

Restoration Specification

Restoration Specification
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1.0 Introduction

1.1 Definitions

EMPLOYER'S REPRESENTATIVE means the person nominated in the Contract as Employer's Representative, Architect, Contract Administrator or Project Manager.

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.

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.

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

CONSOLIDATION 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.

2.0 General

2.1 Precedence

2.1.1 General: Where, and to the extent that, documents conflict the following orders of precedence apply:

2.1.2 Preliminaries override contract drawings, which override the Reference specification.

2.1.3 Conflict in the documents: Give notice.

2.2 Definitions and interpretations - General

2.2.1 Employer's Representative: The person nominated in the Contract as Employer's Representative, Architect, Contract Administrator or Project Manager.

2.2.2 Reference specification: Not all clauses in the Reference specification apply to this project. If in doubt about the applicability of a clause, obtain instructions.

2.2.3 Communication: When required to communicate – including advise, inform, submit, give notice, instruct, agree, confirm, seek, or obtain information, consent, or instruction, or make arrangements – do so in writing to the Employer's Representative.

2.2.4 Responses from the Employer's Representative: Do not proceed until response has been received.

2.3 Definitions and interpretations – products and work

2.3.1 Remove:

a) Disconnect, dismantle as necessary and take out the designated products or work and associated accessories, fastenings, supports, linings and bedding materials. Dispose of unwanted materials.

b) Excludes taking out and disposing of associated pipework, wiring, ductwork, or other services.

2.3.2 Keep for reuse:

a) Do not damage designated products or work. Clean off bedding and jointing materials.

2.3.3 Make good:

a) Execute local remedial work to designated work. Make secure, sound, and neat.

b) Excludes redecoration and/ or replacement.

2.3.4 Repair:

a) Execute remedial work to designated products. Make secure, sound, and neat.

b) Excludes redecoration and/ or replacement.

2.3.5 Refix: Fix removed products.

2.3.6 Replace: Supply and fix new products matching those removed. Execute work to match original new state of that removed.

2.3.7 Ease: Adjust moving parts of designated products or work to achieve free movement and good fit in open and closed positions.

2.3.8 Match existing: Provide products and work of the same appearance and features as the original, excluding ageing and

weathering.

2.3.9 Make joints between existing and new work as inconspicuous as possible.

2.4 Documents

2.4.1 Currency: References to published documents are to the editions, including amendments, current on the date of the Invitation to tender.

2.4.2 Services drawings: Diagrammatic, except to the extent that figured dimensions are given or calculable.

2.4.3 Dimensions: Do not rely on scaled dimensions.

2.5 Compliance

2.5.1 Submittals, samples, inspections, and tests: Undertake to suit the Works programme. Do not conceal, or proceed with, affected work until compliance with requirements is confirmed.

2.5.2 Compliance with proprietary specifications: Retain on site evidence that the proprietary product specified has been supplied.

2.5.3 Compliance with performance specifications: Submit evidence of compliance, including test reports indicating properties tested, pass/ fail criteria, test methods and procedures, test results, identity of testing agency, test dates and times, identities of witnesses, and analysis of results.

2.6 Design and production documentation

2.6.1 Design compliance: Submit certification that design complies with documented requirements.

2.6.2 Documentation:

2.6.3 Draft: Submit complete design and production documentation.

2.6.4 Final: Submit sufficient copies for distribution to affected parties. Keep at least one copy on site.

2.6.5 Space requirements: Check space requirements of products or work indicated diagrammatically in the contract documents. Submit a report on consequent variations needed to the design.

2.6.6 Drawings: Include dimensions.

2.7 Authorities and statutory undertakers

2.7.1 Approvals: Submit evidence of approvals of relevant authorities and statutory undertakers.

2.8 Product samples

2.8.1 Complying samples: Retain in good, clean condition on site.

2.9 Products and Execution

2.9.1 General quality

2.9.2 Products generally: New. Proposals for recycled products will be considered.

a) Supply of each product: From the same source or manufacturer.

b) Whole quantity of each product required to complete the Works: Consistent kind, size, quality, and overall appearance.

c) Product tolerances: Where critical, measure a sufficient quantity to determine compliance.

2.9.3 Execution generally: Fix, apply, install, or lay products securely, accurately, plumb, neatly and in alignment.

a) Colour batching: Do not use different colour batches where they can be seen together.

b) Dimensions: Check on-site dimensions.

c) Finished work: Not defective, e.g. not damaged, disfigured, dirty, faulty, or out of tolerance.

2.10 Sizes

2.10.1 General dimensions: Nominal.

2.10.2 Cross section dimensions of timber: Finished dimensions.

2.11 Substitution

2.11.1 Products: If an alternative product to that specified is proposed, obtain approval before ordering the product.

2.11.2 Work: If alternative work to that specified is proposed, obtain approval before execution.

2.11.3 Reasons: Submit reasons for the proposed substitution.

2.11.4 Documentation: Submit relevant information, including:

a) manufacturer and product reference;

b) cost;

c) availability;

d) relevant standards;

e) performance;

f) function;

g) compatibility of accessories;

h) proposed revisions to drawings and specification;

i) compatibility with adjacent work;

j) appearance; and

k) copy of warranty/ guarantee.

2.11.5 Alterations to adjacent work: If needed, advise scope, nature, and cost.

2.11.6 Manufacturers' guarantees: If substitution is accepted, submit.

2.12 Incomplete documentation

2.12.1 General: Where and to the extent that products or work are not fully documented, they are to be:

a) Of a kind and standard appropriate to the nature and character of that part of the Works where they will be used.

b) Suitable for the purposes stated or reasonably to be inferred.

2.13 Manufacturers' recommendations

2.13.1 General: Comply with manufacturer's current printed recommendations and instructions.

2.13.2 Changes to recommendations or instructions since close of tender: Submit details.

2.13.3 Manufacturers' current recommendations and instructions: Keep copies on site.

2.13.4 Ancillary products and accessories: Use those supplied or recommended by main product manufacturer.

2.13.5 Agrément certified products: Comply with limitations, recommendations, and requirements of relevant valid certificates.

2.14 Defects in existing work

2.14.1 Reporting undocumented defects: When discovered, immediately give notice. Do not proceed with affected related work until response has been received.

Documented remedial work: Do not execute work which may:

a) hinder access to defective products or work; or

b) be rendered abortive by remedial work.

2.15 Accuracy, appearance and fit

2.15.1 Tolerances and dimensions: If likely to be critical to execution or difficult to achieve, as early as possible either:

a) submit proposals; or

b) arrange for inspection of appearance of relevant aspects of partially finished work.

2.15.2 General tolerances (maximum): To BS 5606, tables 1 and 2.

2.16 Services runs

2.16.1 General: Provide adequate space and support for services, including unobstructed routes and fixings.

2.16.2 Services inaccessible after installation: Submit proposals for future location and identification of runs and fittings.

2.16.3 Fixing of services: Submit typical details of locations, types, and methods of fixing of services to fabric.

2.17 Spares

2.17.1 General: Supply designated spares in their original packaging.

2.18 Schedule of Works, Drawings & Reports

2.18.1 General: The specification must be read in association with all available drawings, schedules, specifications, and reports.

2.19 Sub-consultants, specialists

2.19.1 General: The specification must be read in association with all available sub consultant / specialists' information, including drawings, schedules, specifications, and reports. Any discrepancies / anomalies identified are to be brought to the attention of the Architect as soon as they become evident.

2.20 Contractor Designed Packages

2.20.1 Where appropriate, sub-contractor designed packages related to the architectural elements are highlighted upon Buttress Architects drawings.

3.0 Specific Requirements

3.1 Method Statements

3.1.1 The Contractor must provide method statements detailing the sequencing, method of work and protection for the following items:

3.1.1.1.1 Management of security of the site.

3.1.1.1.2 Management of public access to and in and around the museum, including all temporary access provisions.

3.1.1.1.3 Site setup, including deliveries and parking.

3.1.1.1.4 Protection of all historic fabric during the works, including exhibits and collections items.

3.1.1.1.5 Recording of historic fabric prior to the works commencing on site.

3.1.1.1.6 Methodology for movement of materials throughout the site without causing damage to the historic fabric.

3.1.1.1.7 Control of dust, debris, and noise without causing nuisance to adjoining properties.

3.1.1.1.8 Protection against existing masonry falling from high level.

3.1.1.1.9 Management of the removal of waste.

3.1.1.1.10 Safe access for high level works.

3.1.1.1.11 Methodology for removing historic fabric during the works.

3.1.1.1.12 Methodology for all fabric repair works.

3.1.2 Note: the contractor may be required to provide additional method statements, as stipulated and highlighted across this full specification.

3.2 Work in Listed Buildings and Heritage Assets

3.2.1 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.

3.2.2 Should the Contractor be in doubt about the extent of works or protection required, they must 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 must make any queries to the Architect in a timely manner.

3.2.3 The Contractor must 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 must be agreed with the Architect prior to works being carried out.

3.2.4 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.

3.2.5 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.

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

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

3.2.8 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.

3.2.9 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.

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

3.3 Opening-up and Inspection

3.3.1 It is the nature of the historic building repair works described on the drawings, that the full scope or nature of these works will not be known until opening-up and exposure of concealed / hidden structure and access to closely inspect the historic fabric has been undertaken by the contractor and Architect. The Contractor is to be fully aware of the requirement for inspection and clarification of the scope and specification of repairs throughout the works, making allowance within the programme for such input by the Architect. It is expected that the Contractor shall make themselves available together with their Head Mason and Conservator to inspect and confirm the scope of works to each elevation with the Architect, Curator and Employer's representatives and that this period of further investigation shall be allowed for in their programme.

3.3.2 The Contractor is to allow for a sequencing of work and operations, typically as set out below:

1. Preparation and submission of method statements and samples, with adequate time for review by the Design Team and revision or re-sourcing, as necessary. It is recommended that method statements be submitted 2 weeks prior to the undertaking of the relevant works.
2. Protection of the adjacent historic fabric and access routes as required.
3. Recording and opening-up of the fabric, to expose concealed structure etc.
4. Inspection of the fabric by the Architect, allowing for recording and survey works, as necessary. The contractor is to include for providing access and allowing time within the programme for such inspections.
5. Inspection of the fabric by the structural engineer, local authority etc and/or specialist surveyors, timber and damp for example.
6. Confirmation of instructions for works, which might differ from expectations and allowances, outlined within the contract documents. The contractor is to allow time within the programme and sequence the opening-up and repairs to enable such input.
7. Undertaking of the specified works, with allowance for inspection by the Design Team as works progress and prior to covering in.
8. On-going maintenance and adaptation of protection as necessary, removal of the same and cleaning of the site area upon completion of the works.

3.4 Samples

3.4.1 Sample panels will be executed prior to commencement of the works and will be carried out by skilled craftspeople who will be working on the project. The purpose of the sample panels is to ensure that the craftsperson is familiar with the proper execution and care of the works and that the Architect and Property Curator is satisfied with the level of workmanship to be produced.

3.4.2 The Contractor shall allow for the participation of the Employer's representatives in the planning, execution, and review of all samples.

3.4.3 The Contractor is to provide a secure facility within their compound to store samples of materials and workmanship approved by the Architect. These samples are to remain available for the duration of the works.

3.5 Recording

3.5.1 Photographs

3.5.1.1 High quality digital detailed and general photographs will be taken of areas of specific interest at each progress stage, in particular to record evidence of building sequences and materials which may be subsequently lost or covered up.

3.5.1.2 At the completion of work general photographs will be taken of the completed work.

3.5.2 Drawings

3.5.2.1 Final Construction drawings to show all areas of stone repair and renewal, and mortar repairs shall be prepared.

3.5.3 Records and Reports

3.5.3.1 Written records will be kept describing work carried out and observations regarding the condition of the works. Conservation reports of work to fine carving and details shall be prepared.

3.5.4 Archive Standards

3.5.4.1 All record be they photographic, drawn or written, shall be deposited in the assigned work shared folder location in accordance with the Employer's archive policy.

3.6 Workmanship

3.6.1 The Contractor is to be aware that the Science and Industry Museum, Manchester is an important heritage site, with a number of listed assets and as such only skilled masons, conservators and craftspeople are to execute the works. Full details of those undertaking the works are to be provided to the Architect prior to commencing any works on site.

3.7 Programme

3.7.1 The Contractor shall provide a programme of work based on the tender 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 phase of work.

4.0 Access Scaffolding

4.1 Overview

4.1.1 New Warehouse

4.1.2 The scaffolding will be erected in a logical and measured approach to ensure continuity and care is taken during the erection phase. The current proposal is to start the erection of the scaffolding from the west end of the warehouse, continuing towards the east main entrance, with the erection of the scaffolding to the north elevation, carefully managed and sequence as to limit any disruption on neighbouring properties, as the north elevation directly interfaces with a main public and vehicular access route.

4.1.3 The facades will be carefully inspected, alongside the Architect, scaffold contractor and structural engineer to highlight and advise of the most suitable location for scaffold tie fixings.

4.1.4 Gantry

4.1.5 The scaffolding will be erected to in a logical and measured approach to ensure continuity and care is taken during the erection phase. The current proposal is to encapsulate and tent the entire Gantry to allow for blasting of the metalwork to be undertaken within a controlled, wind, and watertight enclosure, then allowing for subsequent remediation and redecoration.

4.1.6 The exact phasing and sequencing is to be further discussed with the specialist metalwork contractor.

4.1.7 The Gantry, elements and components will be carefully inspected, alongside the Architect, structural engineer, contractor and sub-contractor to highlight and advise the most suitable method for tying back the scaffold to the structure.

4.2 Health and Safety

4.2.1 The Contractor shall comply with all legal obligations currently in force and in particular with the following:

a) Health and Safety at Work Act 1974

b) Lifting Operations and Lifting Equipment Regulations 1998

c) Provision and Use of Work Equipment Regulations 1998

d) Construction (Health and Welfare) Regulations 1996

e) Personal Protective Equipment at Work Regulations 1992

f) Manual Handling Operations Regulations 1992

g) Management of Health and Safety at Work Regulations 1992

h) The Construction (Design & Management) Regulations 2007

i) BS EN 12811-1:2003

4.2.2 The Contractor shall ensure that a competent person inspects all material to be used for any scaffold prior to erection and inspect the completed scaffolding within 7 days of erection and prior to use.

4.2.3 Further inspections shall be carried out by a competent person within 7 days of any alteration to the scaffolding and after weather conditions likely to have affected its strength and stability, prior to use.

4.2.4 The Main Contractor is responsible for safety standards during erection, use and dismantling of the scaffold.

4.3 Proposals:

4.3.1 Pre-tender, the client has commissioned a scaffold designer to develop a scheme for the New Warehouse.

4.3.2 Scaffold designer drawing(s) references:

4.3.2.1.1 SMG6391-0

4.3.2.1.2 SMG6391-1A

4.3.2.1.3 SMG6391-2A

4.3.2.1.4 SMG6391-3

4.3.2.1.5 SMG6391-4

4.3.2.1.6 SMG6391-SK01

4.3.2.1.7 SMG7412-1a-Model

4.3.2.1.8 The contractor must check and confirm that they are in possession of the most up to date / current drawings, calculations, schedules, and revisions.

4.3.3 The purpose of this, was as follows:

1) To aid general discussions around site wide logistics.
2) To aid review of sequencing, commencing erection from the east.
3) To aid discussions and communication with neighbouring property owners.
4) To develop an approach to the north elevation, which is constrained being on a principal access route.
5) To identify constraints and access requirements.
6) To identify potential scaffold access points and loading bays.
7) To aid budget analysis.
8) To identify scaffold fixing / restraint requirements.

4.3.4 The scaffold proposal provided by the client within the tender pack is to be reviewed by the contractor and assessed for its suitability.

4.3.5 The contractor is not required or tied to the pre-tender scaffold design; however, the contractor must take into account the general philosophy and intent with respect to access requirements and fixings.

4.3.6 The Contractor is to submit their proposals for the scaffold on or before the date for possession and not less than 7 days before commencement of the scaffold.

4.3.7 The Contractor's 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 EN 12811-1.

4.3.8 These drawings will clearly indicate positions / locations where any scaffold is to be tied back to the fabric of the building.

4.3.9 No scaffolding shall be commenced on site until the Contractors proposals have been submitted and agreed with the Architect / Structural Engineer. Agreement of the Contractor's proposals does not relieve the Contractor of their responsibilities to ensure full compliance of all requirements.

4.4 Design

4.4.1 The design of all scaffolding will be the responsibility of the Contractor and is to be in accordance with the recommendations of BS EN 12811-1 or as updated.

4.4.2 As the work involved is to a listed building / heritage asset, the scaffold should essentially be regarded as independent of the existing structure and designed accordingly. Where tying to the existing structure cannot be avoided the positions and type of any such ties shall be submitted and agreed with the CA prior to the erection of any scaffold. No additional costs will be granted after the acceptance of any tender where this requirement has been overlooked.

4.4.3 Compliance with the various Acts and regulations listed in BS EN 12811-1 is the responsibility of the Contractor.

4.4.4 Compliance with all aspects of Health and Safety during erection, using and dismantling is the responsibility of the Contractor.

4.4.5 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.

4.4.6 The design of the scaffolding will take into account any specific requirements of any consulting structural engineer appointed to assess the proposals.

4.4.7 The Contractor is to ensure that their proposal and any subsequent refinements or additional items comply with the following clauses.

4.4.7.1 The Contractor shall present to the Employer, the Architect, and the Principal Designer their design for the scaffolding (including canopy / temporary roof), calculations and method statement at least 21 days prior to erection.

4.4.7.2 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.

4.4.7.3 The Employer reserves the right to employ a suitably qualified Structural or Civil Engineer to check the design and to require amendments where he considers the design inadequate in terms of safety, serviceability, and protection of the existing structure.

4.4.7.4 The Contractor shall have regard to all relevant British European standards in particular BS EN12811-1:2003, TG20:08:2011, BS 1139:2001 and BS 2482:2009 including all latest amendments.

4.4.7.5 The scaffolding must either be capable of taking the weight of the materials or a loading bay must be provided adjacent to the working lift.

4.4.7.6 The Contractor shall obtain the approval of the Architect prior to proposing the use of any scaffold fixings (temporary or permanent) which are attached to the building in any way. Putlog scaffolds are not permitted.

4.4.7.7 The Contractor shall, subject to safety requirements, avoid ties through window openings.

4.4.7.8 The Contractor must not assume that the existing building structure is in any way suitable or stable enough to provide wind bracing of the scaffolding structure.

4.4.7.9 The Contractor is to make an assessment of the ground conditions on which the scaffolding is to bear. Where necessary carry out lead bearing tests to ensure the ground is adequate to carry the scaffold.

4.4.7.10 The contractor is to ascertain and take into account the requirements of all sub-contractors when designing the scaffold.

4.4.7.11 On request the Contractor is to provide the following details:

a) Scaffold design

b) Full set of drawings

c) Calculations

d) Number and location of working levels

e) Loading bays

f) Manufacturer's details for specialist equipment such as ladder beams and duster props, etc.

g) Detailed method statements covering erection, fixings, use and dismantling.

4.4.7.12 Variations to the design must be clearly documented and be submitted by the Principal Contractor to the Principal Designer to be checked by a competent person.

4.4.7.13 The use of 'wedge couplers' for connecting scaffold elements is not permitted.

4.4.7.14 Contractors are to be members of the National Association of Scaffolding Contractors or the National Access & Scaffolding Confederation (NASC).

4.4.7.15 The design of the scaffold(s) must take into account all 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.

4.4.7.16 Allow for all below ground drainage channels, voids below the surface etc to be spanned across with no direct loadings imposed. Review of existing drainage drawings, archaeological reports required by the contractor to ascertain exact locations.

4.4.8 Further Guidance & Standards:

4.4.8.1 British Standards:

4.4.8.1.1 BS EN 39 (2001) Loose steel tubes for tube and coupler scaffolds. Technical delivery conditions

4.4.8.1.2 BS EN 741 (2005) Couplers, spigot pins and baseplates for use in falsework and scaffolds - Part 1: Couplers for tubes - Requirements and test procedures

4.4.8.1.3 BS 2482 (2009) Specification for timber scaffold boards

4.4.8.1.4 BS 1139-1.2 (1990) Metal Scaffolding. Tubes. Specification for Aluminium Tube

4.4.8.1.5 BS 1139 2.2 (2009) Metal scaffolding - Couplers and fittings - Couplers and fittings outside the scope of BS EN 74. Requirements and test methods

4.4.8.1.6 BS EN 128111 (2003) Temporary Works Equipment, Scaffolds. Performance requirements and general Design

4.4.8.1.7 BS 5975 (2019) Code of practice for temporary works procedures and the

permissible stress design of falsework

4.4.8.1.8 BS EN 199114 (2005) Eurocode 1. Actions on structures - General actions. Wind actions

4.4.8.1.9 BS EN 199113 (2003) Eurocode 1. Actions on structures - General actions. Snow Loads

4.4.8.2 Industry Technical Guidance:

4.4.8.2.1 NASC TG20:21 (2021) Guide to good practice for tube and fitting scaffolding : Design Guide

4.4.8.3 NASC Technical Guidance for erection:

4.4.8.3.1 NASC TG20:21 (2021) Guide to good practice for tube and fitting scaffolding : Operational Guide

4.4.8.3.2 NASC TG4:19 (2019) Anchorage Systems for Scaffolding

4.4.8.3.3 NASC SG5:18 Overhead Power Sources and Earthing of Scaffold Structures

4.5 Programme:

4.5.1 Prior to commencement of any scaffolding the contractor shall submit a programme indicating the commencement date, and completion date. The contractor shall include dates for the Architect and structural engineer visits, alongside other required contractor / sub-contractor attendances.

4.5.2 Prior to striking the scaffold, the contractor will submit a programme indicating the period for dismantling for each area of scaffolding.

4.5.3 Scaffold is required for inspection purposes prior to confirmation of the scope oof the work and the contractor is to indicate this period on their programme and ensure there proposals are submitted early enough to ensure that this period is not compromised.

4.5.4 The programme shall take into account all the requirements of the sub-contractors who require the use of the scaffold.

4.6 Supervision

4.6.1 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.

4.6.2 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.

4.7 Security

4.7.1 All external scaffolding shall be designed and erected so as to prevent unauthorised access by sheeting (whether painted ply or steel [fully decorated]) to a minimum height of 3 metres at the base. 'Herras' mesh fencing is not considered a suitable alternative. Exact colour of scaffold hoarding is to be confirmed and coordinated with the client.

4.7.2 The design and application of any applied graphics across solid hoarding etc is to be confirmed by the client. Contractor must seek further guidance prior to the order and installation of any hoarding.

4.7.3 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.

4.7.4 Access to the scaffold is to be via a single point of entry and a lockable door through the barrier described above.

4.7.5 Any areas which may be accessible from adjoining structures, roofs, etc are to be similarly protected by boarding or by other approved means.

4.7.6 Scaffolding shall be alarmed at all times.

4.7.7 Adequate measures must be taken to prevent unauthorised access from all elevations. Which could include floodlights and motion detectors as well as CCTV cameras.

4.7.8 Adequate signage and lighting must be provided in areas where light levels are reduced due to insertion of crash deck / covered & enclosed public passageways.

4.7.9 Allow for temporary removal of any wall fixed items / components during the erection and temporarily remount on the scaffold (CCTV / lights etc). Upon dismantling, refix in original locations and make good any disturbed surfaces.

4.8 Protection

4.8.1 The design and method of construction is to avoid causing damage whatsoever to the fabric of the building. In particular:

a) No part of the scaffolding shall be placed in such a way that it abrades the structure or fabric of the building. Adequate timber bearers and soft packing should be used where scaffold is in contact with masonry. Scaffold caps will not be considered as adequate.

b) Plastic caps **must** be placed on all tube-ends adjacent to or likely to come into contact with the fabric of the building during erection with a carpet disk offcut between the cap and building fabric, dismantling or as a consequence of lateral movement.

c) Scaffolding bearing on the roof must take account of the bearing capacity of the roof construction. Spreader boards should intervene between scaffolding and leadwork, the boards being placed so that rainwater run-off is not impeded.

d) Extreme care shall be taken, or temporary protection installed to avoid damage to windows, many of which may contain irreplaceable crown or painted glass of historical importance.

e) In the event of authority so being given by the Architect, any scaffolding taken through window openings for bracing and tying in is to be adequately buffered to prevent damage to internal stonework, plasterwork, and decorations. On no account is scaffolding to bear onto internal floors, panelling, or other joinery or on to wall paints. All openings through the external wall are to be adequately protected against the ingress of rainwater, snow or blown dust and other debris.

f) The scaffold is to be adequately earthed against lightning strikes.

4.8.2 Landscaping: Where plant and equipment is wheeled across paving or other, the Contractor is to take all reasonable precautions to avoid damage to surfaces. The Contractor is held responsible for making good any such damage.

4.8.3 Underground Services: Before erecting the scaffold, the Contractor shall ascertain the location of external services below ground, concealed inspection chamber covers, etc., and shall take such precautions as may be necessary to avoid accidental damage and maintain access (to valves, rodding eyes, inspection chambers, culverts, etc.).

4.8.4 The Contractor shall fence off scaffolded area (or areas beneath scaffolding if of the cantilever type) to prevent public

access to within 2.0m of any scaffolding.

4.8.5 The Contractor shall be responsible for monitoring the security of the scaffold both during and at the end of the working day, taking all precautions to prevent access into the building via this route.

4.8.6 The covering to pavements is to be double boarded with visqueen between.

4.8.7 All surfaces at ground level are to be suitably protected to prevent the scaffold damaging existing external and internal finishes.

4.8.8 Where internal scaffold is to be erected full protection will be required under all scaffolding except with prior written consent.

4.8.9 Ensure any architectural features or areas prone to damage are suitably protected.

4.8.10 All entrance doors, fire exits etc are to be kept clear of obstructions and are to be lined at the top and both sides.

4.9 Erection Requirements: Generally

All scaffold tubing and fittings are to be galvanised and in good condition and free from corrosion. Rusty components will not be accepted.

No steel component (including capped tubes) will be in contact with the fabric of the building except where specific approval has been given.

Where it is necessary to brace the scaffold from the masonry then timber packing of a minimum thickness of 20mm is to be placed between the scaffolding and the masonry.

No scaffolding shall rest on any roof coverings unless agreed in writing prior to commencement.

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.

Scaffold tubes are not to encroach within 200mm 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.

Unless unavoidable it will not be permitted to brace scaffold through window or door openings. Should this prove necessary 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.

4.10 Erection of Access Scaffolding – New Warehouse

4.10.1 Main contractor to segregate all working areas to eliminate other trades working within the same areas.

4.10.2 Scaffolders to typical operate in 2-man teams, when erecting or dismantling any scaffolds.

4.10.3 Scaffold standards to be positioned as per drawings(s): *see clause 4.3.2.* These are to be set on base plates and sole pads / sleepers as per design.

4.10.4 Scaffolds to be connected with ledgers and transoms as identified on the drawing references provided above.

4.10.5 Transoms to be positioned on ledgers to suit the boarding.

4.10.6 All further erection to be constructed as per the drawings listed.

4.10.7 The north elevation scaffold will be constructed differently to that of the other facades, due to the close proximity of the private adjacent vehicular and public access road. A series of ladder beams will be erected at lower level with a fan board scaffold projecting above, suitably sealed to protect the public / vehicles below from dust and debris. This scaffold

arrangement will retain an appropriate clear width between the scaffold and adjacent properties to maintain safe and clear access for neighbouring vehicles, as well as emergency services vehicles. It may also be deemed necessary to erect and construct elements of this scaffolding as a possible bridged tunnel.

4.10.8 The exact erection procedure along the north elevation is to be agreed with the neighbouring properties to ensure minimal disruption to traffic access / egress. Laydown area to be agreed.

4.10.9 The scaffold will include a series of loading bays along its length, to temporarily stored materials and plant across levels.

4.10.10 All main entrances and fire escape routes are to be protected and maintained at all times.

4.10.11 All ties will be pull tested as per requirements by the design with certification passed onto the main contractor.

4.10.12 Complete scaffold will be checked, handed over and scaff-tagged as complete with certification issued to the main contractor.

4.11 Fixings

4.11.1 Restraining the scaffold

4.11.2 A scaffold with no stability ties requires the width of the structure to be substantially increased to ensure that the base to height ratio is sufficient to achieve stability. The need for a temporary roof over the existing building also results in very high horizontal load reactions at eaves level (as the temporary roof is required to support the same imposed loads as the permanent roof). The outcome of these requirements means that designing a freestanding scaffold would require the scaffold to project an excessive distance outward from the building walls. Resulting in vast amounts of scaffolding material and many counterweights. Due to the nature of the site constraints and other interfacing projects, it is not possible to extend the scaffold further outwards.

4.11.3 There were many practical and commercial reasons as to why installing such a large scaffold footprint would not be possible. The primary reasons were that the warehouse will remain in use as a museum visitor attraction and a freestanding scaffold would result in blocking access and egress requirements, for surrounding pavements, service roads and fire escape routes for museum users, neighbouring businesses, and members of the public, in addition to impacting general visitor experience, likely resulting in the reduction in interior daylight.

4.11.4 Therefore, the outcome of the study agreed that the most practical method of constructing the scaffold, is to use the existing building for stability, by securing 'ties' to the existing structure.

4.11.5 Choice of stability ties

4.11.6 Scaffold stability ties can be arranged into two categories:

- mechanical &
- non-mechanical

4.11.7 Mechanical ties are positively fixed to a structure via a 'mechanical' connection, e.g., screw clamped to steelwork, bolted to columns / beams or purlins, anchored to concrete, stone or brickwork etc.

4.11.8 Non mechanical ties are fixed behind, around or through a structural component of a building, e.g., around a column, through and behind window openings, over or around a wall etc.

4.11.9 For this project, in relation to the New Warehouse project, non-mechanical ties are predominantly ruled out due to the lack of available connection points; all window and doors need to remain in use, as the building is to remain fully operational, no exposed steelwork was available, and no walls or column edges are available for tying around / over.

4.11.10 However, the second-floor plate will be almost entirely decanted and as such, there are some localised opportunities to fix

through existing window openings. This option will be utilised where anchor tie loads cannot be achieved at eaves level.

4.11.11 Choice of mechanical ties: due to lack of steelwork or concrete, the use of scaffold anchors into the masonry walls was the only viable option.

4.11.12 The types of masonry anchor ties available are as follows: resin anchors, anchor 'plugs' (steel or plastic), self-tapping anchors.

4.11.13 Resin anchors had to be ruled out due to the unknown wall construction (potential hollow/cavities behind the outer skin), this left the choice of either plug or self-tapping.

4.11.14 Scaffold anchor installation

4.11.15 Anchors must be installed by competent installers, using the correct tools and strictly in accordance with anchor manufacturer's instructions.

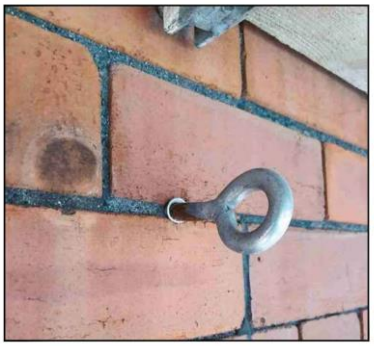
PROPOSED ANCHOR TIE OPTION 1

SELF TAPING - EXCALIBUR RING BOLT



PROPOSED ANCHOR TIE OPTION 2

APOLLO NYLON ANCHOR PLUG & RING BOLT



4.11.16 When drilling into brickwork, the anchor should ideally be located in the solid portion of the brick, rather than the mortar joint. The preference is to anchor into the mortar joint if suitable pull test readings can be provided.

4.11.17 If anchors are to be fixed into mortar joints, then the following approach may be sanctioned by the responsible engineer, if approved by the manufacturer:

- Choose an anchor with a diameter significantly larger than the width of the mortar joint, e.g., 14mm in a 10mm joint.
- Fix into the base of the junction between the bed and perpendicular joints.
- Preliminary tests must be carried out but with an increased rate of 1 in 10 of the whole job.

4.11.18 If tie loads cannot be achieved in the mortar joints, then inevitably, the fixings will need to be located directly into the solid portion of masonry. Upon striking of the scaffold, the anchor should be removed, hole filled with mortar and brick dust to match that of the brick in colour, texture, composition. In the unfortunate situation that a brick becomes defective, the brick will be carefully cut out and a new brick indented, to match the existing in size, texture, and bond.

4.11.19 Scaffold Box Tie Installation (through windows)

4.11.20 Box ties will be installed through the windowpanes where anchor tie loads cannot be achieved at eaves level.

4.11.21 This will involve the careful temporary removal of windowpanes. Windowpanes are to be selected onsite, following dialogue with contractor, scaffold designer and structural engineer. The full extent of the glazing that will be required to be removed, cannot be confirmed until the start of the works and what is illustrated on the proposed drawings are for planning purposes

only. The existing windows are typically metal framed with localised surface corrosion. Glazing is likely to be predominantly non-original. The windows are sat and fixed within a masonry aperture. Glazing putty to the exterior. Metal framed windows are a mix of fixed, single and double opening lights to the inner.

4.11.22 In advance of this, the interior spaces in question must be comprehensively protected and over-sheeted to protect the building fabric.

4.11.23 Details of the putty, fixings and glass type will be recorded prior to the works.

4.11.24 The selected windowpanes will be carefully removed, protected (wrapped), labelled / tagged, and stored in a safe location, ready for future reinstatement.



4.11.25 Scaffold poles will be carefully fed through the metal framed windows into the interior, secured to a horizontal ladder beam. Timber packers and wedges will be placed in between the scaffold members and building fabric, separated by a layer of carpet. No scaffold elements are allowed to come into direct contact with the building fabric. Scaffold legs will be required to be installed internally to provide vertical support to tie tubes and beams (to suit onsite conditions).

4.11.26 During the striking and removal of the scaffold, windowpanes will be reinstated within there original locations, cleaned and re-puttied / sealed to match original arrangement. All disturbed areas are to be made good to match original make-up, condition, and redecorated. Interior and exterior protective provisions will be removed.

4.11.27 Scaffold anchor testing

4.11.28 Drilled in anchors used to tie scaffolding to a building structure, should be load tested to the requirements of the NASC Document TG4:19.



4.11.29 Maximum 'working' anchor load on the project = 5.75kN – to be confirmed by contractor, scaffold design, structural engineer.

4.11.30 Preliminary tests are used to check suitability of a particular fixing in the base material and determine allowable loads. This approach is to test a series of 5 sample anchors to a load which demonstrates a satisfactory safety margin and thereby, if possible, avoid testing fixings to failure.

4.11.31 'Proof' tests are needed to check the quality of installation of the chosen anchors. They should be carried out on all projects. A sample of anchors to be used shall be tested to a load of 1.25 times the working load. A minimum of 3 anchors shall be tested and at least 5% (1 in 20) chosen at random and spread evening throughout the whole job. All anchors that have been proof loaded should be clearly identified with a tag showing the date of test and the test load, any anchors failing the test should be tagged as such. The failure of an anchor in proof testing is a serious issue and requires the investigation of the cause(s) of failure and an increase in testing rate.

4.11.32 Site tests should be carried out by suitably competent personnel (other than the actual installer of the fixings) using a test meter with a gauge calibrated within the last 12 months to an accuracy of < 5%. Equipment should apply the load to the anchor and be arranged such that the reaction loads are taken sufficiently far from the anchor, so as not to influence the result, typically this means ensuring the feet of the bridge do not rest on the masonry unit being tested.

4.11.33 Scaffold anchor removal and repair





4.11.34 Anchors should be removed progressively with the scaffold dismantle, by competent persons in accordance with the scaffold RAMs. The two types of recommended anchors can be removed by unscrewing. The remaining hole can then be repaired as follows:

- Self-tapping Excalibur ring bolts. Nothing is left behind in the wall, therefore the hole can be repaired by repointing (where anchors are into joints) or if anchors have been installed into solid brick, the brick dust will be saved and the hole repaired using acrylate resin along with specialist brick tinting techniques, offering a permanent repair.
- 'Nylon' plug or ring bolts. The nylon plug remains in the wall but will not corrode. For repairs into the mortar or brick the 'visible' front part of the plug will need to be drilled out, then the hole can be repaired, as detailed above.

4.12 Public Access

4.12.1 During erection, modification or dismantling, care must be taken to exclude the public and staff from a clearly defined area around the work.

4.12.2 Authorised access thoroughfares must have effective protection in the form of fans, netting, sheeting, brick guards, etc. to protect persons from falling objects.

4.12.3 Ladders must not be left unattended when accessible to the public.

4.12.4 Ladders at ground floor level and other risk areas should be removed and securely locked away at the end of each working day.

4.13 Temporary Protection Against the Elements (weather):

4.13.1 A temporary roof is to be provided as part of the works, protection to side walls and public walkways under the scaffold must be included, alongside the temporary sheeting of opened roofs and gutters.

4.13.2 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.

4.13.3 All sheeting shall be adequately secured against wind uplift etc.

4.13.4 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.

4.13.5 All areas are to be maintained as watertight at all times.

4.14 Dismantling

4.14.1 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.

4.14.2 Ensure all necessary care is taken to ensure that no damage occurs to the fabric of the building.

4.14.3 Scaffold tubes should be carefully lowered to ground level and not thrown or dropped.

4.14.4 No dismantled components shall be left on site outside working hours unless housed within a secure compound area.

4.14.5 There will be no alterations to the physical facades, other than the tie hole mortar repairs and these will be sympathetically remediated to match the current mortar composition, texture, and colour.

4.14.6 Upon dismantling of the scaffold, the mortar bed repairs will be mixed to a colour and constituent material matched mortar repair to the tie location, once carefully removed.

4.15 Certificates

Copies of all handover certificates issued by the scaffolding sub-contractor shall be forwarded to the Architect upon receipt by the Main Contractor.

Copies of all test certificates for hoists shall be forwarded to the Architect on receipt by the Main Contractor.

No scaffolding shall be used unless handover certificates and test certificates have been issued.

5.0 Asbestos / Hazardous Materials

5.1.1 Be aware that existing buildings / assets may contain materials which are considered hazardous by current standards. All such materials must be flagged and carefully disposed of in accordance with all relevant legislation and safety standards, and relevant authorities informed wherever applicable.

5.1.2 The Control of Asbestos at Work Regulations 2002 (CAW Regulations) came into effect in November 2002 replacing the 1987 Control of Asbestos at Work Regulations 1987 (the 1987 Regulations). The new provisions (such as the duty to manage asbestos) have been applicable since 21st May 2004.

5.1.3 Regulation 4 of the CAW Regulations relates to the identity of the responsible party/ parties who have a duty to manage asbestos. This onus has been changed from the "employer" – as defined under the Health and Safety at Work Act 1974 – to the "duty-holder" who will have a duty to manage asbestos.

5.1.4 The CAW Regulations define a "duty-holder" in Regulation 4 as (a) "every person who has, by virtue of a contract or tenancy, an obligation of an extent in relation to the maintenance or repair of non-domestic premises or any means of access thereto or egress therefrom; or (b) in relation to any part of non-domestic premises where there is no such contract or tenancy, every person who has, to any extent, control of that part of those non-domestic premises or any means of access thereto or egress therefrom".

5.1.5 The definition of a "duty-holder" under the CAW Regulations is therefore different from the definition under the 1987 Regulations (where the duty was placed on the Employer).

5.1.6 The CAW regulations require the duty-holder to manage the risk from asbestos in non-domestic premises. The "duty-holder" is required to ensure that a "suitable and sufficient assessment is carried out whether asbestos is liable to be present in the premises". The duty-holder shall take such steps that are reasonable in the circumstances in making the assessment to "those parts of the premises which are reasonably accessible".

5.1.7 The industry standard for asbestos surveys requires contractors to be accredited by the United Kingdom Accreditation Service (UKAS). Surveys are carried out in accordance with the Method of Detecting Hazardous Substances, (the HSE Asbestos Survey Guide HSG264:2012) and three surveys are identified as follows: -

Type 1: Location and Assessment Asbestos Survey (presumptive)

Type 2: Standard Sampling, Identification and Assessment Asbestos Survey (sampling survey)

Type 3: Full Access Sampling and Identification Asbestos Survey (pre-demolition/ major refurbishment surveys

5.1.8 The Architect is not an expert in matters relating to asbestos, nor an accredited surveyor in respect of the UKAS requirements and this report should therefore not be considered as a contribution to the Asbestos Survey Report required by the CAW Regulations. The Architect has no duty to report on asbestos. However, where there is reasonable cause to suspect that asbestos containing materials are encountered during the course of the fabric inspection, these matters will be reported in the usual way.

5.1.9 All contractors and specialist sub-contractors dealing with asbestos are to comply with the following Regulations and Directives:

- Asbestos Surveys and Asbestos Sampling and Removal.
- The Control of Asbestos Regulations 2012 (2012/632).
- HSE Asbestos – Health and Safety in the workplace – April 2012.
- The revised Approved Code of Practice (ACOP) 2nd October 2013.
- ISO 17020 UKAS P402 accredited laboratory for testing.

6.0 Demolition & Removal

6.1 General Requirements

6.1.1 Code of Practice: Comply with BS 6187:2011 Demolition subject to any qualifications given hereunder.

6.1.2 Choice of Demolition Contractor: Ensure that major dismantling is undertaken by specialists who are experienced in working in accordance with BS 6187 and the publications of the National Federation of Demolition Contractors. These documents form the basis of this specification. BS 6187 shall be read in conjunction with this and its principal clauses are referred to hereunder.

6.1.3 Scope of Dismantling: The extent of the work is indicated within the drawing package.

6.1.4 The Contractor is to undertake a survey in order to ascertain sufficient information about the structures and its surroundings prior to undertaking any works.

6.1.5 Before commencing work, complete the survey to obtain the information referred to in BS 6187 clause 4.1. Agree with the Architect and clearly label on-site items, fabric and contents that are not to be demolished but are to be carefully protected and retained or removed for reuse.

6.1.6 Investigate Risks: Investigate the features of the structure, ascertain if shock or vibration could damage surrounding property or equipment therein or buried services and check the existence of toxic or flammable substances or asbestos.

6.1.7 Disconnect Services: Disconnect, divert, seal off or remove existing services.

6.2 Materials

6.2.1 New Materials

6.2.2 Generally: Any new materials required shall be as specified hereafter in the appropriate work sections.

6.2.3 Old Materials

6.2.4 Removal and Credit: Remove from the site only those materials not required and identified by the Employer. For any such materials of value, allow credit as stated within separate specification sections. The Employer reserves the right to retain any materials on payment to the Contractor of the credit amount allowed.

6.2.5 Salvaging: Carefully salvage, protect and label materials and items required by the Employer. Sort, clean off any unwanted dirt and neatly stack or store in locations indicated as advised. Any salvaged materials for reinstatement should be appropriately stored, dependant on the item to which is being retained and adequately ventilated for the foreseeable future and/or until reinstatement.

6.2.6 Bricks: Clean, stack and protect on-site any bricks suitable for re-use for general brickwork.

6.3 Workmanship

6.4 Methods of Taking Down

6.4.1 Select Suitable Methods: Employ methods that cause no shocks or vibration likely to damage surrounding property or equipment housed therein or buried services. The use of explosives is forbidden.

6.4.2 Note: The Contractor shall provide the Architect with appropriate method statements and mitigation measures for taking down / temporary supports and retention measures, prior to the dismantling or removal of any asset, component, or element. No works will be permitted to commence until the Architect has advised accordingly.

6.5 Safety

6.5.1 Precautions: Take protective precautions. Ensure there are no risks of uncontrolled collapse. Leave partially removed structures secure. Prevent overloading by debris.

6.5.2 Temporary Supports: Design and provide all necessary shores and other temporary supports.

6.5.3 Rot Infected Timber: Ensure that infected timber does not contaminate any materials intended for re-use.

6.6 Adjacent Structures not Demolished

6.6.1 Disconnecting: Disconnect by means causing least damage. Leave no unnecessary projections. Obtain instructions from specifier if the Contractor considers it necessary to leave any temporary supports in position.

6.6.2 Making Good: Make good only to the extent required to ensure safety of persons, weather protection, stability, and security. Do not leave any dangerous or unnecessary projections. Remove any infected embedded timber, if possible, otherwise cut off flush and soak with creosote – to be agreed with the Architect. Remove any debris constituting a health or fire risk.

6.7 Protection

6.7.1 Generally: Provide general protection as clause 5.4 of BS 6187 and Section 2 herein.

6.7.2 Screens: Provide temporary screens or corridors wherever needed for safety, noise or dust control, weather protection, security or other purposes to facilitate the Works.

6.7.3 Leave the site secure at all times.

6.7.4 Trees: Protect as stated elsewhere in the contract documents.

6.8 Materials

6.9 Old Materials

6.9.1 Unwanted Materials: Remove debris and materials not required for retention or re-use on site; do not permit such materials to accumulate or become a health or fire risk.

6.9.2 Salvaging: Materials to be salvaged for the benefit of the Employer fall into two classifications as follows:

a) Materials described as 'set aside for re-use'.

b) Materials described as 'hand to Employer'.

6.10 Preliminary Work

6.10.1 Pre-Commencement

6.10.2 Site Visit: In addition to the general implications of undertaking a survey referred to in above, visit all locations given with the spot works and ensure that the full extent of the work is understood and priced.

6.10.3 Removing Debris: Subject to approval and prior to commencing removal of debris, ensure that all items to be salvaged are identified, set aside, protected, labelled, and safely stored for reuse or retention by the Employer. Remove debris, rubbish, loose fittings and the like from the buildings and site and leave tidy. Disinfect if necessary.

6.10.4 Services: Make safe or divert all services. Liaise with the relevant service authorities as necessary. Test the drains and report on the findings.

6.10.5 Preliminary Investigations: Undertake investigatory cutting away and opening up in order to become acquainted with the condition of the building. If any investigations of this nature are undertaken by the specifier, provide attendance including labour and suitable hand tools.

6.11 Workmanship

6.11.1 Generally: Make every attempt to undertake the work as follows:

a) Work which exposes the building to the weather (e.g. roof repairs): undertake during favourable weather; once such work is commenced, complete it as quickly as possible.

b) Cutting away and alteration work generally: undertake with the minimum amount of disturbance to those parts of the building intended to be left undisturbed.

c) Work involving existing work and components: undertake to the same standard and appearance as that originally achieved.

6.11.2 New Work: Undertake new work associated with the alterations as specified in the appropriate work sections.

6.12 Safety

6.12.1 Safety of Structures:

6.12.2 Provide props, struts, scaffolding and shores, etc as necessary to ensure the stability of the existing structures. Make preliminary investigations and calculations where necessary and accept responsibility for the overall safety of the Works and existing structures unless expressly made the responsibility of others in the Contract Documents.

6.13 Nuisance

6.13.1 Prevent Nuisance: Prevent nuisance as stated in Section 1.585 with particular reference to dust and noise. Establish and maintain good relations with adjoining occupiers.

6.13.2 Bonfires on or adjacent to the works are strictly prohibited.

6.14 Spot Works

6.15 Description and Pricing

6.15.1 Definition of Spot Work: Alteration or repair work that should be valued on site and which is described in self-contained items that contain work in all trades. The following is deemed to be included with such items:

a) All work that can be seen or anticipated on the 'spot' (i.e. the stated location).

b) Ancillary work and labours normally associated with the type of work involved.

c) The provision of fixing materials of every description

d) Properly bonding, jointing and making good to surrounding work.

NOTE: Extending finishing's is not included in a spot item unless so stated in the description.

6.15.2 SMM not Applicable: Spot work is not subject to any published method of measurement or other recognised documentation, nor shall any statement given elsewhere in this document in respect of descriptions and/or measurement apply to spot work. Each and every specific rule of measurement set out in any method of measurement referred to in any other contract document is hereby overridden.

6.15.3 Locations: The location of spot work is stated in most instances. Such locations relate to the building as existing.

6.15.4 Repetitive Work: Repetitive spot work is grouped (i.e. one description covers a number of items of like work) and such work shall be priced to allow for the average circumstances at the various locations.

6.15.5 Reference System: Spot work involving a long description is referred to a schedule of typical descriptions ... by means of a brief title and an item reference (e.g. Overhaul 600 x 1450 mm D/H sash as Item xx).

6.15.6 Sizes: Sizes are stated in sequence of length/width/height. Any dimensions given with a spot item are approximate. Precise dimensions or other measurements required shall be taken by the Contractor at the Works.

6.15.7 Unlocated Spot Works: Work of a type that can be envisaged by reference to description only is not necessarily located.

6.16 Terms

6.17 List Of Terms Used: The following terms are used:

6.17.1 See 'definitions' list identified above.

6.18 Protection

6.18.1 Generally: Provide general protection as specified within separate section, titled 'Opening up, Building / Asset Protection'.

6.18.2 Existing Floors: Lay hardboard or other suitable material on existing floors and stairs, etc. that are not scheduled for upgrading but will be subject to site traffic.

6.18.3 Temporary Openings: Maintain weather protection and security at all times throughout the contract.

6.18.4 Screens: Provide temporary screens or corridors wherever needed for safety, noise or dust control, weather protection, security or other purposes to facilitate the Works and protect all existing and new building fabric and finishes to be retained.

6.19 References

6.19.1 Some standards in this specification have been withdrawn by the British Standards Institution but remain appropriate and applicable for the traditional repair and reinstatement of historic building fabric. Copies of these withdrawn standards may be obtained online.

7.0 Opening Up & Building / Asset Protection

7.1 General

7.1.1 Work which exposes the historic fabric to the weather (where protection is not specified) undertake during favourable weather; once such work is commenced, complete it as quickly as possible. The Contractor is responsible for preservation of the historic fabric in accordance with the contract documents.

7.1.2 Cutting away and alteration work generally:

Undertake with the minimum amount of disturbance to those parts of the building intended to be left undisturbed. The use of power tools should be carefully considered and only used with the Architect's approval. The Contractor is to assume that all opening up will be undertaken by hand.

7.1.3 Opening up of joinery should be undertaken at existing access points, or by removal of complete panels, fascia's etc. to joint lines. Retain, reference, and set aside for future refixing any removed panels.

7.1.4 Provide all necessary forms of protection, temporary support, and safe access as necessary to allow for inspection of and access to the exposed structure or fabric.

7.2 Workmanship Generally

7.2.1 Generally, undertake the works as follows:

a) Prior to undertaking any construction works, all working areas and access routes are to be thoroughly protected for the duration of the contract.

b) 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 implemented.

c) Whilst historic surfaces are often worn, discoloured and out of true level, these imperfections can contribute to the interest and historic value of a building and thus should be thoroughly protected.

d) The Contractor must be aware that works of opening up which are not carried out in accordance with the specification may contravene legislation requiring Listed Building Consent.

e) Work which exposes the building fabric to the weather (where protection is not specified) undertake during favourable weather; once such work is commenced, complete it as quickly as possible. The Contractor is responsible for the preservation of the building fabric in accordance with the contract documents.

f) Cutting away and alteration work generally: undertake with the minimum amount of disturbance to those parts of the building intended to be left undisturbed. The use of power tools should be carefully considered and only used with CA approval. The Contractor is to assume that all opening up will be undertaken by hand.

g) Opening up of joinery should be undertaken at existing access points, or by removal of complete panels, fascia's etc. to joint lines. Retain, reference and set aside for future refixing any removed panels.

h) Provide all necessary forms of protection, temporary support and safe access as necessary to allow for inspection of and access to the exposed structure or fabric.

7.3 Onsite Recording Prior To Works

7.3.1 In advance of any works commencing onsite (inc. opening up, demolition, removals, temporary, conservation, restoration works etc) the existing building fabric musy be thoroughly recorded to provide a snapshot in time and reference archive material for future usage.

7.3.2 The contractor shall provide a full dilapidation survey, covering the area of works, to the CA for wider distribution and should be provided digitally.

7.3.3 The contractor shall agree with the CA and clearly label onsite items, fabric and contents that are not to be demolished and/or removed but are to be carefully protected and retained for reuse, conservation and/or restoration works.

7.3.4 Subject to approval and prior to commencing removal of detritus, the contractor shall ensure that all items to be salvaged are identified, set aside, protected, labelled (catalogued & tagged), safely stored for reuse and/or retention. Tagging protocol as per item 17.4.

7.3.5 The contractor shall adopt the following strategy for recording onsite items, as follows:

a) Full dilapidation survey photographs both internally and externally prior to any works taking place.

b) Photograph each specific asset, component and/or element which are to undergo works (removal, repair, restoration etc), including but not limited to:

    a. Wall fixed items; wall panelling, dado rails, picture rails, skirtings, inbuilt furniture, lighting etc.

    b. Ceiling fixed items; cornices, roses, lighting etc.

    c. Windows; varying types, surrounds, cills, linings, ironmongery etc.

    d. Door set; varying types, door leaf(s), frame, linings, architraves, ironmongery etc.

c) Take mouldings and profiles (cross sections/dimensions) of elements and components to allow for reproductions (like-for-like) to be produced.

d) Where elements of the fabric are loose, carefully remove (retain intact as far as is feasible), tag and store a remnant (of the above) of each instance to assist with future matching within a designated area within the building.

e) It will also be possible to record areas of the fabric which were previously unseen: offering a unique opportunity to gather invaluable data, previously unavailable.

7.4 Onsite Tagging and Recording of Objects

7.4.1 No direct fix and or permanent marking of items will be acceptable.

7.4.2 Temporarily mark a unique identification number on each object, component prior to any removal and catalogue accordingly.

7.4.3 The reference number must be:

- unique, none repeating.
- durable to remain legible over time.
- removable, should the need arise to make a change in the future.
- never cause harm to the object, element, or component.

7.4.4 All items temporarily removed and identified to be reinstated within original locations at a later date, should be thoroughly recorded so that the item is returned to the exact position to which it was removed.

7.4.5 The exact tagging protocol may differ from object to object but will typically include one of the following methods:

- Cloth binding cord loosely wrapped and tied with solid tag.
- Brass wire and solid tag, can be used where existing holes or voids exist within the object in question. Choose a strong holding point.
- Direct paper labels, generated from a computer or hand written.

7.4.6 If in doubt, discuss in further detail with the Architect and client curator.

7.5 Preparation Of Fabric

7.5.1 Prior to installation of any protective measures. The areas in question must be thoroughly cleaned to remove all loose debris / dust which could lead to scratching / abrasion of the finished surface once protective boards are overlaid.

7.5.2 It is important to try to not over wet floors as the substrate could become loosened or efflorescence could be triggered. Surface dirt should be removed with minimal quantities of warm water.

7.5.3 Sweep and vacuum existing floors / components prior to laying / fixing of any protective boards.

7.5.4 Contractor is to photograph and record all areas prior to undertaking any works.

7.6 Protection Of Fabric

7.6.1 Generally, provide all necessary and suitable protection to all areas of work and areas adjacent to the works in order to enable the least destructive, safe and efficient means of carrying out of the works.

7.6.2 The element of protection is to encompass the non-destructive shielding of the existing building fabric and finishes against wear and tear and destructive working methods; the enclosing of working areas and areas of opening up against environmental and climatic conditions; the security of the working area and the site as a whole and the safety of site operatives, visitors and general public.

7.6.3 The structure, fabric, decoration, and contents of the buildings are to be suitably protected by the use of dustsheets, solid protection, sealing of doors, etc.

7.6.4 All protection is to be loose laid, or pressure fixed by wedging, bracing, clamping or tying as appropriate in a manner that will not damage the existing fabric of the building, no direct fix will be acceptable. The use of cloth string is acceptable.

7.6.5 The Contractor is to make allowance for and carry out all necessary modifications and adaptations of all forms of protection, where so instructed or where so required, to enable the safe and efficient carrying out of the works.

7.6.6 All protective installation must be regularly and routinely checked, with replacement of materials etc where well-worn and/or defective.

7.6.7 The appropriate method of protection is to be agreed with the CA.

7.6.8 Equipment and materials must not be propped against decorated surfaces, fittings, or furniture.

7.6.9 Footwear is to be appropriate to the part of the building or structure in which the work is being undertaken to avoid damage to floor finishes and coverings.

7.6.10 No contents or fixture and fittings shall be moved by the Contractor without the written permission of client.

7.6.11 No adhesive tapes or mechanical fixings shall be used to secure insitu protection. If no alternatives can be proposed, each instance of proposed use should be discussed with the Architect and Project Conservator.

7.6.12 No item longer than 1200mm can be carried through the building unsupervised. Materials and objects should be appropriately covered to ensure that damage will not occur to either the fabric or contents of the building. The admission of equipment / materials longer than 1200mm into the building will be considered – however prior consultation must be sought with the Architect / Project Conservator.

7.6.13 Cutting of boards on site; dustsheets must be laid, and vacuum cleaners must be available at the point of work and used to collect dust as and when created.

7.6.14 All Contractors must adhere to the restricted walkways through the building / site. These routes MUST be clearly visible and identified by the Contractor.

7.6.15 All contractors must use dustsheets at all times.

7.6.16 Illustrative prints relating to particularly fragile elements / components, will be located at the site of work. All contractors are required to familiarise themselves with the pictures provided.

7.6.17 All areas of the building / asset are vulnerable and important and should be protected for the duration of the building works.

7.6.18 All items protected must be protected by products and materials which are fire retardant.

7.7 Collections Care

7.7.1 The contractor must liaise with the client conservation and collections care manager and Architect to develop suitable protective measures for exhibits and collections items, where required, highlighted.

7.7.2 It is important to note that any changes across the interior building fabric during construction works packages may result in variations across previously maintained relative humidity, temperature, moisture, and ventilation levels. This may adversely affect the exhibits and collections items.

7.7.3 It is of paramount importance to maintain all internal climatic conditions, for the duration of the contract.

7.7.4 Temporary monitoring equipment may need to be deployed. Locations are to be agreed with the client collections team.

7.7.5 Monitoring equipment / sensors may be required to monitor, rH, temperature, moisture, ventilation, vibration levels.

7.7.6 The collections team will undertake enhanced environmental control of the building spaces.

7.8 Conservation Working Practices During Building Works

7.8.1 It is of paramount importance that the working site is maintained and cleaned throughout the construction works.

7.8.2 The following measures are to be observed and implemented throughout the duration of the contract to minimize the disruption to the Client and occupier and reduce the time needed for the final clean prior to Client handover.

- Prior to temporary fixing of protection measures, area to be covered should be vacuumed / cleaned to remove all loose debris and dust prior to overboarding.
- Vacuum cleaners must be used at source where dust is being created. Bags and filters must be regularly changed, and the vacuum cleaners well maintained.
- Contractors should vacuum up after themselves at the end of each working day.
- Insitu protection must be well maintained.
- Keep to walkways of protection.
- Items over 1.2m need to be carried by two people, with ends padded.
- Provide walkways of Antinox covered with hardwood through each room.
- All equipment and materials should be placed on Antinox.
- Loose laid sheets of Antinox should be used by contractors around work areas.
- No access to storage areas or other unauthorised areas outside work site except where accompanied at all times by Client or Project Architect.

7.9 Materials For Protection Generally

7.9.1 Dust Sheets: To be linen or cotton type close weave material to prevent the ingress of dust and paints.

7.9.2 Polythene Sheet: To be minimum 250micron polythene, laid with all joints lapped and taped to prevent the passage of dust and moisture.

7.9.3 Reinforced Polythene: To be heavy duty Sisalite reinforced polythene sheet (860) by British Sisalcraft or similar.

7.9.4 Fibreboard: To be minimum 12mm Tentest board, loose laid and cut to suit irregular plan shape.

7.9.5 Underlay: To be carpet felt underlay, minimum 1.36 kilos per m2, loose laid and cut to suit.

7.9.6 Plywood: To be water and boilproof (wbp) plywood to BS 6566. Generally, the following minimum thicknesses will be used:

7.9.7 Floor protection: 4mm, cut to suit with joints taped.

7.9.8 Framed protection: 12mm on softwood frame, formed independent of the protected element.

7.9.9 Rubberized Foam: To be flexible foamtype pipework insulation, i.e. Armourflex or similar, of a suitable diameter and thickness to provide suitable protection.

7.9.10 Antinox is available from Swiftec tel: 0161 945 1500. Correx 2mm black flame retardant, is available from Cordek Ltd. tel: 01403 799 600.

7.9.11 Flame retardant bubblewrap FRC120 is available from Euronova Ltd. tel: 0117 944 2061.

7.9.12 Megafilm is available from Megafilm, tel: 0121 608 6161.

7.9.13 Flame retardant 5mm Impact CoverGuard TIG 5MM150, is available from Bainbridge International tel: 01489 776020. Bainbridge International also supply flame retardant bubblewrap.

7.10 Opening Up and Further Assessment

7.10.1 It may be necessary in some instances to open up areas of the fabric to provide further insight and assessment of building fabric which is concealed and/or hidden from view, this will help to define and inform the full extent and scope of remedial works and detailed repairs required within these locations. For example, there may be embedded timber members within masonry walls which are showing signs of structural failure, this may require microdrilling or the use of a resistograph tool.

7.10.2 Locations identified to be opened up shall be kept to an absolute minimum with minimal disturbance to the surrounding fabric.

7.10.3 The full extent of the opening up works is to be agreed / marked up with the Architect onsite prior to the commencement of any invasive works to ensure that there is the absolute minimum of disturbance to the historic fabric, and that all other areas are suitably protected.

7.10.4 If investigation of spores / fungal decay / mould growth is required, this MUST be completed by timber and damp specialist.

7.10.5 Works specified as requiring opening up for inspection, shall be undertaken only in accordance with the agreed schedule of opening up, and Method Statements to be submitted by the Contractor. The Contractor should be aware that works to open up structure and finishes which are not carried out in accordance with the specification, may contravene legislation requiring Listed Building Consent.

7.10.6 A full photographic record shall be undertaken before commencement and a record maintained throughout the progress of the works.

7.10.7 All areas of the fabric opened up for inspection MUST be reinstated upon completion of the main works. Reinstatement of the fabric may be required sooner, dependant on the item to which has been opened up. For example, if an area of the external envelope has been opened up, this shall be reinstated and made good following the inspection works to retain a weathertight enclosure.

7.10.8 All works MUST be undertaken by approved and skilled conservation specialist contractors.

7.10.9 If required, trial holes are to be dug in locations agreed with the Architect or Structural Engineer. In locations adjacent to existing buildings or site features, works are to be undertaken by hand.

7.10.10 All necessary protection and propping are to be incorporated to ensure the structural integrity of the existing building, the protection of the excavation and building fabric and the safety of the site operatives, occupiers and visitors.

7.10.11 Lifting of floorboards is to be undertaken using nonpowered hand tools only, by skilled craftsmen and in such a way as to allow for the reinstatement of all fabric to its existing state.

7.10.12 Where there are screw fixed floorboards, these are to be taken up in preference to others. Raised floorboards should be placed carefully on one side such that they do not present a Health and Safety hazard from projecting nail fixings and that these do not damage any existing part of the fabric of the buildings or its contents. Any dust and debris created by lifting of the boards should be vacuumed up as the work proceeds (not only at the end of the working day) to limit the spread of dust, although particular vigilance is required for items of potential archaeological importance.

7.10.13 Any items of masonry that are dismantled are to be carefully referenced with their original location. Do not scratch references, mark only on unexposed faces. Any dismantled masonry is to be stored on soft, non-staining, material and is to be placed without stone-to-stone contact.

7.10.14 Service ductwork is generally to be opened up for inspection at locations of existing access panels, or other locations as agreed with the Architect. Ductwork and services are to be opened up in such a way as to allow for the reinstatement to their proper functioning state of all fabric and services on completion of the work.

7.10.15 Opening up and investigation of existing services are to be carried out strictly as described within the agreed Contractor's Method Statements.

7.10.16 Close circuit television (CCTV) investigations where so specified, shall be undertaken by an approved specialist, in accordance with the Architect's instructions.

7.10.17 The Contractor is to inform the Architect when areas of opening up are safely secured and available for inspection, allowing a minimum of two working days' notice. Following inspection, unless otherwise instructed, backfill, relay, refix all disturbed materials and fabric to the area of the works, and make good surface finishes.

7.11 Health And Safety

7.11.1 The contractor will provide props, struts, scaffolding and shores, etc as necessary to ensure the stability of the existing structures, including making preliminary investigations and calculations where necessary. The Contractor is responsible for the overall safety of the Works and existing structures unless expressly made the responsibility of others in the Contract Documents. All such methods of temporary support and access are to be clean and isolated from the building fabric by suitable forms of protection.

7.11.2 All works are to be carried out strictly in accordance with all relevant legislation and legal obligations currently in force. The Contractor is to have particular consideration of the programming, planning and safe carrying out of operations in respect of other works and site operatives on and about the building.

7.11.3 The Contractor is to prepare and submit to the Contract Administrator and Principal Designer, for consideration, Risk Assessments and Method Statements to address the safe carrying out of the works with the minimum of disruption to the existing structure and fabric.

7.11.4 All opening up is to be carried out strictly in accordance with the health and safety measures and requirements.

7.12 Nuisance

7.12.1 Prevent all avoidable nuisance on and about the site with particular reference to fumes, dust and noise. Establish and maintain good relations with adjoining occupiers. Smoking is only allowed on site outside of the building, where it has been agreed with the Client and waste is to be collected and disposed of by the Contractor at the end of each working day.

7.12.2 Bonfires will not be permitted. All waste materials shall be removed from site and disposed of in a suitable manner and in compliance with all relevant legislation.

7.13 Risks

7.13.1 Fire:

Fire is one of the greatest risks as the damage can be so far reaching. Where a process creates a high risk of fire and is considered unavoidable, it is important to ensure that there is an adequate policy in place to mitigate the risks.

Where possible all hot work is to be dealt with offsite or on the ground well away from the building fabric. Hot work is only permitted only when deemed necessary by the CA.

Where possible prefabrication and Hotwork are to be carried out a minimum distance of 6 m outside the building, on the ground and with no combustible materials within 10m of the Hotwork operation.

The contractor is to advise the CA, in writing beforehand, of the dates when hot work is being carried out, and the details (including method statements) of the work. This is to allow the client and CA to consider whether any further precautions are deemed necessary. A Hot Work Permit System may be introduced.

7.13.2 Burglary, theft and arson:

The asset must be thoroughly secured and protected at all times throughout the construction contract. All windows, doors and access points into the asset shall be blocked and/or secured at all times, ensure that the fixings do not, in themselves damage the building if it is forced.

Remove ladders, along with tools and other materials which may pose a risk to the fabric. Consideration should also be given to individual objects of value, this may include fixed assets fireplaces, doors etc which could be easily stripped out or loose portable items. These assets should be security marked with a property ID system (SmartWater or SelectaDNA for example) with assets temporarily over boarded to provide additional protection and hide from view. Details of the property identification system should be displayed at the perimeter if adopted to deter certain individuals.

7.13.3 Access routes:

It is important to consider access for equipment, materials, and people throughout the asset for the duration of the project. Prior to undertaking actual building works, access routes and elements and/or components of significance should be thoroughly protected.

Access routes should be carefully chosen to avoid proximity to vulnerable fabric, though this may be difficult for historic fabric. Mitigation measures should be implemented within the interior which may involve the use of foam padding and sheets or plywood or plastic padding for the protection of floors, staircase, and balustrades.

Protective measures must be carefully cut to fit and fixed to together to minimise the risk of them becoming trip hazards. Sheets are normally taped together at joints.

Principal trafficked areas need to be checked regularly to ensure that they remain sound and have not moved.

Vulnerable corners and projections may also need to be protected with foam rubber or expanding foam separated from the material by a sheet of polythene.

7.13.4 Incidental damage during repair or conservation work:

Identify potential risks and look to reduce the likelihood of occurrence and severity, when undertaking any intervention or conservation works.

7.13.5 Water damage:

The exterior envelope of the asset must be maintained and protected at all times to reduce and limit potential water ingress issues.

As well as rain, other sources of moisture could be introduced during pointing, masonry cleaning and other conservation processes.

Gutters and downpipes which are disconnected and/or removed during construction works shall be reconnected immediately or temporary drainage system introduced.

8.0 Masonry Cleaning: General

8.1 General

8.1.1 The cleaning of masonry on any part of this project shall only be undertaken by experienced operatives who have regularly been engaged in or specialise in restorative cleaning of external and internal masonry and shall produce references of such activity with the tender return. The sub-contractor shall be a member of the Stone Federation's surface cleaning contractors.

8.1.2 The operatives shall be fully conversant with the method of cleaning specified and have had previous experience and knowledge of the system. The operatives shall have attended training sessions on the use of all items of equipment or chemicals contained in the specification.

8.1.3 The scope of the work is clearly identified on the drawings and the tenderers are to visit the site to confirm for themselves, the difficulties in executing the work as specified and is to include for such within their tender.

8.1.4 No claim will be entertained for failure to appreciate the difficulties in executing the works.

8.1.5 Except where the cleaning is let as a main contract all access scaffolding will be provided by the main contractor. The sub-contractor is to advise the main contractor of their requirements during the tender stage (if known) or immediately on nomination.

8.1.6 Any alterations required to the scaffold to suit the sub-contractors needs arising out of their failure to inform the contractor in accordance with this clause will be charged to the sub-contractor.

8.1.7 Note: Cleaning using the DOFF / TORC system should only be undertaken by contractors on the approved list compiled by Stone Health Ltd and will be part of the Rosette Approved Contractors.

8.2 Preparation

8.2.1 Scope of Work

Stonework and masonry to exterior / interior elevations as indicated on marked up elevations.

8.2.2 Related Repair / Remedial Works

Are specified elsewhere. Ensure the following work has been carried out before the cleaning works commences appropriate access and protection of windows / fixtures and fittings etc.

8.2.3 Removal of Fittings

Timing: before commencement of cleaning works.

Disturbance to surfaces: minimise.

Items for disposal: as noted on marked up elevations.

Items to be kept for reuse: as noted on marked up elevations.

8.2.4 Vents and Grilles

Protect but do not seal up ventilation grilles, air bricks, or other ventilation opening without first seeking instructions.

8.2.5 Control and Disposal of Wash Water and Detritus

Disposal: Safely. Obtain approvals from relevant authority.

8.2.6 Control of Water

Collect and divert to prevent ingress and damage to building fabric and adjacent areas.

Provide suitable temporary catchment boards / sheeting, gutters etc. to collect wash water and divert it to suitable discharge points.

Do not let wash water build up at outlets or above levels of flashings or anywhere where there is risk of it penetrating and causing damage to the building fabric.

Ensure that water does not penetrate interiors and damage finishes, etc. Monitor interior building and seek instructions when any signs of damp appear internally.

Above and below ground drainage systems: Keep free from detritus and maintain normal operation.

8.2.7 Brushing and scraping

Before commencing any other methods of cleaning, remove loosely adhered deposits and heavy deposits of biological matter using suitable corrosion resistant brushes and scrapers / spatulas that do not abrade or gouge the surface. Do not use brushes with steel bristles.

8.2.8 Tooling

To remove thick encrustations of dirt carbon and limescale etc. it is recommended, providing that:

- The works is carried out by skilled and experienced stone masons.
- None of the original surface / detail is removed unless agreed with the CA.

8.2.9 Cold Weather

Cleaning procedures using water: Do not use when air temperature is at or below 5®C. Protect damp surfaces from frost.

Chemical cleaning agents: Do not use when surface temperatures are below those recommended by manufacturer.

8.2.10 Cleaning Generally

Operatives: Appropriately trained and experienced for each type of cleaning works.

- Evidence of training: submit on request.

Control of Cleaning: Confine cleaning processes and materials to designated areas. Prevent wind drift.

Detritus: Remove regularly. Dispose of safely.

Monitoring: Frequently check results of cleaning compared to approved trial samples. If results established by trials are not achieved, seek instructions.

Modifications to cleaning methods and materials: Seek instructions.

8.2.11 Record of Cleaning Works

Written Report: Record cleaning methods and procedures used for each type of surface and deposit.

Content: Relevant attributes of cleaning methods used including:

- Equipment and settings.
- Dwell times.
- Number of applications.
- Ambient temperature.

Additional Documentation: General photographic survey before cleaning to identify heavy soiling.

Submission: At completion of cleaning works.

8.2.12 Trial Samples

Trial Samples reference is required for all cleaning methods.

Surface: Masonry and stonework.

Location / Size: Location to be agreed but no less than 2sq.m per sample.

Type of soiling:

- Atmospheric soiling.
- Biological growth
- Bird droppings
- Fire damage
- Graffiti

Cleaning Methods: As specified below.

Records: Maintain written records for each trial area, including cleaning methods and conditions, to enable replication of results elsewhere.

8.2.13 Cleaning Generally

Use operatives who are skilled Stonehealth Approved, having been trained and experienced with the equipment, materials and procedures for the type(s) of cleaning and surfaces specified. Provide evidence of their training and experience to the CA on request.

Confine cleaning to designated area(s) / surfaces. Do not allow cleaning agents or residues to stray onto adjacent or protected surfaces.

Clean, collect and safely dispose of debris from scaffolding, ledges, etc. at the end of each day. Prevent debris falling to lower levels.

Prevent marking of cleaned areas from dirt and debris splashing up from scaffold boards.

8.2.14 Monitoring

Regularly monitor effects of each cleaning procedure against the degree of cleaning established by approval trial sample(s). Seek instructions immediately, wherever:

- Disruption to the surface occurs
- Anticipated level of surface cleaning is not being achieved.
- Discolouration or stains are revealed by cleaning.

Do not modify cleaning procedures or materials without approval from the CA.

8.3 Health And Safety

8.3.1 The Contractor shall be responsible for ensuring that all products used, and all procedures adopted comply in full with current Health and Safety requirements.

8.3.2 Ensure that all operations carried out in such a way that they do not represent a risk to health and safety of the general public or other operatives on site.

8.4 Sample Panels

8.4.1 Although the basic cleaning method has been established there is a requirement for sample panels to be carried out to ensure that the Contractor is aware of the standard required. 3 sample panels of each substrate to be cleaned are to be

carried out under the direction of the Architect in locations previously agreed with the Architect. Each sample panel will be approximately 2 square metre as item 'trial samples'.

8.4.2 Sample panels will be executed prior to commencement of the works and will be carried out by experienced operatives who will be working on the project. The purpose of the sample panels is:

f) to confirm the method, working pressures etc to be used and

g) to ensure that the site operatives are familiar from the start with the project requirements. For this reason, it is imperative that the operative executing the trials should be actively involved in the works.

8.4.3 Area around sample panels shall be protected as required for the main works.

8.5 Protection

8.5.1 All surfaces not being cleaned shall be fully protected to ensure that no accidental over spray of cleaning occurs.

8.5.2 Where different cleaning techniques are specified for adjoining surfaces, the surfaces not being cleaned during either operation shall be fully protected.

8.5.3 Protection of surfaces shall include the following:

h) Windows to be boarded up with ply and covered in heavy duty polythene securely taped at all edges.

i) Painted surfaces not being redecorated shall be protected with heavy duty polythene and securely taped.

8.5.4 Where cleaning is internal all fixtures and fittings which cannot be removed are to be fully protected. Statues and any areas of ornate carving are to be protected with ply box covers and heavy-duty polythene.

8.5.5 Decorative ironwork is to be fully protected. Where ironwork would puncture polythene a protective layer of expanded polystyrene, foam or similar approved material is to be taped in position prior to installing heavy duty polythene which shall be fully taped.

8.5.6 Furniture and fixtures are to be protected against damage with ply or MDF boards and covered with heavy duty polythene fully taped. Where loose furniture is involved, it may be moved to a central point(s) but will still require full protection.

8.5.7 The Contractor is to allow for all protection. Where the Architect considers the protection to be inadequate, the protection shall be augmented as directed at the Contractors own cost.

8.5.8 Protection shall be inspected at the start of each working day to ensure its integrity. Any defects noted shall be rectified by the Contractor prior to commencement of work.

8.5.9 No cleaning operations shall commence until all protection is in place.

8.5.10 No protection shall be removed until cleaning operations have been completed and have been inspected and approved by the Architect. Protection is to remain in place until "snagging" items have been completed and approved.

8.6 Products / Equipment

8.6.1 Compatibility of Chemical Products

Products: Compatible and produced by the same manufacturer.

8.6.2 Surface Biocides

Types: Registered by the Health and Safety Executive (HSE) and listed on the HSE website under non-agricultural pesticides.

8.6.3 Doff Steam Cleaning

Equipment Type: Stonehealth DOFF with DRS steam / water vacuum recovery unit.

Apply steam at the lowest pressure and allow when removing paint, the appropriate temperature that will remove/soften/loosen deposits without abrading or disrupting the surface(s). If removing biological growth, it may be possible to be removed at a lower temperature but to ensure that the re-growth does not occur, the full temperature of 150®C should be applied over the whole surface in order to kill off the spores. In such instances, there is no need to use a chemical biocide.

For each area / surface, establish the optimum settings (temperature, volume and pressure), nozzle type and distance of nozzle from substrate. Keep a written record of these variables but allow an operator to vary.

Assist removal of softened deposits with suitable corrosion resistant brushes and scrapers / spatulas that do not abrade or gouge the surface.

Method statements and Risk Assessments are appended to this document for information.

8.6.4 Torc Abrasive Cleaning

Equipment type: Stonehealth TORC

Apply abrasive at the lowest pressure that will remove deposits whilst causing the minimum of abrasion to the surfaces(s). where deposits are ingrained seek instructions.

For each surface, establish the optimum settings (pressure and abrasive volume), nozzle type and distance of nozzle from the surface. Keep a written record of these variables.

Remove and collect dust and debris from each completed surface as work proceeds and finish by rinsing off thoroughly with clean water using a suitable low-pressure spray equipment.

Rinse debris / slurry thoroughly from each completed surface with clean water using suitable low-pressure spray equipment. Do not allow slurry to dry out on the surface.

Method statements and Risk Assessments are appended to this document for information.

8.6.5 Cleaning Mineralic Substrates

Equipment Type: Stonehealth CLEANFILM

Cleanfilm refers to the Stonehealth latex cleaning system for internal cleaning, without the use of water.

The areas to be cleaned will be examined by the Supervising Officer and those of historic or delicate nature will be noted for additional precautions. The said officer will be assisted by the Contractor or other participants having an understanding of the principle of the cleaning system. Considerations will include safety, substrate condition and proximity of other works.

Samples to several identified locations are to be undertaken prior to wholesale cleaning works being undertaken and should be agreed with CA. Due merit should be given to the following;

j) Areas should be representative of the substrate, soiling and detail of the main works.

k) Test panels should be positioned discreetly.

l) Location of the test areas must be recorded and protected from further alteration.

m) The parameters by which the result is obtained must be recorded.

n) An acceptable test area should be retained as a control panel for the main works.

o) Measures adopted as a result of tests must be attainable and controllable in the main works.

The cleaning of the building surface should be carried out by a capable operator, who has received instruction from Stonehealth Limited, into the correct use of Cleanfilm.

If the Test Supervisor is not familiar with Cleanfilm they should seek such information from Stonehealth Limited.

Method statements and Risk Assessments are appended to this document for information.

8.7 Application

8.7.1 Removal of Loosely Adhered Deposits

Timing: Before commencement of other cleaning methods.

Surfaces: Prevent damage, including abrasion.

8.7.2 Biocide Application

Preparation: Remove loose growths.

Surfaces: Prevent damage, including abrasion.

Biocide Treatment: Appropriate solutions to kill growths and inhibit further growths.

- Dead growths: Remove.

8.7.3 Abrasive Blocks

Types: Suitable grades of carborundum or gritstone.

Application: Lubricate with water. Remove detritus.

Abrasive Power Tools: Prohibited.

8.7.4 Abrasives Cleaning

Surfaces: Minimise abrasion.

- Ingrained deposits: Seek instructions.

Equipment Settings (including nozzle type and distance from surface): Adjust regularly to achieve optimum cleaning performance for each surface.

Detritus: Remove with clean water.

8.8 Completion

8.8.1 Obtain CA's approval of cleaning to each area / surface and before of temporary protection.

8.8.2 After removal of temporary protection, thoroughly clean all glazing, window frames, doors, sills, and other affected surfaces.

8.8.3 Check that all gutters, hoppers, downpipes, and gullies are free from obstruction and debris arising from cleaning works.

8.8.4 Give the CA two weeks' notice before striking each stage of scaffolding, to allow for final inspections.

8.8.5 Refix the following fittings: all items temporally removed and stored.

8.8.6 Complete all necessary documentation, review, and record final results with supportive drawings and photographs.

9.0 Masonry Cleaning: Removal of Organic Growth

9.1 Materials

9.1.1 Hot Box Water Jet

The use of a 'DOFF' Hot Box water cleaning system or similar approved is considered the most appropriate way to effectively kill off all organic growth other than significant 'woody growth'. This should be used in preference to a biocide unless directed otherwise.

DOFF system to be used in conjunction with DRS steam / water vacuum recovery unit.

BS 8221-1:2012 Code of practice for cleaning and surface repair of buildings. Cleaning of natural stone, brick, terracotta and concrete.

DOFF cleaning system uses steam as the cleaning agent. A normal water supply is taken into the high-pressure pump where the pressure is increased to the required level before it enters the hot-box. The temperature is increased up to 150◦C if necessary before it passes to the heat resistant nozzle where special jets direct the steam onto the surface to be cleaned. The DOFF system will effectively remove paint, bitumen, oil and grease, chewing gum, algae etc from virtually all surfaces including brick, stone, concrete, tiles, terracotta, wood, stucco. Consult with Stone Health, Tel: 01453540600, www.stonehealth.com where additional specifications / information can be provided.

Note: Cleaning using the DOFF / TORC system should only be undertaken by contractors on the approved list compiled by Stone Health Ltd and will be part of the Rosette Approved Contractors as per RS8 1.2.13 above.

Sample areas must always be undertaken prior to commencement of wholesale cleaning package(s) and agreed with the Architect.

9.1.2 Biocide

The biocide is to be Epicuro Anti-Algae as manufactured by Epicuro Protective Materials, Cardinal House, 39/40 Albemarle Street, London, W1S 4TE.

Where alternative proprietary biocides are proposed they shall be based on a quaternary ammonium compound which is to be subject to the Architects approval.

The biocide should not contain calcium chloride, which will cause a build-up of soluble salts. Where there is any possibility of run off onto limestones then the biocide should not contain zinc or magnesium silicofluoride. Use only biocides with a current Health and Safety Executive number and approved by them for the purpose intended and shall comply with all current pesticide legislation.

Confirmation of this is to be forwarded to the architect prior to commencement of the works.

9.1.3 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 shall be erected to the approval of the local water authority.

9.2 Equipment

p) Non-ferrous soft wire brushes.
q) Knife blades.
r) Pneumatic garden spray with adjustable nozzle.
s) Rubber gloves.
t) Safety mask.
u) Safety goggles.

9.3 Protection

9.3.1 Protect all flowerbeds, landscaped areas etc, with polythene sheeting prior to commencement.

9.3.2 Do not spray near unprotected personnel and animals.

9.3.3 Ensure that pollution of waterways, drainage etc. does not occur as a result of treatment.

9.4 Health and Safety

9.4.1 Biocide should be one approved by the HSE Pesticide Registration Division.

9.4.2 The Contractor shall be responsible for ensuring that all products used, and all procedures adopted comply in full with current Health and Safety requirements.

Contractor shall ensure all recommended Personal Protection Equipment be worn by his operatives.

9.4.3 Ensure that all operations carried out in such a way that they do not represent a risk to health and safety of the general public or other operatives on site. Include for all temporary protection and carrying out work "out of hours" to minimise risks.

9.5 Storage

9.5.1 Ensure all materials are stored in sealed containers clearly marked with their contents. Undiluted biocides should only be stored in the manufacturer's original containers.

9.5.2 Biocides should only be diluted in such quantities as can be used during the working day. Diluted biocides should not be stored overnight, but any surplus material at the end of the working day should be disposed of to the satisfaction of the Local Authority.

9.5.3 Any biocides stored on site shall be kept in securely locked areas with toxic hazard signs.

9.6 Preparation

9.6.1 Remove as much plant growth, moss, lichens etc. with a knife blade and wire brush as necessary.

9.6.2 Ensure that no damage is caused to the stone by the removal of plant growth. If any damage is encountered restrict removal to the removal of moss only.

9.7 Application

9.7.1 Treatment with biocides should not be undertaken during wet weather or immediately after prolonged periods of wet weather.

9.7.2 The air temperature should be above 5°C during application.

9.7.3 Prepare a solution of quaternary ammonium-based biocide to the manufacturer's specification.

9.7.4 Fill a pneumatic garden-type sprayer two-thirds full with the diluted biocide. Adjust the nozzle to a coarse spray setting. There should be sufficient pressure at the wand nozzle, after pumping the container, to saturate the surface of the masonry without causing excessive 'bounce back' and spray drift.

9.7.5 Apply a flood coat. Commence at the top of the vertical surface to be treated and move across horizontally and slowly to allow approximately 100mm run down. The next horizontal pass should be made across the previous run down.

9.7.6 Leave the treated area for a minimum of two weeks and a maximum of four weeks to allow the growth to die off. Brush off as

much dead growth as possible with dry soft bristle brushes, making sure that any adjacent gutters and hoppers are kept clear.

9.7.7 Prepare a second solution of a proven long-lasting biocide to the manufacturer's specification.

9.7.8 Fill a second pneumatic sprayer with the diluted biocide and apply in the same manner as (1.7.3) above.

9.7.9 Allow the surface to absorb and carry out a second application of proprietary biocide as above to prevent re-colonisation of the cleaned stone.

10.0 Hydraulic Lime Mortar

10.1 Products

10.1.1 Hydraulic Lime Mortar

Hydraulic Lime Mortar 1:2½/3 using a moderately hydraulic Lime (St. Astier NHL 3.5 or similar approved) and well graded sand aggregates from 2.5mm down to 75 microns. Strength of mortar may be reduced to NHL 2 following analysis of existing mortars.

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

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

10.1.2 Hydraulic lime

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

Womersley Associate Walkley Lane Heckmondwike WF16 0PG E: info@womersleys.co.uk Tel: 01924 400651	Joseph Parr Ltd (Alco) Higginshaw Lane Royton Oldham OL2 6JD Tel: 0161-633-1264
Telling Lime Products Limited Primrose Avenue Fordhouses Wolverhampton WV10 8AW Tel : 01902 709777	

10.1.3 Prompt Natural Cement

3 parts ollitic sand; ½ part hotlime; ½ part Vicat Prompt natural cement; 1 part sieved coal ash. 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.

10.1.4 Dry Hydrate Fineness: The Contractor is to retain a 0.2mm mesh (200 micron) sieve on site at all times to enable fineness of the dry hydrate to be checked by sampling before use.

10.1.5 Mortar Testing: The lime supplier is to provide chemical analysis and mortar compressive strength test results in accordance

with BS EN 459 using the dry hydrate currently produced on request.

10.1.6 Dry Hydrate Fineness: The Contractor is to retain a 0.2mm mesh (200 micron) sieve on site at all times to enable fineness of the dry hydrate to be checked by sampling before use.

10.1.7 Mortar Testing: The lime supplier is to provide chemical analysis and mortar compressive strength test results in accordance with BS EN 459 using the dry hydrate currently produced on request.

10.1.8 Hydraulic Lime Putty: Hydraulic lime in accordance with above and from an approved manufacturer, run to putty in accordance with the specific gravity and workability given for CL lime putty in BS EN 459. NHL 2 lime is to be used on the same day that it is run to putty. Hydraulic lime putty may be thinned to hydraulic lime grout with an appropriate portion of fine aggregate as given in the Particular Specification, where the grouting of exceptionally fine ashlar joints and gauged brickwork (2mm or less) is required.

10.1.9 Aggregate: The word "aggregate" in this context includes one or more of the following:- sand, broken or crushed stone and crushed brick. It also includes other crushed inert materials. If sand particles are not of the correct colour or size, or the aggregate in the existing mortar to be matched is composed of crushed or broken stone or other material, this is to be matched with a similar material.

10.1.10 Additives: No additives (pigments, plasticisers and the like) of any sort shall be incorporated in the mortar except in very special circumstances on express written instructions given by the Architect. Raw linseed oil, up to a maximum of 3% of the lime by volume, may be added to aid water-shedding properties of the mortar where appropriate following approval of trial samples by the Architect.

10.1.11 Ready Mixed Lime:Sand for Mortar: Only to be used from an approved source, agreed with the Architect. Any such ready mixed mortars are to comply with BS 4721:1981 and BS EN 998:2003 and must not include Portland Cement.

10.1.12 Transport, Storage and Handling of Materials: Approved sands shall be stored in clearly marked bags or bunkers and protected from inclement weather, site debris, leaves and the like. Quantities shall be based on the use of dry sand and accurate allowances made for bulking.

10.1.13 Lime putty is to be stored in clean containers, protected from contamination and kept in an excess of water to prevent carbonation.

10.1.14 Hydraulic lime is to be supplied in bags which must be date stamped with the day of manufacture. Hydraulic lime over 3 months old must not be used. All bags must be delivered to site undamaged and dry without moisture penetration of the covering. Dry hydrate that has been exposed to the air or moisture in transit and in damaged bags is to be rejected.

10.1.15 Hydraulic lime must be stored in a dry weatherproof building with a raised floor. Record the date of delivery. No materials may be stored on the ground. Do not store bagged lime on site for more than ten weeks.

10.2 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.

10.3 Pre-works

10.3.1 Before any re-pointing work is undertaken, a survey of the building shall be carried out by the supervising officer and the

contractor to determine the precise areas to be re-pointed. Often much of the old lime mortar raked out is sound and could, with advantage (appropriate access), have been left in place. It is essential that all pointing is carried out to match previously approved samples.

10.4 Preparation

10.4.1 In preparation for repointing works, using hand tools only, rake out all loose jointing material to a depth of not less than twice the joint width. All raking/cutting shall leave a clean, square face at the back of the joint, so as to provide optimum contact with the new mortar.

10.4.2 The prepared face and joint should be carefully cleaned out with a natural bristle brush and thoroughly flushed out with clean water, avoiding unnecessary saturation. All dust and loose material must be removed, working from top to bottom of the wall.

10.4.3 All cutting out and cleaning works should be available for inspection prior to commencement of the repointing.

10.4.4 No cleaning agents or fungicides are to be used either before or after repair works, except on the express authority of the Architect or in connection with treating root pockets as described in paragraph 4.5.1 below.

10.4.5 Any sound pointing should be left undisturbed, even if it has weathered back behind the general wall face to as much as half the joint width. Generally, only rake out where the existing mortar is capable of being removed by raking out by hand with a blunt instrument, leaving the arrises of the brickwork or stone unharmed. A hammer and chisel should not be used unless permitted by the Architect. Under no circumstances should an angle grinder or similar tool be used. The definition of failed means that the pointing has cracked, been partially lost or created a water trap.

10.4.6 Any metalwork such as iron wedges found in the mortar joints will be recorded and then removed where possible.

10.4.7 Where it is desirable to remove damaging and unsightly cementitious pointing, experiments should be carried out to the approval of the Architect to ascertain the most appropriate method of removal and to limit damage caused to existing work.

10.4.8 Vegetation: Remove all growth from the walls and carefully grub out the roots. Treat the root pockets with a solution of sodium chlorate or with tebuthiuron weed-killer. Build up the root pockets reusing the original material in the mortar specified.

10.5 Application

Mortar should be plastic and workable but as stiff as possible. It should be pushed into the back of the joints in layers, avoiding large volumes of deep filling at all times.

On rubble elevations, many of which exist at the Castle, pinning stones should be used to fill wide and deep joints in the same style as the original build. This will reduce the volume of mortar required and will assist the process of setting and final full carbonation. A good yardstick is to keep the joint thickness to no more than a "finger" thick, if the joints are wider than this, they should be pinned with compatible matching masonry.

10.5.1 A "well filled" joint is close to flush with the surrounding masonry / rubblework.

10.6 Pointing

10.6.1 It is essential that the masonry is thoroughly dampened when pointing is commenced. If the joints have dried out before cleaning, they must be re-wetted with a hand-held spray prior to placing of any new mortar. No water should be left lying within the prepared joint.

10.6.2 The mortar must be of minimum water content and should be pushed into the joint and firmly ironed in with the maximum possible pressure and minimum of over-working. Pointing irons should be used, not pointing trowels. The pointing irons may be cranked, bronze or steel flat of a width which will fit into the joint and ensure compaction over the full width. Compaction

is therefore achieved throughout the depth of the joint each time mortar is placed rather than from the surface alone. The Contractor should be aware that it may be necessary for them to fabricate pointing irons to undertake the works.

10.6.3 If the joint is to be filled in one operation, the mortar must be almost crumbly and be ironed in very firmly.

10.6.4 Repointing work should begin at the uppermost section of the wall and proceed downwards, ensuring that all the mortar is pressed well into the joints to achieve good compaction. Fill all the joints solidly with the approved mortar mix finishing very slightly back from the masonry and in accordance with the approved sample. The mortar is not to be spread or buttered onto the face of the masonry unless specified.

10.6.5 Where directed to produce a weathered, roughened finish to expose the aggregate, the mortar should be left to take its initial set and then stippled with a stiff bristle brush. The bristles should not be dragged across the face but tapped hard against it. Timing is critical. If this technique is applied too early the mortar will be removed too easily and the bond forming between the brick/stone and the mortar will be disrupted. If too late, it will be difficult to make the required impression.

10.6.6 The particular finish required (stippled, struck, double struck, tuck pointed or galleted) is to be specified by the Architect on site according to the existing and adjacent.

10.6.7 Any slight fractures due to shrinkage must be cut out and remade prior to at practical completion of the contract and for final completion at the end of the defect's liability period.

10.6.8 When placing the mortar ensure that it is placed in the joint and does not spread over the adjacent stone and cause any lime staining. Likewise, when finishing off ensure no lime is brushed or sponged over the face of the adjacent stones causing lime staining. Such lime staining will not be considered acceptable as a finished result. Surplus lime on the face and arrises of masonry should be cleaned off immediately and all faces kept clean at all times to avoid staining.

10.6.9 Rake out all joints to a minimum depth of 35mm using a hooked knife or similar tool. Under no circumstances shall chisels or mechanical tools (disc cutters etc) be used. Extreme care must be taken to ensure no damage is caused to the stonework. Any stones damaged shall be replaced at the contractor's expense.

10.6.10 All raking out is to be inspected by the Architect prior to repointing. The works are to be co-ordinated such that preparation is carried out to agreed areas and made available for inspection by the Architect. The Contractor is to be given a minimum of 48 hours' notice for inspection.

10.6.11 All joints are to be filled to their full depth and pointed with a purpose made pointing bar with a diameter of 30mm. Where joints widen out due to erosion of the existing stone the pointing is to be kept back to ensure that a consistent visual joint is achieved. Care is to be taken to ensure that a free draining surface is always maintained or created. After the initial set of the mortar, it is to be stippled with a stiff bristled non-ferrous brush to give a texture to the pointing and to remove the smoothness of the pointing bar – giving a 'weathered' appearance.

10.6.12 It is essential that perpends are allowed to run into horizontal bed joints without any clear definition or "lining" occurring such that the mortar should visually transfer from perpend to bed joint in a smooth manner.

10.6.13 Clean off any surplus or spread of mortar with a clean pointing trowel as work proceeds. Great care should be taken to minimise the spread of mortar as lime staining may occur.

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

10.6.15 The work is to be kept clean from mortar spillage at all times. Completed areas are to be protected until cured.

10.7 Masonry Mortar repair

10.7.1 Pozzolanic Material: Where specified, is to be ground brick or tile dust, obtainable from Bulmer Brick and Tile Co., Bulmer, Nr. Sudbury, Suffolk CO10 7EF, tel: 01787 269232 or Metastar 501 obtainable from Rose of Jericho, Horchester Farm,

Holywell, nr. Evershot, Dorchester, Dorset DT2 0LL, Tel: 01935 83676. Particle size of brick dust and colour appropriate to specific site conditions to be given following preparation, curing and laboratory testing of samples by the Contractor.

10.7.2 Crushed Stone: Crushed Cumbrian sandstone is to be incorporated in the masonry mortar repair mix to assist achieving a visual match to the stone under repair. The crushed stone granules must be sieved before use to a well graded particle size as specified above for the sand for mortar mixes.

10.7.3 Pulverised Fuel Ash: This may be required to darken the colour of the mix to match adjacent stone. The darkest P.F.A. available is therefore to be selected. Particle size of the P.F.A must be well graded and between 0.075 and 0.300mm.

10.7.4 The overall proportion of approximately 1 binder to 2 aggregate is to be maintained but mix ratios may be varied for colour matching within this parameter. Allow for 8 additional cured and dry colour samples to be prepared and approved in sequence for each stone colour to be matched to allow for mix variations to achieve matching colours for Architect's approval.

10.7.5 Allow for the drilling and resin fixing of stainless-steel armatures to strengthen masonry mortar repairs as necessary. The build-up of deep pockets or large areas of mortar repair must be carried out in stages in depths not exceeding 20mm at a time. These coatings are to be applied to the same specification as for lime plastering. Ensure the larger aggregate sizes (5mm or more) are incorporated in areas of dubbing out.

10.7.6 All mixing and handling equipment is to be kept clean. Containers, boards, tools, etc. shall be well cleaned before the next batch of mortar is mixed/used.

10.7.7 Preparation: In preparation for masonry mortar repairs use hand tools only, rake out all loose material to a depth of not less than 20mm. All raking/cutting shall leave a clean, square face and well keyed at the back of the stone, so as to provide optimum contact with the new mortar.

10.7.8 The prepared faces should be carefully cleaned out with a bristle brush and thoroughly flushed out with clean water, avoiding unnecessary saturation. All dust and loose material must be removed, working from top to bottom of the stone.

10.7.9 All cutting out and cleaning works should be approved prior to commencement of applying the stone repair mortar.

10.7.10 Finishing: No cleaning agents or fungicides are to be used either before or after repair works, except on the express authority of the Architect.

10.7.11 Any sound stone should be left undisturbed, even if it has weathered back behind the general wall face to as much as half a mortar joint width.

10.7.12 Generally, the existing pointing and finishing size and pattern is to be maintained round each stone repaired.

10.7.13 Where it is desirable to remove damaging and unsightly cementitious pointing, adjacent to the repair experiments should be carried out to the approval of the Architect to ascertain the most appropriate method of removal and to limit damage caused to existing work.

10.7.14 Protection, Cleaning and Aftercare

10.7.15 General: Following completion of the stone repair joint surface finish the work shall be protected from direct sun and rain and kept at a temperature above 5oC for a minimum of four weeks until the face has dried and hardened.

10.7.16 Protect all new work against frost, any repair damaged due to frost action is to be cut out and remade in frost free conditions.

10.7.17 During dry weather, all new work shall be kept continuously tended and moistened for a minimum of 4 weeks (but not wet) to ensure that the set takes place slowly.

10.7.18 Any mortar or stains caused by the works on the face of the masonry must be completely removed immediately and before the stains dry or mortar hardens.

10.7.19 All general clauses for mortar and pointing in this specification apply equally to masonry mortar repairs (or 'plastic s tone repairs') above.

10.8 Protection and Cleaning

10.8.1 General: The work shall be protected from direct sun and rain for a minimum of four weeks (after application). The joint surface finish should be applied and tended at an average minimum temperature of 10°C until the face has dried and hardened. The period of protection must be increased relative to the slower carbonation rate that occurs at lower temperatures.

10.8.2 Protect all new work against frost, any joints damaged due to frost action is to be cut out, re-made in frost free conditions, and protected as above.

10.8.3 During dry weather, all new pointing shall be kept continuously moist (but not wet) for a minimum of 4 weeks to ensure that the set takes place slowly. Damping down is to be done with a fine mist spray – not a jet of water – in several applications. Water must not be made to flow down the face of the work when damping down. Allow for tending and spraying down for a minimum of three times a day during this period.

10.8.4 Turn back scaffold boards adjacent to brick faces at night and during heavy rain to avoid the disfiguration of finished work by abrasion and splashing.

10.8.5 Any mortar or stains caused by the works on the face of the masonry must be completely removed before the mortar hardens.

10.8.6 Pointing on horizontal surfaces – copings, paving and the like – is to be protected to prevent undue saturation in wet weather.

10.8.7 Frost: Work must not be carried out during frost conditions. Frost must not be allowed to affect completed work before it has fully cured. Manufacturers of hydraulic limes are to guarantee the curing periods for the class of lime supplied.

10.8.8 Generally pointing and bedding mortar is not to be laid when the temperature is 5°C or below and falling. Work may re-commence when the temperature is 3°C or above and rising. The Contractor is to keep maximum and minimum thermometers on site for the duration of the contract to record night and day time temperatures as directed.

10.8.9 Winter working and working when ambient temperatures are below 3°C may only proceed where the Contractor has provided sufficient protection and working conditions to ensure average 24-hour day temperatures for all application, preparation and aftercare of the mortar remain no lower than 8°C at all times.

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

10.9 Finishing

10.9.1 To ensure good compaction and adhesion within the joint, the mortar can be tamped firmly back with a stiff bristle brush as it starts to firm up. The timing of this is critical. If it is carried out too soon after placing, fines in the mix will be drawn to the surface and will form a dense skin, inhibiting the proper curing of the mortar. Once the surface of the mortar is firm (usually the next day) lightly scraping or brushing the surface to expose the aggregate can improve the appearance of the mortar and make the joints less visible.

When re-pointing joints should be raked back to approximately 25mm, thoroughly cleaned, including the top and bottom faces of the beds, ready for the new mortar. Pinning stones should not be removed, but if they are loose, they should be removed and put back during the re-pointing. Where a wall has previously been re-pointed and the pinning stones have been lost, suitable replacements should be used. The walls should be well washed to remove any dust and loose friable material making sure that the entire elevation is cleaned down to prevent staining on the walls. Impervious masonry should be dry when the work commences, however the original backing mortar should be kept damp.

Pointing deep joints should be done in layers of 20 - 25mm at a time, allowing the preceding layer to take up before applying the next.

10.10 Workmanship

10.10.1 The mortar shall be a little softer and more porous than the stones/bricks themselves and shall comply with BS4551:2005 parts 1 and 2 for mortars, screeds and plasters and BS4550:1989 part 3 sections 3.6 for methods of testing.

10.10.2 Samples: A range of sample mortar mixes are to be prepared for inspection by the Architect. For repair work the mixes are to match the existing mortar in respect of colour, texture and strength. The Architect will identify an area of existing mortar to be matched. For new work the sample mortar mixes are to be prepared as directed by the Architect.

10.10.3 The Contractor is to allow for blending and sieving sands from different sources, as necessary, to achieve appropriate grading, colour and texture.

10.10.4 If the Architect does not consider the sample mixes to be satisfactory in respect of the requirements of this specification, then further samples are to be provided by the Contractor as necessary.

10.10.5 Where applicable and sound existing pointing survives in good condition, the Architect will mark a section which is to be matched in respect of colour, texture and strength.

10.10.6 A trial area of pointing is to be executed on specially prepared sample panels (NOT THE EXISTING HISTORIC FABRIC) for approval by the Architect using mortar as specified and approved.

10.10.7 The Contractor is to allow for carrying out 4 test panels each approximately 1 square metre under the direction of the Architect, as per methods described hereon in. Work to the rest of the stonework shall not commence until the test panel has been approved by the Architect. The location of test panels is to be agreed prior to commencement. Test panels must have had time to set.

10.10.8 Where directed, the Contractor shall prepare a sample panel of masonry, executed in mortar mixes and pointing techniques as specified by the Architect, or to match existing work.

10.11 Completion

10.11.1 The Architect is to be advised at least two weeks in advance of when pointing will be complete in order that an inspection can be made prior to the removal of any scaffold.

10.11.2 Remove all tools, plant and equipment and used materials and debris.

10.11.3 On completion leave all clean neat and tidy to the satisfaction of the Architect.

11.0 Stone Repairs

11.1 Generally

11.1.1 Scope of Work

Schedule: Generally, as description and schedule of works.

Records of Masonry to be Repaired: Before starting work, use measurements and photographs as appropriate to record bonding patterns, joint widths, specific features, etc.

11.1.2 Identification of masonry units to be removed, replaced, or repaired: Mark clearly, but not indelibly, on face of masonry units or parts of units to be cut out and replaced. Transcribe markings to drawings / photographs.

11.1.3 Site Inspection

Purpose: To confirm type and extent of repair / renovation / conservation work shown on drawings and described in survey reports and schedules of works.

Parties involved.

- Contract Administrator
- Foreman mason; and
- Structural engineer

Timing: To suit contractors programme of work.

Instructions issued during inspection: Confirm in writing, with drawings and schedules as required, before commencing work.

11.1.4 Removal of Fittings / Fixtures

Items to be removed and reinstated on completion of repair work: all items fixed to fabric indicated for reuse.

Identification: Attach labels or otherwise mark items using durable, non-permanent means, to identify location and describe re-fixing instructions, where applicable.

Treatment following removal: as schedule.

Storage: Protect against damage, and store until required.

Storage location: onsite.

Reinstatement: Refit in original locations using original installation methods.

Items unsuitable or not required for reuse: to be tipped.

Masonry fabric and surfaces: Do not damage during removal and replacement of fittings / fixtures.

11.1.5 Removal of Plant Growths from Masonry

Plants, root systems and associated soil/debris: Carefully remove from joints, voids and face work.

Removal of roots: Where growths cannot be removed completely without disturbing masonry seek instructions.

Unwanted plants close to masonry: Where removal of root system is not possible or desirable, cut through stem as close to the ground as possible. Remove bark from stump and apply herbicide paste. Leave stump to wither.

11.1.6 Record of Work

General: Record work carried out to masonry clearly and accurately using written descriptions, sketches, drawings and photographs, as necessary.

Specific records:

- Annotated elevation drawings to identify the location of each individual repair.
- Photographs of damaged areas prior to removal of any material.
- Sketches and drawings for each unique item to be replaced, fully dimensioned.
- Photographs of each repair area following removal of the material.
- Photographs of the finished repair.

11.1.7 All information is to be cross referenced and fully annotated.

11.1.8 Structural Stability

General: Maintain stability of masonry. Report defects, including signs of movement, that are exposed or become apparent during the removal of masonry units.

11.1.9 Disturbance to Retained Masonry

Retained masonry in the vicinity of repair works: Disturb as little as possible.

Existing retained masonry: Do not cut or adjust to accommodate new or reused units.

Retained loose masonry units and those vulnerable to movement during repair works: Prop or wedge so as to be firmly and correctly positioned.

11.2 Materials

11.2.1 Stone & Masonry

Stone / masonry is to be selected to match existing in texture and colour.

Representative samples shall be provided prior to final order. Samples should be weathered samples from all areas of the quarry currently being exploited as there may be colour/texture variations between beds within the quarry. Where dressed stone is to be used then samples of new stone with a dressed face shall also be provided for approval. Whilst provisional orders may be placed no confirmation shall be issued until samples have been approved by the Architect.

All stone shall be free from vents, cracks, fissures, mineral veins, discoloration, and clay pockets. No stone for the project should contain any defect which will adversely affect the strength or appearance of the stone.

11.2.2 Dowels and Cramps

All dowels and cramps are to be as manufactured by Ancon Clarke Ltd., Olive Grove Road, Sheffield S2 3GB and are to be manufactured in austenitic stainless steel to B.S. 1449 Part 2 1983. Typical details for cramping are contained in the appendix to the specification.

Bronze cramps may also be used subject to prior written approval.

11.2.3 Resin

All resins shall be approved in writing before use. The Contractor is to supply full technical details of proposed resins with his tender or where the work is additional to the contract, not less than 2 weeks before intended use.

11.2.4 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 stand pipe shall be erected to the approval of the local water authority.

11.2.5 Mortar

Lime mortar as specification.

11.3 Laying Of Stone

11.3.1 Natural Bed

New stonework shall be prepared such that the natural bed is:

v) Horizontal for plain walling works.

w) Vertical and at right angles to wall face for cornices and other projecting stones.

x) Horizontal in quoin stones or end stones. These shall be specially selected to ensure that they are compact non-laminated stones.

Further bedding details are contained in B.R.E. publications for the relevant type of stone. These are summarised in diagrammatic form in the appendices.

11.3.2 Bedding

All stones shall be laid on a full and even bed of lime mortar based on "coarse stuff" unless specified elsewhere.

11.3.3 Joints

Horizontal and vertical joints are to match the existing joint size unless instructed differently by the Architect.

11.3.4 Face

Stones are to be placed such that their face is flush with the plane of the original stonework. Where new stone is being inserted adjacent to old worn surfaces the new stone shall be set to the face of the nearest unworn surface.

11.3.5 Workmanship

All work shall comply with the general recommendations of B.S. 5390 section 5 Work on Site.

Mason repairs are to be undertaken only by an approved stone mason who is a member of The Heritage Contractors Section of the Stone Federation. Non-registered companies or unqualified personnel will not be permitted to work on site.

11.4 Repairs To Stonework

11.4.1 General

All repairs will be identified during the inspection and will be indicated on the drawings.

All areas for repair are to be marked up from the drawings on site by the Contractor and agreed with the Architect prior to commencing cutting out.

11.4.2 Repair Techniques

Repairs to stonework will be one of the following as noted on the drawings.

A) Full block replacement.
B) Part block replacement.
C) Full face replacement
D) Partial face replacement
E) Carved work replacement.
F) Carved item replacement
G) Indent repair
H) Redressing
I) Crack injection/resin repair
J) Stitch repair
K) Plastic repair

Note: lettered abbreviations A-K as above will be annotated across drawings where relevant. If letter is followed by a number, that number signifies the quantity of said repair within that location. For example, C2 would mean that 2 stones require a full-face replacement.

Each repair technique is described below.

11.4.3 Cutting Out

Cutting out decayed stonework to permit new stones of the specified depth for the appropriate repair to be inserted. Cutting out can be carried out by mechanical means provided that extreme care is taken to ensure that the adjoining stones are not damaged. The stones should be cut to the central section's only by mechanical means ensuring that the perimeter is undamaged. The stone is then to be cut back by hand to the required depth.

If any damage occurs to adjoining stones, then the stone is to be replaced at the Contractors expense at the discretion of the Architect.

In certain areas previous plastic repairs may have to be removed. In this case the Contractor should note that the plastic repair may be harder than the original stonework and great care is to be exercised to ensure no unnecessary damage occurs to the existing stone.

11.4.4 Temporary Support

Stonework above the course being cut out or dressed back shall be fully supported during the course of the works. Support should be by adequately sized timber props secured and wedged. Care should be taken to ensure that no damage is caused by the props to the adjoining stonework.

11.4.5 Existing Ferrous Cramps

Where iron cramps are encountered during the course of the works they are to be brought to the attention of the Architect. Unless instructed otherwise they are to be removed and replaced with non-ferrous cramps.

11.4.6 Cleaning Out

All areas cut out to be cleared of debris mortar etc and washed clean. Care is to be taken not to saturate the stone.

Any defects noted in the stone after cutting back or in the masonry backing are to be reported to the Architect.

11.4.7 Moistening

Wherever new masonry is to be inserted the adjoining stones are to be moistened to ensure that the mortar does not "snatch". Do not saturate the stone

11.5 (A) Full Block Replacement

11.5.1 Preparation

The existing stone block is to be cut out to its full depth and the backing masonry inspected.

11.5.2 Installation

New stone is to be inserted on a bed and backing of lime mortar. Mortar is to be kept back 25mm from the face of the stone to allow for later pointing.

11.6 (B) Part Block Replacement

11.6.1 Preparation

The existing stone block is to be cut out to an agreed line or as shown on the drawing to its full depth. The remaining edge of the block is to be hand dressed to form a new arris ensuring that the adjoining stones are not damaged in any way for ashlar work. The arris is to be formed perfectly plumb and true and at right angles to the face of the block. The backing masonry is to be inspected and any defects reported to the Architect. The backing masonry is to be drilled to receive resin anchors and the adjoining stones drilled to receive dowels.

11.6.2 Installation

New stone is to be bedded in lime mortar and cramped and doweled in position as detailed below.

11.7 (C) Full Face Replacement

11.7.1 General

Where the stone is of sufficient thickness a 100mm indent repair is to be used. This repair may not be used on stone less than 200mm thick and in circumstances where the existing stone thickness varies the Contractor is to inform the Architect when the remaining thickness of the stone after removal of the face is less than 100mm.

11.7.2 Preparation

Existing block is to be cut back to a to a depth of 100mm from the front face of the surrounding stonework.

The existing stone is to be drilled to receive resin anchors and the adjoining stones drilled to receive dowels.

11.7.3 Installation

The new stone slab is to be bedded in 1:2:9 cement:lime:sand mortar and cramped and doweled in position as detailed below. The mortar bed is to be kept back 25mm to allow for pointing.

11.8 (D) Partial Face Replacement

11.8.1 General

Where the stone is of sufficient thickness a 100mm indent repair is to be used. This repair may not be used on stone less than 200mm thick and in circumstances where the existing stone thickness varies the Contractor is to inform the Architect when the remaining thickness of the stone after removal of the face is less than 100mm.

11.8.2 Preparation

The existing block is to be cut back to a as agreed with the Architect or as indicated on the drawings to a depth of 100mm from the face of the surrounding stonework. A new arris is to be formed by hand in the position agreed for ashlar work. The arris is to be plumb and true and square to the face of the stone.

11.8.3 Installation

The existing stone is to be drilled to receive resin anchors and the adjoining stones drilled to receive dowels.

New stone slab is to be bedded in hydraulic lime mortar and cramped and doweled in position as detailed below. The mortar bed is to be kept back 25mm to allow for pointing.

11.9 (E) Carved Work Replacement

11.9.1 General

Where carved or projecting stones are identified for replacement, the decayed stone shall be cut back to a depth which will ensure that the centre of gravity of the stone to be inserted is contained within the line of the masonry wall. The minimum depth is to be 100mm, but the Contractor is to allow within his rates for any increased depth required to suit individual profiles.

11.9.2 Preparation

The section of decayed stonework is to be cut back to the lines agreed with the Architect and cleaned out of all debris and mortar and rinsed out with clean water.

Any defect in the remaining stone is to be reported to the Architect.

11.9.3 Installation

New stone may be carved prior to placing but must be finished after placing to ensure satisfactory junction with the adjoining stones. Stone is to be bedded in lime mortar unless specified elsewhere and mortar is to be kept back 25mm from the face to facilitate later pointing.

Backing stone is to be drilled to receive resin anchors and stainless-steel cramps and adjoining stones are to be drilled to receive dowels as detailed below. If the specified cramps and dowels cannot be achieved the Contractor is to advise the Architect is to instruct on alternatives after the decayed area has been cut out.

11.10 (F) Carved Item Replacement

11.10.1 General

Where an entire item of carved work is specified for replacement then the original decayed item shall be carefully cut out, any existing dowels, cramps, etc are to be removed.

New stone is to be specially selected for its compactness and is to be worked to the required profiles.

11.10.2 Installation

New stone may be carved prior to placing but must be finished after placing to ensure satisfactory junction with adjoining stones. Stone is to be bedded in lime mortar as specification, unless specified elsewhere and the mortar is to be kept back

25mm from the face to facilitate later pointing.

11.11 (G) Indent Repair

11.11.1 General

Cut out area of stone identified to a depth of 50mm for indents of 100mm, 65mm for indents up to 150mm and 75mm for indent repairs to a maximum of 300mm.

11.11.2 Preparation

Carefully form neat arrises to all sides ensuring that no damage occurs to the adjoining stones. Carefully square off the back of the recess and clean out all debris, mortar etc.

11.11.3 Installation

New stone is to be inserted on a bed of resin with arrises tight to the original stone. Joint thickness to the original arrises of the block is to be consistent with the original mortar joints.

Ensure that resin is kept back from the mortar joint positions by 25mm to facilitate later pointing.

Indent repair is to be fully supported until the resin has cured.

11.12 (H) Redressing

11.12.1 General

Where damage to stone is superficial this can be rectified by redressing the stone. The area to be redressed is to be agreed with the Architect on site.

11.12.2 Preparation

The stone is to be taken back the minimum possible to achieve a sound free draining surface using only hand tools.

On many stones, a more robust descaling will be necessary due to the extent of delamination. This work is to be carried out in accordance with previously agreed samples. A sample will be requested during tender stage so that the contractor understands the extent of descaling necessary to some stones.

11.12.3 Finish

The redressed stone shall be finished to a smooth texture with minimum tooling marks visible.

Where it is agreed that only part of the stone is to be redressed the redressed area is to be feathered neatly into the untreated area.

11.13 (I) Crack Injection / Resin Repair

11.13.1 General

Resin repairs will only be used in limited areas where the blocks exhibit minor cracks that do not warrant the replacement of the whole block.

11.13.2 Materials

Resin: Resin shall be Jolly Stone Filler / Glue as manufactured by Ilpa or similar approved, colour to match existing terracotta blocks.

Natural Pigments (black or brown) – obtainable from Womersley's of Heckmondwike.

11.13.3 Preparation

Any loose material is to be scraped away using a hacksaw blade and the joint widened sufficiently to accept the resin and washed out with a syringe and clean water to remove all dust and debris.

11.13.4 Installation

Resin is to be applied into the crack and finished flush with the surface of the terracotta unit. It is important to ensure that the resin is applied to the full depth of the crack and that it is completely filled. The block is then to be lightly polished using carborundum pads to provide a smooth finish. If the colour of the block is lost through this process a natural pigment in a dilute of water is to be applied to the block to re-establish the colour.

A sample of the above process is to be prepared on a defective cut out block for the approval by the Architect prior to commencing this type of repair.

11.14 (J) Stitch Repair

11.14.1 Where specified the adjoin joints to both sides of the defect are to be raked out to a depth of 50mm (or as specified by the structural engineer) and to at least 450mm beyond the line of the defect.

11.14.2 Raked out joints are to be cleaned out of all debris.

11.14.3 Helical stainless-steel tie rods are to be inserted into the joints at the specified centres.

11.14.4 Joints are to be fully repointed with all mortar fully compacted and pointed to match the surrounding masonry.

11.15 (K) Plastic Repair

11.15.1 General

Plastic repairs will normally not be used except in exceptional circumstances. It is essential that any plastic repair is correctly carried out to avoid damage to the adjoining stonework.

11.15.2 Preparation

Decayed and damaged stone is to be cut back to a minimum depth of 25mm from the face of the original stonework, or until sound stonework is located whichever is deeper. All loose material debris and mortar is to be removed and the recess thoroughly cleaned. The recess is to be rinsed in clean water.

11.15.3 Installation

Repair is to be carried out using a plastic mortar consisting of hydraulic lime and stone dust. Samples of repair mortar are to be prepared and approval obtained prior to commencement of repairs. The mix is to be adjusted to ensure that, when dry, the mortar matches the existing stone in colour and texture. The mortar mix should be softer than the stone to avoid future damage.

Stainless steel reinforcement is to be secured with resin into the recess and the resin allowed to cure before commencing the repair.

Moisten the recess and build up in maximum 10mm thick layers of repair mortar, to the required depth allowing each layer to cure before applying the next. The last layer shall be finished to profiles to match the adjoining stone.

11.16 Removal Of Organic Growth

11.16.1 Method

The extent of masonry cleaning / organic growth removal is identified on the drawings. The primary purpose is the removal of organic growth and carbon deposits/staining.

Doff Cleaning:

DOFF cleaning system uses steam as the cleaning agent. A normal water supply is taken into the high-pressure pump where the pressure is increased to the required level before it enters the hot-box. The temperature is increased up to 150◦C if necessary before it passes to the heat resistant nozzle where special jets direct the steam onto the surface to be cleaned. The DOFF system will effectively remove paint, bitumen, oil and grease, chewing gum, algae etc from virtually all surfaces including brick, stone, concrete, tiles, terracotta, wood, stucco. Refer to attached method statement prior to carrying out the works produced by Stone Health.

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 shall be erected to the approval of the local water authority.

11.16.2 Protection

Protect all flowerbeds, landscaped areas etc., with polythene sheeting prior to commencement.

Ensure that pollution of waterways, drainage etc., does not occur as a result of treatment.

11.16.3 Health and safety

The Contractor shall be responsible for ensuring that all products used, and all procedures adopted comply in full with current Health and Safety requirements.

Ensure that all operations carried out in such a way that they do not represent a risk to health and safety of the general public or other operatives on site.

11.16.4 Preparation

Remove as much plant growth, moss, lichens etc. with a knife blade and wire brush as necessary.

Ensure that no damage is caused to the brick and terracotta by the removal of plant growth. If any damage is encountered restrict removal to the removal of moss only.

11.17 Workmanship

11.17.1 All work shall comply with the general recommendations of B.S. 5390 section 5 Work on Site.

11.17.2 NOTE: Masonry repairs are to be undertaken only by an approved stone mason who is a member of The Heritage Contractors Section of the Stone Federation. None registered companies or unqualified personnel will not be permitted to work on site.

11.17.3 Protection of Masonry Units and Masonry

11.17.4 Masonry Units: Prevent overstressing during transit, storage, handling and fixing. Store on level bearers clear of the ground, separated with resilient spacers. Protect from adverse weather and keep dry. Prevent soiling, chipping and contamination. Lift units at designed lifting points where provided.

11.17.5 Masonry: Prevent damage, particularly to arrises, projecting features and delicate, friable surfaces. Prevent mortar / grout splashes and other staining and marking on face work. Protect using suitable non-staining slats, boards, tarpaulins, etc. Remove protection on completion of the work.

11.18 Inspection and Drawings

11.18.1 Access

In any project involving masonry repairs the tender drawings will have been prepared from visual inspection only, usually without the benefit of access scaffold. *The Contractor is to allow in his/her programme a period of 2 weeks for confirmation and appraisal of the scope of the works to each area.*

The Contractor is encouraged to be represented during the inspection in order that he may contribute in any discussion regarding alternative methods of repair.

11.18.2 Notice

The Contractor is to give a minimum of 48 hours' notice to the Architect of the completion of the access scaffold to each area.

11.18.3 Confirmation

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.

11.18.4 Scaffold

The Contractor shall ensure that all access scaffold alterations are 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.

11.18.5 Drawings

In most cases all working drawings will be provided by the Architect. Where fabrication drawings are required to be prepared by the Contractor for specialist areas the Contractor shall submit duplicate copies of the drawings at least two weeks before confirmation of the order for the stonework is required. No cutting of the stonework shall commence until the drawings have been approved in writing by the Architect.

11.18.6 Programme

The Contractor shall provide a programme of work based on the tender drawings before commencement of work on site. This programme shall indicate separately the erection/alteration(s) sequence for access scaffold inspection period, order period and works on site for reach area of work.

11.19 Protection, Storage and Cleaning

11.19.1 Protection of Work Area

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.

11.19.2 Protection of the Fabric

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.

Where scaffold is erected internally or where scaffolding penetrates through into the building internal fittings shall be adequately protected to protect the historic fabric from damage.

11.19.3 Storage

Stone 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 stone during storage or handling.

11.19.4 Lifting

The Contractor shall provide adequate lifting gear to unload and handle stones into position.

11.19.5 Storage on Scaffolding

Only stone for immediate use shall be stored on the scaffold.

11.19.6 Protection of Finished Work

Cover arrises, moulds, carving and other finished work to protect from accidental damage. Protection is to be maintained until completion of all work in that vicinity.

11.19.7 Cleaning of Work

Keep facework clean and free from staining at all times.

Clean off and rub down all stonework as scaffold is taken down.

11.20 Dismantling / Rebuilding

11.20.1 Masonry units to be reused: Remove carefully and in one piece.

11.20.2 - Treatment: Clean off old mortar, organic growths and dirt, and leave units in a suitable condition for rebuilding.

11.20.3 - Identification: Mark each unit clearly and indelibly on a concealed face, indicating its original position in the construction. Transcribe markings to drawings / photographs.

11.20.4 Rebuilding

Replacement materials: as indicated in specification and drawings.

Rebuilding: To match previous face and joint lines, joint widths and bonding. Adequately bonded to retained work / backing masonry, as appropriate.

Joint Surfaces: Dampen, as necessary, to control suction.

Laying masonry units: On a full bed of mortar; perpend joints filled.

Exposed faces: Remove mortar and grout splashes immediately.

Joints: To match existing.

12.0 Brick Repair

12.1 Materials

12.2 Brick

Bricks shall match 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.

Bricks shall be free from the presence of fungal attack, visible salts, paint, lime wash or other substances.

12.2.1 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 or other approved and agreed:

Ancon Clarke, Olive Grove Road, Sheffield S2 3GB.

12.2.2 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.

12.2.3 Mortar

Shall be lime mortar in accordance with specification as instructed.

12.3 Inspection

12.3.1 The Contractor should note that the tender 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 their programme.

The Contractor is encouraged to be represented during the inspection in order that they may contribute in any discussion regarding alternative methods of repair.

12.3.2 Notice

The Contractor is to give 48 hours' notice to the Architect of the completion of the access scaffold to each area.

12.3.3 Confirmation

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.

12.3.4 Scaffold

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.

12.3.5 Programme

The Contractor shall provide a programme of work based on the tender 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.

12.4 Protection, Storage and Cleaning

12.4.1 Protection of Work Area

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.

12.4.2 Protection of the Fabric

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.

Where scaffold is erected internally or where scaffolding penetrates through into the building internal fittings shall be adequately protected.

12.4.3 Storage

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.

12.4.4 Storage on Scaffolding

Only bricks for immediate use shall be stored on the scaffold.

12.4.5 Protection of Finished Work

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.

12.4.6 Cleaning of Work

Keep face work clean and free from staining at all times.

Clean off and rub down all brickwork as scaffold is taken down.

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.

12.5 Cutting Out of Defective Brickwork

12.5.1 The areas to be cut out shall be marked on site and approved/confirmed by the Architect prior to commencement of cutting out.

12.5.2 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.

12.5.3 Any damage to adjoining areas will be made good at the contractor's expense.

12.5.4 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.

12.5.5 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.

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

12.6 Inserting New Brickwork

12.6.1 The recess is to be thoroughly cleaned out and the adjoining brickwork is to be moistened to prevent the mortar "snatching".

12.6.2 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 for lime mortar.

12.6.3 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.

12.6.4 The mortar is to be kept back 25mm from the face to facilitate later pointing.

12.6.5 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.

12.6.6 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:

a) 900 mm centres horizontally and 450mm centres vertically with rows staggered.

b) 225 centres vertically within 300mm of any opening.

c) At closer centres if specified by the Structural Engineer or indicated on the drawings.

13.0 Pointing Of Brickwork

13.1 General

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.

Pointing should commence from the top of the building and work down.

13.2 Sample Panels

The tenderer is to allow for carrying out five test panels each approximately 1 metre square under the direction of the Architect, using the methods described below. One panel should include fine joints. Each must be approved by the Architect before work is to commence. Work to the rest of the brickwork should not commence until the test panel(s) have 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.

The provision of test panels must be included in the programme, provided for inspection no less than 6 weeks in advance of the actual full re-pointing works commencing. The contractor must allow enough time in the programme, for the test panels to cure, before making them available for inspection. The contractor shall note that the process may not be concluded upon the first presentation of sample panels and the Architect / Conservation Officer may request that further sample panels be provided, for further inspection and analysis.

13.3 Preparation

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.

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

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.

13.4 Filling And Pointing

Mortar is to be hydraulic lime mortar in accordance with the Mortar specification.

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

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

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

The joint is to be lightly brushed as mortar is achieving its first set to remove the mechanical smoothness left by the pointing iron. Protect pointing from over speedy drying during hot weather to the discretion of the architect.

13.5 Progress

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.

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

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.

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

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

Completed areas are to be protected until cured.

13.6 Cleaning

Clean down all areas on completion using clean water and bristle brushes only. Beat mortar with a bristle brush with oblique bristles after a setting period of couple of hours to dispose of surplus mortar.

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

14.0 Ceiling Repairs

14.1 Preparation

14.1.1 Floor covering within area to be repaired is to be protected with viqueen taped to the skirting boards and overlaid with ply or MDF.

14.1.2 Remove insulation from ceiling void if present, carefully clean out all areas with soft brushes and handheld vacuum cleaner, ensuring that all areas are clean.

14.1.3 Plaster key and laths are to be inspected and checked throughout the specified area. The contractor is to allow within his programme an appropriate period of time for detailed inspection by the Architect to enable final instructions to be issued for the work.

14.1.4 Defective areas of ceiling are to be propped using felt pads on 12mm ply bearers on timber studding.

14.1.5 Exceptional care is to be taken supporting areas around details particularly where papier maché work may be present.

14.1.6 All timbers including joists and laths are to be inspected for decay by specialist timber Preservation Company and a report issued to the Architect for consideration of further treatment.

14.2 Laths

14.2.1 Where existing laths are spaced too close thus preventing adequate key for the plaster alternate laths are to be cut through and removed.

14.2.2 When existing laths are decayed these are to be cut out with a hacksaw blade and snapped off.

14.2.3 In areas where ceiling has collapsed or is missing new laths are to be fixed with split or riven oak or hazel laths. These are to be 39mm wide with 10mm gaps between laths and are to be secured with stainless steel or copper wires. Laths are to be cut on joist lines with additional timber battens fixed to the side of the joists to enable ends of new and existing laths to be staggered, with existing laths re-nailed at the junction.

14.3 Individual Bridge Reinforcement

14.3.1 This method is to be used in areas where isolated laths have been removed or where small areas of plaster nibs have been lost.

14.3.2 Old plaster and laths are to be thoroughly cleaned and treated with a thin coating of PVA solution (1 part PVA to 10 parts / water) in order to control suction and prevent rapid removal of water from the new plaster. From key to adjacent joists with 75mm brass screws left projecting 38mm from the joists.

14.3.3 The area is to be filled with retarded superfine plaster of Paris.

14.4 Bulk Reinforcement

14.4.1 This technique is applicable to areas when the fixings to the laths have become loose from the joists.

14.4.2 Old plaster and laths are to be cleaned thoroughly and treated with a thin coating of PVA solution (1 part PVA to 10 parts water) in order to control suction and to prevent rapid removal of water from the new plaster.

14.4.3 Complete support to the area is to be provided by 6mm gauge stainless steel or copper mesh formed into troughs turned up the side of the joists.

14.4.4 Retarded plaster of Paris is to be poured over the existing plaster and the mesh pushed into the initial thin coat prior to fixing

via 25 x 38 treated sw battens fixed with brass or stainless-steel screws to the side of the existing joists.

14.4.5 A second coat of plaster is to be applied after the installation of the mesh tray but prior to the setting of the initial coat to give a total thickness of 15mm with a splayed fillet to the side of the joists.

14.4.6 Adequate setting time is to be allowed prior to the removal of any propping to the ceiling below.

14.4.7 In areas where plaster nibs have failed but the laths are secure. The above method may be used but substantiating hessian resin instead of wire trays. The resin is still to be secured by treated battens.

14.5 Repairs to Underside

14.5.1 On completion of the reinforcement, cracks to underside of the ceiling can be repaired.

14.5.2 Larger cracks should be carefully cut out with a sharp chisel or knife to form a dovetail key. All cracks shall then be cleaned thoroughly by hand vacuum cleaners or by air blasting. After cleaning the cracks should be cleaned by hand spraying with water.

14.5.3 Fill material shall be a lime or gypsum plaster to match the existing.

14.6 Repairs to Details

14.6.1 Where cornice or other embellishment has become loose, this is to be secured back to the timber structure with galvanised steel, copper or stainless-steel wire drilled through the features and secured to brass screws into the joists and recessed into the detail.

14.6.2 Areas of damage are to be made good for completion with fibrous plaster where small sections of cornice are missing wire reinforcement is to be installed and the detail "run in" with fibrous plaster.

14.6.3 Larger such replacement of cornice etc are to be by precast fibrous plaster sections manufactured from moulds taken from the existing profiles.

14.6.4 Loose details may be secured into the timber structure from below by brass screws and washers recessed into the detail with the surface made good.

14.7 Plaster

14.7.1 Lime Plaster

14.7.2 Render coat lime plaster (9mm) 1 part lime putty 3 parts sand. Coarse stuff is to be reinforced with hair well beaten in, at a rate of 7 kg/m³. Render coat is to be cross keyed with a lath scratcher.

14.7.3 Floating coat (6mm) 1 part lime putty to 3 parts sand reinforced with hair as above. Floating coat to be keyed with a devil's float.

14.7.4 Setting coat (3mm); 3 parts lime putty to 2 parts sand setting coat is to be laid on with a laying on trowel, trowelled and floated and made compact by scouring with a cross grained wood float lubricated with water to prevent shrinkage cracking.

14.8 Lime Plaster gauged with Gypsum

14.8.1 Render coat (9mm) 1 part gypsum, 1 part lime putty, 6 parts sand.

14.8.2 Floating coat backing coat (6mm) 1 part gypsum, 1 part lime putty, 6 parts sand.

14.8.3 Setting coat finishing coat (3mm) 1 part gypsum, 1 part lime putty.

14.9 Lime Plaster

14.9.1 Materials

14.9.2 Fine Aggregates

14.9.3 All sand shall be to BS 1200, 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.

14.9.4 Lime Putty

14.9.5 Lime putty shall be made from quick lime which has been freshly burned and properly slaked, run to putty and matured for not less than two weeks.

14.9.6 Prepared lime putty shall be obtained from one of the following:

Masons Mortar
61 - 67 Trafalgar Lane
Leith
Edinburgh
Tel. 0131-5550503

Rose of Jericho
Kettering
Northamptonshire
Tel. 01536-73439

Whitford Sand Lime & Mortar Co
Bedw,
Whitford Road
Holywell
Clwyd
CH9 9AE
Tel. 01352 - 714144

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

14.9.7 Lime putty made from dry hydrate, or an acetylene by-product (Lamotex) is not acceptable. Before ordering the contractor is to gain confirmation that the putty has been prepared from Quick Lime.

14.9.8 Additives

14.9.9 Under no circumstances will the addition of any additives to the plaster be permitted.

14.9.10 Water

14.9.11 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.

14.10 Weather and Protection

14.10.1 Cold Weather Working

14.10.2 No work involving the preparation of plaster shall be undertaken when the temperature is 5 degrees centigrade falling or below 4 degrees centigrade when the temperature is rising.

14.10.3 Protection

14.10.4 All work is to be protected from the frost. In warm weather the work is to be similarly damped down to prevent curing occurring too quickly.

14.10.5 Damage Due to Weather

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

14.11 Finishing

As per section 18.0.

15.0 Glazing Repairs

15.1 Materials

15.1.1 Clear Float Glass: Where specified to BS 952-1:1995, selected glazing quality, thickness as specified to match existing and adjacent.

15.1.2 Wired Glass: Where specified to BS 952, 6 mm thick, square pattern wired ground and polished.

15.1.3 Special Glass: As specified.

15.2 General

15.2.1 Glaze: In accordance with the recommendations of BS 6262-4:2005 unless otherwise specified.

15.2.2 Rebates: Clean, dry and remove obstructions from rebates and grooves before priming or sealing surfaces prior to glazing.

15.2.3 Seal Surfaces of rebates, grooves and beads that will be in contact with putty as follows:

y) For painted softwood surrounds, one coat of primer.

z) For painted hardwood surrounds, one coat of primer and one undercoat of paint.

aa) For galvanized steel surrounds, one coat of primer.

bb) For stained joinery treat rebates and glazing beads with preservative coats.

15.2.4 See Painting and Decoration clauses for suitable primers.

15.3 Glazing

15.3.1 Putty or Mastic

cc) For metal (except aluminium), metal casement putty.

15.3.2 Putty Glazing of Windows: Bed, sprig or clip as appropriate, and back and front putty the glass.

15.3.3 Bead Glazing of Windows: Set glass on blocks and distance pieces. Bed and back putty as above or use Sadolin Dri-glaze on stained windows in accordance with manufacturer's instructions.

15.3.4 Painting of Putty to BS 544: Prime and paint as soon as sufficiently hard and in any case within two weeks of glazing. Cut out and re-putty any material showing cracks. NB. This standard has been withdrawn by the British Standards Institution but remains applicable for traditional repair and reinstatement of historic building fabric specified. Copies of the Standard may be obtained on-line through the internet.

15.4 The Removal and Reinstatement of Historic Glazing

15.4.1 Materials: Historic glass, whether Crown, drawn or cylinder glass, is almost irreplaceable and only at considerable cost. All original glass is historically important and is to be conserved.

15.4.2 The greatest care must therefore be taken to avoid damaging historic glass.

15.4.3 Replacement glass will be specified by the Architect and is to match existing and adjacent.

15.4.4 Removal of Historic Glass: The conventional way to remove a pane from frame is with a glazier's hacking knife, which is inserted between the putty and wood at right angles to the glass and tapped down with a hammer. This method is ineffective with very old, hardened putty and it is probably that, if attempted, the glass will be broken.

15.4.5 To soften the old putty a modern chemical paint remover is to be employed such as Ronstrip. This particular type is of putty form and should be applied generously over the glazing putty to thickness of about 10mm ensuring that the Ronstrip is sealed completed from air with a number of overlapping strips of Sellotape or masking tape and left for 24 hours. The tape is then to be removed and the Ronstrip scraped off. It will then be possible to remove about 50% of the old putty behind. The process must be repeated, and the second application should soften sufficiently the remaining putty, including that around the edge of the glass.

15.4.6 When all putty has been removed the glazing sprigs (retaining pins) are to be carefully removed with sharp nosed pliers. When all the putty has been cleared from the front and edge of the glass the pane can then be gently pushed out from behind. Extreme care is needed to avoid cracking the sheet; thick ones are, in fact, more likely to break than thin ones, because they are less flexible. The pane is to be cleaned with soap and water.

15.4.7 Reglazing with Crown Sheet Glass: When reglazing with salvaged crown sheet the convex side should be outwards both for appearance and for better bedding of the pane into the frame. If flow lines and other marks within the plane of the glass are noticeably curved (a sign of the spinning process of manufacture) it seems to be usual for the pane to be mounted so that these lines are convex upwards (or to either side).

15.4.8 Refixing: Workmanship shall comply with the recommendations of BS 6262:2005, and CP 152 (BS 6262:1982). CP 152 has been replaced by the BSI but remains applicable for the traditional repair and replacement of historic building fabric specified. Copies of the Code of Practice may be obtained on-line through the internet.

15.4.9 Where specified, new sheet glass shall conform to BS EN 572-1:2012.

16.0 High Quality Joinery

16.1 General

16.1.1 This specification covers all new / repaired high quality joinery.

16.1.2 All repairs, replacement, etc., will be scheduled and identified on drawings as appropriate and cross referenced to this specification.

16.1.3 For all new work this specification is to be read in conjunction with the drawings.

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

16.1.5 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.

16.1.6 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.

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

16.1.8 No claims arising from the Contractors failure to comply with all above clauses will be permissible.

16.1.9 Machined samples of all timber shall be submitted to the Architect for approval. Where relevant the samples shall display the extremes of colour grain and texture variation. The approved samples will be retained as "control samples" against future deliveries. The samples shall have half the sample finished as the final finish specified with the remaining half unfinished.

16.1.10 Ensure that all delivered materials match the approved samples.

16.1.11 No orders for materials shall be confirmed by the joinery contractor until the representative samples have been approved.

16.1.12 The joinery sub-contractor is to ensure that they visit the site during the tender period to ensure that they are fully familiar with the conditions on site and to ensure that they are fully appreciative of the full scope of the works.

16.1.13 No subsequent claims arising from failure to inspect the site conditions will be entertained.

16.2 Components

16.2.1 Roof Access Portal: Door, Frame, Wall Plate & Sill: Generally

16.2.2 Wood:
Manufacturer: By a firm currently registered under the British Woodworking Federation Accreditation Scheme.
Product reference: Contractor choice. Windows to match existing generally.

16.2.3 Timber: Generally, to BS EN 942

16.2.4 Species: Iroko

16.2.5 Moisture content on delivery: 12-19% (or to match existing being fixed within 1%).

16.2.6 Finish as delivered: Prepared and primed for finishing on site. To be finished with a high-performance saturating wood oil for hardwoods. Product: Owatrol D1 Pro or equal approved.

16.2.7 Fixing: Screwed to timber framing.

16.2.8 The contractor shall provide fabrication drawings for comment, prior to order and manufacture.

16.2.9 Roof Access Portal Elements:

16.2.9.1 Door & Frame:

- To be ledged and braced. 15-18mm treated t&g boards with 'V' joints at equal centres, allow for a hardwood lip / cover to head of t&g boards. The contractor shall provide the Architect with fabrication drawings for comment, prior to order and manufacture.
- Re-use existing lock and handle. Service and return to good working order and decorate.
- Provide and install external grade heavy duty hinges. Black. Designed for the weight of the door.

16.2.9.2 Sill:

- To be hardwood with weathering and drip details. Rounded corners.

16.2.9.3 Frame:

- Treated softwood frame predominantly with hardwood wall plates with weathering tongue.

16.2.9.4 Sheathing:

- To be 12mm thick WBP plywood. To be decorated to interior face. Colour to be agreed.

16.2.9.5 Roof:

- To be 18mm thick treated softwood boarding with 2mm penny gaps. To be decorated to interior face. Colour to be agreed.

16.2.9.6 Leadwork:

- For leadwork details, see separate lead specification.

16.3 Materials

16.3.1 All timbers shall be from a renewable source which is properly managed to ensure a sustainable supply.

16.3.2 Lippings, edgings, solid inserts, etc., shall be of solid timber.

16.3.3 All finished components are to be free from bow, twist, scratches, chipping, pimpling, depressions, glue spill, staining or any other defects, and shall be sanded to a smooth finish, free from sanding marks.

16.4 Fixings

16.4.1 All fixings shall be non-corrosive and of an approved type.

16.4.2 All nails shall be to BS 1202.

16.4.3 All screws shall be to BS 1210. Where screws are used these will be counter sunk and oak pelleted.

16.4.4 Fixings which are visible on finished joinery will not be permitted.

16.4.5 Use fixing and joints methods and types, sizes, quantities and spacing of fastenings which are suitable having full regard to:

dd) the nature and compatibility with the materials being fixed,

ee) The recommendations of the manufacturers of the components and products being fixed or fixed to,

ff) materials and loads to be supported,

gg) conditions expected in use,

hh) appearance subject to approval.

16.5 Environmental Control

16.5.1 Ensure all components are stored in conditions appropriate to maintain the specified moisture content (10% to 12%) prior to manufacture, during machining, and subsequent storage.

16.5.2 Do not deliver any components or finished joinery to site until the correct conditions can be guaranteed to maintain the specified moisture content.

16.5.3 Do not fix any first fix backing framework, battens etc until conditions prevail to maintain a maximum moisture content of 18%.

16.5.4 Do not fix any joinery if the relative humidity is above 60%.

16.5.5 It is the joinery manufacturer's responsibility to ensure that the above conditions are satisfied, and the joinery sub-contractor will be responsible for replacing any component which is subsequently found to be defective due to movement of any description caused by variations in moisture content.

16.5.6 The joinery contractor is responsible for maintaining conditions in their stores and workshops and ensuring that the main contractor has provided the correct conditions on site prior to commencing any deliveries or installation.

16.5.7 Agree with the Main Contractor arrangements for maintaining the environment up to the date of Practical Completion of the works to ensure excessive movement does not occur.

16.6 Preparation and Fabrication offsite

16.6.1 All internal joinery components shall be dried to achieve an average moisture content of 10-12% at the time of fixing. External joinery components will have a moisture content of between 13-19% on delivery.

16.6.2 All materials must be cut to the required sizes and acclimatised to end use conditions for a minimum of 4 weeks prior to being worked further.

16.6.3 Fabricate joinery components to BS EN 942:1996. Form sections out of solid timber except where specified. Carefully machine timbers to accurate lengths and profiles free from twist or bowing.

16.6.4 After machining all surfaces are to be smooth and free from tearing, woolliness, chip bruising and other machining defects.

16.6.5 Assemble with tight close-fitting joints with meeting surfaces to be perfectly flush to produce components free from distortion.

16.6.6 All fabrication is to be carried out in the joinery contractor's workshop unless prior written consent is given by the Architect for limited fabrication being carried out on site.

16.6.7 All joinery is to be manufactured to very strict tolerances to ensure the best possible finished product.

16.6.8 Length + 2mm on the total length of the component.

16.6.8.1 Width + 1mm on the total width of the component.

16.6.8.2 Flatness + 1mm under a 1 metre straight edge.

16.6.8.3 Squareness + 1mm under a 1 metre straight edge.

16.6.9 Fix any panels setting out accurately, true to line and level, free from any undulations and lipping with any lines or joints (where specified) correctly aligned, straight and parallel to surrounding frame components unless otherwise specified. Make allowance for future movement caused by temperature variations and variations in humidity.

16.6.10 Fix all panels securely to prevent pulling away, bowing or other movement during use.

16.6.11 When using adhesives ensure that the surfaces to receive adhesive are sound, unfrozen, free from dust, grease and any other contamination likely to affect the bond. Where necessary clean the surfaces with materials recommended by the adhesive manufacturer for the purpose.

16.6.12 Components are to be checked for fit before applying adhesive. Surfaces should be of sufficient smoothness and evenness to suit gap filling and bonding characteristics of the adhesive where joints will not be visible and to ensure that all joints are a tight fit with no discernible gaps on surfaces which will be visible on the finished product.

16.6.13 Ensure that operatives observe the manufacturers and statutory requirements for storage and safe use of adhesives. Do not use adhesives in unsuitable environmental conditions or beyond the manufacturer's recommended shelf life. Safely dispose of any adhesive which has received prolonged exposure to air or has started to set prior to use.

16.6.14 Apply adhesives using recommended spreaders/applicators to ensure correct coverage. Bring surfaces together within recommended time period and apply pressure evenly over the full area of contact surfaces to be bonded ensuring that any clamps, presses etc. are cushioned to prevent marking or indentation of the timbers.

16.6.15 Remove surplus adhesive immediately using methods and materials recommended by the adhesive manufacturer and without damage to the affected surfaces.

16.6.16 Where preservative treated timber is specified carry out as much cutting and machining as possible prior to treatment. Re-treat all timber which is subsequently machined or cut with flood coats of a solution recommended for the purpose by the main treatment solution manufacturer.

16.7 Protection

16.7.1 Ensure that after manufacture/fabrication all components are safely stored/packaged and protected from damage in conditions similar to those that will prevail in the building.

16.7.2 Do not deliver to site and do not remove protective packaging/coverings until immediately before components are required for fixing and the correct environmental conditions prevail.

16.7.3 Stack boards, panels, etc., on bearers and separated by spacers to prevent damage to or from projections.

16.7.4 Keep all components clean and dry and adequately protected from physical damage until Practical Completion. Protection will have to be removed for inspection/snagging but must be reinstated and maintained thereafter.

16.8 Erection on site

16.8.1 Check all dimensions of components and openings prior to commencing installation of any joinery works. Report any discrepancies to the Architect.

16.8.2 Nailing of joinery components will not be permitted if nails will be on exposed surfaces of the completed installation, with the exception of beads to panels or glazing. In these circumstances pins shall be punched below the surface of the wood and the hole filled with a suitable filler to precisely match the colour of the timber. Ensure that the filler is capable of receiving the specified finish and that it will not vary from the colour of the finished product on completion of all finishing treatments.

16.8.3 Any areas subsequently found not to match will be replaced at the contractor’s expense.

16.8.4 Where nailing of joints etc. is permitted, use not less than 2 nails, and opposed skew nailing unless otherwise specified. Drive nails carefully to ensure that there is no splitting or crushing of the materials being fixed. Punch nail heads below the surface.

16.8.5 Any components which are split during nailing will not be accepted for final installation.

17.0 Joinery Repairs

17.1 Materials

17.1.1 Softwood for Carpentry: To comply with CP 112 the structural use of timber Part 2 sections 2 and 3, stress graded to BS 4978:2007 + A1:2011.

17.1.2 Hardwoods for Carpentry Repairs: To be of same species as existing work to be repaired.

17.1.3 Oak for carpentry repairs to be not less than 1 year felled with structural characteristics as described for D40 grade in accordance with BS EN 1995-1:2004 + A1:2008.

Knots are not to occupy more than half the cross section.

The slope of the grain is not to be steeper than 1:6.

Oak for structural repairs to be generally suitable for intended use.

Any sections over 250 x 250 in cross section must be in boxed heartwood.

17.1.4 Timber Generally: To be clean, straight, sound and matured growth, thoroughly well-seasoned, free from discoloured sap wood, shakes, splits, pithwood, large loose or dead knots, excessive wane and other defects.

17.1.5 Plywood: To BS 6566:1985 to be birch faced of thickness and bonding as specified.

17.1.6 Preservative Treatment for Timber: To be as defined below. Ensure that moisture content is less than 20% before treatment, and after treatment before fixing. All preservatives to be approved under the Control of Pesticides Regulations 1986 and any latest amendment and used in accordance with other relevant legislation, notably the Health and Safety at Work Act 1974, the Control of Substances Hazardous to Health Regulations 1988, the Wildlife and Countryside Act 1981, the Water Act 1989 and the Environmental Protection Act 1990 and their latest amendments.

New Timber

Either the treatment to be:

ii) Water borne CCA preservative: applied by pressure treatment to BS 4072 by licensed processor of one of approved specialist firms listed below.

a. Hicksons Timber Impregnation Co (GB) Ltd - Tanalith
b. Rentokil Limited
c. RD (Chemicals and Wood Processes) Ltd or equivalent

OR

jj) Double vacuum treatment: apply approved organic solvent preservative by double vacuum treatment in accordance with British Wood Preserving and Damp Proofing Association (BWPDA) standards pages 112 - 116 inclusive appropriate to timber species and use. The treatment to be undertaken by a licensed processor of one of the approved firms listed below:

a. Cuprinol Ltd: BWPDA Standard 115
b. Cuprinol Ltd: BWPDA Standard 115
c. Hicksons Timber Impregnation Co (GB) Ltd: BWPDA Standard 112
d. Protim Ltd: BWPDA Standard 116
e. Rentokil Ltd: BWPDA Standard 113 or equivalent

Existing Timber

To be Wykamol Microtech Range, Wykamol green range, or similar approved promethium, cypermethium or Boron based organic solvent.

Take advice where bats or evidence of bats is found, and inform Architect.

17.1.7 Subsequent Treatment: Liberally brush two coats of specified preservative to all holes and cuts formed after timber has been treated.

17.1.8 Preservative Treatment Certificate: Provide the Architect with the certificate accompanying each consignment to site.

17.1.9 Bolts and Nuts for Carpentry: To Engineer's specification. All fixings to be stainless steel.

17.1.10 Nails and Screws: Nails to BS 1202:1974:Part 1 and screws to BS 1210:1963 each of suitable size and type. All fixings to be stainless steel.

17.1.11 Adhesive: Synthetic resin gap-filling adhesive to BS EN 301:2013 and BS EN 302:2013, Type WBP for exterior work and Type MR for interior work.

17.2 Window Repairs Generally

17.2.1 Replacement Window Installation:

17.2.2 Standard: To BS 8213-4.

17.2.3 Burnt Sand Mastic: Between Frames And Stone Reveals:

17.2.4 Manufacturer: Womersleys Ltd. Tel: 01924400651. E: info@womersleys.co.uk

17.2.4.1 Product: Traditional Burnt Sand Mastic.

17.2.4.2 Colour: Samples to be provided, to achieve natural appearance. The mastic should not be overpainted.

17.2.4.3 Preparation: before pointing, ensure that all wide gaps between the frames and masonry are tightly packed with well haired lime mortar, that has been allowed to cure and harden.

17.2.4.4 Application: Working with a Mastic Box or a small hawk and a proprietary mastic trowel press the mastic firmly into the angle of the frame / jamb and filling from the bottom up, forming the mastic joint to a neat 45-degree angle. Keep tools wiped with an oiled cloth during the application. After forming the angle, starting from a corner, press a clean oiled mastic trowel tightly against the face of the timber frame and masonry jamb and carefully press and draw the trowel to create a neat regular fillet. Clean away any excess mastic and wipe the finished timber edges on completion. For mastic to sills, ensure the mastic does not bridge any drips and is left recessed behind the drip check.

17.2.5 Timber Repairs Generally:

17.2.6 The purpose of repair is to replace or reinforce those parts of the window or door that have decayed so badly that they can no longer function as intended.

17.2.7 Wherever possible, repairs to window frames should be carried out in-situ, particularly where the frame is inbuilt and cannot be easily removed without damaging the window or the surrounding wall. Sashes and casements can usually be removed without damage for repair either onsite or in a joiner's workshop.

17.2.8 Prior to undertaking any works. The windows in question should be carefully recorded with photographs and some basic measurements. Sashes, casements and other parts should be appropriately labelled to ensure that they go back in the correct positions. Any historic glass and its characteristics should also be recorded.

17.2.9 Following assessment of each window including identification of areas of decay / missing timber components / damaged glass etc, appropriate repair works can be proposed which suit the situation. In most instances the decayed timber in question can be salvaged in-situ with resin-based repairs undertaken.

17.2.10 Types of repairs include the following;

17.2.10.1 Spliced repairs

17.2.10.2 Resin-based repairs

17.2.10.3 Wholesale replacement – like-for-like

17.2.11 Spliced Repairs (timber to timber repairs);

17.2.11.1 Repairs should be made by carefully cutting away damaged or decayed timber and piecing in timber inserts which are shaped to obtain the maximum strength and match the existing profiles. The new timber should be worked to the line of the existing timber following any existing deformations in the line of the window.

17.2.11.2 Timber inserts should be designed so that water is directed towards the outer face of the timber and cannot lie on or enter the repair joint.

17.2.11.3 Timber inserts should ideally match / be similar to the host material to which it is replacing in species, moisture content, grain orientation and growth rate. Inserts should be glued to the host material, screwed and or pinned with stainless steel fixings. Loose joints in otherwise sound joinery should be reassembled, glued and wedged or secured with pins as appropriate. See *'Image 100'* for typical splice repair details.

17.2.12 Resin-Based Repairs;

17.2.12.1 The use of Resin repairs is to be considered where, small areas of loss can be made good with fillers as opposed to cutting out and splicing in new timber. The decay is to be cut away and proprietary polyester or epoxy resin repair undertaken. This is an effective way of maximising the amount of original fabric retained. Refer to section 1.9.2 above for proposed product and guidance.

17.2.13 Filling And Patching:

- Fill small holes less than 3mm dia and scratches in polished timber with Brummer filler.
- Fill larger holes 3mm to 15mm with tapered pellets fitted so that the grain runs with the filled timber. Select pellets from identical timber matched for grain and colour. Glue pellets, finish flush with surface.
- Fill larger holes with patches of identical timber let into the surface. Patches must taper in depth and be glued and must be matched for grain and colour. Finish flush with surface.

17.2.14 New Timber Sections:

- New items must be exactly as drawn. Full size sections must match exactly.
- New items made to match must be copied exactly in all particulars. Carvings must be identical in all aspects to the original.
- New items must be finished by hand. All machine marks must be removed. A surface which is not dead flat is preferred.

17.2.15 General Requirements For Workmanship:

- It is essential that as much of the original work as possible should be protected and preserved.
- The desired finished result is not that the woodwork should look new. It should look as old as it is but well cared for.

17.2.16 Quality Standards:

Reference is made to the following documents which establishes the desired approach and standards in the repair of historic timber windows;

- SPAB Technical Pamphlet No.13 – repair of wood windows.
- Historic England – traditional windows, their care, repair and upgrading.

It is expected that a copy will be obtained by the contractor for retention and use on site and will be brought to the attention of relevant labourers.

17.2.17 Renew Hardwood Timber Beads:

Species: Well-seasoned European Oak.

Renew to match existing – all dimensions, mouldings and fixing details.

Record works photographically and log location and date as appropriate.

17.2.18 Hardwood For Joinery Repairs:

Species: Well-seasoned European Oak.

Quality: Generally, to BS EN 942' free from decay and insect attack.

Appearance class: Class J2.

Treatment: British Wood Preserving and Damp Proofing Association Commodity Specification C8; Service life: 60 years.

Moisture content on delivery: 12-16%.

17.2.19 Repair Of Members – Cutting Out Members:

- Extent of timber removal: Cut out full cross section of member where wood is defective or decayed, plus 50mm of sound wood.
- Distance from face of support to cut end of existing timber: Obtain instructions if dimension exceeds 200mm.

17.3 Workmanship

17.3.1 Standard: Unless otherwise specified or noted on the drawings, comply with CP 112: Part 2.

Section 1: General

Section 5: Workmanship

Section 6: Inspection, Testing and Maintenance

Appendix A: sizes and grading of hardwoods and softwoods.

17.3.2 Sizes, Stress Grading and Spacing: of carpentry timbers to be as detailed.

17.3.3 Trimmers and Trimming Joists: 25 mm thicker than ordinary joists.

17.3.4 Bridging: 50 mm solid sawn softwood to full depth of joints.

17.3.5 Herringbone Strutting: 38 x 50 mm sawn softwood.

17.3.6 Drying Out Treated Timber: Before allowing the timber to contact any other materials or components allow the preservative to dry out to the specified moisture content and sufficient to avoid damage to any other materials or components.

17.3.7 Vertical DPC's: To be built in at junction between internal stud partitions and existing solid external walls.

17.3.8 Packings and Grounds: To be treated as specified. Do not use hardboard packing.

17.3.9 Standard: Unless otherwise specified or noted on the drawings, comply with CP 112: Part 2.

Section 1: General

Section 5: Workmanship

Section 6: Inspection, Testing and Maintenance

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17.3.15 Vertical DPC's: To be built in at junction between internal stud partitions and existing solid external walls.

17.3.16 Packings and Grounds: To be treated as specified. Do not use hardboard packing.

17.4 References

17.4.1 Some standards in this specification have been withdrawn by the British Standards Institution but remain appropriate and applicable for the traditional repair and reinstatement of historic building fabric. Copies of these withdrawn standards may be obtained online.

18.0 Painting, Decorating & Powdercoating

18.1 General

18.1.1 Code of Practice: Comply with BS 6150:2006 "Painting of Buildings" – Code of Practice.

18.1.2 Paints: Manufacturer to be agreed with Architect but must be applied in accordance with the makers' instructions and to follow the specification below in principle.

18.1.3 Preparation: Allow for sweeping out all areas before applying coatings and protect all floors and fittings with sheets etc. Make good any damage done to adjacent surfaces.

18.1.4 All coats of paint to be thoroughly dry before the application of subsequent coats and to be rubbed down with sand paper between each coat.

18.1.5 All iron to be thoroughly de-rusted and cleaned of rust before paint is applied.

18.1.6 External painting is only to be done in good painting weather when it is free from moisture.

18.1.7 All colours to be selected by the Architect subject to sample areas being prepared.

18.2 Compatibility

18.2.1 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.

18.3 Protection

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

18.4 Inspection by Coating Manufacturers

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

18.5 Existing Ironmongery

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

18.6 Previously Coating Surfaces Generally

18.6.1 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.

18.7 Preparation of Existing Metalwork

18.7.1 Intact Painted Surfaces

18.7.1.1 Wash down with detergent and warm water solution to remove grease and dirt.

18.7.2 Rusted Surfaces

18.7.2.1 Chip, scrape or wire brush rusted areas back to bare metal.

18.7.2.2 Rub down all surfaces with abrasive paper or block used wet and rinse with clean water and dry off with a soft cloth.

18.7.2.3 Apply phosphoric acid type rust remover to base metal areas (unless clean).

18.7.2.4 Prepare and prime bared areas.

18.8 Previously Painted Surfaces

18.8.1 Preparation: If the existing paint is generally in good condition wash with soap and water, detergent solution or a suitable solvent to remove dirt, grease, wax polish etc and rub down glossy surfaces. Remove any poorly adhering or defective paint by scraping back to a firm edge.

18.8.2 Make good cracks and other imperfections and allow to dry out thoroughly. Prime and make good all areas exposed by the removal of paint as described for new surfaces.

18.8.3 If the existing paint is flaking, blistered, poorly adhering or generally in poor condition, remove it completely over the area identified and agreed with the Architect and treat the surface as described for new surfaces.

18.8.4 Paints: To be as specified in the Finishes Schedule or by Architect's Instruction.

18.9 Painting New Woodwork

18.9.1 Preparation: Prime with the specified wood primer, when primer is hard make good all cracks etc.

18.9.2 Paints: To be as specified as above. Prime all new timber joinery immediately following fabrication. Where specified, apply undercoat to new or repaired joinery, under workshop conditions.

18.10 Painting New Plasterwork

18.10.1 Preparation: Remove any plaster nibs, scum etc and stop in cracks or holes. Wipe off any deposits or efflorescence with a damp sponge and lightly abrade any over-trowelled 'glossy' areas of plaster with worn or fine abrasive paper. Dust off leave to dry and ensure that no efflorescence recurs.

18.10.2 Paints: Where water-based emulsion is specified, prime with a thinned coat of emulsion. Make good any defects with a plaster filler. Rub down and dust off, patch prime with thinned emulsion. Finish one or two full coats of emulsion specified as

directed.

18.11 Painting Existing Plasterwork

18.11.1 Preparation: If the existing emulsion paint is in good condition and firmly adhering clean down the surface. If in poor condition completely remove all the flaking, peeling and powdering coating. Make sure that all the remaining paint is sound and adheres firmly to its backing.

18.11.2 Interior Surfaces: Apply the finishing material direct. If the surface is very porous, apply a sealing coat of thinned finishing material. Alternatively, if, after thorough preparation a residue of powdery material remains or the adhesion of the previous coating is suspect prime with:

- 1 coat of primer sealer to reduce the risk of subsequent flaking.

18.11.3 Paints: To be as specified in the Finishes Schedule or by Architect's Instruction. Prime with thinned coat of water-based emulsion and then apply two coats of emulsion paint.

18.11.4 Where rollers are used to apply paint finishes they are to provide a smooth and even coating for undercoats. The final top coat shall be brush applied.

18.12 Paint Systems and Application

18.12.1 Paints for Metal Windows, Grilles, Downpipes, Joinery and Ironmongery etc.

18.12.1.1 Refer to the schedule of paint systems at the end of this specification.

18.12.2 Paint Application to Metal Windows and Metalwork

18.12.2.1 Priming

a) Fabricated and cleaned metalwork to have one coat of primer in the shop.
b) Any damaged or unpainted areas are to be primed with works primer before building-in on site.
c) Ensure all sharp edges, angles, corners etc are fully covered and protected from damage both in works and on site.
d) Allow minimum interval of 16 hours for priming coats to dry.

18.12.2.2 Undercoat and Finish Coat

e) Clean down painted surfaces to remove mortar, grouting etc.
f) Brush apply coats of paint in even thicknesses.
g) Ensure all sharp edges, angles, corners etc are fully covered on site.
h) Allow a minimum interval of 12 hours between coats.

18.12.3 Paints for Plastered Walls and Ceilings Etc.

18.12.3.1 Soft Distemper: To be manufactured on site using hot glue size, natural pigment and water-soaked whiting in the traditional manner. Allow for 4 no. coats, to be agreed with the Architect, dependent upon condition of substrate.

Suppliers of Soft Distemper:

1. Rose of Jericho (who provide a product data sheet for Soft Distemper and Oil Bound Distempers)
2. Little Greene
3. Farrow and Ball
4. Craig and Rose Ltd.

18.12.4 Paint Application for Plastered Walls and Ceilings Etc.

18.12.4.1 Priming

i) Carry out all preparations as detailed in sections 8.5 and 8.6 above.

j) Any damaged or unpainted areas are to be made good and primed as specified, before full priming and applying undercoats.

k) Ensure all sharp edges, angles, corners etc are fully covered.

l) Allow minimum interval of 16 hours between priming coats.

18.12.4.2 Undercoat and Finish Coat

m) Brush apply an even thickness undercoat and finishing coat(s) as specified in the Finishes Schedule or by Architect's Instruction.

n) Ensure all sharp edges, angles, corners etc are fully covered on site.

o) Allow a minimum interval of 12 hours between coats.

p) All applications are to be strictly in accordance with the manufacturer's recommendations.

18.13 Concealed Metal Surfaces

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

- Components: Backs of rainwater pipes.

18.13.2 Additional coatings: n/a.

18.14 External Doors

18.14.1 Bottom edges: Prime and coat before hanging doors.

18.15 Bead Glazing to Coated Wood

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

18.16 Putty Glazing

18.16.1 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.

18.17 Schedule of Paint Systems

Substrate	Primer	Top coat
External timber access portal	Treat with Aquanett and neutralise with Net-trol	D1 Pro as directed
External timber	1 coat Rubbol Primer Plus	2 coats Rubbol Satura Plus
External ferrous metal	1 coat of Rapidly Anticorrosive Finish by Teamac	2 coats Sigmadur 520 (Semi-gloss) by PPG
External non-ferrous metal (zinc, lead, brass, chrome, copper etc.)	1 coat Hammerite Special Metal Primer	2 coats Rubbol Satura Plus
External galvanised metal, aluminium (not anodised or cast),	1 coat Dulux Trade Metalshield Quick Drying Metal Primer	2 coats Rubbol Satura Plus
Internal timber	1 coat Rubbol BL Primer	2 coats Rubbol BL Satura
Internal ferrous metal	1 coat Dulux Trade Zinc Phosphate Primer	2 coats Rubbol BL Satura
Internal non-ferrous metal	1 coat Hammerite Special Metal Primer	2 coats Rubbol BL Satura

Note: The above paint systems are to be applied strictly in accordance with the manufacturer's recommendations.

18.18 Powder Coatings (Z31)

18.18.1 Working Procedures (210)

18.18.1.1 Comply with the follow following standards.

q) Aluminium components: To BS 6496 or BS EN 12206-1.

r) Steel components: To BS EN 13438.

s) Safety standards: To British Coatings Federation 'Code of safe practice - Application of thermosetting powder coatings by electrostatic spraying'.

18.18.2 Powder Coating Applicators (220)

18.18.2.1 Applicator requirements:

t) Approved by powder coating manufacturer.

u) Currently certified to BS EN ISO 9001.

v) Comply with quality procedures, guarantee conditions, standards and tests required by powder coating manufacturer.

w) Applicator to use only one plant.

x) Selected applicator: Submit details before commencement of powder coating including :Name and contact details. Details of accreditation schemes.

18.18.3 Guarantees (225)

18.18.3.1 Powder coating manufacturer and applicator guarantees:

a) Submit sample copies before commencement of powder coating.

b) Submit signed project specific copies on completion of work.

18.18.4 Pre-treatment of Aluminium Components (310)

18.18.4.1 Condition of components to be pre-treated:

18.18.4.2 Free from corrosion and damage.

18.18.4.3 All welding and jointing completed and finish off as specified.

18.18.4.4 Free from impurities including soil, grease, oil.

18.18.4.5 Suitable for and compatible with the pre-treatment process.

18.18.4.6 Conversion coating requirements:

a) Chromate system: To BS 6496 or BS EN 12206-1.

b) Chromate-free system: To BS EN 12206-1. Submit details before using.

18.18.4.7 Rinsing requirements: Use demineralized water. Drain and dry.

18.18.5 Extent of Powder Coatings (430)

18.18.5.1 Application: To visible component surfaces, and concealed surfaces requiring protection. Coated surfaces will be deemed 'significant surfaces' for relevant BS 6496/ BS EN 13438 performance requirements.

18.18.6 Application of Powder Coatings (435)

18.18.6.1 Surfaces to receive powder coatings: Free from dust or powder deposits.

18.18.6.2 Powder colours: Obtain from one batch of one manufacturer.

18.18.6.3 Commencement of powder coatings: To be continuous from pre-treatment.

18.18.6.4 Jig points: Not visible on coated components.

18.18.6.5 Curing: Controlled to attain metal temperatures and hold periods recommended by powder coating manufacturer.

18.18.6.6 Stripping and recoating of components: Only acceptable by prior agreement of powder coating manufacturer. Stripping, pre-treatment and powder coating are to be in accordance with manufacturer's requirements.

18.18.6.7 Overcoating of components: Not acceptable.

18.18.7 Performance and Appearance of Powder Coatings (440)

18.18.7.1 For aluminium components:

a) Standard: To BS 6496 or BS EN 12206-1.

18.18.7.2 For steel components:

b) Standard: To BS EN 13438.

18.18.7.3 Visual inspection after powder coating: Significant surface viewing distances to be as specified in the relevant Standard, unless specified otherwise.

18.18.7.4 Colour and gloss levels: To conform with approved samples. Allow for 2no. nonstandard colours.

18.18.8 Aluminium and Alloy Fabrications (450)

18.18.8.1 Units may be assembled:

a) Before powder coating.
b) From components powder coated after cutting to size.
c) Where approved, from components powder coated before cutting to size.

18.18.8.2 Exposure of uncoated background metal: Not acceptable.

18.18.8.3 Assembly sealants: Compatible with powder coatings. Obtain approval of colour if sealants are visible after fabrication.

18.18.9 Fixings (470)

18.18.9.1 Exposed metal fixings: Powder coat together with components, or coat with matching repair paint system applied in accordance with the powder coating manufacturer's recommendations.

18.18.10 Damaged Components – Repair/Replacement (480)

18.18.10.1 Before delivery to site: Check all components for damage to powder coatings. Replace damaged components.

18.18.10.2 Site damage: Submit proposals for repair or replacement.

18.18.11 Protection (510)

18.18.11.1 Powder coated surfaces of components: Protect from damage during handling and installation, or by subsequent site operations.

18.18.11.2 Protective coverings: Must be:

a) Resistant to weather conditions.

b) Partially removable to suit building in and access to fixing points.

18.18.11.3 Protective tapes in contact with powder coatings: Must be:

a) Low tack, self-adhesive and light in colour.

b) Applied and removed in accordance with tape and powder coating manufacturers' recommendations. Do not use solvents to remove residues as these are detrimental to the coating.

18.18.11.4 Inspection of protection: Carry out monthly. Promptly repair any deterioration or deficiency.

18.18.12 Documentation (535)

18.18.12.1 Submit the following information for each batch of powder coated components:

a) Supplier.

b) Trade name.

c) Colour.

d) Type of powder.

e) Method of application.

f) Batch and reference number.

g) Statutory requirements.

h) Test certificates.

i) Maintenance instructions.

18.18.13 Completion (540)

18.18.13.1 Protection: Remove

18.18.13.2 Cleaning and maintenance of powder coatings: Carry out in accordance with procedures detailed in powder coating manufacturer and applicator guarantees.

19.0 Renewal of Rainwater Goods

19.1 General

The extent of redecoration works to the rainwater systems is to be confined to new sections of installation. Where only sections of a pipe are being replaced then the whole pipe should be redecorated.

All components being redecorated are to be carefully removed, descaled, redecorated and re-fixed in accordance with the following specification.

19.2 Material

19.2.1 Cast Iron Rainwater Pipes and Shoes:

Cast iron rainwater pipes to be generally single / double socketed 100mm 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 other approved manufacturer.

19.2.2 Fittings:

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.

19.2.3 Jointing

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 mastic). 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.

19.2.4 Fixing:

Socketed rainwater pipes and all fittings are to be supplied with ears of the projecting type, to give 38mm projection from wall face to facilitate decoration, and each drilled with 2 No. 10mm diameter holes. Fixing to the walls is by means of 8mm chisel pointed galvanised nails driven through these holes into hardwood plugs in the walls.

19.2.5 Finish:

After cutting to finished installed sizes all components are to be dipped in primer, or tar based composition to BS 416: 1973, and given a minimum 4 coat paint system, i.e. primer, 1 undercoat and 2 gloss coats, (or 2 undercoats and 1 gloss coat), giving a minimum coating of 90 microns prior to fixing. 1 final coat of gloss is to be applied when the installation is complete.

19.2.6 Cast Iron Rainwater Pipes:

All rainwater pipes noted on the drawings are to be replaced are to be replaced with 4x3'' cast iron pipes to match existing, conforming to the dimensional requirements of BS 460: 1964, and manufactured by J & J W Longbottom Ltd or other approved suppliers.

All new pipework to be primed and painted with two coats of black glass paint.

19.3 Installation Generally:

19.3.1 Install to ensure the complete discharge of rainwater from the building without leaking.

Obtain all replacement components for each type of pipework from the same manufacturer unless specified otherwise.

Provide access fittings and rodding eyes as necessary in convenient locations to permit adequate cleaning and testing of pipework.

Provide for thermal and building movement when fixing and jointing and ensure that clearances are not reduced as fixing proceeds.

Where not specified otherwise use plated, sherardized, galvanized or nonferrous fastenings, suitable for the purpose and background, and compatible with the material being fixed or fixed to.

19.3.2 Pipework:

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.

Make changes in direction of pipe runs only where shown on drawings unless otherwise approved.

20.0 Restoration of Historic Ironwork

20.1 Conservation Philosophy

20.1.1 Read in association with structural engineers reporting, specifications, drawings, and schedules.

20.1.2 The Gantry restoration project is predominantly a package of focused structural repair works.

20.2 Protection & Finishing

20.2.1 Cleaning

Visually inspect the surface to ensure that sharp edges, fillets, corners, and welds are smooth and have been radiused to a minimum of 2mm and that there are no defects or weld spatter from repairs.

Remove all dirt, salts, oils and greases with a detergent pressure wash and freshwater rinse.

Record air temperature, relative humidity, dew point and surface temperature.

Ensure that relative humidity is below 80% and that the surface temperature is a minimum of 3 degrees 'c' above the dew point.

Blotter check the compressed air to ensure no oil or water is present and the pressure is correct.

20.2.2 Blasting

Blast clean with metallic abrasive to achieve a cleanliness of Sa2.5 with all rust and old coating removed and roughness of Grit Medium G ISO 8503-2 40-75 micron profile test with Testex tape (both coarse and extra coarse averaged) retaining tapes.

The exact blasting medium will be chosen to minmise damage to the underlying structural fabric, except for where corroded material is to be removed.

Vacuum dust and residue from surface to achieve a maximum dust level of 2 and particle size 2 (ISO 8502-3) record tapes on a dust assessment chart.

Check and record time between blasting and painting (not more than 4 hours unless RH is less than 50%).

Check blast cleanliness is satisfactory and not deteriorated.

Record air temperature, relative humidity, dew point and surface temperature prior to starting.

Ensure that the relative humidity is below 80% and that the surface temperature is a minimum of 3 degrees 'c' above the dew point, preferably close to 20 degrees 'c'.

Stripe coat all welds, holes, corners, and difficult to reach areas with Penguard HSP ZP epoxy primer.

20.2.3 Paint system product specification for Gantry:

Stage 1 Apply one full coat of Penguard HSP ZP primer to achieve a minimum dry film thickness of 100 microns (137 microns wet) ensuring that all crevices, joints and welds are covered.

Stage 2 After appropriate drying time (see data sheet) stripe coat all welds, holes, corners, and difficult to reach areas with Penguard Express MIO.

Stage 3 Apply one full coat of Penguard Express MIO to achieve a dry film thickness of 100 microns (135 wet) ensuring that all crevices, joints and welds are covered.

Stage 4 After appropriate drying time (see data sheet) stripe coat all welds, holes, corners and difficult t reach areas with Hardtop Optima two pack polysiloxane finish.

Stage 5 Apply one full coat of Hardtop Optima to achieve a minimum DFT of 50 microns (66 microns wet) ensuring that all crevices, joints and welds are covered.

20.2.4 Notes:

All drying and over-coating times must be strictly in accordance with the manufacturers data sheets.

The environmental conditions should be checked prior to start and at the finish in addition where spraying continues for more than 4 hours or breaks occur re-check.

The application of each product to the specified dft will allow the system to achieve a total minimum of 250 microns meeting ISO 12944-5:2018 C3VH.

An over application within the range stated on the manufacturers data sheet is acceptable and will meet a higher environmental level.

20.2.5 Contact:

Ron Parkinson – Technical Consultant

New Guard Coatings (Hull)

355 Hedon Road, Hull, HU9 1RA

Tel: 01482 321154

Email: hullsales@newguardcoatings.com

20.2.6 Paint colours:

Paint scrape analysis has been carried out in August 2020. Refer to separate Crick-Smith paint analysis report which includes detailed analysis across the Gantry. Dated 12th of August 2020.

The proposed paint colour for the restoration of the Gantry is to be confirmed, following consultation with the client team.

20.2.7 Samples:

5 sample panels are to be provided under the direction of the Architect, in locations previously agreed with the Architect. Each sample panel will be approximately 2 square metres.

Sample panels will be executed prior to commencement of the works and will be carried out by experienced operatives who will be working on the project.

The purpose of the sample panels is:

j) to confirm paint colours

k) to confirm the method, working pressures etc to be used and

l) to ensure that the site operatives are familiar from the start with the project requirements. For this reason, it is imperative that the operative executing the trials should be actively involved in the works.

Area around sample panels shall be protected as required for the main works.

21.0 Roof Repairs – Carpentry/Timber Framing

21.1 Graded Softwood for Roof Modifications and Repairs

Stress graded to BS 4978 or other national equivalent and so marked.

Strength class to BS 5268:Part 2: SC 3

Surface finish: Sawn

Preservative treatment: As Wood Protection Association Commodity Specification C 8

Type/desired service life: 60 years

Timber of a basic thickness less than 100 mm and not specified for wet exposure conditions to be stress graded at an average moisture content not exceeding 20% with no reading being in excess of 24% and clearly marked as 'DRY' or 'KD' (kiln dried).

Timber graded undried (green) and specified for wet exposure conditions to be clearly marked as 'WET' or GRN'.

21.2 Ungraded Softwood For Non Structural Use

e.g. Battens counter battens gutter framing, gutter boarding

Free from decay, insect attack (except pinholes borers) and with no knots wider than half the width of the section.

Surface finish: sawn

Species: Baltic whitewood or Siberian Larch

Preservative treatment: As Wood Protection Association Commodity Specification C 8

Type/desired service life: 60 years

21.3 Selection And Use of Timber

Do not use timber members which are damaged, crushed or split beyond the limits permitted by their grading.

Ensure that notches and holes are not so positioned in relation to knots or other defects that the strength of members will be reduced.

Do not use scarf joints, finger joints or splice plates.

21.4 Processing Treated Timber

Carry out as much cutting and machining as possible before treatment.

Retreat all treated timber which is sawn along the length, thickness, planed or otherwise extensively processed.

Treat timber surfaces exposed by minor cutting and drilling with two flood coats of a solution recommended for the purpose by main treatment solution manufacturer.

21.5 Moisture Content

Moisture content of timber at time of erection to be not more than 15%

21.6 Treated Timber

Treat surfaces exposed by minor cutting and drilling with two flood coats of a solution recommended for the purpose by main treatment solution manufacturer.

21.7 Surface Treatment

Before fixing boards, apply first coat of specified finishing system to all surfaces ensuring liberal application to end grain.

21.8 Fixing Boarding

Fix boards securely, allowing for movement of boards and fastenings to prevent cupping, springing and excessive opening of joints. Finished boarding to be free from undulations, lipping, splits, hammer marks and protruding fastenings.

Position heading joints centrally over supports and not less than two board widths apart on any one support.

Punch nail heads below surfaces that will be visible in the completed work.

Preservative/Fire Retardant Treatment

21.9 Generally

Application to be carried out after cutting and machining, but before assembly, by a processor licensed by the treatment solution manufacturer for the specified treatment.

For each batch of timber, provide a certificate of assurance that treatment has been carried out as specified.

21.10 WP Commodity Specifications

WP Commodity Specifications, where specified, are those defined in the latest edition of the Wood Protection Association Manual. Solution strengths and treatment cycles to be selected to achieve the service life (if specified) and to suit timber tradability.

21.11 Copper/Chromium/Arsenic (Cca) Preservative Treatment

Moisture content of timber at time of treatment to be not more than 28%. Allow timber to dry for at least 14 days before use.

Application: High pressure.

21.12 Organic Solvent Preservative Treatment

Moisture content of timber at time of treatment to be as specified for the component at time of delivery. After treatment, timber to be surface dry before use.

Application: Double vacuum/low pressure.

Fixings/Adhesives

21.13 Fixing Generally

Use fixing and jointing methods and types, sizes, quantities and spacing of fasteners which are suitable having regard to:

Nature of and compatibility with product/material being fixed and fixed to,

Recommendations of manufacturers of fasteners and manufacturers of components, products or materials being fixed and fixed to,

Materials and loads to be supported,

Conditions expected in use,

Appearance, this being subject to approval.

21.14 Fasteners

For materials and components:

Forming part of external construction but not directly exposed to the weather to be of corrosion resistant material or have a

corrosion resistant finish.

Fasteners directly exposed to the weather to be of corrosion resistant material.

21.15 Fixing Through Finishes

Ensure that fasteners and plugs (if used) have ample penetration into the backing.

21.16 Packings

Provide non compressible, rot proof packings at fixing points to take up tolerances and prevent distortion.

Ensure that packings do not intrude into zones that are to be filled with sealant.

21.17 Cramp Fixing

When not specified otherwise, position cramps not more than 150 mm from each end of frame sections and at 600 mm maximum centres.

Secure cramps to frames with matching screws as masonry work proceeds, and fully bed in mortar.

21.18 Adhesives

Types: As specified in the relevant section.

Surfaces to receive adhesive to be sound, unfrozen and free from contamination likely to affect bond. Where necessary, clean as recommended by manufacturer.

Adjust surface regularity and texture as necessary to suit bonding and gap filling characteristics of adhesive.

Observe manufacturer's and statutory requirements for storage and safe usage of adhesives.

Do not use in unsuitable environments or beyond the storage period recommended by the manufacturer.

Apply using recommended spreaders/applicators to ensure correct coverage. Bring surfaces together within recommended time period and apply pressure to ensure full bonding.

Remove surplus using methods recommended by manufacturer, without damaging surfaces.

Repeat the operation until the joints are filled solid and flush. Brush off all residue without delay.

Do not wet the paving: allow the joints to hydrate naturally. Immediately after filling joints, cover paving with polythene sheeting for three days to protect from rain.

22.0 Roof Repairs – Slating

22.1 Materials

Base: Existing softwood boarding on existing rafters.

Pitch: to match existing.

22.1.1 Counter battens: 50x38mm treated softwood.

Sawn softwood, species type A or B to BS 5534:2014, clause 4.11.1.

Permissible characteristics and defects must not exceed the limits given in BS 5534:2014, annex D.

Preservative treatment: As per BS 5534:2014, clause 4.11.3.

All battens and counter 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 specified.

22.1.2 UNDERLAY: Steico multi UDB with Steico multi nail tape between the counter batten and membrane.

22.1.3 Battens: 25x50mm treated softwood.

22.1.4 Slate: Ffestiniog Heather Blue (samples to be provided for approval)

Slates: To BS EN 12326

New slates shall be obtained to match existing in colour.

Type: County

Grade: Best

Sizes: 20'' x 12''

Minimum head lap: 76mm tbc as required for roof pitch.

Minimum side lap: Varies with slate length. As per BS 5534:2014, 5.5.4.3.

Samples shall be submitted to the architect for approval prior to ordering materials.

22.1.5 Nails

Nails shall to be zinc coated (in accordance with BS EN 10230-1) round plain shank nails of not less than 3.35mm shank diameter and length sufficient to penetrate the battens to a minimum depth of 15mm but not long enough to penetrate the full batten..

22.1.6 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.

22.2 WORKMANSHIP

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

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

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

Keep slates clean and dry until laid. Set out to give true lines and regular appearance, fitting neatly at all edges, junctions and features. Fix slate roofing to make the whole sound and weathertight at the earliest opportunity. Repair any defects as quickly as practicable to minimise damage and nuisance. Keep gutters and pipes free of debris and clean out at completion

22.3 Existing Roof Coverings

Existing roof coverings to be removed sufficient to undertake repairs or where necessary in their entirety and removed from site.

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.

Allow a credit for the scrap value of all lead and slates being removed from the site.

22.4 Fixing

22.4.1 Counter battens

To be fixed through the wood fibre insulation boards, directly into timber sarking boarding and timber rafters below. Fixings must not be through the timber sarking boarding onto. A secure fix back into the structure is required, as per Steico manufacturers recommendations and standards. Structural engineer to further advise.

22.4.2 Steico Insulation boarding

The Steico insulation boarding, Steico special dry is held fully in place via the screws for the counter battens as detailed by Aptus / HECO. The insulation boarding is laid directly over the existing timber sarking boards, separated by Steico multi cover 5 membrane.

22.4.3 Underlay

Breather membrane shall be Steico multi UDB underlay fixed under the counter batten, directly over the wood fibre insulation boarding with Steico multi nail tape fixed between the counter batten and the membrane to seal around fixings. Steico products must be laid in strict accordance with manufactures installation details set out in their Steico Product Guide and BBA Certificates.

Handle carefully to prevent tears and punctures, repair any which do occur with adhesive tape and cover with underlay patch tucked under the horizontal lap above.

22.4.4 Battens

In straight horizontal lines, aligned on adjacent areas, with no batten less than 1200mm long.

Joints to be square cut, butted centrally on supports and must not occur more than once in any group of four battens on any one support.

Provide an additional batten where an unsupported lap in the underlay occurs between battens.

Fix each batten to each support, with splay fixings at joints.

22.4.5 Slates

Lay with an even overall appearance, with slightly open butt joints and tails of slates aligned.

Use slates of consistent thickness in any one course laid with the thicker end as the tail.

Use extra wide slates generally at ends of courses to maintain bond and ensure that cut slates are as large as possible. Do not use slates less than 150mm wide.

Centre fix each slate through countersunk holes 20-25mm from side edges, with two copper clout nails to BS 1202:Part 2, of 3.35mm shank diameter and length to provide adequate withdrawal resistance and not less than 15mm penetration into the batten.

23.0 Roof Repairs – Leadwork

23.1 General

The extent of lead work on the roofs is identified on the following drawings:

The work involves:

23.2 Requirements

23.2.1 All work shall be undertaken by trained operatives employed by a contractor who is a member of Lead Contractors Association.

All workmanship shall be in accordance with the Lead Sheet Association's recommendations, as contained in 'The Lead Sheet Manual - a guide to good building practice', Volume 1 to 3 and latest updates.

Working Practices shall comply with the Health and Safety Executive COP2 "Control of lead at work - approved code of practice".

23.3 Materials

23.3.1 Lead Sheet

Lead sheet shall be code 7 rolled lead to British Standard BS EN 12588 for roof coverings, code 8 for parapet gutters and code 5 for all cover flashings. The minimum weight 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". The lead shall be colour coded for thickness and weight.

23.3.2 Lead Sheet

Lead sheet shall be traditional sand cast lead, code 7 for roof coverings, code 8 for parapet gutters and code 5 for all cover flashings. The minimum weight 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". The lead shall be colour coded for thickness and weight.

23.3.3 Underlay

Building paper to BS1521 Class A

23.3.4 Underside coating

The underside of lead bays shall be coated with chalk rich 'Patination Cream' as manufactured by Rowan Technologies Ltd.

23.3.5 Copper Nails

Copper nails for fixing lead shall be in accordance with BS1202 part 2.

23.3.6 Wood Screws: shall be stainless steel in accordance with BS 1210.

23.3.7 Timber:

Timber for roof decks etc. shall be 100x25mm straight edged softwood boards (Siberian Larch or Baltic Whitewood) butt jointed to match existing.

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

Moisture content shall not be more than 15% at the time of covering.

23.4 Workmanship

23.4.1 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 and adequately fixed to resist wind uplift but also able to accommodate thermal movement without distortion or distress.

23.4.2 Lead Welding

In situ lead welding is permitted where specified subject to completion of a "hot work permit" form and compliance with its requirements.

23.4.3 Layout

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

23.4.4 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.

23.4.5 Existing Lead to be Removed

Lead specified to be stripped shall become the property of the contractor. The contractor shall allow a credit in his tender for the scrap value of all such lead.

23.4.6 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 all boards are securely fixed. Punch in any protruding fastenings and plane or sand as necessary to achieve an even surface.

23.4.7 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.

23.5 Fixing And Jointing

23.5.1 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. Additional fixings may be required in the top third of

larger sheets, in accordance with the recommendations of the Lead Sheet Association

23.5.2 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.

23.5.3 Clips

Clips shall generally be 50mm wide unless specified otherwise. Lead clips shall be cut from sheets of one code heavier than the code of the sheet being secured. Alternatively use copper or stainless-steel clips in accordance with the recommendations of the LSA.

Each clip shall be secured with 2 fastenings not more than 50mm from the edge of the lead sheet. Clips shall be welted around the edges of sheets and turned over 25mm.

23.5.4 Hollow core Roll Joints

To form the hollow roll the undercloak is to be turned up 100mm and secured with min. 50mm wide copper clips fixed to the timber down the line of the roll at maximum 450mm centres. The overcloak is to be turned up 125mmand the edge welted over the undercloak. The prepared and clipped upstand is then turned to form the hollow roll.

23.5.5 Wood Cored Roll Joints

Timber core shall be 45x45mm rounded timber tapering to a flat base 25mm wide. Ridge rolls may be larger and should be to the dimensions specified on the drawings.

Rolls shall be fixed to the base with stainless steel countersunk screws at not more than 300 centres, and after laying of geotextile underlay.

Dress undercloak 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.

Dress overcloak around the core, and extent onto the main surface to form a 40mm splash lap

23.5.6 Welted Joints

Form with a 50mm overlap, 25mm underlap and copper or stainless steel clips at not more than 450mm centres.

Welt overlap and clips around underlap loosely turn over and lightly dress down.

23.5.7 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.

23.5.8 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.

Dress over lap over drip and form a 75mm splash lap. Secure with lead clips lead welded underlap with not less than one per bay

23.5.9 Forming Details

Details may be formed by bossing or lead welding 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 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.

Bossing must be carried out without thinning cutting or otherwise splitting the lead sheet.

23.5.10 Fixing into Joints

Carefully rake out joint/chase to a depth of 25mm. Dress lead into joint/chase and fix with lead wedges at not more than 450mm centres, and to the recommendations of the LSA. Max. length of cover flashing to be 1500mm with minimum laps of 100mm, to the recommendations of the LSA. Back point with lead sealant.

23.5.11 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.

23.5.12 Lead Sheet Roofing

Lead: Code 8 cut and dressed to shape for fixing by roofer.

Horizontal Junctions in Sheets: Form with hollow cored rolls at max. 600mm centres, in accordance with Lead Sheet Association recommendations.

Vertical Junctions in Sheets: Lapped joints in the fall of the roofing material, at max. 2400mm centres, and with min. 100mm vertical lap. Weld 2 No. lead retaining clips per bay to undercloak at lap positions and turn around bottom edge of overcloak, allowing min. 6mm expansion gap, all in accordance with Lead Sheet Association recommendations.

23.5.13 Underside Patination Cream

Surface Preparation:

Following preparation and bossing of the lead bay and before final fixing into place, the underside surface should be treated with the passivation coating.

The surfaces should be thoroughly cleaned and wire brushed to remove any mill scales, oxidation layers or previously formed corrosion products.

Application:

The coating should be thoroughly stirred prior to use.

The coating should be brush applied to give a continuous thick coating of between 150 and 200 micrometers. This may require more than one coat, depending upon the environmental conditions at the time of laying. If the lead is to be laid over substrates that may emit organic acids during their life (oak, sweet chestnut, various hardwoods or man-made boards containing adhesives – plywood, particle board and others) then an increased coating thickness is recommended.

The chalk enriched coatings may induce a small amount of capillarity of rainwater into the roof under severe exposure conditions. The coating is be applied to some three quarters way around the inside of the roll leaving a 30mm uncoated allowance on the edge. For laps, an uncoated allowance should also be left at the bottom edge as follows:

60° slope 70mm allowance

30° slope 160mm allowance

10° slope 220mm allowance

Drips and other details should be treated in a similar manner.

The coatings should be fully dried before the panel is finally installed on the roof.

24.0 Hotworks

24.1 General

24.1.1 Where the works require operations involving flame, cutting equipment, brazing, and soldering equipment, blow lamps and other equipment producing heat or having naked flames, all work must be carried out strictly in accordance with this Specification and the instructions given on the hotwork Permit issued by the Architect. A copy of the Hotwork Permit is attached.

24.1.2 Where possible prefabrication and hotwork are to be carried out a minimum distance of 6 m outside the building, on the ground and with no combustible materials within 10m of the hotwork operation.

24.1.3 Where it is considered that there is no practical alternative to the use of heat-emitting apparatus then a hotwork Permit is to be completed. Each section must be filled out and the permit submitted to the Architect when finished.

24.1.4 The person inspecting the work shall consider the following:

1) The location of the proposed hotwork in relation to surrounding combustible materials both fixed and movable, with particular reference to substrates, the likelihood of concealed timbers, inaccessible voids, hidden cables or pipes and materials with rapid ignition such as roofing felt, or with a high degree of heat transference such as steel.

   Consideration must also be given to the material and space behind the proposed hotwork, e.g. the inner face such as wallpaper, wall hangings, panelling, and furniture placed against or near to the wall which could ignite by heat to determine the risks involved either by direct or conducted heat, such as:

   m) Opening up a void.

   n) Stripping off the roof covering.

2) What action to be taken to minimise and, if possible, to eliminate the fire risks, such as:

   a) Removal of combustible materials.

   b) Clean the area to remove dust and rubbish.

   c) Ventilation of enclosed spaces.

   d) Prior saturation with water of combustible materials that cannot be removed.

   e) Temporary covering of immovable combustible surfaces with a 50-75 mm thickness of damp sand.

   f) Removal of containers of inflammable gases or compressed gases.

   g) Protection of surrounding areas with flame-retardant boards or other suitable fire-resistant material.

   h) The use of butane and not paraffin lamps.

   i) Confining the hotwork to mornings only.

3) What fire-fighting facilities are required, such as:

   a) The number and type of portable extinguishers, buckets of water and/or sand to be immediately to hand.

   b) Fire hoses to hand.

   c) Adequacy of water supply, and water pressure.

   d) Nearest fire alarm.

   e) Builder's tools for opening up roofs, walls, floors, etc.

   f) Alerting the fire brigade of the time and location of the hotwork and in extremely hazardous situations requesting a fire tender to be in attendance.

4) What operatives will be permitted to carry out the Hotwork:

   a) Suitably qualified and experienced.

   b) Numbers to be involved never to be less than 3 (i.e. 2 in addition to the experienced operative for standby surveillance as required in (3) and (4)).

   c) NOTE: The accompanying person is to be present during the Hotwork operation and carry out the checks after the work has been completed.

5) The "watching" and "follow up" procedure:

   a) During the hotwork process the standby operatives will be in attendance with fire-fighting equipment ready for use.

   b) Following Hotwork the person inspecting the work shall for at least 1 hour after completion of the task (except for any essential minimum break, in which event alternative cover must be provided), make regular inspections of the work with particular reference to the surrounding area to ascertain that there is no ignition.

   c) A further inspection shall be made at the end of the working day by the person inspecting in conjunction with one of the standby operatives.

6) A record shall be made of the hotwork on the approved "Hotwork Permit" form and shall be returned to the Architect.

   NOTE: It may be prudent to advise Insurers in advance of the hotwork operation so that they

can inspect and, if necessary, approve procedures to be adopted.

24.1.5 Fire extinguishers and appropriate fire-fighting equipment must be to hand during the whole of the attendance time.

24.1.6 The employer is to be notified when and where hotwork is carried out.

HOTWORK PERMIT – Project Name				
This permit is issued to:	(name)			
To undertake:	(type of work)			
At:	(exact location)			
Between the hours of:	and		on	(date)
Accompanied by:	(name)			
Fire extinguishers required:	a) Type: no: b) Type: no: c) Type: no: d) Type: no:			
The Hot area will be inspected 1 hour following completion of work and at the end of the working day by:	(Contractor)			
Special conditions:	All works to be undertaken at minimum 10 metres from structure. All works to be completed by 1300 hours.			
The nearest fire alarm point is:	(location)			
INFORMATION				
The Employer and Architect has been made aware that Hotworks will take place.	Signed		Time	Date
	(Contractor)			
COMPLETION CERTIFICATE (CONTRACTOR)				
The Hotwork detailed was completed at:	(time)			
The Hotwork is now complete. The area is being inspected by the person named.		Signed	Time	Date
	Person undertaking work:			
	Accompanying person:			
	Person inspecting work:			
INSPECTION CERTIFICATE (CONTRACTOR)				
The Hotwork has been inspected:		Signed	Time	Date
One hour following completion of the work.	Person inspecting work:			
At the end of the working day	Person inspecting work:			

Buttress

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