RENEW
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Methodology for Brickwork Repair and Replacement October 2024

Discharge of Condition 5, 24/00852/LBC
The Mulberries,
Raunds Road,
Keyston

This document has been prepared to satisfy condition 5 of listed building consent 24/00852/LBC for work to The Mulberries, a grade 2 listed private residence in Keyston, Huntingdonshire.

The condition states:

> *'Prior to the commencement of works to the external brickwork, a methodology detailing the proposed works shall be submitted to and agreed in writing by the Local Planning Authority. This shall include a full schedule of works which address the method of raking out and repointing, the proposed mortar to be used including mix, colour, texture and pointing finish. The works shall be carried out only in accordance with the agreed details.*
>
> *Reason: In the interests of safeguarding the character of a Building of Special Architectural or Historic Interest and in accordance with LP12 and LP34 of Huntingdonshire's Local Plan to 2036 (2019).'*

SCOPE OF WORK
- Replacing/rebuilding/repairing/infilling brickwork where approved alterations are taking place, including where services have been removed, and where a window is being replaced with a narrower unit. Brickwork and mortar to match existing.
- Raking out & repointing open jointed surviving masonry as required and as directed on site by the Architect.

REVIEWING SCOPE OF THE WORK
- Inspect each relevant area of masonry with the Architect to confirm the type and extent of the work.
- Mark clearly on each face any masonry units or parts of units that are to be cut out and replaced.
- Adequately record the characteristics of existing masonry in areas affected by repair works. Use measurements and photographs as appropriate to record bonding patterns, joint widths, special features, etc.

OPERATIVES
- Use operatives who are skilled and experienced with the materials and procedures required for the types of repairs specified.
- Provide evidence of their training and previous experience to the Architect on request.

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MORTAR MATCHING

- Given the patchwork of different mortars used in areas where work is to be undertaken, identify the exact mortar to be matched and agree it with the architect before preparing samples.

REFERENCE SAMPLE(S)

- Prepare up to 3no. 0.5sq.m brick and sample panels of the specified mortar mix for approval of the architect/client before proceeding with the remainder.
- Protect from adverse weather and damage.
- Take care to match pointing finish, colour and texture.

MORTAR CHOICE - ALL WORK

- In work on historic buildings, current thinking is that Hot Lime mixes are generally preferred to Lime Putty, which, in turn, is generally preferred to Natural Hydraulic Limes (NHLs). The latter have fallen out of favour as they tend to be too strong, more akin to cement, and increase in strength over time. HOWEVER, NHL still has some practical applications in conservation and it is important to consider the nuances of each job rather than apply a broad brush approach.
- In this context, a feeble naturally hydraulic lime mortar (an NHL 2) offers benefits over other approaches and can be used for repointing, repairs and small areas of replacement and infilling as:
  - The areas within scope are small
  - a fast chemical set is beneficial rather than a long slow carbonation, given that the areas are external and exposed and that we are coming into winter with resulting lower temperatures and smaller windows of opportunity
  - In repointing work of this nature, better durability is preferred
  - The bricks in question, though soft reds, are relatively strong, with little evidence of damage caused by overly strong mortars
  - There are several areas of patching in with different bricks and mortars adjacent to the work in this scope, some of it poorly specified and executed. These include areas of cement and areas of mismatched harder lime mixes. A softer mortar may be unduly affected by the strength differential.
  - A weaker mix, through the addition of extra sand (3:1 rather than 2.5:1) and impurities will serve to reduce the overall strength of the NHL as well as enabling better colour and texture matching.

Accordingly:

- Use a feebly naturally hydraulic lime mortar (an NHL 2) from an approved supplier such as Mike Wye or Ty Mawr.
- Mix 1:1.5:1 (1 parts soft sand : 1.5 part sharp sand : 1 part lime).
- Sand source/ type: good quality, well-graded washed sharp coarse sand with angular grains (particle size 3.35mm to 0.075mm); fine sharp sands to contractors proposals.
- NOTE: various impurities may be required for the purpose of matching historic mortars.

SITE PREPARATION OF HYDRAULIC LIMES AND MORTAR

- Thoroughly mix (dry) natural hydraulic lime powder with sand, first in the dry state and then with water.
- Closely follow the lime manufacturer's recommendations for each stage of the mix.

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- Add only sufficient water to produce a workable mix.
- Use mortar within time limits recommended by the lime manufacturer. NHL 2.0 & 3.5 mortars can generally be re-worked, or 'knocked-up', for up to 24 hours and can improve workability.
- If the mix requires significant addition of water then it has reacted too far to be useable and must be rejected.
- Cover mortars intending to be re-worked to control water loss.
- It is essential that lime is uniformly dispersed and that any fine agglomerations are broken down. The time of mixing will be controlled by the efficiency of the mixer.
- Use operatives who are skilled and experienced in the making and use of hydraulic lime:sand mortars.
- Provide evidence of their experience to the Architect on request.
- Keep plant and banker boards clean at all times.
- Avoid contamination of hydraulic lime:sand mortar by other materials or by any set material (including Portland cement).
- Measure materials accurately by volume using clean gauge boxes or clean undamaged buckets.

MORTAR APPLICATION - REBUILDING/INFILLING

- Do not use frozen materials and do not lay masonry units on frozen surfaces.
- Do not bed masonry units or re-point in natural hydraulic lime:sand mortars when the air temperature is at or below 5°C and falling or below 3°C and rising.
- Where it is anticipated that the temperature in the first few days might fall to 5°C, or lower, the structure should be protected with damp hessian to preserve the moisture and with sufficient cover, using bubble wrap or insulating material, to protect the structure itself and the mortar against frost.
- Dampen down the substrate with clean water before application to avoid lime mixes drying out and to control suction – therefore minimising the potential for shrinkage and cracking.
- Dampen down again after application where conditions dictate.
- Maintain temperature of the work above freezing until mortar has fully set.
- Protect masonry against rain and snow by covering when precipitation occurs AND AT ALL TIMES WHEN WORK IS NOT TAKING PLACE.
- Prevent masonry from drying out too rapidly in both hot conditions and from the effects of the wind by covering with damp hessian as soon as possible to maintain moisture and then with additional cover to prevent the hessian drying out AND AT ALL TIMES WHEN WORK IS NOT TAKING PLACE.
- For best results the moist conditions should be maintained, whilst allowing air movement over the mortar, for as long as is practicable.
- Rake out and replace mortar damaged by frost and where instructed, redo the repair.

NOTE: FROST RESISTANT ADDITIVES MUST NOT BE USED AS THEY CONTAIN SALTS WHICH WILL AFFECT THE MORTAR.
NOTE: PLASTICISERS MUST NOT BE USED UNDER ANY CIRCUMSTANCES

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REDUNDANT FITTINGS/FIXINGS

- Generally all redundant fittings/fixings, and as identified by the contractor and approved by the Architect on site, are to be removed from the masonry carefully, causing as little disturbance to the surface as possible.

REMOVAL OF BRICKS

- Bricks are to be carefully removed and in one piece by experienced workers using hand tools.
- Powertools are not permitted.
- Removed bricks are to be set aside for reuse.

CLEANING BRICKS

- Retained bricks are to be carefully and gently cleaned by hand by experienced workers, taking care to protect arrises.
- Clean off old mortar, organic growths and dirt, and leave units in a suitable condition for rebuilding.

PUTLOG OR ANY MECHANICALLY-FIXED SCAFFOLDING WILL NOT BE PERMITTED

STRUCTURAL STABILITY

- Ensure that the stability of the surviving/intact masonry is maintained throughout the work.
- Immediately stop all work and report any defects, including signs of movement that are exposed or become apparent during the removal of masonry units.

DISTURBANCE TO RETAINED MASONRY

- Ensure that retained masonry in the vicinity of repair works is disturbed as little as possible.
- Do not cut or adjust existing retained masonry to accommodate new or reused units without approval.
- Prop or wedge retained loose masonry units or those that are vulnerable to movement during repair works, so that they are firmly and correctly positioned.

REBUILDING

- To match previous face and joint lines, joint widths and bonding.
- In areas where joint lines, widths or binding have been compromised by previous poorly executed repairs, proposal to be agreed with the architect before work commences.
- Adequately bonded to retained work/ backing masonry, as appropriate.
- Dampen joint surfaces to control suction as necessary.
- Lay on a full bed of mortar and ensure that all joints are filled.
- Ensure that no mortar encroaches upon exposed faces.
- Remove mortar/grout splashes immediately.
- Joints weatherstruck to match existing.

PREPARATION FOR REPOINTING

- Work from the top of the wall downwards.

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- Remove loose or cracked mortar ONLY, using hand tools, carefully and without damaging adjacent masonry, arrises or widening joints.
- Form a neat recess of depth not less than 30mm or twice the thickness of the joint.
- When mortar beyond this depth is loose and friable and/or cavities are found seek instructions.
- Remove dust and loose debris and flush out with clean water.
- Dampen joints to control suction as necessary.

POINTING WITH TOOLS/IRONS

- Press mortar well into joints using pointing tools/irons that fit into the joints, so they are fully filled.
- Ensure that no mortar encroaches/smears upon the face of the masonry.
- Use suitable temporary adhesive tape on each side of joints where necessary.
- Finish joints neatly, as specified (with a 'weatherstruck' to match existing).
- After initial setting and before fully dry, revisit area of pointing and carefully 'beat back' with a stiff bristle 'churn brush' until the mortar is recessed by approx. 1mm behind face of adjacent stones.

MORTAR APPLICATION - REPOINTING

- Under no circumstances re-point in natural hydraulic lime:sand mortars when the air temperature is at or below 5°C and falling or below 3°C and rising.
- Where it is anticipated that the temperature in the first few days might fall to 5°C, or lower, the structure should be protected with damp hessian to preserve the moisture and with sufficient cover, using bubble wrap or insulating material, to protect the structure itself and the mortar against frost.

NOTE: FROST RESISTANT ADDITIVES MUST NOT BE USED AS THEY CONTAIN SALTS WHICH WILL AFFECT THE MORTAR.
NOTE: PLASTICISERS MUST NOT BE USED UNDER ANY CIRCUMSTANCES

- Maintain temperature of the work above freezing until mortar has fully set.
- Protect re-pointed walls against rain and snow by covering when precipitation occurs and at all times when work is not proceeding.
- Prevent re-pointed walls from drying out too rapidly in both hot conditions and from the effects of the wind by covering with damp hessian as soon as possible to maintain moisture and then with additional cover to prevent the hessian drying out.
- For best results the moist conditions should be maintained, whilst allowing air movement over the mortar, for as long as is practicable.
- Rake out and replace mortar damaged by frost and where instructed, redo the repair.