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***FIRST DRAFT FOR CLIENT COMMENT BEFORE FINALISING & SENDING TO THE DAC – DRAWING & PHOTOGRAPHS TO BE ADDED.***

Mr A Warner
Church Warden
[redacted]

DCH.LEP.2139 **BY EMAIL**

25th April 2019

Dear Mr Warner

**REPORT ON DAMP RELATED PROBLEMS – ST PETER ad VINCULA CHURCH DITTON**

This report has been prepared at the request of your Parochial Church Council to advise on the likely causes of the problems which you are experiencing in the Church, mainly relating to damp, and to suggest works to assist in resolving the situation.

Following our initial meeting with yourself, the Reverend Ross Terranova & John Paul, we have revisited the Church both to undertake a measured survey and to look at more detail at the visual evidence and consider the causes of the problem.

Ahead of our appointment, your third Quinquennial Survey was undertaken by Thomas Ford & Partners on the 24th May 2017 and we have referred to that report when undertaking our inspection.

This report has been prepared to identify areas of concern that maybe causing/accelerating the problems with dampness, and also to suggest solutions. Once the report has been considered by the DAC, and the approach agreed, as a separate exercise a more detailed specification can be prepared to obtain quotations.

It is possible some of the work can be undertaken with self-help, but also the work could be broken down into sections and undertaken in a preferred order, as this may assist with fund-raising and using funds available in the best order.

Also, please find attached to this report a copy of our drawing 2139/01/- showing a plan of the layout of the Church and a section through the nave. This will help in identifying the areas to which we refer in this report and providing advice on remedial measures.

Like the inspecting architect who prepared the Quinquennial Report, we were surprised at the relative deterioration of the condition of the decorations in the Church since undertaking the work for you a few years ago, mainly at the tower end and the installation of the new door between the tower and nave.

The noticeable change relates mainly to the condition of the decorations, not only where they are becoming stained, but also mould growth has become far more evident. Also, particularly at lower levels, much of the plaster on the walls has started to deteriorate and decompose. In places, not only is the paintwork pealing off, but the layers of plaster are breaking away, and especially in the southwest corner of the nave, sections of the plaster have delaminated from the wall behind.

You mentioned that one aspect which has changed is the installation of the new heating, whereby there is now heating beneath the pews.

Problems relating to condensation and mould growth can be caused by a number of factors such as the following:

a) Churches are often left unheated for relatively long periods, and where there is a quick warm-up of the air within the building, the structure does not warm up so quickly, so the warm air condensing on the cold wall surfaces.

b) Understandably, for cost reasons, Churches often only want to heat their buildings when they are in use, but if the Church can be kept constantly warm, even at low temperatures, the risk of condensation and mould growth will be reduced.

c) The inside of Churches is often not ventilated, as windows are not regularly opened and doors are kept shut, apart from when the are occasionally in use. Good ventilation is an important key to reducing the problems relating to condensation.

d) Where the structure is getting damp, either from rising moisture and/or penetrating moisture from rain, the increase in moisture in the building will add to the problem. The causes of damp penetration will be described later in this report.

e) Over recent years there has been an increasing range of temperatures throughout the year, often accompanied by periods of heavier and intense rain. This can of course lead to differing ground conditions and affects on the external walls, thus having an impact on the interior of the Church.

f) Particularly during the last century, there was an increasing use of cement in materials, as it was thought this would provide a better solution, particularly again damp problems. However, this has been found to cause more problems than it solved, as it is vital that building, such as Churches, can "breathe" so when the walls become damp, moisture can evaporate quickly rather than become trapped and cause problems.

   Looking around the Church, it does appear, particularly at lower levels, that some of the plaster has been replaced (see photograph XX), but from visual inspection it is not possible to check whether the plaster/render has contained any cement or waterproofing materials. If this is the case, often the water/moisture in the walls is pushed up the wall and becomes visible at slightly higher levels and in places there is some evidence to demonstrate this point.

g) Also, incorrect paints may have been used when redecorating has been undertaken. For example, vinyl emulsions become widely used in the second part of the last century. This had the effect, with the vinyl content of wrapping the inside of the building with a material that did not breathe, so the risk of condensation increased, where any air moisture could not evaporate but instead was reabsorbed back into the structure, or instead condensed on the surface with the result of increasing the risk of mould growth.

   I understand that during the last decoration Classidur was used and this paint claims to have a degree of breathability. However, from experience of using this paint on other Churches and historic structures, we have found problems of deterioration from damp, so it may not be as breathable as it claims. More recently, we have used Potmolen paints, which so far have proved to be more successful.

h) With the building that is used infrequently, not only will the building heat up quickly from heating installed in the building, but the occupants can give off heat which will add to the problem, especially where the building is not well ventilated, and the structure is cold from infrequent heating.

i) It is often noticeable that condensation occurs more on the north side of the building where it does not warm up as quickly as on the southside, where even in the winter, the sun will add warmth to the fabric of the building.

j) In older buildings such as Churches, rising damp from the ground cannot be avoided, so has to be managed by the correct form of construction and use of materials.

Walls in Churches are usually made up of an external and internal skin of stone, where the cavity in between is filled with rubble. This will have voids, which will attract moisture, so it is very important to use breathable materials such as lime plaster, render and mortar and also check that the external ground levels, wherever possible are below internal floor levels and rainwater from roofs is effectively discharged without un-necessary wetting of the walls.

**PROBLEMS & SOLUTIONS**

1) Internally, the plaster at low level on several of the walls has become badly stained (see photograph X), has started to delaminate (see photograph X), and in places it is loose (see photograph X). The most likely cause will relate to problems caused by damp and possibly incorrect materials being used when repairs have been previously undertaken.

Looking around the Church and the defective plaster at low level, the condition varies and where it is exposed, some varies in colour and texture which could indicate the plaster has been done at different times using different mixes.

Any defective plaster, especially at low level, should be removed sooner rather than later both to avoid further damage, but also to enable the structure behind to dry out properly, which could take some time.

This particularly applies to the plaster at low-level in the nave and also sections in the chancel, tower (limited) and vestry. As the plaster is removed, it will become evident with regard to the extent that needs to be taken off and replaced with lime-based plaster.

2) The sources of dampness need to be identified and where possible resolved.

One of the obvious sources is water off the roof, since there are no gutters. The water will drip off the roof and either splash down onto the ground below or blow onto the wall.

We recommend that guttering is added to all the tiled roofs and this should be of a suitable size and profile to match the size of the roof, especially bearing in mind that over recent years, there have been more frequent heavy downpours of rain, so gutters should ideally cope with that eventuality and discharge the water safely away from the building.

On the north side of the nave there is some external lighting fixed to the wall at high level, and this may need to be adjusted when the guttering is added.

At the stage of the detailed specification, an inspection should be made of the eaves of the roofs to check the condition in order to ensure that a secure fixing can be designed and achieved for the guttering and downpipes.

3) Disposal of rainwater on the southside of the building will need careful thought, as the ground levels are higher, although there is a drainage ditch/French drain dug down against that side of the building.

This will mean that it is difficult to run rainwater away into the higher ground on that side unless a suitable place for a soakaway can be found or the French drain improved and utilised.

Alternatively, the drainage could be taken around to the north side where the ground is lower.

4) On the south side, with the French drain, any rain that drips off the roof should not splash back onto the wall as much as it would do on the northside, where there is a brick channel (see photograph X). When guttering is installed, this should not be so much of a problem, so on the north side, either the brickwork can be taken up and a stone French drain added, or the brickwork re-laid and repointed if it is felt this feature is important to keep either for visual or historic reasons.

5) At low level, and at ground level in some cases, there are vents (see drawing and photograph X). It is possible these may have provided ventilation to a void behind some timber wainscoting which could have been installed inside the building but is now removed. Also, this might be one reason for the apparent line of re-plastering internally.

   It is important the purpose for these vents is established but if they are redundant, they can either be blocked off or raised, since any rainwater/snow at low level will penetrate the vents and enter the wall, adding to the problems with penetrating and rising damp with the resulting defective plaster, condensation and mould growth within the building. However, it may be necessary to temporarily remove the gratings and clear any debris from inside that could have built up over the years.

6) Looking at the condition of the external face of the walls, this varies depending upon location but there are a number of voids in the mortar work and stonework which need cutting out, repointing (with lime mortar) and, in some cases replacing.

   Where any stonework or mortar is defective, this will allow rainwater to enter the wall, especially with the present situation where no gutters exist. However, even with gutters, rain will drive against the walls but causing less problems.

   In the Quinquennial Report in Sections 5 & 7, these generally identify areas where work is needed, and touches on the question of damp.

   The more detailed areas of attention will be identified in a specification of works to follow later, once the general approach has been agreed with the DAC.

   Often it is found when work starts and it is possible to check the exposed structure from a safer position, further work may be identified and is beneficial to be done at the same time, so it is always wise to have contingency funds available in case the need arises.

7) Looking at some areas of stonework, it may be necessary to re-build or replace some of the stones, especially where cementitious pointing has been used which is stronger than the stone (see photograph X), and the stone has eroded faster than the pointing. Only lime-based mortar should be used with any re-pointing, so the pointing is not as strong as the stonework. It is therefore crucial that all visible areas of concern are raked out and repointed with an agreed sample of lime mortar.

8) Roof Tiling. From a visual inspection from ground level, the roof does need a general overhaul, and there are areas where patches of tiles are missing or misplaced (see photograph X), so there will be water penetration.
   During our meetings, you mentioned that you thought the south facing side of the nave roof and the chancel may have been relatively recently re-tiled and in places the felt underlay can be seen.

   Whilst working on the roof, the flashings should be checked and repaired/replaced where appropriate.

   Internally, there are signs of damp patches/staining to the sloping ceiling of the nave, and these are in the areas where defective tiling can be identified.

Although the problems with the tiling may not relate directly to the mould, any defect will introduce water into the building, which in turn can cause decay and other problems to the structure, so it is always wise to endeavour to keep a building as watertight as possible and regular visual inspection should be made.

9) Plaster. As mentioned earlier in this report, there are areas of defective plaster around the building, mainly at lower levels. As a priority, we recommend this defective plaster is removed to start the drying out process of the walls.

   The length of time before re-plastering with lime plaster/render will very much depend on the drying out period of the walls and this can be identified using a moisture meter.

   This will be helped with the installation of rainwater gutters and downpipes, together with external repointing and repairs, along with the improvements of the ground channels and French drains.

10) Mould Growth. Possible causes are mentioned earlier in this report. The more obvious areas of mould growth and marking are on the northside of the nave, which probably does not heat up so quickly from the sun.

    Furthermore, there is considerable marking and mould growth at higher level around the organ pipework on the gallery (see photograph X) where the wall abuts the tower and there is likely to be less air movement and ventilation. Again, this gets worse towards the north side.

    It was noticeable the mould marking is only at higher level at this end, possibly due to hot air rising which then condenses against the colder wall at higher level, where there is no positive air movement.

    Similarly, in the chancel by the organ console there is a wall heater, which presumably is operated at times of services and in this area, there is no visual sign of mould or damp.

    In the chancel, there is mould growth and marking on the southside and northeast corner (see photograph X), but where the rest of the north wall becomes an integral wall against the vestry, the markings are slightly less, as this wall may stay warmer.

    There tends to be more visible mould growth around the window openings where the walls are colder and damper.

    At an early stage, it will be advisable to use a fungicidal wash on a trial area of the wall. Once this has taken effect, the sample area can be redecorated with a selected Potmolen paint and monitored to see if this improves the situation, removing as much of any previous painted coats as possible.

    This will be done in parallel with the removal of the plaster at lower levels, installation of rainwater goods and repairs to the walls externally, where the situation should improve overall.

    However, ventilation and more constant air warmth are an important factor in reducing condensation and mould growth. Although it is appreciated there has been a recent cost with the installation of the under-pew heating, it would be wise to monitor the situation for a short period before deciding whether any changes or alterations are needed to the heating.
    If at all possible, it would be useful to introduce both ventilation into the building.

    It may be tempting to consider using a dehumidifier, but this needs to be done with care, and only slowly, in order that any drying out process is not un-naturally accelerated to a point where damage may occur rather than a benefit being gained.

    Interestingly, within the tower, which is heated by an overhead electric fan heater, although this gives instant heat, it does provide air movement, and there is less mould growth and marking within this area.

**SUMMARY**

For the reasons explained above, we recommend the following actions:

A) Removal of all defective plaster/rendering to enable the structure to start drying out before any re-plastering with lime-based plaster takes place.

B) Installation of guttering and downpipes to all tiled roofs and establishing a method for the effective and safe disposal of rainwater from the downpipes.

C) Checking over all external walls and repointing/repairing/replacing stonework to enable the wall to become more water repellent.

D) Investigate the purpose of the vents at low level and agree future action, depending upon findings.

E) Overhaul and repair roof tiling and flashings.

F) Undertake a sample area of fungicidal wash and redecoration to the internal walls and monitor the situation.

G) Investigate/consider ways of providing more ventilation and maybe some background heating during the week, so the fabric of the building is kept slightly warmer and is not affected by the sudden warm up of heating when the building is in use.

Once the above proposals are agreed with yourselves, we will present them to the DAC on your behalf to request their comments.

After the approach is confirmed, as a separate exercise we can produce a more detailed schedule of works for each of the above areas so they can be priced separately and undertaken in stages as funds permit but agreeing the best order of the works to the benefit of the building and its occupants.

Yours sincerely

Derek Hudson RIBA

c.c. Reverend R Terranova
Mr John Paul