

Manchester Reform Club

External fabric project: Mortar replacement & window decoration

1.0 *Executive summary*

As the project has progressed at Manchester Club, it has become apparent the deterioration of the stonework is heavily noticeable over the 2 year period of looking at this scheme. From further discussions with the specialist main contractor (Crown Services Organisations Limited) and sub-contractor (Mono Masonry), it has been highlighted that the sandstone has been inappropriately pointed using a cement mortar. This has led to the historic sandstone of the building deteriorating at a rapid rate which if not addressed now, it will lead to further loss of historic stone but also poses a significant health and safety risk with sections of stone delatching from the structure of the building.

We are proposing to carefully remove all cement from the 3 sandstone ashlar elevations (Brown Street, King Street & Spring Gardens) and repoint using an appropriate lime mortar. Works will be completed by a combination of the main contractor (Crown Services Organisations Limited) and specialist sub-contractor (Mono Masonry). The building will be wrapped with temporary works scaffolding which will be built from the ground up on the Brown Street & Spring Gardens elevations and the King Street elevation scaffolding already erected will be altered to provide a safe working platform.

As the building is being proposed to be scaffolded on each elevation, we have reviewed the condition of the timber frame windows. The windows are in a fair condition but require redecoration to prolong the lifespan of the historic windows as the paintwork is starting to flake and bubble, this has led to timber being exposed to the elements. We are proposing to carry out maintenance to redecorate all timber frame windows using the paint which was approved in the **Application to discharge CDN 4 (Paint Analysis) on 123930/LO/2019** to provide a consistent appearance on the building.

2.0 *Issues with building fabric*

Due to the building being repointed with an inappropriate impermeable cement mortar, this leads to the acceleration of stone decay, this is due to the water being trapped behind the porous stonework. As there is little moisture movement allowed through the joints, moisture is concentrated behind the cement barrier. This forces water to repeatedly move into and through the stone causing the surrounding masonry to deteriorate.

In low temperatures, the water trapped behind the cementitious mortar is subject to freeze thaw action. This is where the water freezes and leads to the surface of the stonework to spall; this poses health and safety risk to the general public as this could happen without any warning if root cause of this issue is not addressed.

Following inspection of the building by the specialist stone mason it has been established that the main issue is to do with the cement mortar. Furthermore there is more limited potential in some circumstances throughout the building that the cement mortar has failed and there are open joints which will contribute to the decay of the sandstone. However, by raking out all cement and repointing the whole building this will resolve both issues.

Example photos of damage to stonework

	
Cementitious mortar leading to sandstone spalling around mortar joint	Heavily stained stonework around cement mortar joints
	
Spalled sandstone concentrated around mortar joint	Heavily stained stonework around cement mortar joints

	
Failed mortar and signs of decay around joints	Heavy stained sandstone and open mortar joints

As the building is going to be wrapped with scaffolding, we believe this is a perfect opportunity to redecorate the timber frame windows. The windows are in fair condition but as seen below require some attention to pro-long the historic fabric of the building.

Example photos of window condition

	
Signs of poor paintwork condition with previous colour scheme shown	Signs of flaking paintwork throughout the frame
	

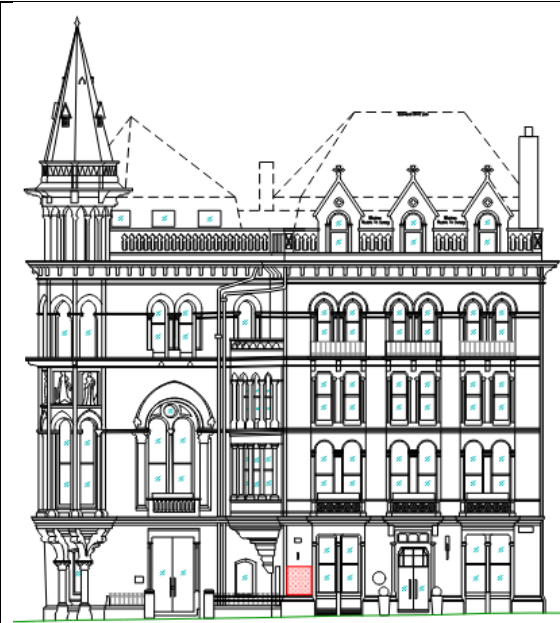
Signs of flaking paintwork throughout the frame	Heavily flaking paintwork throughout the frame
	
Previous repair not decorated	Flaking paintwork and heavily soiled window frame

3.0 *Paint analysis*

	
Agreed paint sample with LPA, colour 07/143	Finished paint to timber oriel louvers to turrets

We are proposing to use the agreed colour scheme determined by the research provided by the report "Final APR Report Manchester Reform Club OCT19" produced by Hirst Conservation. The colour we are proposing to use is Dulux 07/143 as shown in the above sample and completed decoration to the turret louver windows. By utilizing the same colour throughout the scheme, this provides a consistent appearance to the building.

4.0 Mortar sample & analysis

	
Marked up area for mortar sample	Mortar sample location on Spring Gardens elevation (Grand Pacific level)

We are proposing to undertake a mortar sample for Manchester City Council (MCC) to review and approve. The sample will be completed in the above area which Bruntwood will provide a full detailed photographic schedule of the stages of raking out and repointing.

Samples have been taken from (King Street, Brown Street & Spring Gardens) and sent off to Heritage Testing Limited for chemical analysis. We believe from reviewing the deterioration and the previous samples completed to the turrets that the mortar throughout the building is cement part lime. We are currently waiting for the samples to be produced but once we have received, this will be issued to Manchester City Council for review.

5.0 Proposed works

EXTERNAL FABRIC REPAIR SPECIFICATIONS

GENERAL REQUIREMENTS

- Works to be completed in strict accordance with all current British Standards and BS 7913 – Guide to Principles of Conservation of Historic Buildings and BS800 workmanship series
- All works to be carried out in a manner which prevents any damage or disturbance to the historic building's fabric
- All works to be completed by contractors who have proven experience working with historic buildings and are suitably qualified to carry out the task set out. Crown Services Organisation Limited (Principal Contractor) has a vast history of working on historic buildings, along with Mono Masonry (Sub-contractor) who has worked on various cathedrals and prestigious historic buildings throughout

the UK

SCAFFOLDING

- Scaffolding to be completed by operatives who are suitably qualified and in-line with National Access & Scaffolding Confederation guidelines
- Scaffolding to be built in-line with specialist scaffolding drawings
- Scaffolding ties to be as minimal as possible and where it is deemed totally necessary to be installed within mortar joints avoiding any damage to historic stonework
- Historic scaffolding ties to be utilized where possible, on completion of the project, ties to be removed and filled using epoxy resin with sandstone dust to provide an invisible repair
- Where ties go into mortar joints, on completion of the project, ties to be removed and joints to be repointed with specification below

RE-POINTING

Following detailed inspection throughout the whole façade, there is no historic facing mortar to the joints which has been found, over the years the building has repointed with an inappropriate cementitious mortar. This was echoed by the previous sample conducted on the turrets which the mortar analysis results identified was Portland cement, hydrated lime plasticiser and orangish brown very fine silica / quarts sand. Currently, we have 3 samples from each elevation sent for analysis however we believe the mix will be very similar to the one already completed and submitted to Manchester City Council.

The works will be undertaken as follows:

- Rake out all cementitious mortar from joints to stonework to a minimum depth twice the width of the joint.
- Where cement mortar is weak to medium strength, mortar to be raked out utilizing hand tools which consist of a sharp masonry scutch and hammer to remove the cement from the delicate stonework. Works to be carried out with due care to avoid any potential damage to sandstone.
- Where cement mortar is extremely hard and unable to be broken with hand tools without the potential to damage the historic surrounding stonework, cement to be initially cut along the centre of the joint utilizing Fein Oscillating Machine with a heritage blade. Loose mortar then to be removed by hand using a sharp masonry scutch and hammer.
- Clean the raked out mortar joints using a stiff bristle brush, removing all dust and loose material from the joints in preparation for repointing
- Lime mortar mix to be used: 3:1 Sand:NHL Lime. The 3 sand will consist of 2 yellow, and 1 Nosterfield (sieved where joints are smaller than 5mm). The lime will be St.Astier N.H.L 3.5. This has been selected for the following reasons:
 - Yellow sand has been chosen for the colour match, nosterfield has been chosen purely for

the aggregate content as the yellow sand chosen for the colour does not bind very well on large joints with the lime.

- Sand has aggregates which range down from 7mm, this allows the lime to bind with the sand and due to both sands being river washed, and this eliminates the salt content and avoids any efflorescence on completion of the curing.

- In some circumstances where the joints are smaller and 7mm aggregate does not fit, the nosterfield is sieved down to either 5mm or 3mm dependant on the width of the joint.

- Mortar mix has been chosen from advice from specialist conservation contractor Mono Masonry who have extensive experience working with buff sandstone buildings. The mortar mix proposed is most suited for this type of sandstone.

- Working temperatures: Not below 5oC or above 30oC. Avoid rapid drying due to high temperatures or strong winds by curing with a light water mist several times a day if necessary. Scaffolding to be fully mono-flexed in to prevent exposure to adverse weather. Newly installed mortar to be protected with hessian sheets.

- Mortar to be gauged and batched using a mortar mixer, to be panned for a minimum of 30 mins until thorough fattening up has taken place.

- All open joints to be dampened down using a spray bottle and clean water. Once wetted area has soaked into the stone the lime mortar will be applied using small pointing irons ensuring it is not smeared onto the adjacent stone.

- Once the mortar has started to cure, a stiff bristle brush to be used to beat the mortar, compacting it into the joints. This will ensure it is well packed in as the drying and shrinking process takes place and leave a stippled effect showing the aggregate it contains.

- Finished pointing will then undergo a tending process. As the mortar begins to dry out, it will be sprayed accordingly with clean water and protected using damp hessian to allow the curing to take place at a slow pace. This will prevent cracking and the failing of the mortar.

- Mortar joints to match existing flush profile.

REDECORATION OF TIMBER WINDOWS

- Decoration to comply with BS 6150

- All paints to be part of the same manufacturer's system and applied as the manufacturer's recommendations, to give a total of three coats after priming

- Any flaking paint will be carefully removed by hand to minimise loss. In order to provide an appropriate key for repainting, minimal gentle sanding will take place by hand using a fine grit sand paper. This will ensure that historic layers of paint are not affected by the preparatory work. No power tools or heat gun will be used to strip paint. No chemicals will be used

- Timber frame windows to be decorated utilizing colour approved by the local planning authority from the turret louver windows decoration scheme, colour to be Dulux 07/143

-Windows to be painted using hand brushes to carefully apply the paint avoiding any spillage on surrounding stonework or glazing