Tŷ-Mawr
ecological building materials

Site Visit Report

All Saints Church
Ebbw Vale

February 2015

1. Introduction

This report has been prepared for Father Edmund by Sam Hale, Ty-Mawr Lime Ltd following a request to inspect the problems with failing stonework, water ingress and failing plaster within All Saints Church, Ebbw Vale. The inspection was undertaken by Sam Hale on 28th January 2015.

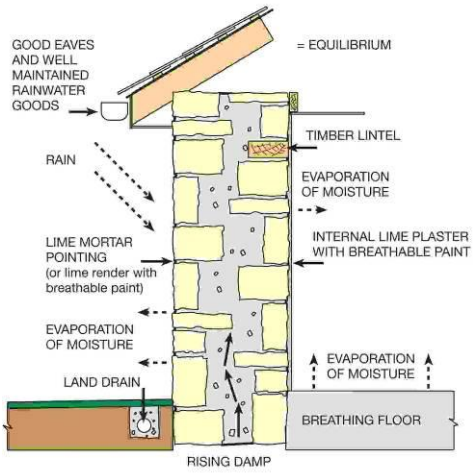
2. Description

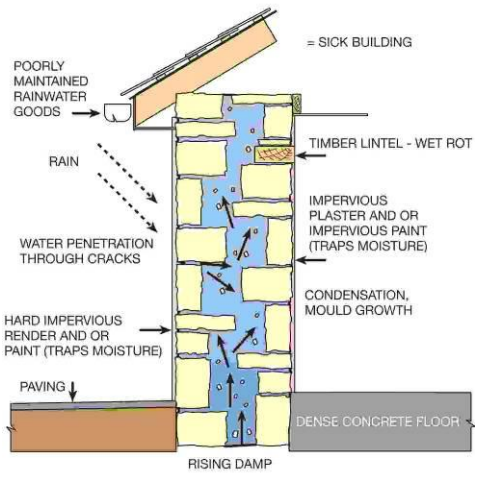
All Saints Church was built c.1905-24. It is an enormous rock-faced stone Gothic church with Welsh slate roof. The Bath stone dressings are soft and susceptible to weathering and erosion. The stonework is laid in a typical valleys black ash mortar.

Following a period of decay to stonework and the roof there has been sustained water ingress resulting in erosion of external stonework and failure of internal plaster.

Principles

This type of construction relies on the building being able to 'breathe' – i.e. to be able to release any moisture entering the building through weather, rising damp etc - see below, impervious materials, trap moisture and this build up of moisture can lead to problems associated with damp and condensation including mould growth, wet and dry rot etc. It is also important to consider the water/moisture management for the whole building so that as much water as possible is diverted from the building via effective rainwater goods, land drains, good detailing of joints etc to avoid problems associated with damp, plant growth, decaying fabric etc. This report will consider these aspects.





Priorities

In its current state there are many issues with the fabric of the building. It is important to set out the priorities for a system of works which will dictate costs and phasing. It is imperative that the building be made water tight and rainwater goods addressed and drainage fixed as a matter of urgency. Failure to address these issues could cause the unnecessary failure of any new work undertaken.

It is <u>not</u> recommended that the interior walls should be re-plastered and redecorated before the source of the moisture has been rectified and the walls allowed to dry out.

Roof

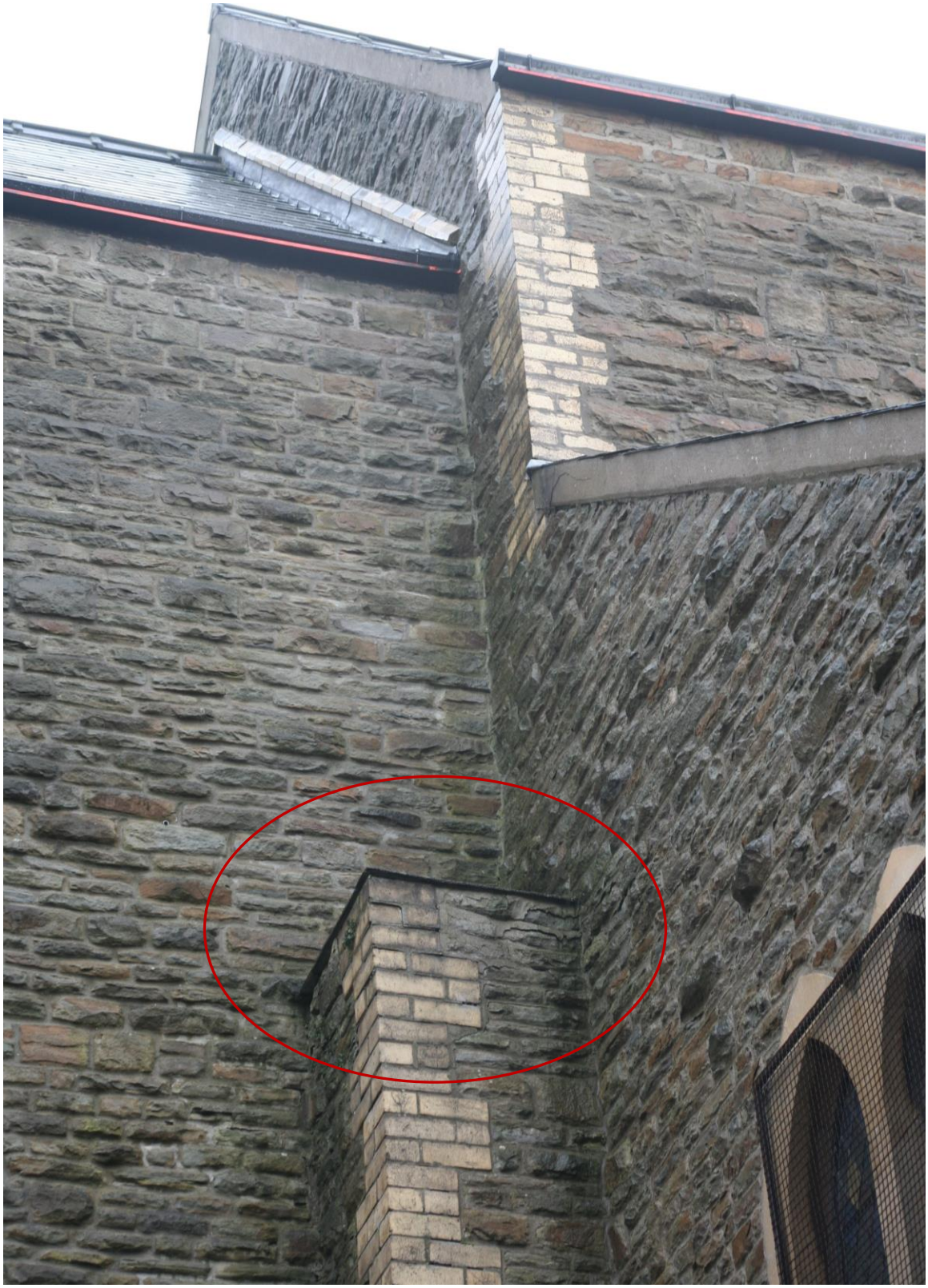
The roof must be assessed and repaired with special care taken in dealing with lead flashings at valleys and gables which have been allowing water ingress. The mortar flaunching around the gables and coping stones should be checked for cracking and displacement and if necessary replaced by an eminently hydraulic lime mortar (NHL5). Defective coping stones should be re-bedded using resin or alternative non-ferrous pins and laid on a NHL5 hydraulic lime bed. Where coping stones are damaged they should be cut back and new stone laid in - engaging a mason to detail the junctions with lap joints so there is no direct passage of water between coping stones. It is understood that Selwyn Jones has addressed many issues with the roof already which has included works to flashings and copings. It is worth providing a high-level access crane / rope access team to make sure all roof details are thoroughly checked and photographs taken to make sure the roof is now weather-tight.

The flow of water off the roof should be checked when it is raining to pinpoint problem areas. There is minimal overhang in places potentially resulting in rainwater flowing down the walls. Rainwater goods should be repaired / replaced where necessary ensuring gutters are of an appropriate gauge for the water run-off. Downpipes should allow free drainage into drains around the foot of the building.

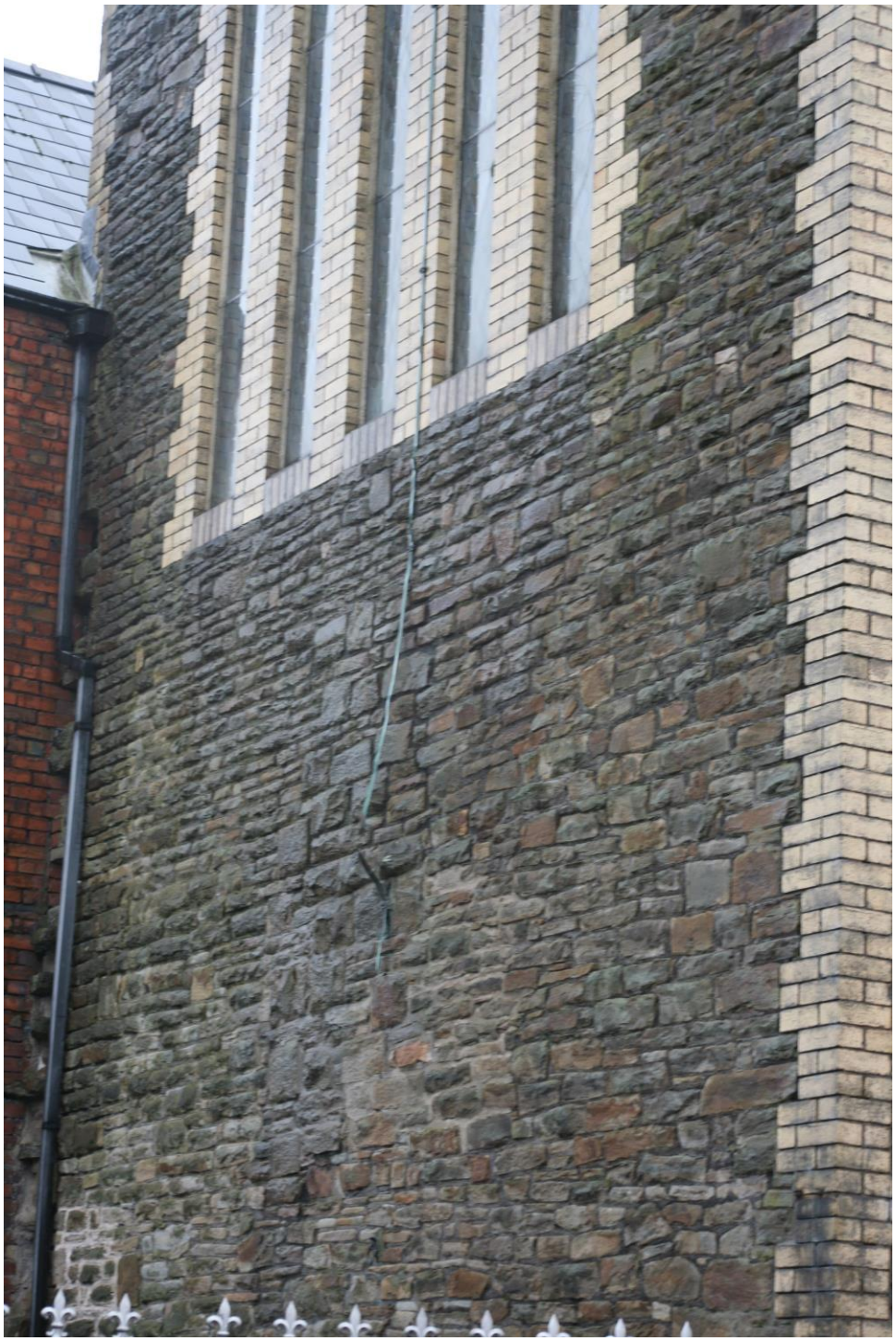
A dislodged gutter connection with the downpipe causing water to run down the face of the wall leading to saturation of the wall. The plastic guttering system is not ideal as it tends to move with changes in temperature and will require vigilance to ensure there are no loose connections.

Wall saturated from the leaking gutter connection

On the east facing elevation another gutter has detached from its connector allowing water flow down the wall. There appears to be a slipped slate next to it in the gutter.



…An area for water to sit and flow back against the wall – the installation of a sloped flaunching or lead or tile run off would be a good idea.



Water running down the end gable. Some of this will simply be from rain hitting the gable but some may be water runoff down the coping stones. Where pointing has failed this will be taking water in.

The gable end which appears extremely wet – breaks in slates should be addressed

An example of an ineffective drain – this should be dug up and a new drain surround installed to ensure there is no water back flowing into the base of the walls.

Without a drain water pools at the base of the wall before soaking in below resulting in a wet rubble wall – drains should be installed at <u>all</u> downpipes.

Drainage

The drainage around the church should also be addressed. A land drain to take water away from the foot of the building should be considered.

Lowering ground levels around the building and providing land drains will dramatically reduce any issues with rising damp.

Note we do not recommend the use of any damp proof injection system. With a rubblestone wall injection cannot in practice achieve a complete, unbroken barrier and could exacerbate problems.

3. Observations and recommendations

Exterior Walls

The rock-faced stone is generally hard with the Bath stone dressings friable and eroded in places. Much of the pointing is sound and perfectly serviceable in some areas lime survives and in others it has been replaced with impervious, brittle cement. There are areas of failed pointing and washed out pointing across the whole building which require selective re-pointing. Face-bedded stone has failed more obviously in places and may require isolated stone replacement or repair. Water run-off and wind driven rain has accelerated the decay of soft stone on windows and doorways.

An example of the failed Bath stone – some of this is due to physical damage but also freeze-thaw weathering from saturated stonework and freezing temperatures causing the beds to fracture. These areas could be considered for lithomex stone repairs in many cases and actual stone replacement in others.

An example where stone repairs are necessary not just aesthetic considerations – all damaged window sills should be repaired to allow the effective run-off of water. Lithomex stone repair mortar can be used unless the stone has completely disintegrated.

An example where isolated repointing would be sensible. The cement should be raked out, the wall allowed to dry, then be repointed with Blaenavon aggregate and NHL3.5 lime at 3:1 aggregate to lime.

An example where re-pointing is needed in hollows or where the mortar has washed out entirely such as behind the downpipe.

Uneven coping stones can lead to open joints where moisture can ingress

Recommendations

Where pointing is sound it should be retained.

Where re-pointing is required extreme care should be taken not to damage the stonework and plugging chisels or more effectively quirks should be used by hand – angle grinders and electric hammer chisels should **not** be used. If in doubt the pointing should be left in places where more damage would result from its removal. A minimal intervention approach is best with isolated pointing repair where needed.

The most appropriate material to use would be a 'blaenavon' NHL3.5 lime mortar to offer a similar colour match and some flexibility. The mortar should always be softer than the surrounding stone making it sacrificial to the stone. If undertaking work at this time of year a NHL3.5 hydraulic lime with 'blaenavon' aggregate should be used. Joints should be kept tight and the mortar sponged back to achieve a finish to blend in with the walls.

Washing / power washing is <u>not</u> advised. This would introduce too much water and could accelerate loss of fabric for little benefit.

Where stone decay has taken place a stone mason should be employed for stone repairs and isolated stone replacement. In areas such as the door and window surrounds loose stone should be removed and it may be appropriate to carry out hydraulic lime plaster repairs with lithomex stone repair mortar.

Interior

No interior re-plastering or decoration should be carried out before the issues with water ingress have been addressed and the walls allowed to dry out

The interior of the building shows the effects of water ingress, especially at gable ends. The lime plaster has failed in numerous places. Large areas have blown and salts are coming through. A vinyl emulsion has been painted on the walls and after trapping moisture within the walls it is now blistering and peeling. This will also allow lots of condensation to form on its surface during services.

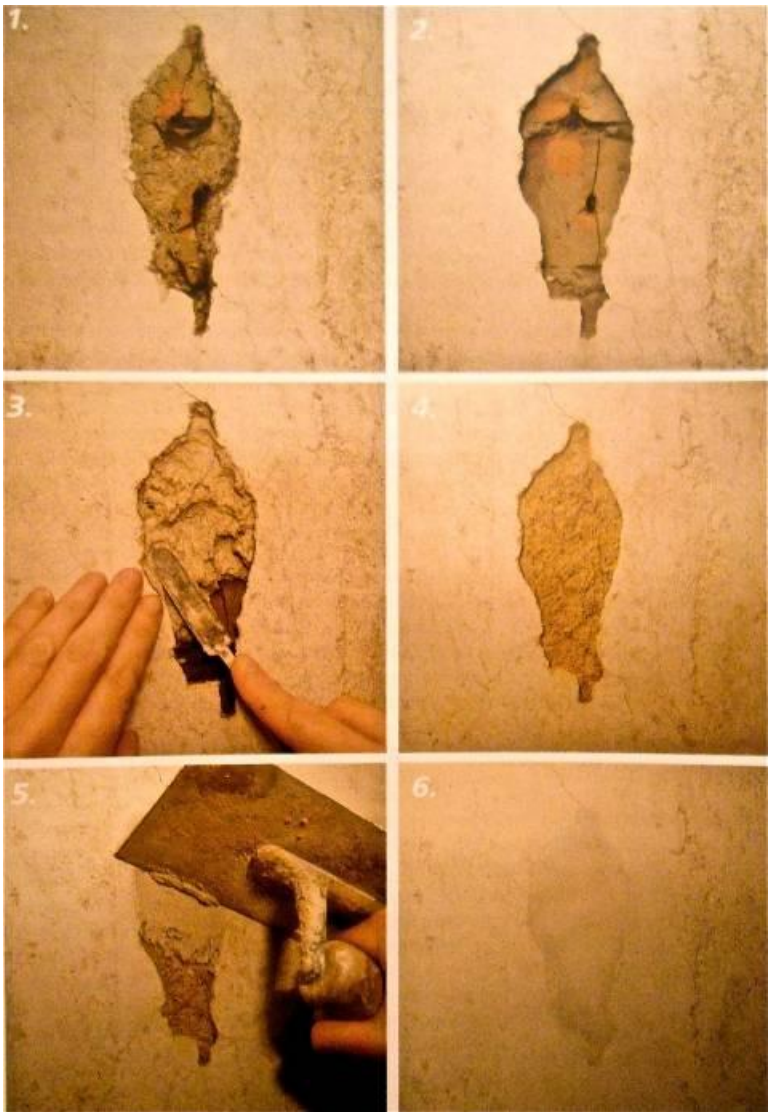
Walls should be allowed to dry before re-plastering. Care needs to be taken at the junction of new and old plaster

Recommendations

After the water ingress problem has been fixed, drainage installed and the walls allowed to dry the walls can be re-plastered.

A ‘standard’ build up comprises two 9mm haired base coats and one 3mm fine finish top coat. New plaster could be thinner on walls and still be flat. If using hydraulic rather fat lime plaster we would recommend ‘Ty-Mawr standard’ aggregate for haired base coats and fat lime internal finish top coat. Hair can either be natural or synthetic added at a ratio of approximately 1.5kg per tonne of plaster. Patch repairs can be done in Ecomortar R50 providing the wall is dry.

If retaining areas of original plaster care must be taken with new plaster at the joints where the old plaster has been cut away. We recommend that at edges the old plaster should be slightly undercut to allow a good joint for the new plaster. There will be high levels of suction at the joints and they should be carefully wetted to minimize shrinkage and well finished working up to the cut edge. It is likely that the joint between the old and new plaster may show through. This can be disguised to an extent in the finish.



The sequence of a small patch repair.
1. The area to be patched, 2. The area is cleaned back to the substrate and the edges of the area to be repaired are slightly undercut using a sharp craft knife to help provide a key for the repair, 3. The area is thoroughly dampened and the lime plaster pressed onto the backing, the undercut edges are supported whilst plaster is pressed into the recess – if using a sand lime hair is necessary to reduce the risk of shrinkage, 4. The plaster is brought up to below the finished level, it is allowed to pick up, then keyed by scratching, 5. The
base coat is dampened before a topcoat is applied flush to the surface and dampened to control drying, 6. The patched wall ready for painting

A breathable paint should be applied to the finished plaster. Limewash will not readily adhere to gypsum and old synthetic paint but will be fine on new lime plaster. For durability it is suggested that a pure mineral paint such as INSIL is used. It is as

breathable as a limewash but it has 4% artificial resin which helps it to bond on difficult surfaces e.g. where an old emulsion may have been used. This paint is therefore highly popular for the internal walls of churches that have had other paints on in the past but where you wish to maximise breathability.

Application of insil is best done by brush. Onto a clean dry background one coat of insil/maxil primer followed by one coat of insil paint. Onto areas where there have been salts apply 1 coat of silane primer before the insil paint. Apply the insil evenly and lap free, do entire areas in one go and do not cut in or you will get ‘picture-framing’.

Signs of past water ingress on the chancel arch. If this is now dry and no longer getting wet the area should be painted with volvox isolating primer before being painted with Insil silicate mineral paint.

Water ingress high up in the nave corresponding with the leaking gutter outside. All loose and flaking paint and plaster should be removed then the wall allowed to dry out. Only after the wall has dried it can be patch repaired with Ecomortar R50. Small cracks can be filled with volvox casein filler.

Staining from moisture and condensation this should be cleaned back with sugar soap and if stains remain painted with volvox isolating primer before being repainted in insil.

Areas of blown plaster and plaster with salts in (shown by the white salt efflorescence clearly visible) should be removed. The wall allowed to dry and patch repaired with R50. Ultimately when the wall dries the salts should stop moving through the wall however this can be a long slow process. A silane primer can be applied before painting in insil. If the wall remains getting wet then ultimately salts will come through a silane primer. Do not wash off salts as they will just get reabsorbed into the wall instead dry brush and vacuum.

Salts clearly seen on this cement and gypsum plastered wall. Simply painting over in insil will not solve the problem and the insil will come off within a few months.

Salts coming through the wall and bubbling off the synthetic emulsion paint which is holding it back. This area should be removed and the wall allowed to dry before patch plastering.

Stains from water running down the walls – these stains should come off with a wash down and sugar soap. Carefully monitor this wall to ensure this does not continue to get wet during heavy rain.

Water staining from running water in the chancel/sanctuary

Water ingress on the lancet windows on the west front looking from the balcony. This is likely historic water damage before the gable coping stones were repaired. Remove all loose and flaking paint before applying the insil primer and paint.

The wall of the vestry from within the side aisle – this has evidently got wet before and the entire wall has been re-plastered with gypsum plaster. This should be removed wholescale and the wall allowed to dry before re-plastering with sand and lime or Ecomortar R50.

The inside of the vestry – this wall should also be stripped back and allowed to dry before re-plastering with EcoMortarR50. The plaster should be allowed to cure for 4-6 weeks before painting.

Summary

- Replace defective lead flashings and damaged or slipped slates,
- improve the weatherproofing on the gables by undertaking the measures above of re-pointing and re-bedding stones where necessary,
- replace / repair rainwater goods for the future protection of the building,
- installation of land drains around foot of building
- external re-pointing only where necessary,
- isolated stone replacement / repair / plaster repairs
- only when it has been satisfied that the problem of moisture ingress has been solved and the walls allowed to dry out should they be re-plastered and re-painted with a breathable mineral paint

Attachments

- hydraulic lime mortar and fat lime mortar fact sheet
- fat lime plaster guide
- Lithomex repair mortar
- EcoMortar R50 guide
- Volvox casein filler
- Volvox isolating primer
- mineral paint technical sheet

The information provided in this report is provided in good faith after an initial visit. It is suggested that you satisfy yourself with the technical characteristics of the product for the specific applications (see published technical sheets – copies available on www.lime.org.uk) and if necessary ask the contractor to produce samples so that the suitability, timescales and finish of the house can be finalised. Ty-Mawr Lime Ltd are committed to providing the highest level of support to ensure a successful job, if you have any concerns at any stage of the project, please call us for advice.