

**ROCHESTER CATHEDRAL**

**CHOIR SCREEN PAINTED DECORATION AND  
FRAMED CHOIR SCREEN BOARDS**

**Condition Survey and Treatment Proposals**

**Contents**

|   |    |
|---|----|
| 1. Introduction .....                         | 3  |
| 2. Description, Technique and Materials ..... | 3  |
| 3. Condition .....                            | 4  |
| 4. Environmental Conditions ` .....           | 7  |
| 5. Paint Sample Analysis Strategy .....       | 7  |
| 6. Remedial Treatment Proposals .....         | 8  |
| 7. Priced Summary of Works .....              | 11 |

**Appendices**

- Appendix 1 Choir screen boards condition graphics 1 and 2
- Appendix 2 *Rochester Cathedral - The Conservation of the Pulpitum Screen Painted Panels:  
Environmental Factors*, Tobit Curteis Associates, March 2016

**Richard Lithgow**  
**January 2017**



Fig 1. The east-facing Choir screen boards



Fig 2. The framed panel of two detached Choir screen boards on the south face of a pier in the South Choir transept.

## 1 INTRODUCTION

In 2013 the Perry Lithgow Partnership compiled outline condition survey reports with treatment proposals for the painted decoration on the 13<sup>th</sup> century vertical boards above the clergy stalls on the east face of the Choir screen and for the two boards detached from that screen in the 19<sup>th</sup> century, framed, glazed and positioned on the south face of a pier in the South Choir transept.<sup>1</sup>

These reports were submitted to the CFCE along with an application for approval to undertake the conservation works. The Commission approved the application with the following condition:

That no work is to take place until the Commission has received the following and given its approval:

- (a) A condition report fully addressing the underlying causes of deterioration, including an assessment of environmental conditions;
- (b) Sample analysis to understand the screen materials;
- (c) A detailed methodology for the treatment and post-treatment mounting of the screen.

This is to ensure that the underlying causes of deterioration are fully addressed and will not reoccur after conservation.

This document replaces the 2013 reports and addresses the CFCE conditions. The Perry Lithgow Partnership regard the conservation of the east face of the Choir screen and the framed boards as a single project. The costs provided are applicable only if both elements are treated concurrently.

## 2 DESCRIPTION, TECHNIQUE AND MATERIALS

### 2.1 Choir Screen

Apart from the two 19<sup>th</sup> replacement boards (immediately north of the central opening) the vertical boards above the clergy stalls on the east face date from the 13<sup>th</sup> century and retain much of the original paint scheme, albeit overpainted in the 14<sup>th</sup> and 19<sup>th</sup> centuries. A section of the original 13<sup>th</sup> century painted decoration is still visible on the detached, framed boards. It comprises a trellis scheme of double lines framing ornately decorated lozenges. The principal colours being bright-red, light-green, yellow ochre and black; all on a white ground. The 14<sup>th</sup> century scheme is based on gilt lions and fleur-de-lis within cusped and scalloped frames. That scheme on the Choir screen was entirely repainted in the 19<sup>th</sup> century, extended along the north and south Choir walls, and adapted to include the coats of arms and names of Rochester Bishops from the 12<sup>th</sup> to the late-19<sup>th</sup> centuries.

Extract from *English Wall Painting of the Fourteenth Century* E.W. Tristram (London 1955).

The wall-surface above the stalls to the height of the string-course is painted with a heraldic pattern, originally continued also over the screen at the western end of the choir. It consists of a series of contiguous quatrefoils bordered in pink, white and green, framing golden lions passant gardant on a vermilion field, the octagonal interspaces being filled with golden lilies on a blue field. This pattern is terminated immediately above the stalls by a border of interlaced riband pattern in red and blue, inset with sixfoil flowers in yellow upon roundels of red and blue counterchanged, and tracery in black and white, the whole outlined strongly in black. Beneath the string-course is another and deeper band of ornament, in which similar riband pattern in red, green and blue alternates with shields in white on green, many of these having apparently been left blank originally, but in 1876, when the decoration was discovered, filled with the arms of the Bishops of Rochester. The greater part of all this decoration was heavily restored at the date just mentioned, but a portion of about a foot in depth immediately above the stalls was retouched comparatively lightly, and a coat of arms, charged with a cross fleury, near the thirteenth-century Wheel of Fortune on the north wall, and in the higher of the two ornamental borders just described, was left, and still remains, intact. Part of the decoration, comprising the lions passant gardant, may also be seen in its unspoilt state upon a piece of boarding removed from the screen mentioned above and preserved in the south choir transept. The work is executed in oil, and vermilion, pink, green, blue, white, gold and black are used; it is of an early date in the fourteenth century, not long after 1330.

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<sup>1</sup> *Rochester Cathedral, Choir Screen Painted Boards, Outline Condition Survey, Treatment Proposals and Costs*, the Perry Lithgow Partnership, October 2013; & *Rochester Cathedral, Choir Screen Painted Decoration, Outline Condition Survey, Treatment Proposals and Costs*, Perry Lithgow Partnership, November 2013

The east facing Choir screen is made up of seven vertical boards either side of the central opening. Each board measures 1400mm H x c. 420mm W and are up to 50mm thick. They are likely to be hardwood (probably oak or elm).

Sample analysis will be required to positively identify the paint materials and technique. The 19<sup>th</sup> century repaint certainly appears to be oil-based paints and oil-gilding. From the detached and framed boards it appears the 14<sup>th</sup> century scheme is on a white ground laid over the 13<sup>th</sup> decoration. The earlier scheme may be tempera paint on a gesso ground but, equally, there may be an oil content. Options for paint sample analysis are discussed in item 4 (*below*).

## 2.2 Framed Boards

The two boards detached from the Choir screen at some point the 19<sup>th</sup> century were framed, glazed and positioned on the south face of a pier in the South Choir transept. A section of the original 13<sup>th</sup> century, original painted decoration is still visible on the framed boards. It comprises a trellis scheme of double lines framing ornately decorated lozenges. The remaining surface of these two boards, and all of the boards still in position, were overpainted in the 14<sup>th</sup> century with a scheme based on gilt lions and fleur-de-lis within cusped and scalloped frames.

Sample analysis will be required to positively identify the paint materials and technique. The 14<sup>th</sup> scheme certainly appears to be oil-based paints and oil-gilding on a white ground laid over the 13<sup>th</sup> decoration. The earlier scheme may be tempera paint on a gesso ground but, equally, there may be an oil content. Options for paint sample analysis are discussed in item 4 (*below*).

Together the two framed boards measure 1400mm H x 870mm W. Each board varies in width from 420mm to 450mm and, remarkably, are up to 50mm thick. The frame is 90mm deep and made of varnished oak. The boards are thicker than the depth of the frame rebate so are not wholly contained within the frame.

The boards are likely to be hardwood (probably oak or elm). When removed from the frame there would be an opportunity to identify the wood and date the boards through tree-ring analysis.



Fig 2. Countersunk screws on the side and bottom are covered by oak plugs.

The boards are secured in the frame by large screws (c. 4 top and bottom 6 on either side). The screws heads are countersunk in the frame and disguised by oak plugs. The frame is fixed in place by two metal plates hung from steel bolts (set into the pier immediately below string course): the metal plates spaced back from the frame by wood blocks.

The Perspex glazing the framed boards is cracked and broken. The damage is not recent but evidently caused by forceful impact to the lower section.

## 3 CONDITION

### 3.1 Choir Screen

The painted decoration on the choir screen and on the north and south walls of the Choir were last conserved and cleaned by Christoph Oldenbourg in 1992. No treatment record is available from that intervention. It is

not known what measures (if any) were taken by the 19<sup>th</sup> century restorers to stabilise the 13<sup>th</sup> and 14<sup>th</sup> century layers prior to overpainting, but the uneven surface suggests there had been significant loss of the early paint schemes prior to the 19<sup>th</sup> century repaint.



Fig 2. Raking light details of lifting and flaking paint.

There is evidence of some retouching over 19<sup>th</sup> century paint loss - presumably the retouching dates to the 1992 intervention. It would be helpful to study the 1992 treatment record but it has not been found in the cathedral archives.

The surface appears to have at least two varnish coatings. The earliest resin varnish is yellowed and has been partially removed/reduced, presumably in 1992. The uppermost clear, glossy varnish coating overlies the 1992 retouchings and therefore dates from that intervention. Since the general appearance of the painted decoration is satisfactory - although a light surface clean to remove particulate dust is required - no varnish removal tests were carried out during this survey.

Whilst most of the painted decoration is stable there are significant areas of lifting, flaking and loss from boards across the width of the screen. These areas of damage are marked on the accompanying graphics. Some of the damage takes the form of tenting in vertical lines suggesting swelling/shrinkage of the boards. There are also narrow cracks along some of the vertical joints. The appended graphics also show which boards and timbers are nineteenth century replacements.

Recent monitoring found environmental conditions in the main body of the cathedral to be relatively stable so one can only speculate that heat from machinery associated with the organ workings housed behind the boards may be one cause. Some of the loss, particularly just above the stalls, may result from dusting the loose paint or accidental impact.

### 3.2 Framed Boards

The discoloured and broken glazing prevents a thorough, close inspection of the paint surfaces. Nevertheless, significant lifting and flaking paint and some paint losses are evident, particularly within the central part of the 13<sup>th</sup> century scheme and the upper section of the right hand board where the 14<sup>th</sup> century paint scheme overlies the 13<sup>th</sup> century decoration.



Fig 3. Raking light details of lifting and flaking paint

The cracked and broken glazing affords inadequate protection to the unstable paint layers and, in places, is in direct contact with lifted flakes. Some paint flakes have already detached, their fragments now lodged at the bottom of the frame.

A slight surface sheen indicates there may be a thin surface coating overall (possibly wax-based). The two main areas of flaking appear to have an initial, thicker coating, probably applied in the 19<sup>th</sup> century to stabilise flaking paint. In places the thicker coating has bloomed slightly giving the surface a cloudy appearance.

The two boards appear generally stable with no evidence of recent splitting. There are two small areas of insect damage either side of the gap between the boards where the two paint schemes meet. Some frass from these areas has transferred onto the glazing, probably when the Perspex was smashed.

The present location of the framed boards is not ideal. They are not visible from most parts on the South Choir Transept and, being south facing, have direct sunlight falling upon them for part of each day. Temperature

variation due to the sun's radiant heat will continue to affect both the paint and surface coating(s) and undoubtedly will have been partly responsible, for the recurrence of lifting and flaking paint. The cathedral FAC have decided that the conserved framed boards should be relocated to the opposite (north) face of the South Choir Transept pier. A similar arrangement of iron bolt fixings to be installed while the treatment works are in progress

#### 4 ENVIRONMENTAL CONDITIONS

In March 2016 Tobit Curteis Associates prepared a report, to form part of the application for approval of this project, detailing the environmental conditions in the cathedral and their influence on the condition of the Choir screen and framed boards. The report is appended to this document.<sup>2</sup>

Curteis' observations are informed by environmental monitoring in the Choir and the South Choir Aisle undertaken by him between 2012 and 2016. Over that period relative humidity (RH) generally remained within the band 45%-70% with occasional fluctuations above and below, particularly in periods when there was excessive external air leakage due to building work. This indicates the building envelope provides a high level of both thermal and hygral buffering between the internal and external conditions: thus the background conditions have a relatively benign influence on the painted decoration of these panels. Nevertheless, ongoing localised environmental factors may be responsible for the slight expansion and contraction of the boards likely to have initiated the paint flaking and delamination, particular on the Choir screen.

Curteis found that conditions in the organ itself were similar in the summer but, during the winter, when the heating was in operation the temperature was notably higher with the RH falling lower. He suggests it's possible that if the conditions behind the Choir screen are similar to those in the organ that a thermal and hygral gradient may exist which would cause uneven dimensional response and, in due course, further investigations should be undertaken.

The framed panel in the South Choir Aisle is lit by windows to the south east and to the south-west so have direct sunlight falling upon them for part of each day. Curteis suggests the the level of direct solar gain experienced by the painting is comparatively low due to the nature of the painted glass which will act as a significant filter. Although he also mentions that anecdotal evidence indicates that some direct sunlight strikes the panels through areas of clear glass and the lux levels will be greater in this location than in an area that is less directly illuminated. Whilst the consequent dimensional response of the boards may be insignificant, the temperature variations due to periods of direct sunlight falls may be affecting the wax-based surface coating and the paint and ground layers which have not been treated in any way since some time in the 19<sup>th</sup> century. In any event, as stated in the previous item, the cathedral FAC have decided that the conserved framed boards should be relocated to the opposite (north) face of the South Choir Transept pier. This will minimise the impact of direct light from the south windows, thereby providing a small increase in thermal buffering and a considerable reduction in lux and UV exposure. Curteis proposes that environmental monitoring should be undertaken in the vicinity of the painting as part of the next phase of monitoring of the cathedral to ensure the conditions are as anticipated.

#### 5 PAINT SAMPLE ANALYSIS STRATEGY

Sample analysis will be required to characterise the paint materials and technique. . Cross-section analysis and analysis using polarised light microscopy and micro-chemical tests are proposed to identify the pigments and characterise the binding media. Due to the limited budget available for this project, expensive organic analysis (FTIR / GC-MS) necessary to positively identify media and coatings, and costing min. £500 per sample is not considered an option.

Ideally the sample analysis would be undertaken as a preliminary measure with the findings available before the start of treatment. Although, in this case, there are complicating factors.

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<sup>2</sup> Rochester Cathedral - The Conservation of the Pulpitum Screen Painted Panels: Environmental Factors, Tobit Curteis Associates, March 2016

**Strategy 1** - The obvious strategy would be to obtain samples of the exposed C13<sup>th</sup> and C14<sup>th</sup> paint schemes on the two framed boards and just the C19<sup>th</sup> paint from the screen itself. However, regarding the framed boards, this would involve a considerable delay between the initial stage - taking down the framed boards from the pier, removing the frame and obtaining samples – and the remedial treatment stage. In this instance applying a temporary facing to secure the paint in the interim would make subsequent treatment more difficult so is not a desirable option. Since the paint is extremely unstable and vulnerable, the boards they would have to be stored on-site horizontally, in the same environment and adequately protected for a period of 4-6 weeks until the analysis findings are available. Consequently, whilst this strategy would allow accurate sampling of the early paint layers, the painted decoration may be exposed to risk unless suitable storage conditions can be arranged.

**Strategy 2** - An alternative strategy is attempting to take samples of all three paint schemes from choir screen itself. Although this involves an element of hit and miss, there are instances of C13<sup>th</sup> paint grinning through overlying paint loss and indents in the unbroken C19<sup>th</sup> layer indicating where the C14<sup>th</sup> layer is lost and, therefore, where it survives. Consequently there would be a reasonable prospect of obtaining at least some samples from the early paint schemes. This option entails a single sample-taking visit followed by a 4-6 week hiatus until the analysis findings are available. If sampling of the C13<sup>th</sup> and C14<sup>th</sup> schemes proves unsatisfactory, the option remains for additional samples to be obtained from the framed boards during treatment (see Strategy 3).

**Strategy 3** - A third option would be to obtain the samples as in Strategy 1 (above) but then proceed immediately with remedial treatment, thus obviating the need for a storage period. The benefit over Strategy 2 is more accurate sampling of the early layers; the disadvantage being the analysis results would be unavailable during treatment. Undoubtedly it is good practice for the pigments to be identified and the technique characterised before treatment but in this case it is doubtful the analysis results will significantly affect the treatment strategy and methods. A conservation grade acrylic-based consolidant, such as Primal B60a or Lascaux 4176, will be required to re-attach flaking paint where the (undoubtedly) oil-based C14<sup>th</sup> and C19<sup>th</sup> layers are present; and the same type of consolidant will be required for the C13<sup>th</sup> layer – as opposed to a water-soluble consolidant such as isinglass - if the wax-based surface coating is subsequently to be reduced/removed.

The choice of sampling strategy will affect the overall cost of the project. Strategy 3 is the least costly. Strategy 2 involves an initial site visit (£500 including travel) to obtain the samples from the Choir screen, with the possible additional cost of further sample taking from the framed boards during treatment. For Strategy 1 the project would be divided into two phases involving additional conservator attendance and expense amounting to c. £1,000.

## 6 REMEDIAL TREATMENT PROPOSALS

### 6.1 Choir screen

*Re-attachment of lifting and flaking paint* - Pre-wetting with Industrial Methylated Spirits (IMS) injected behind the flakes, followed immediately by injection of the adhesive solution – 10-30% solution of Primal B60a<sup>3</sup> in deionised water (depending on the distortion and thickness of the paint flakes). The flakes are then eased gently back into place using a heated spatula, set at a moderate heat (30-40°C) and applied to the surface through polyester film. The purpose of the heat is to relax and flatten the distorted flakes and encourage the adhesive to become tacky. Then a small pad of dry cotton wool wrapped in Japanese tissue is used to absorb excess adhesive displaced as the flakes are pressed back. When the adhesive had dried the surface is wiped with acetone swabs to remove any residue.

*Light surface clean* – Removal of non-ingrained dust/surface dirt from the east-facing choir screen.

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<sup>3</sup> Primal B60a is an acrylic dispersion of a thermoplastic acrylic resin. It has appropriate handling properties and its stability is good. Primal B60a is widely used as a paint fixative on both wall paintings and panel paintings.



*Reintegration of distracting white lacunae* – Distracting white lacunae from recent paint loss to be toned in using Lascaux acrylic paint. Lascaux paints have good aging properties and will remain easily removable over time.

*Access scaffolding (to be provided by the client)* – Single working platforms on the left and right sides of the east facing screen will be required. The platforms to be at a level immediately over pew-back height. The platforms to be adaptable/removable to allow standing on the floor when working on the lower parts of the screen.

## 6.2 Framed Boards

The strategy for treatment is to remove the painted boards from the 19<sup>th</sup> century frame; stabilise the flaking paint layers; consolidate localised areas of insect damage; reduce/remove the wax-based surface coating; replace the existing fractured glazing with non-reflective, UV resistant glass; then reinstall the boards in the existing frame using stainless steel fixings and a breathable backing. The cathedral will make arrangements for the conserved and re-glazed framed boards to be mounted for display on the north-face of the South Choir Transept pier using the same system of threaded bolts to hand the frame.

Because of the broken glazing and the fragile condition of the paint layers careful consideration and planning has been given to minimising the risk of paint damage while the framed panel is taken down from its present position and as the boards are removed from the frame.

**Removal from the South Choir Aisle pier** - As an initial measure to stabilise the existing fractured glazing a series of c. 5 timber battens will be taped horizontally to the frame then, in turn, the glazing taped to the battens. This will prevent the glazing from pressing down on the unstable paint when the framed panel taken down and laid face up on a work bench. The thickness of the boards (c. 50mm) suggest framed panel will be heavy. Two people will support the weight from below while a third (from a ladder) slides the metal plates off the hanging bolts having first released the securing nuts. Four people will be needed to lower the framed panel and carefully tip it horizontally onto its back and lie it on spacers on the workbench.

Separating the frame from the boards will involve removing the oak plugs which conceal the c. 16-18 countersunk, large screw heads before removing the screws themselves. A furniture conservator will be engaged to undertake this process since the large screws may well prove stubborn to remove. The furniture conservator will have the tools and expertise to resolve any such difficulty. When the fixings have been removed the frame will then be lifted up and away from the boards.

**Re-attachment of lifting and flaking paint** - Pre-wetting with Industrial Methylated Spirits (IMS) injected behind the flakes, followed immediately by injection of the adhesive solution – 10-30% solution of Primal B60a<sup>4</sup> in deionised water (depending on the distortion and thickness of the paint flakes). The flakes are then eased gently back into place using a heated spatula, set at a moderate heat (30-40°C) and applied to the surface through polyester film. The purpose of the heat is to relax and flatten the distorted flakes and encourage the adhesive to become tacky. Then a small pad of dry cotton wool wrapped in Japanese tissue is used to absorb excess adhesive displaced as the flakes are pressed back. When the adhesive had dried the surface is wiped with acetone swabs to remove any residue.

**Removal/reduction of surface coating** - It is rarely possible to completely remove all traces of wax and/or varnish coatings, especially where the wax has combined with the paint layer. The aim is to remove/reduce as much as possible, with the view to creating an even and acceptable appearance. In some areas a minimal surface shine may remain as a result of this undercleaning.

Assuming the coating is indeed wax-based, a mixture of solvents applied on swabs will be the likely method. In similar circumstances the solvent mixture (xylene 5; acetone 2; iso-propanol 1) has proved effective.

To avoid paint loss it is often necessary to stabilise flaking paint and ground in conjunction with the wax-reduction processes. Some areas it may not be possible to remove more than the darkened upper surface of the wax layer. In areas where the wax coating had undercut, and is acting as a successful consolidant for

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<sup>4</sup> Primal B60a is an acrylic dispersion of a thermoplastic acrylic resin. It has appropriate handling properties and its stability is good. Primal B60a is widely used as a paint fixative on both wall paintings and panel paintings.

previously lifted paint and ground, and where wax reduction would jeopardise this present stability, the surface only will be cleaned to reduce the darkening effect.

#### **Stabilise Insect damage**

To stabilise and prevent further wood loss from small areas of timber affected by insect infestation, the exposed wood will be consolidated with infusions of Paraloid B72 (10% in acetone). If further consolidation is required the affected areas will be filled (or part filled) with a fine acrylic putty of butyl methacrylate and calcium carbonate (Flügger) and toned in as necessary.

#### **Reintegration of distracting white lacunae**

Distracting white lacunae from recent paint loss to be toned-down using a thin wash of Lascaux acrylic paint. Lascaux paints have good aging properties and will remain easily removable over time.

**Re-framing** - Since the boards are thicker than the depth of the frame rebate - so are not wholly contained within the frame - the furniture conservator will fit narrow hardwood battens to the reverse of the frame: thick enough to extend just beyond the reverse of the boards, but set in from the outer edge of the frame and stained to match. This measure will afford additional protection and facilitate the fitting of backing fabric.

Local picture framers, Francis Iles Galleries, have provided samples of the glazing options and will supply and fit the replacement glass and appropriate spacing. Having viewed the samples cathedral FAC have opted for Tru Vue Museum Glass® (<http://tru-vue.com/solution/museum-glass/>) which is advertised as having the following properties:

- Virtually eliminates reflections
- Blocks up to 99% of UV rays
- Optimal light transmission brighten colors
- Enhanced surface for better durability and easy cleaning
- No ripple or “orange peel” effect on glass surface
- Proprietary coatings are engineered for permanence
- Premium 2.5mm thickness provides better strength and rigidity

Taking into account the thickness and weight and condition of the boards, as well as budgetary concerns, the aim will be to re-use the existing frame and re-fix the boards using stainless-steel screws in the existing screw holes. The furniture conservator will disguise the countersunk screw heads with oak plugs stained to match the frame.

In view of the environmental conditions and observations set out in Tobit Curteis Associates report black Tyvek® picture frame backing is considered a suitable option for the frame backing. This material has the following properties: tear resistant, dust resistant, water resistant, mould and mildew resistant, breathable, acid free and pH neutral (pH = 7). The backing will be fitted on-site by the framers along with suitable spacers to keep the frame away from the wall allowing air to circulate.

### **6.3 Treatment Documentation**

A treatment record to include:

- A written, graphic and photographic treatment record in accordance with guidelines in the English Heritage PIL 1 *The Production of Wall Paintings Conservation Documents* and the requirements of any organisations funding the project. The number of hard copies to be submitted will depend on the funding bodies involved but our cost allow for 2 hard copies.
- The report text will discuss all aspects of the painted boards: their conservation history; previous technical analysis findings; condition prior to treatment; treatment methods and materials; recommendations for future maintenance.
- The report will include layered vector graphics as necessary to indicate relevant features and categories of condition and treatment.
- The photographic record will include comprehensive coverage of the areas before and after treatment and representative examples of damage, deterioration, previous interventions and other specific conditions before, during and after treatment - using direct flash, raking light flash and UV fluorescent sources as appropriate.

- In addition to hard copies, the report text, graphics and photographs will be supplied in digital format on disk. The report will also be supplied as a .pdf document. In addition, high resolution versions of all images will be included on the disk in a standard editable format (.jpeg, .bmp, .tiff, etc). Image titles will include location references.

## 7 PRICED SUMMARY OF WORKS

The following quotation assume both elements of the project will take place concurrently involving a team of 3 conservators for up to 3 weeks. It includes materials and all associated costs except that of necessary access scaffolding. VAT will be added at the applicable rate.

**N.B.** Provisional sums are included to account for the additional costs of alternative paint sampling strategies (see item 4 above).

| <b>Rochester Cathedral<br/>Painted decoration on the 13th Choir Screen Boards</b>                            | <b>Man Days</b> | <b>Cost (£)<br/>(ex VAT)</b> | <b>Item Totals (£)<br/>(ex VAT)</b> |
|--|-----------------|------------------------------|-------------------------------------|
| <b>C13th Choir Screen Boards:</b>  |                 |                              |                                     |
| <i><b>Treatment works:</b></i>   |                 |                              |                                     |
| Re-attachment of lifting and flaking paint   | 19              | 6,935.00                     |                                     |
| Reintegration of paint loss  | 2               | 730.00                       |                                     |
| Light surface clean  | 2               | 730.00                       |                                     |
| <i><b>Conservation materials</b></i>   |                 | 40.00                        |                                     |
| <b>Sub-total treatment of Choir screen boards</b>  | 23              | 8,435.00                     | 8,435.00                            |
| <b>Framed Boards in S Choir Aisle Transept:</b>  |                 |                              |                                     |
| <i><b>Treatment works:</b></i>   |                 |                              |                                     |
| frame  | 2               | 730.00                       |                                     |
| Re-attachment of lifting and flaking paint   | 3               | 1,095.00                     |                                     |
| Removal/reduction of surface coating   | 10              | 3,650.00                     |                                     |
| Stabilise Insect damage  | 0.2             | 73.00                        |                                     |
| Reintegration of distracting white lacunae   | 0.5             | 182.50                       |                                     |
| Fit hardwood battens to reverse of frame; fit oak plugs to disguise screw heads; stain all to match existing | 2               | 730.00                       |                                     |
| Supply and fit Tru Vue Museum glass and Tyvek frame backing  |                 | 640.00                       |                                     |
| <i><b>Other conservation materials</b></i>   |                 | 200.00                       |                                     |
| <b>Sub-total treatment of framed boards</b>  | 17.7            | 7,300.50                     | 7,300.50                            |
| <b>Sample Analysis:</b>  |                 |                              |                                     |
| Strategy 3 (lowest cost strategy)  |                 | 500.00                       |                                     |
| <i>Provision for additional cost of Strategy2</i>  |                 | 500.00                       |                                     |
| <i>Provision for additional cost (over Strategy 2) of Strategy 1</i>   |                 | 365.00                       |                                     |
| <b>Sub-total sample analysis (inc. provisional sums)</b>   |                 | 1,365.00                     | 1,365.00                            |
| <b>Treatment documentation:</b>  |                 |                              |                                     |
| Conservator's attendance (off-site)  | 3               | 1,020.00                     |                                     |
| Associated materials   |                 | 100.00                       |                                     |
| <b>Sub-total sample analysis (inc. provisional sums)</b>   |                 | 1,120.00                     | 1,120.00                            |
| <b>TOTAL ALL TREATMENT WORKS (inc. provisional sums)</b>   |                 |                              | <b>18,220.50</b>                    |



CONDITION NOTES

It is not known what measures (if any) were taken by the 19th century restorers to stabilise the 13th and 14th century layers prior to overpainting, but the uneven surface suggests there had been significant loss of the early paint schemes prior to the 19th century repaint.

There is evidence of some retouching over 19th century paint loss - presumably the retouching dates to the 1992 intervention. It would be helpful to study the 1992 treatment record but it has not been found in the cathedral records.

The surface appears to have at least two varnish coatings. The earliest resin varnish is yellowed and has been partially removed/reduced, presumably in 1992. The uppermost clear, glossy varnish coating overlies the 1992 retouchings and therefore dates from that intervention. Since the general appearance of the painted decoration is satisfactory - although a light surface clean to remove particulate dust is required - no varnish removal tests were carried out during this survey.

Whilst most of the painted decoration is stable there are significant areas of lifting, flaking and loss from boards across the width of the screen. These areas of damage are marked on the accompanying graphics. Some of the damage takes the form of tenting in vertical lines suggesting swelling/shrinkage of the boards. There are also narrow cracks along some of the vertical joints. Recent monitoring found environmental conditions in the main body of the cathedral to be relatively stable so one can only speculate that heat from machinery associated with the organ workings housed behind the boards may be one cause. Some of the loss, particularly just above the stalls, may result from dusting the loose paint or accidental impact.

KEY  Replacement timber   Flaking paint and paint loss

DIMENSIONS

Width = 3 meters

Height from top of choir stall = 2.5 meters

GRAPHIC NO: 1

TITLE  
CONDITION OF  
PAINT AND TIMBER

SITE  
ROCHESTER CATHEDRAL

AREA  
CHOIR SCREEN  
EAST FACE, SOUTH SIDE

The Perry Lithgow Partnership  
1 Langston Lane, Station Rd, Kingham,  
Oxon OX7 6UW Tel. 01608 658067



CONDITION NOTES

It is not known what measures (if any) were taken by the 19th century restorers to stabilise the 13th and 14th century layers prior to overpainting, but the uneven surface suggests there had been significant loss of the early paint schemes prior to the 19th century repaint.

There is evidence of some retouching over 19th century paint loss - presumably the retouching dates to the 1992 intervention. It would be helpful to study the 1992 treatment record but it has not been found in the cathedral records.

The surface appears to have at least two varnish coatings. The earliest resin varnish is yellowed and has been partially removed/reduced, presumably in 1992. The uppermost clear, glossy varnish coating overlies the 1992 retouchings and therefore dates from that intervention. Since the general appearance of the painted decoration is satisfactory - although a light surface clean to remove particulate dust is required - no varnish removal tests were carried out during this survey.

Whilst most of the painted decoration is stable there are significant areas of lifting, flaking and loss from boards across the width of the screen. These areas of damage are marked on the accompanying graphics. Some of the damage takes the form of tenting in vertical lines suggesting swelling/shrinkage of the boards. There are also narrow cracks along some of the vertical joints. Recent monitoring found environmental conditions in the main body of the cathedral to be relatively stable so one can only speculate that heat from machinery associated with the organ workings housed behind the boards may be one cause. Some of the loss, particularly just above the stalls, may result from dusting the loose paint or accidental impact.

KEY  Replacement timber   Flaking paint and paint loss

DIMENSIONS

Width = 3 meters

Height from top of choir stall = 2.5 meters

GRAPHIC NO: 2

TITLE  
CONDITION OF  
PAINT AND TIMBER

SITE  
ROCHESTER CATHEDRAL

AREA  
CHOIR SCREEN  
EAST FACE, NORTH SIDE

The Perry Lithgow Partnership  
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# TOBIT CURTEIS ASSOCIATES LLP

ROCHESTER CATHEDRAL

THE CONSERVATION OF THE PULPITUM SCREEN PAINTED  
PANELS: ENVIRONMENTAL FACTORS

*MARCH 2016*

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CONTENTS

|     |                                      |   |
|-----|--------------------------------------|---|
| 1.0 | Introduction.....                    | 3 |
| 2.0 | Framed Panels .....                  | 3 |
| 3.0 | Pulpitum Screen In Situ Panels ..... | 6 |
| 4.0 | Discussion .....                     | 8 |
| 4.1 | Framed Panels.....                   | 8 |
| 4.2 | Pulpitum Screen In Situ Panels ..... | 8 |
| 5.0 | Limitations.....                     | 9 |

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3. This report does not constitute a formal specification for conservation treatment, building repairs or other work. Recommendations are in general terms only and if any intervention is to be undertaken the advice of the appropriate professional adviser should be sought, and a formal specification prepared by them.

## 1.0 INTRODUCTION

The 13<sup>th</sup> century quire screen at Rochester Cathedral retains much of its original scheme of painted decoration albeit largely overpainted in the 14<sup>th</sup> and 19<sup>th</sup> centuries. While most of the screen remains in situ, two boards have been detached and are now mounted in a timber and glazed frame in the quire south aisle. These are of particular interest as the 13<sup>th</sup> and 14<sup>th</sup> century schemes of painting remain exposed.

There has been concern for some years about the condition of the painted panels which have shown signs of delamination and flaking. Whilst on the main screen the level of deterioration is limited, on the detached panels that deterioration is severe, with further risk of imminent loss.

The condition of the panels has been surveyed by the Perry Lithgow Partnership and proposals for conservation treatment have been made by them.<sup>1</sup> As part of the development phase of the project the current preliminary environmental assessment has been prepared by Tobit Curteis Associates. This summary report is largely based on data gathered as part of the main monitoring programme and is intended to provide information to enable the programme of treatment to proceed. It is anticipated that further investigations into long term environmental deterioration and control will continue as part of the ongoing environmental investigations.

## 2.0 FRAMED PANELS

The two panels are situated on the south face of the wide south pier, which is fixed to the wall at the top of the frame and is held off the masonry by wooden blocks that are approximately 20 – 30mm in depth.

Figures 1 & 2. General view of the panels in the south aisle and detail of the panels.



<sup>1</sup> Perry Lithgow Partnership, *Rochester Cathedral, Choir Screen Painted Boards, Outline Condition Survey, Treatment Proposals and Costs*, October 2013 & Perry Lithgow Partnership, *Rochester Cathedral, Choir Screen Painted Decoration, Outline Condition Survey, Treatment Proposals and Costs*, November 2013



The panels are mounted in a heavy timber frame with a sheet of thin picture glass set between approximately 1mm and 10mm from the surface of the panel (due to the irregularity of the wood). The panels are exposed at the back and there is no backing board.

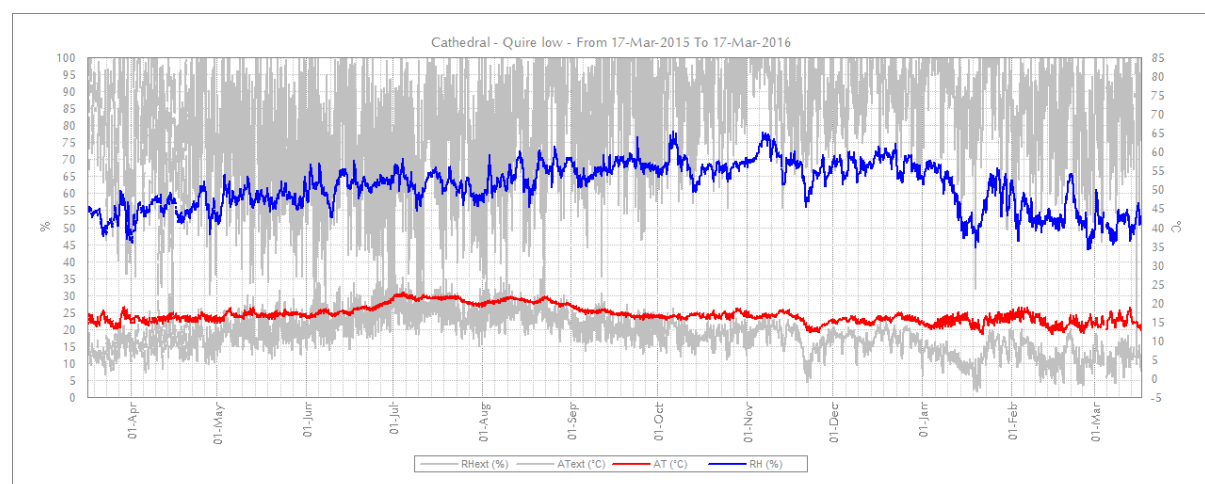
Although the frame appears to be in good structural condition with one or two minor areas of impact damage, the glass is broken in a number of areas and is secured with adhesive tape. At the bottom of the panel the broken shards of glass press against the painted surface.

The panel itself has suffered significant delamination and flaking of the original and later paint layers with considerable losses, some of which appear to be recent. At the base of the glazed panel there are a number of flakes of paint which have fallen away.

The location of the panel is such that it is illuminated by windows to the south east and to the south west. Both of these are higher than the panel and are glazed with 19<sup>th</sup> century figurative stained glass. As a result, the painted panels are likely to experience some solar illumination in both the morning and the afternoon. Light and surface temperature monitoring has not been undertaken in this area but it is likely that the level of direct solar gain experienced by the painting is comparatively low due to the nature of the painted glass which will act as a significant filter.<sup>2</sup> Nevertheless, anecdotal evidence indicates that some direct sunlight strikes the panels through areas of clear glass and the lux levels will be greater in this location than in an area that is less directly illuminated. Because of the filtered and periodic nature of the direct sunlight, it appears that the hygral and thermal response, which is causing dimensional changes in the timber structure, will be small.

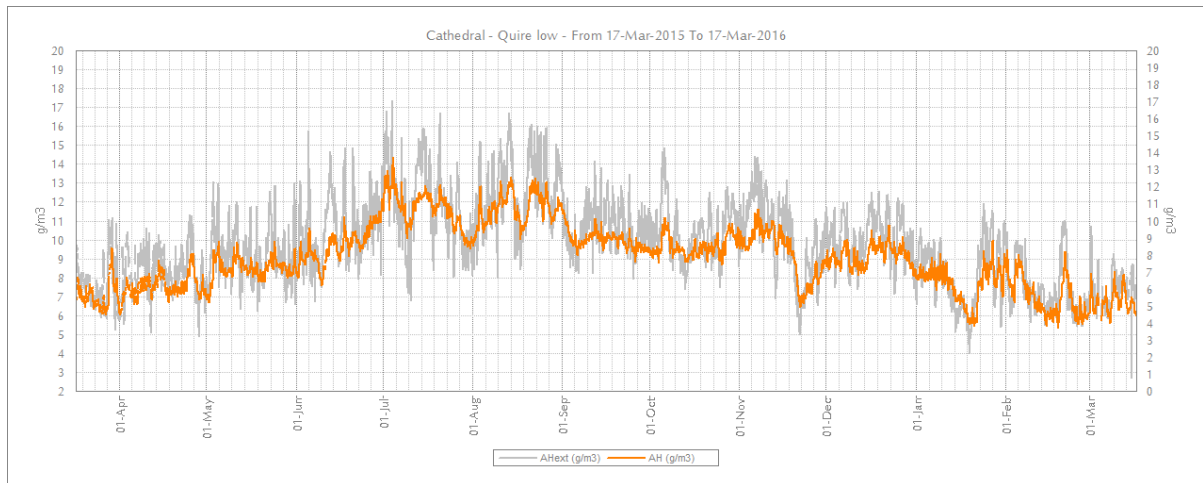
Environmental monitoring undertaken in the quire between 2012 and 2016 indicated that the building envelope provided a high level of both thermal and hygral buffering between the internal and external conditions.<sup>3</sup> As a result, large changes in the external weather are likely to be reflected by any small changes within the body of the cathedral. Stability was undermined by internal/external air leakage as can be seen from the AH data.

Annual RH data was generally in the band 45%-70% with occasional fluctuations above and below, particularly in periods when there was excessive external air leakage due to building work.



<sup>2</sup> Pers. Com. Graham Keevil

<sup>3</sup> The overall environmental conditions in the cathedral are discussed in detail in Tobit Curteis Associates, *Survey and Monitoring of the Environmental Conditions in the Crypt and Library at Rochester Cathedral, A Report for the Dean and Chapter*, April 2013



Figures 3 & 4. RH, T and AH data showing the comparatively stable conditions in the quire.

Data collected in the south aisle since June 2015, close to the framed panels, indicated that conditions in this area are similar to that than within the body of the quire.

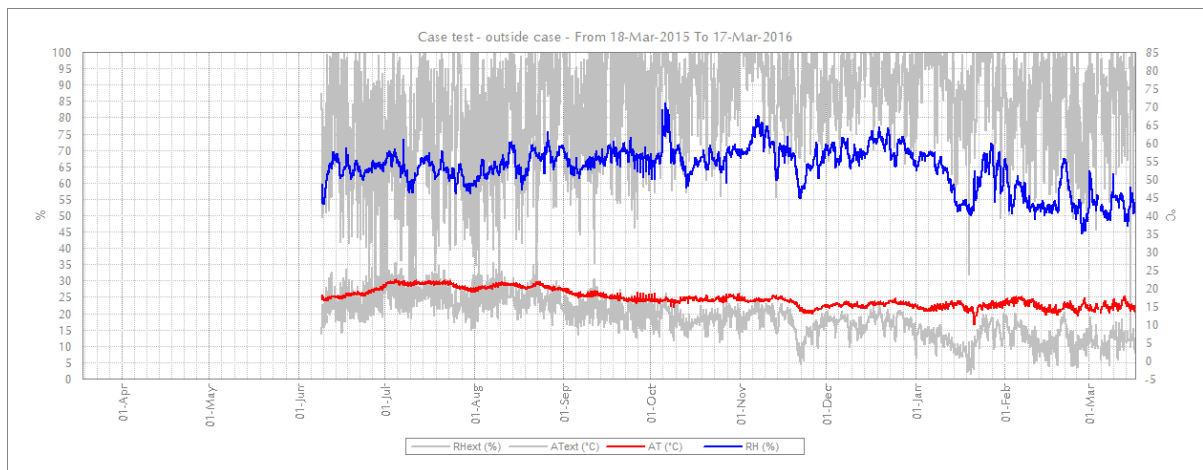


Figure 5. Data from the south quire aisle showing similar conditions to those within the quire itself.

Conditions were not monitored within the glazed frame but it is likely that this would have provided an additional level of hygral buffering (although little thermal buffering). However, it should be noted that, because the rear surfaces of the panels are exposed they will be subjected to marginally different short term conditions than the painted surfaces. While this will result in a minor hygral and thermal gradient this is unlikely to be of a level to cause deleterious effects.

Therefore, the background conditions for the panel, while not being perfect, are likely to be comparatively benign and not significantly different to those in other parts of the cathedral.

An initial infrared thermography (IRT) survey indicated no obvious or significant variations in surface temperature of the surrounding structure which would cause concern for the local microclimate in the conservation of the paintings. It should be noted that this was carried out on a comparatively dull day when direct solar illumination was not taking place and this would certainly cause local temperature variations, although these would possibly be quite small and short-lived.<sup>4</sup>

<sup>4</sup> IRT imaging was undertaken using a Flir E60bx unit. Although data was observed to be accurate, image recordings were corrupted and are therefore not shown here.

### 3.0 PULPITUM SCREEN IN SITU PANELS

The panels in the main pulpitum screen have suffered from minor delamination of the paint layer, indicating a small level of movement in the timber substrate at some point in the last century, which is possibly ongoing. No obvious stress lodging or other movement factors were observed and this appears likely to be associated with local environmental factors.



Figures 6 & 7. General view of the screen on the east side of the pulpitum and detail of the south side.

A review of the monitoring data from the quire discussed above indicated that RH conditions in the quire are comparatively stable generally remaining in the 45%-70% band.

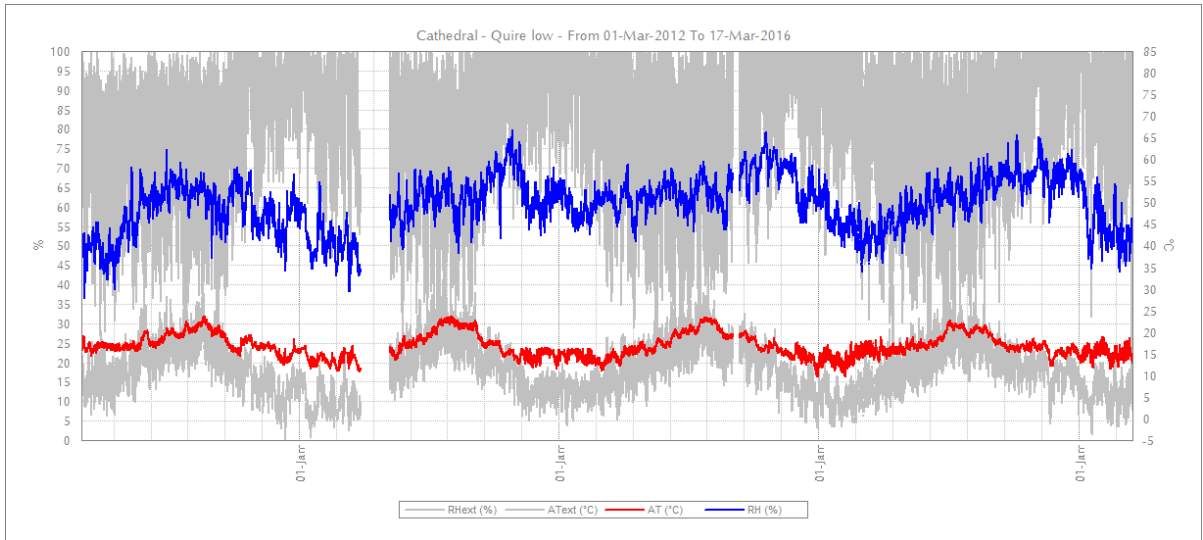
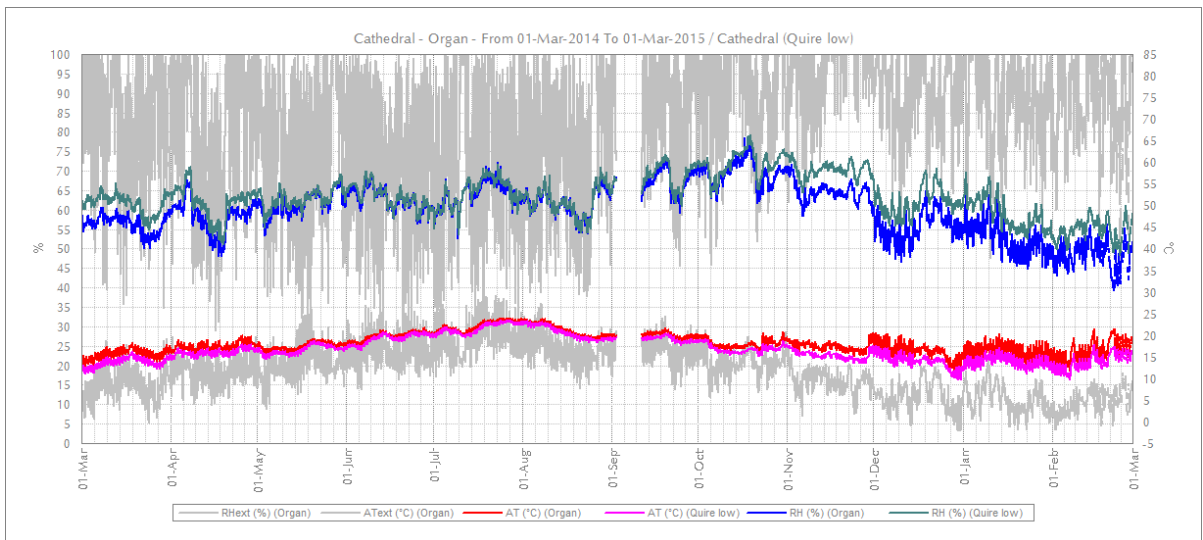
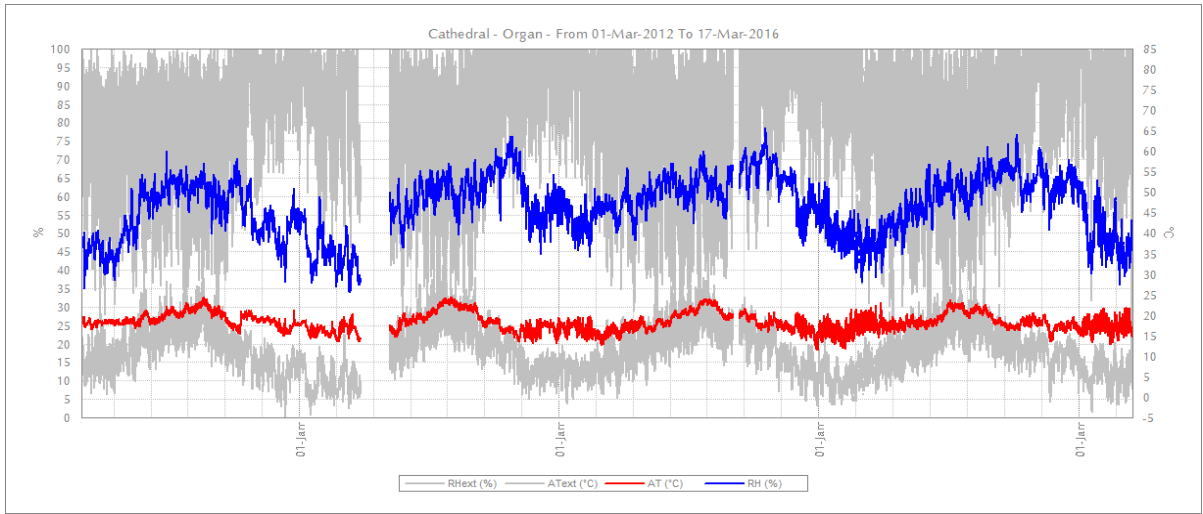


Figure 8. RH and T conditions in the quire between 2012 and 2016.

Conditions in the organ itself were similar in the summer but, during the winter, when the heating was in operation the T was notably higher with the RH falling lower. It is possible that if the conditions behind the screen are similar to those in the organ that a thermal and hygral gradient may exist which would cause uneven dimensional response and, in due course, further investigations should be undertaken.



Figures 9 & 10. Conditions in the organ and a comparison in 2015/2016 with conditions in the quire.

IRT imaging in October (when the heating is in operation) does not indicate any local anomalies of the type which would be expected to cause differential movement (although slight preferential heating was noted at the top of the panels from the lighting).

The Perry Lithgow report drew attention to the current heating system and recommendations were made for how conditions might be further stabilised. It is understood that this is being addressed as part of the current programme of work. Clearly maintaining the most stable practical environmental conditions is an advantage for the conservation of both the panels and other hygroscopic and sensitive materials. However, the present observed conditions are not especially deleterious and the physical condition indicated that the deterioration rate is slow. In due course a more detailed study of the local environmental conditions would be advisable.

#### 4.0 DISCUSSION

##### 4.1 *Framed Panels*

Although the rate of deterioration may be slow, the condition of some areas is severe and further loss is likely to take place unless remedial work is undertaken.

It is understood that the panels are to be mounted on the north side of the same pier in order to minimise the impact of direct light from the south windows, thereby providing a small increase in thermal buffering and a considerable reduction in lux and UV exposure.

Consideration should be given to the framing and mounting of the panels in order to ensure that no unnecessary stress is placed on the panels or the paint layer as a result of the fixing method within the frame. The panels should be mounted forward of the column using spacers, to allow air circulation behind the panels so as to provide a level of thermal buffering.

It is understood that the glass pane is to be repaired and replaced with a suitable pane of reinforced glass fixed away from the paint surface. The resulting enclosure of the panel will further increase the level of hygral buffering to which the surface of the panel is exposed. While this might be a concern if the reverse of the panel were exposed to significantly different conditions, in this position on an internal wall, it appears that the risk is low. However, consideration should also be given to increasing the depth of the frame to allow the installation of a backboard, enclosing the painted panels.

In order to ensure that the conditions are as anticipated it is proposed that environmental monitoring should be undertaken in the vicinity of the painting as part of the next phase of monitoring of the cathedral.

##### 4.2 *Pulpitum Screen In Situ Panels*

While vulnerable to further damage, the condition of the pulpitum screen panels is less severe than on the framed panels. Nevertheless the condition is serious and remedial treatment is required.

The rate and underlying causes of deterioration are less clear than for the framed panels but it is possible that a hygral and thermal gradient exists across the panels during periods of heating leading to dimensional response. While this need not delay the stabilisation of the paint layer, it is recommended that conditions on either side of the screen are monitored in order to identify any potentially deleterious conditions and controls should be implemented as necessary.

## 5.0 LIMITATIONS

The current report is based on a review of existing environmental data and an examination of the panels on site. No specific environmental monitoring of the panels has been undertaken and it is possible that when this is carried out conclusions may need to be varied.