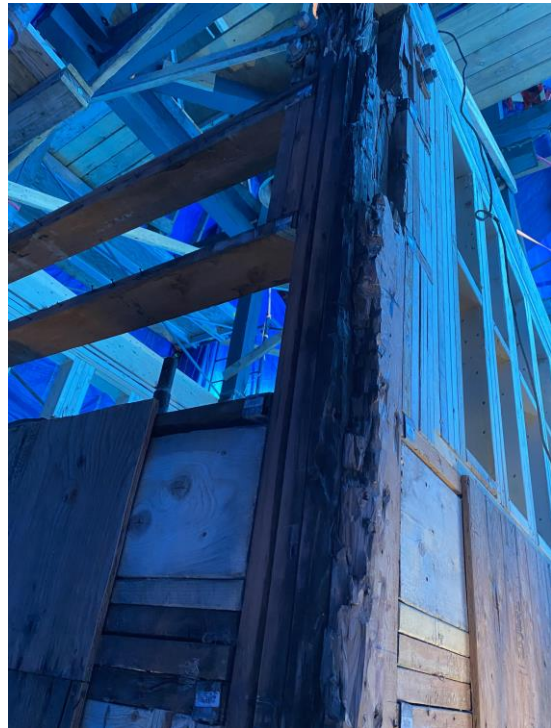






**Solution:** Reframe and upgrade to meet all required structural requirements and BC Building Codes. Meet or exceed all RCABC codes and best practices.

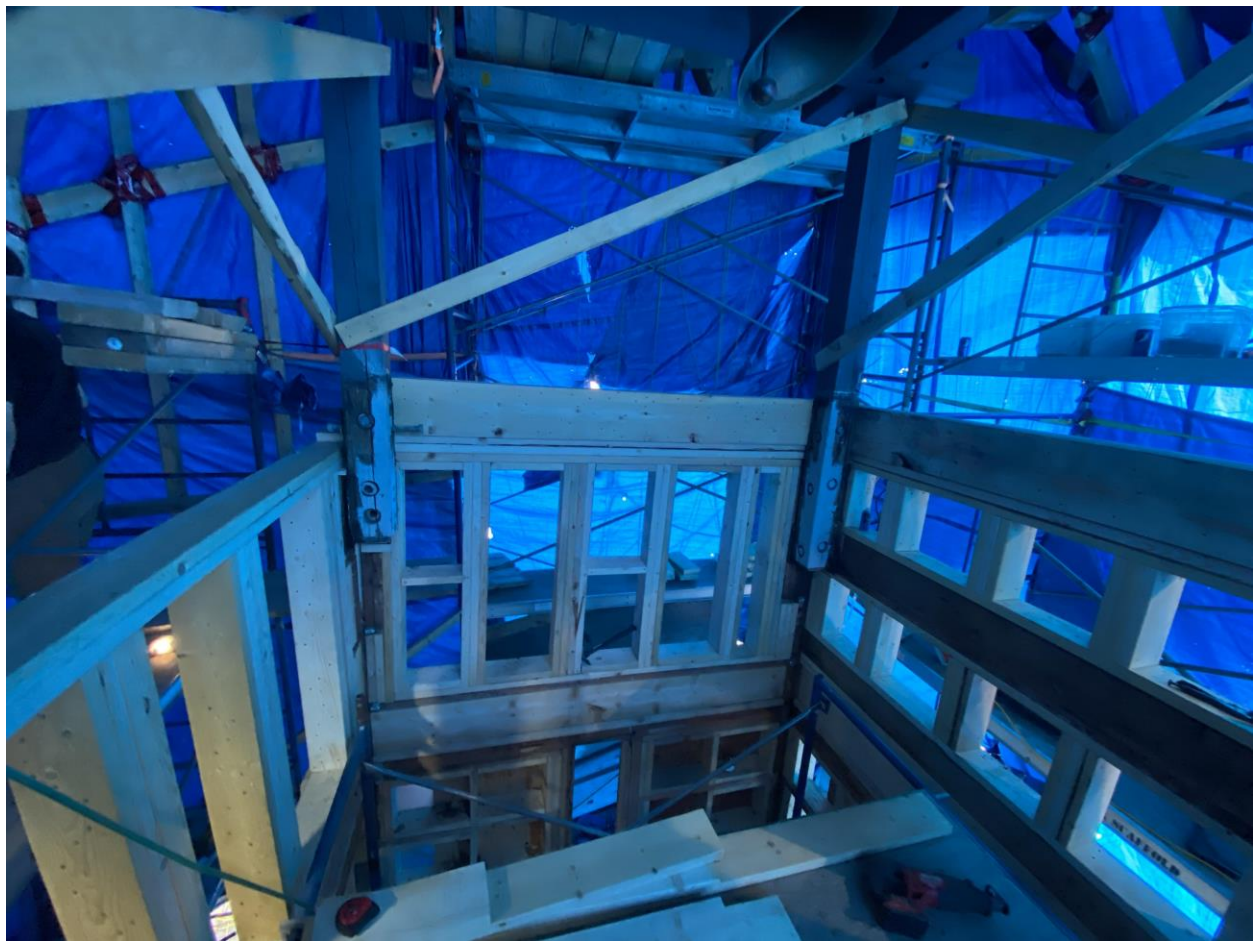
**Problem:** All the existing structural corners have substantial damages due to water ingress.



**Solution:** In order to do these repairs the timbers and the timber structure needs to “braced” and “shored” up in order to take the full above weight capacity.

**Problem:** The existing timbers lean and/or spread at the lower elevations.









**Solution:** The temporary use of shoring jacks and bracing is needed to correct this problem. Once the structure is up righted the solution maybe to install some “new” timbers at the lower elevation of the timbers. These are to act as a xxl spreader block and hold the entire unit in place. This will prevent any future spreading.

**Problem:** There is “0” seismic hardware on this wall. This allows for heavy sway/ wear and tear on the timber bolts.

**Solution:** Reframe and upgrade to meet all required structural requirements and BC Building Codes.

Install seismic brackets to lower elevations of all timber details. Timber tails must be extended to gain the proper lower assembly strength.

**Problem:** The devastation is so great in some areas that the combinations of heavy sway, water ingress and lack of seismic consideration has actually cause some of the structural corners to “crack” in half, leaving the full weight to be displaced on the wall framing only.



**Solution:** Reframe and use the proper seismic fore thought into completing these areas. The BC Building codes and best regional practices need to be implemented here.

**Problem:** The bolts holding the timber structure to the tower assembly are starting to wear. Partially due to the above mentioned, as well as water gaining “breach” to the holes.



**Solution:** Treat the holes with anti- rot and petrified solution. Install synthetic structural wood filler and re drill rot the existing bolt pattern. Then seal each “new” hole with the appropriate caulking sealant.

**Problem:** The overall height of the timber/bell tower assembly exceeds the maximum height rational for the internal timber length and support. This also is a big contributor to the assemblies negative out sway.

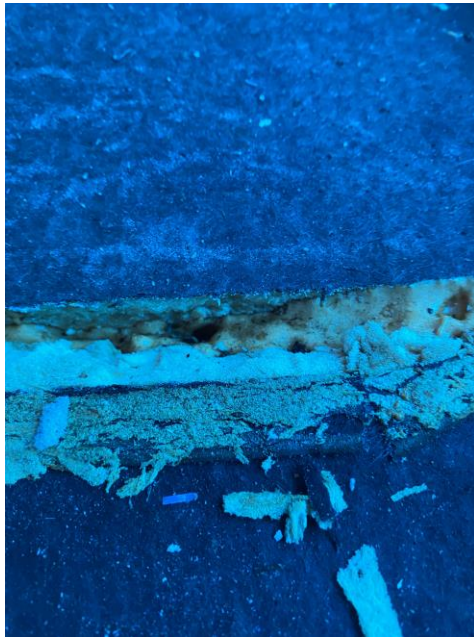




One side of the structure the timbers are on 24" into the structure, the other side is 36". All these should be a minimum of 6' below the top curb into the structure.

**Solution:** In conjunction with the above mentioned, the existing timbers should be extended and "new" heavy duty tower bolts and hardware applied. Since is now going to inside and visible this in turn would need to have a finished product install to hide the "new" work.

**Problem:** During the demo process it was discovered that the existing ISO insulation at the tower junction was saturated. It is so heavy it was breaking under its own weight when being removed.  
There has been a substantial rain in approx 4-5weeks.





**Solution:** Find the leak source and eliminate it and install new product.

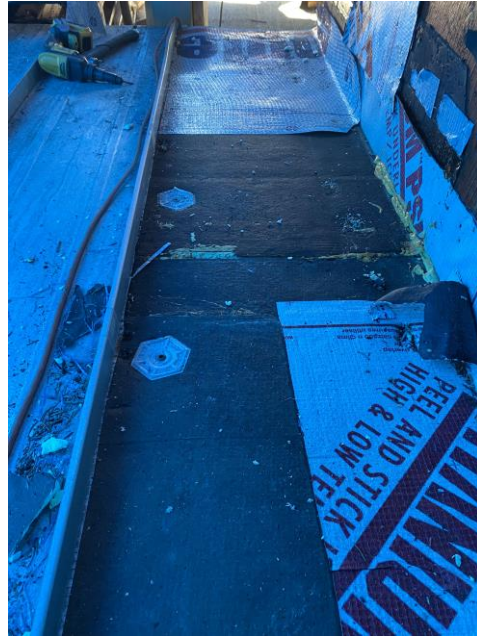
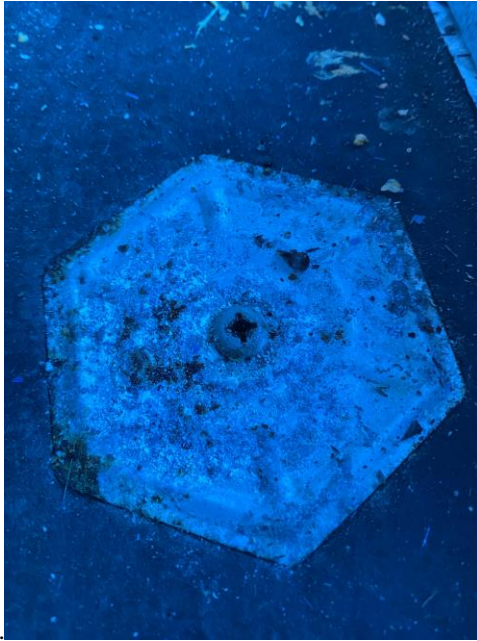
**Problem:** Not only is water running below the insulation, but it is also making its way between the existing roof panel and the top side of the ISO insulation.





**Solution:** : Find the leak source and eliminate it and install new product.

**Problem:** All the existing insulation plates and screws have been compromised are have a combination of regular and white rust.



**Solution:** Find the leak source and eliminate it and install new product

**Problem:** The original proponent has installed the roof panel with 6" insulation screws @ all clip and panel heads as the drag load fasteners. This is the complete wrong application for these screws. All drag load fasteners need to be self-sealing with a washer and sealing grommet. Since the existing has neither, water has been breaching at every screw head. This runs to the lower extremities of the structure, being absorbed by the ISO.

You can see the rust staining on the back side of the panels. This is an indicator to a leak source.



**Solution:** : Find the leak source and eliminate it and install new product. Install the proper sealed fastnars,

**Problem:** During the demo process@ the roof to wall elevation, it was discovered the appearance of heavy water staining and black mould on the existing ISO upper cut edges at the hip elevations. Upon further investigation the water sources seem to also be breaching at the above already mention details, however this runs the entire length of the main roof/sanctuary elevation.

During the investigation water staining is evident along all the internal beam work. This could from previous damages before the “newer” roof was installed or “not”.

\*\*\*\*\*{see pictures previously above}





**Solution:** Re-detail the entire hip and applied the proper technique to insure to meet all RCABC standards.

**Problem:** The contractor has installed the ice/water shield membrane below the ISO insulation and on too the tower wall assembly.

However, the installers must have known the product was either damaged or installed incorrectly. They have installed a spray foam insulation in areas and then tried to install a sealant over it.

The materials have several long slices in the product at the wall to roof intersect. This would suggest that the membrane was “webbed” in these areas and the installer had cut it to make it lay better. After which they had tried a failing attempt to water proof it.

This would further explain some of the water damages and water flow issues into the wall cavity and the structure.



**Solution:** Re-detail and apply the proper technique to insure to meet all RCABC standards.

**Problem:** The contractor has installed a primer to the tower wall assembly wear the ice/water sheild has intersected.



However this has failed as bonding agent because the water and moisture have been generated from higher up and are also working its way from the backside of the plywood.

This would explain the ease it came away from the structure and was displaced. This then would also contribute to lack of waterproofing and the continue existing demise of the waterproofing system.



**Solution:** Re-detail and apply the proper technique to insure to meet all RCABC standards.



**Problem:** The original contractor has installed the hip flashing at the very minimal standards. Were as this maybe passable under the guidelines it doesn't mean it's acceptable. Due to the size of the roof, the open exposed area and the exposure to high winds and extreme elements with the probability of blow in problems. This would fall outside of those minimal standards and should have been falling under the best regional practices.

**Solution:** Re-detail the entire hip and applied the proper technique to insure to meet all RCABC standards as well as the best regional practices. In this case a much bigger boxed hip flashing detail.

**Problem:** The is "0" universal closer at the hip elevation in its entirety. This product allows the building to breath while eliminating any blow-in. The hip as it is, is full of debris and critter tracking.



**Solution:** Re-detail the entire hip and applied the proper technique to insure to meet all RCABC standards. Clean this elevation in its entirety and install a breathable universal closure.

**Problem:** This final problem is a major one. The contractor has install what is known as a "built up roof system" This were you have the insulation and vapour barriers sandwiched in between the roof assembly. The insulation is above the frame work rather than in between or below it. When this system is built the ISO board is supposed to have an area space between it and the ceiling. This air space allows the building to breath. Without that it chokes the building and causes condensation and venting issues. Especially when an ice/water shield membrane is applied to the substrate, as is here. This can and maybe part of the issues above the bell tower elevation. There are definably issues showing to point towards these items. Saturation, even though it has rained and the appearance of mould on the edgeds.



**Solution:** Consider a deeper further investigation into these issues.

**SUMMARY:**

As stated there are heavy damages to the structure. All of these above mentioned issues can be rectified and repaired. Even though we all knew there was going to be some hidden damages, this “new” scope of work has exceeded even our the original ‘hopes” at the size of the additional repairs.

Outside of these estimated work parameter’s is the hidden damages to the roof/wall ISO board insulation and the water tracing from the existing hip flashing elevations on the main roof.

All this work overlaps and all contribute to the problems in their own way.

All of these “new” problems can be fixed and made to not re-occur. Unfortunately this requires time and money.

Cameron was able to come and see the damages first hand.

Since there are so many pictures and only a few are provided in this document, we are providing a USB drive so you can open it up and have a better understanding of what is going on.



