

Station Building Re-roofing Project



Architectural Restoration Specification
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DEFINITIONS

CA means Conservation Architect.

REMOVE means disconnect, dismantle as necessary and remove the stated element, work or component and all associated accessories, fastenings, supports, linings, and bedding materials, and dispose of unwanted materials. It does not include removing associated pipework, wiring, ductwork, or other services.

KEEP FOR REUSE means during removal prevent damage to the stated components or materials and clean off bedding and jointing materials. Stack neatly, adequately protect and store until required by the Employer or for use in the Works as instructed.

REPLACE means remove the stated existing components, features, and finishes. Provide and fit in lieu new components, features or finishes which, unless specified otherwise, must match those which have been removed. Make good as necessary.

REPAIR means carry out local remedial work to components, features and finishes as found in the existing building, resecure or refix as necessary and leave in a sound and neat condition. It does not include:

- Replacement of components or parts of components.
- Redecoration.

MAKE GOOD means carry out local remedial work to components, features and finishes which have been disturbed by other, previous work under this Contract and leave in a sound and neat condition. It does not include:

- Replacement of components or parts of components.
- Redecoration.

The meaning of the term shall not be limited by this definition where used in connection with the defects liability provisions of the Contract.

EASE means make minor adjustments to moving parts of the stated component to achieve good fit in both open and closed positions and ensure free movement in relation to fixed surrounds. Make good as necessary.

TO MATCH existing means use products, materials and methods to match closely all visual characteristics and features of the existing work, with joints between existing and new work as inconspicuous as possible, all to approval of appearance.

SALVAGED refers to materials that have been *removed and kept for re-use* on this job: no second-hand or reclaimed material are to be used on this project.

APPRAISE means the contractor is to appraise and carry out own independent assessment of the works detailed here within and update the scope of works as is necessary through consultation with the Architect.

CONSOLIDATE means the contractor is to make something physically stronger and solid. Returning / combing items into a single / coherent whole. Rake out and repoint / build with an NHL mortar. Return to match original profiles. Rebuild in association with structural ties / wall core gravity grouting etc

DRAWINGS Please note that this specification is to be read in conjunction with the drawings and schedule of works document 9059SoW. Any discrepancies between the documents or omissions from the specification are to be brought to the attention of the Architect at the time of tendering. Note that all specified products are to be installed to the manufacturer's recommendations and by approved installers.

1.0 PROTECTION OF HISTORIC FABRIC/FEATURES

1.1 WORK IN LISTED BUILDINGS

1.1.1 It is the responsibility of the Contractor to ensure that no disturbance of any fabric within the listed buildings takes place unless this is specifically detailed on the Architect's drawings and/or specification. The Architect's information is subject to listed building consent and any deviation from this is an offence under the Planning (Listed Buildings and Conservation Areas) Act 1990.

1.1.2 Should the Contractor be in doubt about the extent of works or protection required, he should consult with the Architect prior to those works being carried out. Agreement may also be required from the local authority Conservation Officer in some cases, and therefore the Contractor should make any queries to the Architect in a timely manner.

1.1.3 The Contractor is to provide adequate protection to any historic features which are to be retained in order to avoid damage as the works are in progress. The methods for protection should be agreed with the Architect prior to works being carried out.

1.1.4 Should it be the case that it is not possible to protect historic features without causing further damage to the building, it is the Contractor's responsibility to exercise maximum care to avoid disturbing any historic fabric during the course of the works. This may entail an approach of temporary protection with the agreement of the Architect.

1.1.5 It should be noted that damage to historic fabric cannot be made good in an acceptable manner and that the Contractor is to take all necessary measures to ensure damage does not occur.

1.1.6 The Contractor is to satisfy themselves that they are in possession of adequate information prior to commencing any work.

Any discrepancies found within this document by the Contractor should be brought to the attention of the Architect at the time of tendering.

The Contractor is to be responsible for all on site measurement including setting out for new work, details and dimensions for any replacement or repair work.

All dimensions included on the drawings are to be checked for accuracy on site prior to commencing work and any discrepancies reported to the Architect immediately.

No work shall commence until any such discrepancies have been resolved.

2.0 ACCESS SCAFFOLDING

2.1 DESIGN

- 2.1.1 The design of all scaffolding will be the responsibility of the Contractor and is to be in accordance with the recommendations of BS 5973: 1990 "Code of Practice for access and Working Scaffold and special scaffold staircases in Steel" or as updated.
- 2.1.2 Compliance with the various Acts and regulations listed in BS 5973 is the responsibility of the Contractor.
- 2.1.3 Compliance with all aspects of Health and Safety during erection, using and dismantling is the responsibility of the Contractor.
- 2.1.4 The design of the scaffold is to take account of the requirements of all trades which will require access, use as a working platform or storage. No claims will be entertained for additional scaffold or for amending scaffold already erected to suit the requirements of trades contained within the specification and the tendered works as a whole.

2.2 PROPOSALS

- 2.2.1 The Contractor is to submit his proposals for the scaffold on or before the date for possession and not less than 7 days before commencement of the scaffold.
- 2.2.2 The Contractors proposals are to include clear drawings and structural calculations in duplicate sufficient to prove the stability of the proposed temporary structures in accordance with BS 5973: 1990. Drawings will be provided to the Architect and the Structural Engineer.
- 2.2.3 These drawings will clearly indicate positions where any scaffold is to be tied back to the fabric of the building and the proposed method of fixing.
- 2.2.4 No scaffolding shall be commenced on site until the Contractors proposals have been submitted and agreed with the Architect/Structural Engineer. Agreement of the Contractors proposals does not relieve the Contractor of his responsibilities to ensure full compliance of all requirements.

2.3 PROGRAMME

- 2.3.1 Prior to commencement of any scaffolding the

Contractor shall submit a programme indicating the commencement date, and completion date.

- 2.3.2 Prior to striking the scaffold the contractor will submit a programme indicating the period for dismantling for each area of scaffolding.
- 2.3.3 Scaffold is required for inspection purposes prior to confirmation of scope of the work and the Contractor is to indicate this period on his programme and ensure that his proposals are submitted early enough to ensure that this period is not compromised.
- 2.3.4 The programme is to take account of all the requirements of the sub-contractors who require the use of the scaffold.

2.4 ERECTION REQUIREMENTS

- 2.4.1 All scaffold tubing and fittings are to be galvanised and in good condition and free from corrosion. Rusty components will not be accepted.
- 2.4.2 No steel component (including capped tubes) is to be in contact with the fabric of the building except where specific approval has been given.
- 2.4.3 Where it is necessary to brace the scaffold from the structure then timber packing of a minimum thickness of 20mm is to be placed between the scaffolding and the masonry.
- 2.4.4 No scaffolding shall rest on any roof coverings unless agreed in writing prior to commencement.
- 2.4.5 The ends of ALL scaffold tubes are to be protected with plastic caps which are to be fitted prior to delivery to site. Where it is necessary to cut scaffold tubes during erection the end is to be re-capped immediately. A disc of carpet is to be sandwiched between the plastic scaffold cap and the building fabric at every point of contact.
- 2.4.6 Scaffold tubes are not to encroach within 50mm of the surface of the building except where required for support or stabilising. This is to prevent accidental damage to the fabric by minor movement of the scaffold. Where such support is required the scaffold

	shall be separated from the building fabric by 20mm timber packers to prevent Scarring of the fabric by scaffold tubes.	2.6.3	Access to the scaffold is to be via a single point of entry and a lockable door through the barrier described above.
2.4.7	Where it is necessary to brace scaffold through window or door openings the existing finishes are to be protected with 20mm thick timber packers both internally and externally. The opening is to be boarded up with access only for the scaffold tubes.	2.6.4	Ladders to the lower lifts are to be removed at night.
2.4.8	<u>A temporary roof shall be erected over all areas where partial or wholesale re-roofing works are undertaken as further damage to the interior could be detrimental.</u>	2.6.5	Any areas which may be accessible from adjoining structures, roofs, etc are to be similarly protected by boarding or by other approved means.
2.4.9	Temporary roofs shall be a minimum of 2.5m clear of the existing roof covering / structure to the underside of any scaffold / beam component on the temporary roof.	2.6.6	Scaffolding shall be alarmed at all times.
2.4.10	Side sheeting to temporary roofs shall extend to below eaves level on the outside of any scaffolding.	2.6.7	Adequate measures must be taken to prevent unauthorised access from all elevations. Which could include floodlights and motion detectors as well as CCTV cameras.
2.4.11	All temporary roofs shall be complete, wind and watertight prior to any work being implemented.	2.7	PROTECTION
2.5	SUPERVISION	2.7.1	The covering to pavements is to be double boarded with visqueen between.
2.5.1	The Contractor is to exercise particular care in supervising the erection and dismantling of the scaffold to ensure that no damage occurs to the fabric of the building.	2.7.2	The contractor is to satisfy all the requirements of the Local Authority and Highways department.
2.5.2	It should be noted that in many instances damage to the historic fabric cannot easily be rectified. Any damage due to the scaffold use, erection or dismantling will be rectified at the Contractors expense.	2.7.3	All surfaces at ground level are to be suitably protected to prevent the scaffold damaging existing external finishes.
2.5.3	Any area of scaffold not complying with section 1.4 above will not be used for any purpose.	2.7.4	Where internal scaffold is to be erected full protection will be required under all scaffolding except with prior written consent.
2.6	SECURITY	2.7.5	Ensure any architectural features or areas prone to damage are suitably protected.
2.6.1	All external scaffolding shall be designed and erected so as to prevent unauthorised access by sheeting (whether ply or steel) to a minimum height of 3 metres at the base. 'Herras' mesh fencing is not considered a suitable alternative.	2.7.6	All entrance doors, fire exits etc are to be kept clear of obstructions and are to be lined at the top and both sides.
2.6.2	Sheeting which forms part of the perimeter hoarding for the site will also need to comply with constraints for site hoarding specified elsewhere within the preliminaries for the project.	2.8	DISMANTLING
		2.8.1	Ensure all necessary care is taken to ensure that no damage occurs to the fabric of the building.
		2.8.2	Scaffold tubes should be carefully lowered to ground level and not thrown or dropped.
		2.8.3	No dismantled components shall be left on site outside working hours unless housed within a secure compound area.
		2.9	TEMPORARY PROTECTION AGAINST THE ELEMENTS

2.9.1	<u>A temporary roof is required for the duration of all roofing works as per above specification.</u>	environment for the duration of the project.
2.9.2	Any damage arising to the building fabric from the failure of temporary sheeting will be made good at the contractor's expense. Sheeting for side walls shall be reinforced translucent sheets which are self-extinguishing and flame retardant (e.g. Monaflex). Details of any alternative proposals shall be submitted for approval with the tender.	2.11.2 The contractor is to provide the Architect with a scaffold design well in advance of any erection works. The scaffold design will highlight all proposed fixing and contact points for discussion with the Architect and Structural Engineer. De Detailed methodologies are to be provided by the main contractor, to accompany the scaffold design.
2.9.3	All sheeting shall be adequately secured against wind uplift etc.	2.11.3 The access scaffold will run around the asset to 3 sides, north, east and south with a ladder beam arrangement enclosing the west end.
2.9.4	All sheeting shall be checked by a competent person once a week and a signed record kept onsite. Any defects are to be rectified immediately.	2.11.4 The scaffold will be built up tight to the facades, with protected scaffold tubes. The scaffold will be braced through existing window and door openings.
2.9.5	All areas are to be maintained as watertight at all times.	2.11.5 Direct fixings will be required into the fabric, these will primarily be taken into mortar joints where the joint size is sufficient.
2.10	CERTIFICATES	
2.10.1	Copies of all handover certificates issued by the scaffolding sub-contractor shall be forwarded to the Architect upon receipt by the Main Contractor.	2.11.6 It may be necessary to fix directly into the masonry (brickwork) where the pull strength (anchor point) is greater. In these limited situations, neat holes will be formed in concealed locations, filled upon decant of the access scaffold with a suitable mortar mix.
2.10.2	Copies of all test certificates for hoists shall be forwarded to the Architect on receipt by the Main Contractor.	2.11.7 In the unlikely event that a brick becomes defective. The brick will be replaced on a like for like basis to match the bond, size, type and texture to as existing.
2.10.3	No scaffolding shall be used unless handover certificates and test certificates have been issued.	2.11.8 No direct fixings into stonework will be accepted.
2.11	DESCRIPTION OF THE PROPOSED WORKS AND METHODOLOGY	
2.11.1	It is proposed that a full access scaffold and temporary roof is erected to encapsulate the Station Building to allow for wholesale re-roofing of the asset within a controlled environment, but most importantly that the assets interior is protected from the external	2.11.9 The access scaffold will likely be required to house contractor welfare facilities due to space restrictions onsite. The exact arrangement is to be confirmed by the main contractor.

3.0 HYDRAULIC LIME MORTAR

3.1 PRODUCT

3.1.1 Hydraulic Lime Mortar

Mortar to constitute 1 part hydraulic lime: 2 ½ part graded sand (from 5mm down to 75 microns) – (St. Astier NHL 2 or similar approved). PENDING MORTAR ANALYSIS AND SAMPLING.

Suppliers to be consulted for variations in aggregates to achieve required distribution and colour.

Mixing and usage to be strictly in accordance with supplier's recommendations.

3.2 MATERIALS

3.2.1 Hydraulic lime

Hydraulic Lime or pre-mixed hydraulic lime mortar may be obtained from:

- a) Womersley Associates
Walkley Lane
Heckmondwike
WF16 0PG
Tel: 01925 400651 Fax: 01924 403489
- b) Wenlock Lime Ltd
The Coats Kiln
Stretton Road
Much Wenlock
TF13 6DG
Tel: 01925 728611 Fax: 01925 728361
- c) Telling Lime Products Limited
Primrose Avenue
Fordhouses
Wolverhampton
WV10 8AW
Tel: 01902 709777 Fax: 01902 398777

3.2.2 Fine Aggregates

All sand shall be to BS 1199 and 1200:1976, well-graded non-staining clean sharp coarse sand, uncontaminated by clay/silt. Sand shall be selected so that when the mortar has dried out the colour will match the colour and texture of the original mortar, unless instructed otherwise in writing by the Architect.

For work requiring very fine joints in the masonry sand grain size may impede filling the joints. In these instances, fine stone dust or brick dust should replace the sand as the fine aggregate.

Suppliers of lime to be consulted on suitability of sands proposed. Ideally sand to be obtained from the supplier of the lime.

3.3 WEATHER AND PROTECTION

3.3.1 Cold Weather Working

No work involving the preparation of mortar or the laying of stonework shall be undertaken when the temperature is 5 degree centigrade falling or below 4 degrees centigrade when the temperature is rising.

3.3.2 Protection

All work is to be protected from the frost and rain with hessian sheets for a minimum of 7 days or until the mortar has cured if longer.

In warm weather the work is to be similarly protected with hessian sheets which should be kept moist at all times to avoid curing occurring too quickly.

3.3.3 Damage due to Weather

Any work affected by the weather is to be cut out and replaced at the Contractor's expense.

4.0 POINTING OF ASHLAR

4.1 GENERAL

- 4.1.1 Contractor's attention is drawn to the fact that the joints between stones are extremely fine and will demand a great deal of care and attention on site to the preparation, filling and pointing

4.2 SAMPLE PANELS

- 4.2.1 The tenderer is to allow for carrying out two test panels each approximately 1 metre square under the direction of the Architect, using the methods described below. Work to the rest of the stonework should not commence until the test panel has been approved by the Architect. The location of the test panels is to be agreed with the Architect prior to commencement.

Tenderer is to allow for several sample mixes using different coloured fine aggregate to obtain a satisfactory colour for the pointing.

4.3 PREPARATION

- 4.3.1 All joints are to be raked out to a depth of 25mm using a fine-toothed saw blade or hooked knife. Extreme care is to be taken to avoid damage to the arris or dislocation of the stone. **Under no circumstances shall chisel and bolsters be used. Under no circumstances will the use of mechanical tools be permitted (disc cutters etc.)**
- 4.3.2 There are power tools that use oscillating blades to clean out joints; care must be taken with these, especially if the stone is softer than the mortar, as the blade can slide off the mortar and cut into the stone.
- 4.3.3 Joints are to be flushed out using a large (30cc) hypodermic syringe and clean water until the water runs clear.
- 4.3.4 The tenderer is to allow for the insertion of a backing 'rod'. This item is to be confirmed during the preparation of the sample area.
- 4.3.5 The backing rod is to be fine waxed string or string coated with petroleum jelly, stretched and twisted several times prior to inserting to the back of the prepared joint with a knife blade.

4.4 FILLING AND POINTING

- 4.4.1 Mortar is to be as described in the lime mortar specification 3.0.
- 4.4.2 Filling is to be by the taping and pointing method.
- 4.4.3 The prepared joints are to be covered with 50mm heavy duty carpet tape applied to the stone. The tape is to be slit along the joint line with a sharp knife. It should be noted that the stone will need to be dry for the tape to adhere.
- 4.4.4 The mortar is to be introduced into damp joints and compressed with a purpose made pointing iron/key. Mortar is to be thoroughly compacted into the joints.
- 4.4.5 The mortar is to be pointed firmly into the joints and finished with a very slight recess (not more than 1mm deep).
- 4.4.6 Adhesive tape is to be carefully removed ensuring that no residue of adhesive is left on the stone.
- 4.4.7 Clean off any surplus or spread of mortar with a clean pointing trowel.
- ### 4.5 PROGRESS
- 4.5.1 Works are to be co-ordinated such that preparation is carried out to agreed areas and made available for inspection by the Architect/Employer's Representative. The Contractor is to give at least 48 hours' notice for inspection.
- 4.5.2 No taping or filling of joints is to proceed until preparation has been inspected and approved by CA.
- 4.5.3 Taping, filling and pointing is to be carried out in small areas such that all operations in one area can be completed within the working day with due notice being paid to any potential adverse weather conditions.
- 4.5.4 Work is to be kept clean from mortar spillage at all times.
- 4.5.5 When pointing commences only area which can be successfully completed during the normal working day are to be attempted giving due regard to the weather conditions/forecast.
- 4.5.6 Completed areas are to be protected until cured.

5.0 BRICK REPAIR

5.1 MATERIALS

- 5.1.1 Bricks shall match the existing in size, texture, bond and colour. Samples shall be provided by the Contractor for approval and no final work shall be commenced on the repairs until the sample(s) have been approved in writing.
- 5.1.2 Bricks shall be free from the presence of fungal attack, visible salts, paint, lime wash or other substances.
- 5.1.3 Ties
- Ties to cavity work shall be as follows:
- a) Where repair involves only the outer skin of cavity brickwork or solid masonry the ties shall be of a resin anchor type (Ancon Clarke ref. AC31) manufactured in austenitic stainless steel.
 - b) where repair involves both skins of cavity brickwork then ties shall be stainless steel fish tail ties to BS 1245: 1978) (Ancon Clarke ref. FVF).
 - c) where repair involves cavity wall tie replacement ties shall be stainless steel anchor resin ties of an approved type.
 - d) where repair involves rebuilding of solid masonry ties shall be stainless steel fish tail ties except where the existing bonding pattern allows header bricks to be used.
- All ties are to be manufactured in austenitic stainless steel by: Ancon Clarke, Olive Grove Road, Sheffield S2 3GB.
- 5.1.4 Water
- Water for the works shall be clean and fresh without pollutants. Where existing water supply is available within the building this may only be used with the Employers permission. In other cases, a lockable standpipe is to be erected to the approval of the Local Water Authority.
- 5.1.5 Mortar
- 5.1.6 Shall be in accordance with specification as instructed, or as referred to in the specification.

5.2 INSPECTION

- 5.2.1 The Contractor should note that the documentation has been prepared based on visual inspection from ground level or from easily accessible parts, without the benefit of access scaffold. Further inspection will be required on completion of the access scaffold and the Contractor is allowed a period of 1 week for inspection and confirmation of the scope of the work in his programme.
- 5.2.2 The Contractor is encouraged to be represented during the inspection in order that he may contribute in any discussion regarding alternative methods of repair.
- 5.2.3 Notice
- 5.2.4 The Contractor is to give 48 hours' notice to the Architect of the completion of the access scaffold to each area.
- 5.2.5 Confirmation
- 5.2.6 Confirmation of the scope of the work will be the issue of revised drawings and confirmed by an Architects Instruction following completion of the inspection from the access scaffold.
- 5.2.7 Scaffold
- 5.2.8 The Contractor shall ensure that all access scaffold is complete and in accordance with the specification and that handover certificates have been issued before inviting inspection. Inspection will not be carried out if the scaffold is not in accordance with the specification.
- 5.2.9 Programme
- 5.2.10 The Contractor shall provide a programme of work based on the Architects drawings before commencement of work on site. This programme shall indicate separately the erection sequence for access scaffold, inspection period, order period and works on site for each area of work.

5.3 PROTECT, STORAGE AND CLEANING

- 5.3.1 Protection of Work Area
- 5.3.2 Where large areas of masonry repairs are to be undertaken the scaffold is to be fully protected using a translucent non-combustible sheet such as Monaflex fixed to the outside of the scaffold.

5.3.3	Protection of the Fabric	5.4.4	The area is to be cleared of any mortar, debris etc and any defect in the backing masonry is to be reported to the Architect.
5.3.4	Any existing windows are to be protected with ply or particle board, in the areas adjacent to any area of work. Other features identified on the drawings are to be protected from damage.	5.4.5	Where large areas of brick or block are to be removed the opening is to be propped with timber props ensuring that no damage is caused to adjoining brickwork.
5.3.5	Where scaffold is erected internally or where scaffolding penetrates through into the building internal fittings shall be adequately protected.	5.4.6	<u>Under no circumstances will the use of mechanical tools be permitted (disc cutters etc.)</u>
5.3.6	Storage	5.4.7	There are power tools that use oscillating blades (fein saw type) to rake out fine joints; care must be taken with these, especially if the brick is softer than the mortar, as the blade can slide off the mortar and cut into the brick.
5.3.7	Bricks should be stored in stacks on battens protected from moisture and freezing. Adequate care is to be taken to ensure that no damage occurs to the bricks during storage or handling.	5.5	INSERTING NEW BRICKWORK
5.3.8	Storage on Scaffolding	5.5.1	The recess is to be thoroughly cleaned out and the adjoining brickwork is to be moistened to prevent the mortar "snatching".
5.3.9	Only bricks for immediate use shall be stored on the scaffold.	5.5.2	New bricks or blocks are to be bedded on a bed (and backing where solid walls are involved) of 1:1:6 or 1:2:9 lime: sand: mortar as specified on the drawings. The mortar is to be prepared as described in the specification.
5.3.10	Protection of Finished Work	5.5.3	New brickwork is to be installed flush with the face of the building and ensuring that the bed joints and perpend joints are maintained consistent with the existing bricks/blocks.
5.3.11	Protect all work from the weather and to ensure satisfactory curing of the mortar. Protection is to be maintained until completion of all work in that vicinity.	5.5.4	The mortar is to be kept back 25mm from the face to facilitate later pointing.
5.3.12	Cleaning of Work	5.5.5	Where brickwork is being inserted into worn areas of brickwork the new brick is to be set such that the face is in the line of the original face of the brickwork.
5.3.13	Keep face work clean and free from staining at all times.	5.5.6	Where individual bricks or blocks are being replaced ties are not necessary. Where larger areas of brickwork or terracotta blocks are to be removed then ties will be required to be located at centres as follows:
5.3.14	Clean off and rub down all brickwork as scaffold is taken down.		a) 900 mm centres horizontally and 450mm centres vertically with rows staggered.
5.3.15	If acid is used for cleaning down fully protect all windows and other areas liable to damage (e.g. paintwork etc.) Acid shall not be permitted if lime mortar has been used for pointing.		b) 225 centres vertically within 300mm of any opening.
5.4	CUTTING OUT OF DEFECTIVE BRICKWORK		c) At closer centres if specified by the Structural
5.4.1	The areas to be cut out shall be marked on site and approved/confirmed by the Architect prior to commencement of cutting out.		
5.4.2	The brickwork shall be carefully cut out with chisels taking extreme care not to damage the arises of adjoining brickwork which may be being retained.		
5.4.3	Any damage to adjoining areas will be made good at the contractor's expense.		

Engineer or indicated on the drawings.

6.0 POINTING OF BRICKWORK

6.1 GENERAL

6.1.1 Contractor's attention is drawn to the fact that in some cases the joints between bricks are extremely fine and will demand a great deal of care and attention on site to the preparation, filling and pointing.

6.1.2 Pointing should commence from the top of the building and work down when undertaking fabric repair works.

6.2 SAMPLE PANELS

6.2.1 The contractor is to allow for carrying out two test panels each approximately 1 metre square under the direction of the Architect, using the methods described below. Work to the rest of the brickwork should not commence until the test panel has been approved by the Architect. The location of the test panels is to be agreed with the Architect prior to commencement.

6.2.2 The contractor is to allow for several sample mixes using different coloured fine aggregate to obtain a satisfactory colour for the pointing.

6.3 PREPARATION

6.3.1 All joints are to be raked out to a depth of 25mm using a fine-toothed saw blade or hooked knife. Extreme care is to be taken to avoid damage to the arris of the brick. Under no circumstances shall chisel and bolsters be used.

6.3.2 Under no circumstances will the use of mechanical tools be permitted (disc cutters etc.)

6.3.3 There are power tools that use oscillating blades (fein saw type) to rake out fine joints; care must be taken with these, especially if the brick is softer than the mortar, as the blade can slide off the mortar and cut into the brick.

6.3.4 Joints are to be flushed out using clean water until the water runs clear. Where very fine joints are encountered a large hypodermic syringe shall be used to flush the joints.

6.4 FILLING AND POINTING

6.4.1 Mortar is to be as specified in accordance with the

mortar specification.

6.4.2 The mortar is to be introduced into damp joints and compressed with a purpose made pointing iron/key of approximately 30mm diameter giving a shallow "bucket handle" joint. Mortar is to be thoroughly compacted into the joints.

6.4.3 Care is to be taken to eliminate lines of mortar occurring on joint intersections, mortar should flow visually from perpendicular to bed joints.

6.4.4 Clean off any surplus or spread of mortar with a clean pointing trowel.

6.4.5 The joint is to be lightly brushed as mortar is achieving its first set to remove the mechanical smoothness left by the pointing iron.

6.5 PROGRESS

6.5.1 The works are to be co-ordinated such that preparation is carried out to agreed areas and made available for inspection by the Architect/Employer's Representative. The Contractor is to give at least 48 hours' notice for inspection.

6.5.2 No filling of joints is to proceed until preparation has been inspected and approved by Architect.

6.5.3 Filling and pointing is to be carried out in small areas such that all operations in one area can be completed within the working day with due notice being paid to any potential adverse weather conditions.

6.5.4 The work is to be kept clean from mortar spillage at all times.

6.5.5 When pointing commences only area which can be successfully completed during the normal working day are to be attempted giving due regard to the weather conditions/forecast.

6.5.6 Completed areas are to be protected until cured.

6.6 CLEANING

6.6.1 Clean down all areas on completion using clean water and bristle brushes only.

6.6.2 Acid cleaners should not be used when lime mortar is present.

7.0 ROOF REPAIRS - GENERAL REQUIREMENTS

7.1 EXISTING NATURAL SLATING

- 7.1.1 Carefully remove all existing slates and battens, taking great care not to dislodge material into the roof void beneath. Sort all slates removed from the roof and retain for re-use all sound slates in secure storage for inspection / approval of the CA.
- 7.1.2 Where specified, existing slates are to be retained and stored for reuse. The slates are to be sorted for size, shape and any broken, delaminating or otherwise unsuitable slates are to be discarded.

7.2 EXISTING ROOF COVERINGS

- 7.2.1 Existing roof coverings shall be removed in sections small enough to ensure that adequate temporary provision can be made to prevent water ingress into the building / structure. Further sections can only be removed once the previous section has been made watertight, unless suitable temporary protection measures are employed.
- 7.2.2 Existing coverings are to be carefully removed to ensure the maximum amount of material capable of being reused is retained.
- 7.2.3 Removal of existing slates, battens, etc shall be carried out ensuring the minimum of disturbance to the roof voids.
- 7.2.4 On removal of the roof covering allow for inspection of the roof timbers by the architect or appointed Timber Treatment Specialist. Any timbers found to be rotten and / or damaged are to be replaced with new treated timber of similar section and species upon written instruction from the CA or cut back to sound timber and new sections pieced in.
- 7.2.5 Allow a credit for the scrap value of any lead to be removed from the site.
- 7.2.6 No salvaged materials are to be stored on the scaffold or on the existing roof. Materials reclaimed for re-use are to be stored at ground level and protected from damage and theft.

7.3 PROGRAMME

- 7.3.1 A detailed programme for the roof works shall be

submitted to the Architect prior to any works being undertaken.

7.4 INSPECTION

- 7.4.1 The contractor is to allow a period for inspection of the existing roof structure/decking after the removal of the roof coverings. A period of 7 days shall be allowed for each roof area for inspection and confirmation of instruction/repairs.
- 7.4.2 The contractor is to give the Architect 2 working days' notice prior to the roof structure being ready for inspection.

7.5 HEALTH AND SAFETY

- 7.5.1 The contractor shall ensure that all necessary precautions are taken to ensure the safety of all operatives, site visitors etc at all times.

7.6 REMOVAL OF EXISTING COVERINGS

- 7.6.1 Carefully remove existing coverings ensuring as many slates/tiles are reclaimed for re-use as possible.
- 7.6.2 Where existing battens have been laid on timber boards and slates/tiles have been bedded on lime mortar ensure all lime mortar and battens are removed and the boards are brushed clean for inspection.
- 7.6.3 Ensure all roof voids are kept clear of inflammable material and debris and that they are vacuumed clean of all dust on completion of the works.

7.7 STORAGE OF MATERIALS

- 7.7.1 Only limited use of scaffold or existing roof structure or roofs shall be permitted for the storage of materials.
- 7.7.2 Materials should generally be stored at ground level in secure areas.
- 7.7.3 Only sufficient materials for the operatives to use in a working day should be brought to roof level.
- 7.7.4 Where materials are stored at roof level, they should be distributed evenly to ensure existing structure or

scaffold is not overloaded.

- 7.7.5 Materials should not be stored on completed roof areas.

7.8 REPAIR OR REPLACEMENT OF EXISTING TIMBERS

- 7.8.1 Once the existing coverings are removed the Architect will inspect the timber structure and issue such instructions as are necessary with regard to the repair or replacement of any defective timbers.
- 7.8.2 No defective timbers shall be removed until inspected by the Architect even if these are identified for replacement on the drawings. The intention will generally be to retain as much of the original timber as possible.
- 7.8.3 Where existing timbers are a softwood species, replacement timbers shall be vacuum pressure impregnated timber of a section to match the existing. Timber treatment shall be carried out in strict accordance with British Standard. Timber shall be delivered to site with a moisture content no greater than 20% and shall be stored in such a way that the moisture content is not increased prior to use.

Treatment certificates are to be forwarded to the Architect on receipt.

- 7.8.4 Where existing timbers form part of a hardwood timber framed structure the replacement timbers shall comply in full with the requirements of the timber frame specification.
- 7.8.5 All battens are to be replaced with new treated softwood battens to sections as specified elsewhere.
- 7.8.6 All framework for concealed gutters shall be minimum 18mm WBP plywood sheathing.

7.9 LEADWORK

- 7.9.1 All leadwork shall be in accordance with the Lead Sheet Association recommendations and shall be

carried out by an approved contractor who is a member of the Lead Contractors Association.

- 7.9.2 Cast lead whether machine cast or cast by hand, shall not be used. All lead shall be milled to BS 1178.
- 7.9.3 All leadwork shall be undertaken by trained operatives employed by a contractor who is a member of Lead Contractors Association.
- 7.9.4 All workmanship shall be in accordance with the Lead Sheet Associations recommendations as contained in the Lead Sheet Manual - a guide to good building practice Volume 1 to 3 and current updates.
- 7.9.5 Working Practices shall comply with the Health and Safety Executive COP2 "Control of lead at work - approved code of practice".
- 7.9.6 All work shall comply with BS 5250 "Code of Practice for control of construction in buildings".

7.10 WORKMANSHIP

- 7.10.1 All work shall be carried out in accordance with BS 5534 part 1 and 2 "Code of Practice for slating and tiling" and BS 8000: Part 6 "Code of Practice for Workmanship and Building Sites - slating and tiling".

7.11 MATERIALS

- 7.11.1 Ensure all materials comply in full with the relevant British Standards as listed below:

BS 747 Specification for Roofing Felts.

BS 1178 Specification for Milled Lead Sheet for buildings.

BS 1202: Part 2 and 3 Specification for Nails.

BS 4978: Specification for softwood grades for structural use.

8.0 ROOF REPAIRS – NATURAL SLATING

8.1 MATERIALS

8.1.1 General

Where areas of the roof are to have slates and battens removed, allow for 25% new slates (ridge & hip tiles) to match the existing in size / colour and texture should be allowed for.

Allow a credit for the sale of second-hand slates removed from site.

8.1.2 Roofing Felts – Untearable breathable felt shall be to BS 747.

8.1.3 ROOF SLATING – where necessary and identified.

Base: Existing timber roof structure with battens to main roof slopes, or masonry and battens to areas of tile hanging. Cementitious sarking board to station platform roof.

Pitch: Existing / to match existing.

Underlay: Dupont Tyvek Supro breathable membrane

Centres: Coinciding with rafters / trusses.

Battens: 50 x 32 mm

Counter Battens: 25 x 50 mm (onto sarking boards)

Fix using stainless steel 'helifix' 75mm or screw to give a minimum 25mm penetration into the top of the underlying rafter and also to reduce imposed vibration on the existing structure whilst reducing the risk internal finishes becoming defective due to impact..

Slates: To BS 680: Part 2.

Supplier and reference: Samples to be supplied to match existing

Fixing: As above, minimum end lap 100 mm or to match existing.

Lead flashings/soakers: As clause 9.0

Sarking boards: allow for 20% replacement at gutter pitch level. Boards to be cementitious boards to match existing and decorate.

Tilt fillet: Provide continuous hardwood tilt fillet across the length, including eaves protection tray.

Ridge / hip tiles: provide hip and ridge terminal tiles at each junction.

8.1.4 Valley with Valley Tiles

Ensure that continuous support is provided for ends of tiling battens on each side of valley. Cover valley with a strip of underlay not less than 600mm wide underlapping general underlay. Cut adjacent tiles and

tile-and-a-half tiles so that valley tiles course in and fit neatly. Note that it is not necessary to mechanically fix the valley tiles.

8.1.5 Nails

Nails shall comply with BS 1202 Part 2 and 3.

Nails for fixing battens should penetrate the rafters by a minimum of 40mm.

Nails for fixing tiles should be hung on battens to a minimum depth of 15mm but should not penetrate the felt.

8.1.6 Timber

All timbers used for both structural, secondary and detail components with the roof construction shall be pressure impregnated preservative treated softwood.

All timbers shall comply with the recommendations of BS 4978 "Specification for softwood grading for structural use" and BS 5534.

All treatment shall be in accordance with the recommendations of the British Wood Preserving Association.

8.1.7 Mortar

Mortar for bedding ridge tiles etc. is to be 1:1:6 mortar. The sand aggregate is to be selected to give a pigmentation similar to the ridge tiles. Samples are to be approved.

8.2 WORKMANSHIP

8.2.1 All work shall comply with BS 5534 parts 1 and 2 code of practice for slating and tiling.

8.2.2 All workmanship shall comply with BS 8000 Part 6 Code of Practice for workmanship on building sites, slating and tiling.

8.2.3 All work shall be undertaken by suitably qualified and experienced roofers.

8.3 EXISTING ROOF COVERINGS

8.3.1 Existing roof coverings shall be removed in sections small enough to ensure that adequate temporary

	provision can be made to prevent water ingress into the building/structure. Further sections can only be removed once the previous section has been made watertight.		specified. For buildings with a ridge height less than 7.2mm above ground level battens shall be nailed using 3.35mm diameter 65mm length smooth round or ring shank galvanised steel nails to BS 5534.
8.3.2	Existing coverings are to be carefully removed to ensure the maximum amount of material capable of being reused is retained, and to minimise any disturbance to the structure below.		At hips and valleys battens should be treated to allow a board 225mm wide to be installed to permit fixing of cut tiles.
8.3.3	On removal of the roof covering allow for inspection of the roof timbers by the architect or appointed Timber Treatment Specialist. Any timbers found to be rotten are to be replaced with new treated timber of similar section unless otherwise directed.		Battens shall be set out to ensure that battens are at 90 deg. to the direction of water runoff. Battens shall be set out such that joints do not occur on the same rafter within 4 rows of battens and that within the zone joints do not occur in adjoining rafters.
8.3.4	Allow a credit for the scrap value of any lead to be removed from the site.		All joints shall be centred over rafters and fully supported by and nailed to the rafter.
8.3.5	Carefully sort all slates removed from the roof and retain all sound slates in secure storage for inspection/approval by the architect.		All structure shall be checked for line prior to commencing felting and battening and any discrepancies reported to the Architect.
8.4	FIXING		All existing and new roof structures shall be checked for line prior to commencing felting and battening and any discrepancies reported to the CA.
8.4.1	Underlay		
	All underlay shall comply with BS 5545 Part 1 1990 and BS 747 where the underlay is not full supported it shall be breathable geotextile felt to BS 744 and BS 5534.	8.4.3	SLATE FIXING:
	For an unsupported installation with a roof pitch between 15 and 30 degrees the minimum horizontal lap should be 150mm. Where the underlay is supported this may be reduced to 100mm.		Ensure that stripped eaves sections are at the correct level in relationship to gable walls and parapet gutters. Provide all necessary support and fixing battens as recommended by slate supplier or component manufacturer.
	Ensure that the underlay does not tear or rip and that no gaps occur at the laps. Any torn underlay should be replaced before tiling commences.		Fix slate roofing to make the whole roof sound and weathertight at the earliest opportunity.
	Underlay shall be fixed using 3.35mm diameter 20mm long extra-large felt nails manufactured in copper or galvanised steel.		Lay with an even overall appearance, with tails of slates aligned. Use slates of consistent thickness in any one course, laid with thicker end as tail. Fix edge slates and fittings securely to neat, true lines.
	The underlay shall be fixed in such a manner that it cannot touch the underside of the tiles even if subjected to wind pressure from below.		Use extra wide slates at ends of courses to maintain bond and ensure that cut slates are as large as possible. Do not use half slates.
8.4.2	Battens		Centre fix each slate with two copper nails to BS 1202: Part 2, 30 mm long x 2.8 mm through countersunk holes 20-25 mm from the side edges. Fix slates wider than width and a third with three nails.
	All battens shall be free from knots and decay. Where battens are cut the cut ends shall be treated with a brush applied compatible preservative. Size of battens should be as described in BS 5534 "Code of Practice for Slating and Tiling" unless larger dimensions are		All slates are to be sorted prior to holing and fixing. All slates to be used on any course shall be of the same thickness. Thicker slates should be used at the eaves

courses.

Holing

Slates to be holed from the underside and positioned so that the thinner end of the slate is at the top when fixed.

Holing with a spiked hammer or pick shall only be used for fixing of details during slating.

Each slate should be holed twice within a range of 20-25mm from each side.

For centre nailed slates holing gauge - batten gauge + lap + 8mm - 15mm. For head nailing holes are to be 25mm from the top of the slate. Unless specified elsewhere all slates shall be centre nailed.

No slate shall be cut to less than 150mm width. Where details would require smaller cuts 'slate and a half' should be used.

Lowest course slates have an under eaves course which should be inverted, and head nailed. Both under eaves course and first full course of slate should overhang the gutter by 50mm and should align to form a neat straight edge.

Remaining courses should be centre nailed so that the tails of all courses are parallel and are finished in clean straight lines.

All slates shall be laid half bond.

Verges should be finished with alternating slates and slate and a half courses.

Pointing for verges shall be up in NHL 3.5 Hydraulic Lime Mortar.

Install additional piece of underlay 600mm wide overlapping the normal underlay and over the hip rafter.

8.5 LIGHTENING PROTECTION

8.5.1 Lightning protection is to be installed as per M&E specification and drawings.

8.6 TRACE HEATING

8.6.1 Trace heating is to be installed within all parapet gutters as per M&E specification and drawings.

8.6.2 To be fully coordinated with lead roofing contractor, re position of clips etc.

8.7 RAINWATER SENSORS

8.7.1 Rainwater sensors are to be installed within each sump outlet to parapet gutters as per M&E specification and drawings.

8.7.2 To be fully coordinated with lead roofing contractor, re position of clips etc.

8.8 VENTILATION

8.8.1 Standard slate ventilator to cast iron gutter eaves:

Product: Nicholson Airtrak F25 Fascia Ventilator

8.8.2 Standard slate ventilator slate pitch into lead gutters:

Product: Nicholson Airtrak Layboard Ventilator

8.8.3 Vent where lead extends to slate pitched roof:

Product: Airtrak PE Pitched Ventilator

8.8.4 Ridge vent:

Product: Airtrak RTV Ridge Ventilation to be installed to horizontal runs. LPS225 Low Pitch Soakers are to be used in conjunction with the Airtrak RTV to provide extra weathering cover.

8.9 INSULATION (WARM ROOFS) – main Station Building

8.9.1 IF rigid insulation board is found to exist on top of the original sarking board layer, it is proposed to replace the rigid insulation with new to match the existing thickness. Include for breathable membrane to be installed.

8.10 INSULATION (COLD ROOFS) – Ticketing Hall

8.10.1 Replace existing mineral wool insulation with sheeps wool.

8.10.2 Install new highly vapour permeable insulation between ceiling joists such as Thermafleece CosyWool, sheep's wool flexible slabs, 75mm thick to suit existing ceiling joist depth and 175mm flexible slabs over as a cross layer, 250mm thick insulation total.

8.10.3 All roof voids are to be cleared of all dust and debris.

Carefully remove debris from roof spaces over the First- and Second-Class Ticketing Hall facilities using HEPA filtered vacuums and dust extraction units etc.

all practical measures should be taken to prevent potentially contaminated debris from entering the occupied airspaces during and after refurbishment.

9.0 ROOF REPAIRS – LEADWORK/COVERINGS/FLASHINGS/GUTTERS

9.1 REQUIREMENTS

- 9.1.1 All leadwork shall be undertaken by trained operatives employed by a contractor who is a member of Lead Contractors Association.
- 9.1.2 All workmanship shall be in accordance with the Lead Sheet Associations recommendations as contained in the Lead Sheet Manual - a guide to good building practice Volume 1 to 3 and current updates.
- 9.1.3 Working Practices shall comply with the Health and Safety Executive COP2 "Control of lead at work - approved code of practice".
- 9.1.4 All work shall comply with BS 5250 "Code of Practice for control of construction in buildings".

9.2 MATERIALS

9.2.1 Lead Sheet

Lead sheet shall be milled lead sheet to BS 1178 unless stated otherwise. The minimum height of lead shall not be less than that recommended in BS 6915 "Specification for design and construction of fully supported lead sheet roofs and wall coverings".

9.2.2 Underlay

Building paper to BS 1521, Class A.

9.2.3 Plywood

Shall only be used where specified and shall be in accordance with BS 1210. Plywood shall be WBP grade, min 18mm thick.

9.2.4 Copper Nails

Copper nails for fixing lead shall be in accordance with BS 1202 part 2.

9.2.5 Wood Screws

Shall be in accordance with BS 1210.

9.2.6 Timber

For gutter linings, roof decks etc shall be 100x25mm straight edged boarding with a 2mm gap between

adjoining boards or min 18mm thick WBP plywood.

Timber shall be vacuum pressure impregnated with preservative in accordance with the British Wood Preserving and Damp Proofing Associations Manual and as British Wood Preserving Association Commodity Specification C8.

Timbers shall be planed, free from wane, pitch pockets decay and insect attack.

Moisture content shall not be more than 22% at the time of covering.

9.3 WORKMANSHIP

9.3.1 General

Cut, joint and dress lead neatly and consistently to provide fully waterproof coverings and flashings free from ripples kinks, buckling and cracks.

Comply with BS 6915 and current good practice as described in the latest edition of "The Lead Sheet Manual" published by the Lead Sheet Association unless specifically instructed in writing.

Do not use screws or other sharp instruments to mark out lead. Use solder only where specified and not in any other location.

Ensure that finished leadwork is fully supported.

9.3.2 Lead Welding

In situ lead welding is permitted where specified subject to completion of a "hot work permit" form and compliance with its requirements. Lead chutes / sumps will require onsite welding.

9.3.3 Layout

Agree setting out of joints drips and laps with the Architect prior to commencing work.

9.3.4 Control Samples

Complete an agreed area of finished work and obtain approval of appearance and detail from the Architect before proceeding with the remainder of the works. The sample area(s) shall be selected so as to reflect

	the problems likely to be encountered on the majority of the work.		Substrates or decking for lead coverings must provide a near continuous smooth surface that is strong enough to support the lead (and any superimposed loadings) and hold the fixings firmly and permanently.
9.3.5	Existing Lead to Be Retained		
	Thoroughly clean by washing with a detergent solution and using a stiff bristle brush. Rinse off thoroughly. In areas of stubborn soiling a 5% nitric acid 95% water solution may be used provided that it can be established that the run off does not have an adverse effect on other materials. Thorough rinsing with clean water should be undertaken on completion.		
9.3.6	Existing Lead to Be Removed		
	Lead specified to be stripped and shall become the property of the contractor.		
9.3.7	Replacement of Existing Lead		
	In areas receiving run off from adjoining unprotected roofs (e.g. gutters etc) then the work must be carried out in small sections at a time to reduce the risk of weather damage. The contractor shall check the weather forecast before commencing removal of lead and shall only remove an area small enough to permit its reinstatement within the working day.		
9.3.8	Existing Bases		
	In areas where existing substrate is to be recovered in lead, remove all existing leadwork and brush clean of all debris, dust etc. Inspect all timbers for condition and level. Replace as necessary any rotten boards with timber to match existing. Ensure that where boarding is straight edged the gaps are cleaned of dust to permit ventilation. Where boarding is tongued and grooved seek instruction prior to drilling ventilation holes in an agreed pattern.		
	Ensure that all boards are securely fixed. Punch in any protruding fastenings and plane or sand as necessary to achieve an even surface.		
9.3.9	All Bases		
	All bases shall be dry, free from dust debris grease and other deleterious material with all nails punched home and free from all protrusions, unevenness etc prior to laying lead.		
	Laying of underlay and lead will be taken as a joint acceptance of the Main Contractor and sub-contractor of the suitability of the base.		
		9.4	FIXING AND JOINTING
		9.4.1	Head Fixing of Lead Sheet
			Unless specified elsewhere secure top edge of lead sheets with two rows of fixings 25mm and 50mm from the top edge of the sheet at 75mm centres to each row and evenly spaced and staggered.
		9.4.2	Fixings
			Fix lead sheet to timber substrates using copper clout nails to BS 1202 part 2 table 2 with annular ring, helical ring or serrated shank, length not less than 20mm, shank diameter not less than 3.35mm and head diameter not less than 8mm, or similar stainless steel (austenitic) clout nails with diameter not less than 2.65mm.
			Where lead is to be fixed to concrete or masonry substrates use stainless steel screws to BS 1210 table 3, not less than 19mm in length and not less than 3.35mm diameter, with stainless steel washers and plastic plugs of length and diameter to suit the screws.
		9.4.3	Clips
			Clips shall generally be 50mm wide unless specified otherwise. Lead clips shall be cut from sheets of the same code thickness as the sheet being secured.
			Each clip shall be secured with 2 fastenings not more than 50mm from the edge of the lead sheet. Clips shall be welted around edges of sheets and turned over 25mm.
		9.4.4	Copper clips
			Copper or tinned copper clips should not be less than 50mm wide and cut from copper sheet not less than 0.6mm thickness conforming to BSEN 1172.
		9.4.5	Stainless steel clips
			Clips should be fully annealed stainless steel strip conforming to BSEN 10088 at least 50mm wide and not less than 0.375mm thickness. It may beterne coated if exposed to view.

9.4.6	Wood Cored Roll Joints	Timber core shall be 45x45 rounded timber tapering to a flat base 25mm wide. Ridge rolls may be larger and should be to the dimensions specified on the drawings. King Wood roll shall be 75x75 rounded timber tapering to a flat base.	formed to a thickness one third more than the sheets being joined. Lap joints are to be formed with 25mm laps and two loadings to the edge of the overlap.
		Rolls shall be fixed to the base with stainless steel countersunk screws at not more than 300 centres.	Bossing must be carried out without thinning cutting or otherwise splitting the lead sheet.
		Dress under cloak three quarters around the core and fix with nails at 150mm centres for a distance of one third the length of the panel starting from the head of the sheet.	9.4.11 Fixing into Joints
		Dress over cloak around core and extent onto main surface to form a 40mm splash lap.	Currently rake out joint or neatly cut chase to depth of 25mm.
9.4.7	Welted Joints	Form with a 50mm overlap, 25mm underlap and copper or stainless steel clips at not more than 450mm centres.	Dress lead into joint or chase and up back face. Fix into back face with stainless steel screws, washers and plastic plugs at minimum 450 centres with a minimum number of 2 fixings per piece of lead.
		Welt overlap and clips around underlap loosely turn over and lightly dress down.	Joint to be pointed as indicated on the drawings and as specification 3.0.
9.4.8	Drips - Roofs up to 3 degree Pitch	Dress underlap into rebate along top edge of drip and fix with one row of nails at 50mm centres on centre line of rebate. Dress overlap over drip and form a 40mm splash lap.	9.4.12 Finishing
9.4.9	Drips - Roofs over 3 degree Pitch	Dress underlap up full height of drip upstand. Fix to lower level base with two rows of nails 25mm and 50mm from face of drip and at 75mm centres to each row. Seal over nails with a soldered or lead welded dot.	As soon as practical apply a smear coating of patination oil evenly in one direction. Apply only in dry conditions.
		Dress overlap over drip and form a 75mm splash lap. Secure with lead clips lead welded to underlap with not less than one per bay.	Where run off will be onto visible surfaces apply patination oil immediately on completion of the section of work to avoid staining.
9.4.10	Forming Details	Details may be made by bossing or lead weld except where specified. Lead welded seams must be neatly and consistently formed. Do not undercut or otherwise reduce the thickness of the sheets at the seams. Filler strips are to be of the same composition as the sheets being joined. Butt joints are to be	9.5 LEAD SHEET COVERINGS / FLASHINGS
			9.5.1 ROOFING: NEW LEAD ROOFS
			- Substrate: existing triangular flat roof. Assumed square edged timber boarding to be inspected for suitability. Allow for 20% renewal of supporting structure pending inspection.
			- New solid wood rolls throughout.
			- Preparation: Remove all latents.
			- Underlay: Building paper to BS 1521, Class A. - Type of lead: Rolled to BS EN 12588.
			- Thickness: Code 6. Refer to drawings.
			- Pre-treatment: Chalk emulsion to underside of lead as supplied by Rowan Technologies Ltd. Tel: 0161-748-3644, applied to manufacturers recommendations.
			- Joints in direction of fall: New wood cored rolls with splash lap.
			- Spacing: Regular, See drawings. 675mm maximum spacing of joints with the fall. 2500mm maximum distance between drips.

	- Eaves detail: See drawings. - Cross joints: 150 mm laps with lead clips. - Spacing: Dependant of code of lead. Follow LSA recommendations. - Alignment: Half staggered and in line on alternate bays. - Intermediate fixings: Brass cup and screw with die-cast lead dome where required. Note intermediate fixings do not allow the lead to move. Ridge/ Hip detail: n/a. - Other requirements: Mushroom vents to be installed – see drawings.	Min width box gutter: 225mm wide. Deep sided gutter with parapet: Upstand to have welted fixings at appropriate widths with min 3 rows of copper / stainless steel nails at 75mm centres. Deep sided gutter to have a separate piece of lead used as weathering between the gutter upstand and roof / cladding covering. Max spacing of vertical joints 650mm / 2250mm max distance between laps. Allow for continuous stainless steel clips with allowance for at least 6mm movement for lead. Ventilation: underside of cementitious boarding to have holes drilled to encourage ventilation within shallow gutter void.
9.5.2	Gutter Linings, Box Gutters, Parapet Gutter: Substrate: Existing timber boarding. Prior to removal note that the existing boarding is to be inspected and extent of repairs / replacement ascertained by the architect before replacement. 20% replacement is to be provisionally allowed for including all supporting structure. New 100x25 treated softwood boards (2mm penny gaps) and firrings inc supporting structure at 1:60 gradient or new 18mm thick WBP plywood sheathing to match existing make-up. Preparation: Remove all latents. Underlay: Building paper to BS 1521, Class A. Type of lead: Rolled to BS EN 12588. - Thickness: Code 6. Refer to drawings. Pre-treatment: Chalk emulsion to underside of lead as supplied by Rowan Technologies Ltd. Tel: 0161-748-3644, applied to manufacturers recommendations. Joints in direction of fall: New wood cored rolls (if required). Spacing: Dependant of code of lead. Follow LSA recommendations. 2250mm maximum length between drips. 850mm maximum overall girth. Cross joints: Wood cored roll at gutter watershed (if required). Laps to suit gradient and roof pitch as per LSA guidance and recommendations. Chute outlets: The finish on the outside of the wall should be flashed and lead welded. The lead should be neatly dressed over existing lead hopper. Refer to drawings. Sump/catch pit: Should be measured, folded, cut and then welded. If the depth is less than 150mm, the length should be increased to avoid surcharging in storm conditions. Drip height: 55mm minimum with 40mm splash lap.	9.5.3 Cover Flashings: Lead: Code 5 in lengths not exceeding 1500 mm. End to end joints: Laps of not less than 100 mm. Cover: Overlap to upstand of not less than 75 mm. Fixing: Lead wedges into bed joint and clips to bottom edge at laps and 450 mm centres. 9.5.4 Soakers and Step Flashings: Lead soakers: - Thickness: Code 5. - Dimensions: - Length: Slate/ tile gauge + lap + 25 mm. - Upstand: Not less than 75 mm. - Underlay: Not less than 100 mm. - Fixing: By roofer. Lead step flashings: - Thickness: Code 5. - Dimensions: - Lengths: Not more than 1500 mm. - End to end joints: Laps of not less than 100 mm. - Cover: Overlap to soaker upstands of not less than 65 mm. - Fixing: Lead wedges at every course. 9.5.5 Sacrificial Lead Flashings Code 4 lead clipped to gutter linings at max 500mm centres at the foot of rainwater run off to the eaves slates, and at the base of the gutter to project beyond the line of the slates by a minimum of 50mm, refer to drawings for details. 9.5.6 Chimney Flashings Back Gutter Thickness: Code 5

	Lead welded. A minimum of 100mm for the upstand against the chimney; 150mm for the gutter sole + 225mm for the extension up the slope, making a total girth of around 500mm. Installed to LSA standards.	insect mesh. Min 10,000mm ² air flow.
9.5.7	Sump / Catch Pit Thickness: Code 7 sump and Code 8 overflow / connection pipes fully welded. Underlay: Building paper to BS 1521, Class A. Lead welded. Min 150mm opening to chute or as drawings. Site measure will be required. Substrate: 18mm WBP plywood. Refer to drawings for details. The finish on the outside of the wall should be flashed and lead welded. The lead should be neatly dressed over existing lead hopper. Sump/catch pit: Should be measured, folded, cut and then welded. If the depth is less than 150mm, the length should be increased to avoid surcharging in storm conditions. Prior to order, manufacture and installation, the contractor should provide fabrication drawings to the CA for comment.	Prior to order, manufacture and installation, the contractor should provide fabrication drawings to the CA for comment.
		9.5.9 Parapet gutter vent
		For vent to ticketing hall roof only, see clause 8.8.3.
		9.5.10 Sump leaf guard
		Provide a stainless-steel fabricated leaf guard to sit recessed within gutter sump, flush with drip edge. Guard is to be designed and fabricated to allow for light foot traffic when laid in place.
		Lid should be perforated to the lid with 20mm gauge holes. Finger slots to either end to allow for lifting for routine maintenance, edges to be rounded with no sharp edges. Allow for neoprene / plastic caps to feet to avoid puncturing of leadwork.
		Prior to order, manufacture and installation, the contractor should provide fabrication drawings to the CA for comment.
9.5.8	Mushroom vents to flat lead roof Code 7 lead, 150mm diameter with min. 75mm upstand welded to gutter base. Locate in each bay, or as indicated on the drawings, where gutter linings are formed on a timber base. Vent to have steel liner with	

10.0 REDECORATION / RENEWAL OF RAINWATER GOODS

10.1 MATERIALS

10.1.1	Cast Iron Rainwater Pipes and Shoes:	ornamental cast iron fittings conforming to the dimensional requirements of BS 460: 1964 and manufactured by J & J W Longbottom Ltd or equal approved.
10.1.2	Cast iron rainwater pipes to be generally single / double socketed 3" (to be confirmed – to match existing) diameter pipes unless otherwise noted on the drawings, conforming to the dimensional requirements of BS 460: 1964, and manufactured by J & J W Longbottom Ltd or equal approved manufacturer.	10.1.13 Gutters:
10.1.3	Fittings:	10.1.14 All gutters are to be 7" cast iron (unless otherwise stated) manufactured by J & J W Longbottom Ltd or equal approved manufacturer. Fixed onto new cast iron brackets (to match existing) fixed into fascia. All new brackets to be half round brackets to match existing.
10.1.4	Include for all necessary fittings to each section of pipework, including square and obtuse bends, union sockets with fixing ears, shoes, side and anti-splash shoes, single branch fittings, offsets, holderbats, inspection pieces, and rainwater hoppers.	10.1.15 Gutters and RWP's internally are to receive 2 coats of bitumen paint and mastic seal to joints and connections.
10.1.5	Jointing	10.2 INSTALLATION GENERALLY
10.1.6	Joints at the sockets of the components should incorporate a hemp gasket and be sealed with a bedding of red lead and white putty (or approved polysulphide sealant). Where pipes / components are cut on site, the ends shall be cut clean and square with burrs removed. All cut ends shall be made good/recoated in accordance with the manufacturer's recommendations prior to decoration and fixing.	10.2.1 Install to ensure the complete discharge of rainwater from the building without leaking.
10.1.7	Fixing:	10.2.2 Obtain all replacement components for each type of pipework from the same manufacturer unless specified otherwise.
10.1.8	Socketed rainwater and soil pipes are to have hardwood bobbins fitted behind ears to give a minimum 38mm projection from wall face to facilitate decoration. Fixing to the walls is by means of 8mm stainless steel screws through ears and bobbins into plastic plugs in the walls.	10.2.3 Provide access fittings and rodding eyes as necessary in convenient locations to permit adequate cleaning and testing of pipework.
10.1.9	Finish:	10.2.4 Provide for thermal and building movement when fixing and jointing, and ensure that clearances are not reduced as fixing proceeds.
10.1.10	After cutting to finished installed sizes all components are to be primed and painted as per the attached Dulux System M2312ALK. Colour to match existing. Existing cast iron components are to be repainted as per attached Dulux System M2334ALKG. Colour to match existing.	10.2.5 Where not specified, use plated, sherardized, galvanized or nonferrous fastenings, suitable for the purpose and background, and compatible with the material being fixed or fixed to.
10.1.11	Cast Iron Rainwater Heads:	10.3 PIPEWORK
10.1.12	All rainwater heads to be replaced are to be	10.3.1 Fix securely at specified centres plumb and/or true to line with additional supports as necessary to support pipe collars, particularly at changes in direction.
		10.3.2 Make changes in direction of pipe runs only where shown on drawings unless otherwise approved.
		10.4 TESTING
		10.4.1 Before striking the scaffold test all gutters by blocking

outlets and filling to overflow level. Leave filled gutters for 5 minutes and then inspect for leaks. Inform architects one week in advance of testing so as they may be present.

11.0 PAINT AND CLEAR FINISHING

11.1 PAINTS

11.1.1 SATIN PAINT: NEW / EXISTING EXTERNAL JOINERY (DOORS, WINDOWS, COMPONENTS ETC)

Manufacturer:

Dulux Trade
Akzonobel
Wexham Road
Slough
Berkshire
SL2 5DS

E: duluxtrade.advice@akzonobel.com

Tel: 0333 222 7070

- Product reference:

Finishing Coat - ['Sikkens Rubbol Satura Plus']. Colour:
TBC with Architect.

Undercoat – ['Sikkens Rubbol Primer Plus'].

To be read in conjunction with manufacturers
recommendations.



rubbol_saturn_plus.
pdf



rubbol_primer_plus
.pdf

Surface Preparation:

The timber surface must be abraded, clean and dry and free from dust, dirt, wax and grease. Remove surface mould and algae using a fungicidal solution. The moisture content of the timber must not exceed 18%. This figure will be 14% or lower for interior timbers. Resinous residues may be removed using a suitable solvent. Knotting may be used to reduce extractive discolouration, however, knotting is not always fully effective in "sealing in" resin. Degrease any exposed bare timber surface by wiping with a cloth dampened in a suitable solvent. Certain timber species contain high levels of natural wood extractives or exudates and some softwood can be highly resinous

New Timber:

Where a preservative treatment to softwood and hardwood is necessary, such as timbers in Durability Class 3, Class 4 (in ground contact) and 5 (marine) apply Cetol WP 567 BPD Impregnating Primer at a rate of 120 – 160 ml / m2. Cetol WP 567 must be fully dry before the application of Rubbol Primer plus.

Do not use on substrates which have had water-repellent preservative pre-treatments applied. Where possible, the first coat should be applied to all parts of the component prior to fixing.

Note: Discoloration of paint especially noticeable within

light colours may occur over knots and resinous areas present in the wood. Particular attention with regards to preparation should be given to wood such as Oak, Teak, Cedar, Douglas Fir, Mahogany and Idigbo, etc., which contain oil and water-soluble tannin which may impair the drying, hardening or adhesion of surface coatings and discolour the finished surface.

Damaged and Decayed Timber:

All damaged or decayed timber must be removed and replaced, cutting at least 25mm into sound timber. When splicing in new sections consider whether the timber species' natural durability is sufficient. Brush apply Cetol WP 567 BPD Impregnating Primer at a rate of 120 – 160 ml / m².

Thoroughly treat timbers, especially end grain sections, and ensure they are fully dry before splicing in. Secure with non-ferrous fixings and fill all voids surrounding the spliced-in area with the Componex WR Primer/Filler system.

Previously Coated Surfaces:

De-nib using a fine grade nylon abrasive pad or a fine grade (P240 or finer) wet or dry silicon carbide abrasive paper, in the direction of the grain. Do not break through the surface coating. Remove all dust.

Where there is localised damage, or deterioration has occurred as a result of exposure of the factory coating for longer than 3 months affected areas should be thoroughly sanded back to a sound substrate.

11.1.2 WOOD VARNISH

Surfaces: EXISTING / NEW TIMBER FASCIA / SOFFIT

Manufacturer: Sikkens

Product: Sikkens Cetol Filter 7 Plus. Note: colour to match existing.

Preparation: [as manufacturer's recommendations -
SAMPLE PANELS TO BE CARRIED OUT.

Undercoats: [as above].

Number of coats: [as above].

Finishing coats: [as above].

Number of coats: [as above].

11.1.3 SATIN PAINT (EXISTING / NEW FERROUS METALS

Manufacturer: [Dulux Trade as 11.1.1].

Surfaces: [Existing / new ferrous metals].

Colours: [to be dealt with on a room by room basis –
exact colours TBC. – SAMPLE PANELS TO BE CARRIED
OUT].

Product reference: [Metalshield Satin]

- Preparation:

To be read in conjunction with manufacturers recommendations.



541 - Dulux
Metalshield Satin.pc

Primer and Undercoat:

New or bare surfaces should be primed with an appropriate **Metalshield** primer from Dulux Trade.

New or unpainted metalwork:

To get the best results, ensure surfaces to be painted are sound, clean and dry (new surfaces particularly must be fully dry) and free from all defective or poorly adhering material such as dirt, grease or wax. New or bare surfaces should be primed with an appropriate Metalshield primer from Dulux Trade. Thoroughly rub down previously painted surfaces, using 'wet flatting' methods where possible, then wipe off with a damp, lint free cloth. Special precautions should be taken during surface preparation of pre-1960s paint surfaces over wood and metal as they may contain harmful lead.

11.2 GENERALLY

11.2.1 HANDLING AND STORAGE

Coating materials: Deliver in sealed containers, labelled clearly with brand name, type of material and manufacturer's batch number. Materials from more than one batch: Store separately. Allocate to distinct parts or areas of the work.

11.3 COMPATIBILITY

11.3.1 Coating materials selected by contractor:

Recommended by their manufacturers for the particular surface and conditions of exposure.

Compatible with each other. - Compatible with and not inhibiting performance of preservative/fire retardant pre-treatments.

11.4 PROTECTION

11.4.1 'Wet paint' signs and barriers: Provide where necessary to protect other operatives and general public, and to prevent damage to freshly applied coatings.

11.5 INSPECTION BY COATING MANUFACTURERS

11.5.1 General: Permit manufacturers to inspect work in progress and take samples of their materials from site if requested.

11.6 PREPARATION

11.6.1 PREPARATION GENERALLY

Standard: To BS 6150, Section 4.

Preparation materials: Types recommended by their manufacturers and the coating manufacturer for the situation and surfaces being prepared.

Substrates: Sufficiently dry in depth to suit coating.

Efflorescence salts: Remove.

Dirt, grease and oil: Remove. Give notice if contamination of surfaces/ substrates has occurred.

Surface irregularities: Abrade to a smooth finish.

Joints, cracks, holes and other depressions: Fill with stoppers/ fillers. Work well in and finish off flush with surface. Abrade to a smooth finish.

Dust, particles and residues from abrasion: Remove.

-Fill with stoppers/ fillers. Work well in and finish off flush with surface.

-Abrade to a smooth finish.

Water based stoppers and fillers:

-Apply before priming unless recommended otherwise by manufacturer.

-If applied after priming: Patch prime.

Oil based stoppers and fillers: Apply after priming.

Doors, opening windows and other moving parts:

-Ease, if necessary, before coating.

-Prime resulting bare areas.

11.7 EXISTING IRONMONGERY

11.7.1 Refurbishment: Remove old coating marks. Clean and polish.

11.8 PREVIOUSLY COATED SURFACES GENERALLY

11.8.1 Preparation standard: To BS 6150, Section 6.

Removing coatings: Do not damage substrate and adjacent surfaces or adversely affect subsequent coatings.

Loose, flaking or otherwise defective areas: Carefully

remove to a firm edge.

Alkali affected coatings: Completely remove.

Contaminated surfaces: Give notice of:

- Coatings suspected of containing lead.

-Substrates suspected of containing asbestos.

-Significant rot, corrosion or other degradation of substrates.

Retained coatings:

-Thoroughly clean to remove dirt, grease and contaminants.

-Gloss coated surfaces: Abrade to provide a key.

Partly removed coatings:

-Additional preparatory coats: Apply to restore original coating thicknesses.

-Junctions: Abrade to give a flush surface.

Completely stripped surfaces: Prepare as for uncoated surfaces.

11.9 PREVIOUSLY COATED WOOD

11.9.1 Degraded or weathered surface wood: Abrade to remove.

11.9.2 Degraded substrate wood: Repair with sound material of same species.

11.9.3 Exposed resinous areas and knots: Apply two coats of knotting.

11.10 PREPRIMED WOOD

11.10.1 Areas of defective primer: Abrade back to bare wood and reprime.

11.11 UNCOATED WOOD

11.11.1 General: Abrade to a smooth, even finish with arrises and moulding edges lightly rounded or eased.

11.11.2 Heads of fasteners: Countersink sufficient to hold stoppers/fillers.

11.11.3 Resinous areas and knots: Apply two coats of knotting.

11.12 ORGANIC GROWTHS

11.12.1 Dead and loose growths and infected coatings: Scrape off and remove from site.

11.12.2 Treatment biocide: Apply appropriate solution to growth areas and surrounding surfaces.

11.12.3 Residual effect biocide: Apply appropriate solution to inhibit re-establishment of growths.

11.13 PREVIOUSLY PAINTED WINDOWS FRAMES

11.13.1 Paint encroaching beyond glass sight line: Remove.

11.13.2 Loose and defective putty: Remove.

11.13.3 Putty cavities and junctions between previously painted surfaces and glass: Clean thoroughly.

11.13.4 Finishing:

-Patch prime, reputty as necessary, and allow to harden.

-Seal and coat as soon as sufficiently hard.

11.14 APPLICATION

11.14.1 COATING GENERALLY

Application standard: To BS 6150, Section 5.

Conditions: Maintain suitable temperature, humidity and air quality during application and drying.

Surfaces: Clean and dry at time of application.

Thinning and intermixing of coatings: Not permitted unless recommended by manufacturer.

Overpainting: Do not paint over intumescent strips or silicone mastics.

Priming coats:

-Thickness: To suit surface porosity.

-Application: As soon as possible on same day as preparation is completed.

Finish:

-Even, smooth and of uniform colour.

-Free from brush marks, sags, runs and other defects.

-Cut in neatly.

11.15 PRIMING JOINERY

11.15.1 Preservative treated timber: Retreat cut surfaces with two flood coats of a suitable preservative before priming.

11.15.2 End grain: Coat liberally allow to soak in and recoat.

11.16 WORKSHOP COATING OF CONCEALED JOINERY SURFACES

11.16.1 General: Apply coatings to all surfaces of components.

11.17 CONCEALED METAL SURFACES

11.17.1 General: Apply additional coatings to surfaces that will be concealed when component is fixed in place.

-Components: Backs of rainwater pipes.

11.17.2 Additional coatings: n/a.

11.18 EXTERNAL DOORS

11.18.1 Bottom edges: Prime and coat before hanging doors.

11.19 BEAD GLAZING TO COATED WOOD

11.19.1 Before glazing: Apply first two coats to rebates and beads.

11.20 PUTTY GLAZING

11.20.1 Setting: Allow putty to set for seven days.

Sealing:

-Within a further 14 days, seal with an oil based primer.

-Fully protect putty with coating system as soon as it is sufficiently hard.

Extend finishing coats on to glass up to sight line.

Install putty as clause **Error! Reference source not found.** above.

12.0 REPAIR OF TIMBER FRAMED STRUCTURES AND COMPONENTS

NOTE: Under no circumstances are any structural alterations to be carried out prior to the Structural Engineer commenting on the Contractors temporary works proposals.

No works will commence to any structural alterations until the Structural Engineer has carried out an inspection.

12.1 MATERIALS

12.1.1 Redwood for Replacement Timbers

Timbers shall be selected to comply with TRADA information sheets and guidance documents.

The maximum permissible size of knots is listed below.

It shall be noted that only one knot of maximum size is permitted within any 300mm zone.

Width of Surface	Knots on any Surface of compression member	Knots on any Surface of tension member
16	7	-
19	8	-
22	9	-
25	10	-
32	12	4
36	13	6
38	14	6
40	15	6
44	16	8
50	19	9
63	23	12
75	27	18
100	35	20
125	43	25
150	51	30
175	59	34
200	66	39
225	72	44
250	78	48
300	91	59

All sections shall be in excess of the smallest diameter required to obtain the specified rough sawn size.

No sapwood will be permitted.

Sizes given in the repair drawings are approximate and

the contractor shall take site sizes to match existing timbers where repairs are concerned, and where replacements are required the section of new timber should match the timber which is being removed unless a different size is specified.

Sections to be removed from the works may only be used for repairs with the express written permission of the Architect. The use of second-hand timbers from other buildings or sources will not be permitted under any circumstances.

12.1.2 Oak Pegs

Oak pegs for joints shall be formed from heart of oak with a square head and tapering to an octagonal base.

Pegs to be of a length and diameter to suit the location and should stand proud of the finished joint by 25mm.

12.1.3 Loose Tenons (Slip Tenons)

Shall be fabricated from air dried oak.

12.1.4 Non-Structural Components

Window Mullions and Joinery Components not associated with the main structural frame shall be fabricated from air dried oak.

12.2 PREPARATION OF TIMBERS

12.2.1 Timbers of Large Cross-Sectional Area

All members in excess of 200mm x 200mm or equivalent cross-sectional area shall be cut from boxed-heart logs squared with axe or adze on cambered surfaces (top and bottom in the case of beams) and sawn on the sides.

12.2.2 Timbers of Smaller Cross-Sectional Area

Where straight sections are required these may be sawn or axed on the remaining three sides.

12.2.3 Curved Members

Curved members may be sawn on the face opposite the heart surface but must be axed or adzed on the curved top and bottom edges such that their final shape conforms to the natural grain of the timber.

12.2.4	Shaped Members		
	Shaped members such as jowelled heads of posts, tie beams etc shall be axed or adzed to shape in accordance with the natural grain and sawn surfaces will be permitted on the sides and outer face.		manner, with repairs being completed before cutting out subsequent sections. The contractor is to prepare a programme for repairs with each section identified and is to submit the programme to the Architect and Structural Engineer at least 2 weeks prior to commencing repairs. Any variation to the sequence of the programme shall be notified to the Architect and the Structural Engineer in writing at least one week before carrying out works in the revised sequence.
12.2.5	Finished Surfaces		
	On finished surfaces saw marks may be left visible, but on axed or adzed sickness the timber shall be finished smooth. Visible axe or adze marks shall not be permissible. Chamfers shall be axed chiselled or planed.	12.5.3	Where necessary the frame shall be propped to ensure that no settlement occurs during cutting out. Great care shall be taken during the insertion of any necessary props to ensure that the props only take the weight and do not exert any pressure in themselves. Where props are used the timber, structure shall be protected from damage by using minimum 25mm thick timber packers between the prop and the timber. Similarly protect under all props.
12.3	STORAGE		
12.3.1	All timbers delivered to site shall be kept under cover and in conditions to match those where they will ultimately to used.		
12.4	INSERTION OF NEW TIMBERS		
12.4.1	Where timber is to be inserted as a partial replacement of an existing member, the new timber shall be selected to match as near as is practical the grain pattern of the retained timber. Once selected it shall be cut to match the existing profile at the position of the joint.	12.5.4	There is a large quantity of embedded timbers across the interior elevations. All timbers are currently highlighted to be replaced pending further examination and inspection by the CA and contractor. Prior to cutting out of defective timber, the masonry shall be appropriately propped to ensure that no settlement occurs. Great care shall be taken as noted above. It may be necessary to allow for grouting of the solid masonry wall prior to cutting out to retain structural integrity of the fabric.
12.4.2	Where timbers are to replace existing members in their entirety then the timber shall be selected to ensure that the new member will not cause any distortion of the existing structure or finishes by virtue of an ill fit. Members must be selected or shaped to ensure that existing members are accommodated without distress. No attempt should be made to correct existing distortions within the frame unless specifically instructed to do so by the Architect.	12.6	CUTTING OUT AND FORMATION OF REPAIRS
12.4.3	Insertion or replacement of timbers shall be carried out in an agreed sequence and one repair shall be completed before commencing any further repairs. This is to ensure that no undue weakening of the existing structure occurs during repairs.	12.6.1	Great care shall be exercised to ensure that all repairs match as near as possible the grain and section of the timbers they are replacing.
		12.6.2	All repairs shall be identified as new repairs with the date of their execution being carved into the new timber.
12.5	PREPARATION OF REPAIRS	12.6.3	Only the areas or members previously marked out by the Architect are to be cut out. Do not exceed the agreed lines of cuts without the consent of the Architect. Wherever possible the extent of timber removal is to be kept to a minimum in order to retain as much of the historic fabric as possible.
12.5.1	The areas of timber to be replaced or repaired shall be finalised on site with the Architect and the sections for renewal are to be marked out. The profile of joints, splices etc will be marked out and approved by the Architect prior to any cutting out commencing.	12.6.4	Reference is to be made to the drawings prior to cutting out to ensure that the required joint is fully understood. Under no circumstances should cutting out of existing timbers take place based solely on the marked-up joint on the member, as this will indicate the finished visible line of repair and not necessarily
12.5.2	Cutting out shall be carried out in a sequential		

the requirements for the "core" of the joint.

Contractor to make good surrounding building fabric following timber replacement.

- 12.6.5 Embedded timber within the solid wall construction shall be replaced on a like-for-like basis and will match the grain and section of timber they are replacing.

New sections to be inserted will be no longer than 1.8m in length to allow for handling and sequencing of removal and insertion. Timbers to be lapped at joint.

13.0 STUCCO RENDER REPAIRS ONTO MASONRY

13.1 General

- 13.1.1 This specification to be read in conjunction with the contract terms, conditions, and preliminaries.

13.2 Sample Panels

- 13.2.1 The tenderer is to allow for carrying out up to four test panels each approximately 1 metre square under the direction of the Architect, using the methods described below. Work to the rest of the render should not commence until the test panel has been approved by the Architect. The location of the test panels is to be agreed with the Architect prior to commencement.
- 13.2.2 Tenderer is to allow for several sample mixes using different coloured pigments to obtain a satisfactory colour for the rendering.

13.3 Protection

- 13.3.1 Prior to any repair works being undertaken, the working area is to be fully protected inc walls, floors, windows, joinery (both loose and fixed).

13.4 Preparation

- 13.4.1 Background preparation: follow good working practices, ensuring that the background is thoroughly clean. If removing vegetable growth using biocides check that these would not react with the render causing stains. If the background is saturated check for cracks or other causes of water penetration, (faulty gutters or drainpipes, cracks in the joints of terraced roofs etc.). Causes of damp should be remedied and cracks should be cleaned out, (packed with low fire clay tiles or slate if necessary) and sealed with an NHL pointing mortar and allowed to cure for 1 or 2 days before rendering starts. Where there has been prolonged water penetration through the core of the wall it might be necessary to grout the cavity. Always use NHL grouts.

Old bricks require more water than new ones. The top of the structure will dry out before the bottom. In base coats this means that scouring back and keying of the lower section might have to be done later than the upper section. Always dampen down before applying subsequent coats.

Setting Properties of NHL Mortars: The setting

properties of NHL mortars require much lesser time for protection against adverse weather conditions than fat lime mortars. Precautions are however necessary and, if in doubt, Womersleys Limited will be able to advise. The following are the main recommendations.

Mortars made Protect from frost, heavy rain, strong wind or direct sun for a minimum of: - NHL 5 = 48 hours; NHL 3.5= 72 hours; and NHL 2 =96 hours.

The preferred form of protection is damp hessian cover which, with re-damping, will also contribute to curing the mortar.

Frost protection should be applied even if frost is not occurring at the moment of finishing the day's work but is forecasted during the night or within a short time (see suggested protection periods above) from completion of work. Work should not start in frost conditions or with temperatures below 5°C. In working with NHL 2 or in rendering with fine finishing coats, this should be 8C.

Protection from direct sun should be provided by using shading sheets or debris netting on scaffolding.

Prior to carrying out any stucco repairs, an assessment of the stucco should be undertaken to determine the extent of the damage. Testing of the plaster should be carried out systematically on all elevations to determine the overall condition of the stucco and how much is to be replaced or repaired. Some areas in need of repair will be clearly evidenced by missing sections of stucco or stucco layers. Unsound, punky or soft areas that have lost their key will echo with a hollow sound when tapped gently with a wooden or acrylic hammer or mallet.

Analysis of the historic stucco will provide useful information on its primary ingredients and their proportions and will help to ensure that the new replacement stucco will duplicate the old in strength, composition, colour and texture as closely as possible.

All deteriorated, severely cracked and loose stucco should be removed down to the masonry if the stucco is directly applied to a masonry substrate. A clean surface is necessary to obtain a good bond between the stucco and substrate. The areas to be patched should be cleaned of all debris with a bristle brush, and all plant growth, dirt, loose paint, oil or grease

should be removed. If necessary, brick or stone mortar joints should then be raked out to a depth of approximately 15mm to ensure a good bond between the substrate and the new stucco.

Re point any deep recesses using a weaker mix of Natural Hydraulic Lime mortar than that specified for the render. (NHL 3.5 1:3 ratio with 2.5mm down well graded aggregate and sharp sand). See section 3.0.

Thoroughly dampen down the substrate before application

For particularly indented substrates, provide a dubbing out coat of NHL 5 in a 1:1.5 - 2 ratio using a 4mm down well graded aggregate.

To obtain a neat repair, the area to be patched should be squared-off with a butt joint using a cold chisel / a hatchet. Proper preparation of the area to be patched requires very sharp tools and extreme caution on the part of the plasterer not to break keys of surrounding good stucco by 'over sounding' when removing deteriorated stucco.

When repairing lime-based stucco applied directly to masonry, the new stucco should be applied in the same manner, directly onto the stone or brick.

A stucco mix compatible with the historic stucco should be selected after analysing the existing stucco. It can be adapted from a standard traditional mix of the period or based upon the analysed sample as noted above.

When patching or repairing a historic stucco surface known to have been tinted, it may be possible to determine through visual or microscopic analysis whether the source of the colouring is sand, cement or pigment.

13.5 Application – New hydraulic lime render to new brickwork

- 13.5.1 Suction Control: if necessary, apply sufficient water to reduce excessive suction, especially on bricks. On many occasions this is done the day before, if necessary, several times with the last damping just before application starts. Apply water starting at the top of the structure.

The top of the structure will dry out before the bottom. In base coats this means that scouring back and keying of the lower section might have to be done later than the upper section. Always dampen down

before applying subsequent coats.

Keying: leave new brick work joints raked back (normally 10mm).

Apply a Stipple or Spatter dash coats to provide adequate keying to the dense brick background of between 3 and 5 mm. This coat has to provide sufficient bonding to support the remaining coats of render. Use a strong mix (1-part Ionic NHL3.5 Old White lime to 1.5 parts sharp sand).

Undercoat/Scratch Coat: to be applied 3-4 days (or more, depending on atmospheric conditions) after completion of the stipple coat. Its strength should be less than the first coat (1-part Ionic NHL3.5 Old White lime to 2.5 parts sharp sand). Thickness can vary according to the overall thickness required but it is normally between 10 and 12 mm. Provide a criss-cross key, creating 25-35 mm diamonds, with a pointed wooden lath.

Float Coat: to be applied 3-4 days (or more, depending on atmospheric conditions) after completion of the scratch coat. Its strength should be less than the previous coat. The thickness should be kept between 8 and 12 mm (1-part Ionic NHL3.5 Old White lime to 3 parts sharp sand).

Ensuring a level surface: using screeds dropped down the building. Scour back and key with a devil float after initial setting. Check for shrinkage during the first 2 days and, if necessary, lightly dampen the relevant area, scour back and re-key. Do not apply a finishing coat for 3-7 days, until undercoat is adequately firm and any small amounts of shrinkage are complete.

Finishing Coat: Apply 5-5mm of Lime Green Natural Finish or other premixed moderately hydraulic lime finish coat.

Protection from frost or direct sun for a minimum of 72 hours. The preferred form of protection is damp hessian cover which, with re-damping, will also contribute to curing the mortar. Plastic sheeting is effective against rain but should not be touching against fresh work. If too tight they will also provoke trapping of condensation. Plastic sheets, unless they are bubble wrap, will not protect against frost.

Frost protection should be applied even if frost is not occurring at the moment of finishing the day's work but is forecasted during the night or within a short time (see suggested protection periods above) from completion of work. Work should not start in frost

conditions or with temperatures below 5°C.

In working with NHL 2 or in rendering with fine finishing coats, this should be 8°C.

Protection from drying winds or direct sun should be provided by using shading sheets or debris netting on scaffolding.

The mortar should always be weaker than the proceeding coats, consult Womersleys Ltd in doubt.

Note: in all renders, coats should be applied firmly to exclude air and any excessive moisture. Suction needs to be carefully controlled at all times.



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Ensuring a level surface: using screeds dropped down the building. Scour back and key with a devil float after initial setting. Check for shrinkage during the first 2 days and, if necessary, lightly dampen the relevant area, scour back and re-key. Do not apply a finishing coat for 3-7 days, until undercoat is adequately firm and any small amounts of shrinkage are complete.

Finishing Coat: Apply 5-5mm of Lime Green Natural Finish or other premixed moderately hydraulic lime finish coat.

13.5.2 Apply all renders firmly to exclude any air and excessive moisture. Suction to be carefully controlled at all times.

13.5.3 Re-work coats as necessary to control shrinkage and to achieve a smooth finish in the Finishing Coat.

13.5.4 Lining-Out.

Lining-out is the method of running very fine lines across a smooth render to create the illusion of finely jointed stone ashlar. Render should only be lined-out where there is previous evidence for it. Lining-out should exactly follow the pattern of the original and be indented to appear like mortar joints, not just scored with a trowel.

Day work joints can be difficult to disguise, on lined out stucco, the course lines should be used to mask them by cutting away some of the previous day's work

to 'key in' the new work. Unlined work should be finished at some physical break in the building.

13.5.5 Repairing Render.

Where patches of render have become loose and/or fallen off, cut back the edges to sound plaster. Ensure the edges of the patch are cut square to provide a key for the new mortar and eliminate feather edging.

Where render is cracked or hollow it may be possible to consolidate and retain and should be assessed prior to removal.

Where stucco is lined out, cutting out should always follow the joint lines. Stucco that is not lined out should be cut out to rectangular shapes around defective area. After cutting out, remove all dust, loose material, efflorescence, and organic growth using a bristle brush and biocide treatment. Where timber framing is flush with the brickwork, a non-ferrous mesh should be fixed onto the surface of the timber using non-ferrous or stainless-steel fixing and covered with a 3-6mm spatter dash.

13.5.6 Stucco Mouldings and Other Details.

Where moulded decoration has deteriorated, it should be repaired rather than removed. In reproducing mouldings and details, the traditional method of 'running' mouldings in situ, using a 'horse mould' should be utilised. A stencil with the profile moulding carefully cut out should be produced and this mounted firmly in a frame which is to run between guides fixed on either side of the cornice, stringcourse.

Render are traditionally swept over window heads without weathering details. Corners should be formed by hand without the use of metal or plastic angle pieces or beading.

13.6 Weather & Protection

13.6.1 Stucco render to be protected from frost or direct sun as below: -

To prevent cracking, it is imperative that stucco not dry too fast. The area to receive stucco should be shaded or even covered if possible, particularly in hot weather. It is a good idea in hot weather to keep the newly stuccoed area damp at approximately 90% humidity for a period of 48 to 72 hours.

Protect using a Hessian sheet, dampened down as necessary.

Apply frost protection if there is any likelihood of frost occurring. Stucco repairs should not be carried out in cold weather. Work should not start in frost conditions or with temperatures at 5°C and falling or at 4°C and rising.

Protection from drying winds or direct sun should be provided by using shading sheets or debris netting on scaffolding.

- 13.6.2 Any work affected by the weather is to be cut out and replaced at the Contractor's expense.

NOTE ON WINTER WORKING

As with all good building practice using any mortars, plasters/renders and paints, protection should be provided against frosts, wind, rain and direct sunlight.

Please note, it is not recommended to use lime products (lime mortars, renders and lime washes) when temperatures are liable to fall below 5°C (41°F) for several weeks/months after the product has been used.

In practice this means that unless adequate weather protection is provided with a fully tented and heated scaffold pure Hot Lime Mortars and Non-Hydraulic/Fat Limes/Air Limes and the weaker Natural Hydraulic Limes should not be used externally until spring.

If work must continue, then please note:

- a. Damp walls must be allowed to dry out prior to the application of mortars, renders or plasters.
- b. Protection is vital but if there is a good drying, sunny day, the protection should be opened up during the day to help the carbonation. Please note - protection may need to be left up throughout the vulnerable time until the danger of frosts is over.
- c. Be aware that too much moisture can retard carbonation/setting so if your substrate is already wet, you will not need to dampen down the background, you will need to allow the background to dry out.
- d. Different elevations and applications need to be treated differently as they will get different weather – know your site, know which way the weather comes from, know which parts do not get any sun/remain in shade and give them as much help as possible – extra protection, extra

damping down – don't expect that the same product will behave the same throughout different elevations and applications on the site. Even internally, different substrates may need to be treated differently e.g. one wall may be particularly wet for some reason, this will slow carbonation down and may impede it altogether.

- e. Record the temperature (using a min/max thermometer) – prolonged periods of less than below 5°C (41°F) may cause problems in the future – it is advisable to keep records.
- f. With external renders it may be necessary to introduce heat into the space between the covers and the render if the temperature is around or below 5°C (41°F) for prolonged periods.

Work can carry on indoors if minimal heat is provided to keep the building above 5°C (41°F) - however direct heat can also cause failures.

- 13.6.3 Always ensure adequate ventilation is maintained at all times.

13.7 Materials

- 13.7.1 Materials can be supplied from one of the following suppliers.

1. Womersley Associates
Walkley Lane
Heckmondwike
WF16 0PG
E: info@womersleys.co.uk
Tel: 01924 400651
2. Lime Stuff Ltd
Unit 12, Glendale Farm
Southampton Road
Whiteparish
Salisbury, Wilts
E: info@limestuff.co.uk
Tel: 01794 884294
3. Rose of Jericho
Horchester Farm
Dorset

E: info@rose-of-jericho.demon.co.uk

Tel: 01935 83676

4. Masons Mortar Ltd
77 Salamander Street
Edinburgh
E: sales@masonmortar.co.uk
Tel: 0131 555 0503

5. Ty-Mawr
Units 5 & 12
Brecon Enterprise Park
Brecon
Powys
LD3 8BT
E: tymawr@lime.org.uk
Tel: 01874 611350

6. Bleaklow Industries Limited
Hassop Avenue, Hassop
Bakewell
Derbyshire DE45 1NS
Tel. 01246 582284

7. Lincolnshire Lime Co.
Northfield Farm
Dam Lane
Thornton Curtis
North Lincolnshire
DN39 6XN
E: sales@lincolnshirelime.co.uk
Tel: 01469 531227

- 13.7.2 All sand shall be to BS 1199 and 1200:1976, non-staining clean sharp coarse sand. Sand shall be selected so that when the mortar has dried out the colour will match the colour and texture of the original mortar, unless instructed otherwise in writing by the Architect. Aggregate / Sand to be sourced from a local quarry to the satisfaction of the Architect. Contractor to submit proposals.

- 13.7.3 Hair to be horsehair from an approved supplier, well beaten into an even distribution, free of lumps and clumps. Hair NOT to be applied to finish coat.

13.8 Additives

- 13.8.1 Under no circumstances will the addition of any additives to the render be permitted.

13.9 Water

- 13.9.1 Water from the works shall be clean and fresh without pollutants. Where existing water supply is available within the building this may only be used with the Employers permission. In other cases, a lockable stand pipe shall be erected to the approval of the local water authority.

13.10 Finishing

- 13.10.1 The stucco render is to match existing areas to which it is replacing in terms of pigment, colour, bond and texture.

13.11 Sample Panels

- 13.11.1 Allow for providing a minimum of two sample panels spread across the elevation as identified in clause 13.2 above.

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