

General SPECIFICATION

Cemetery Junction Arch

Reading Old Cemetery

30/10/2024

CONTENTS:

<i>Section</i>	<i>Name</i>	<i>Page</i>
A11r	Scaffolding and Protection	2
A12r	Masonry Cleaning	7
F21r	Stonework	14
H71r	Leadwork Repairs	26
L40r	Plain Glazing Repairs	31
M21r	Lime Plaster and Render Repairs	35
M60r	Painting & Decorating	46
V91r	Lightning Protection	55
Z11r	Metalwork Repairs	58
Z21r	Mortars and Pointing	68

11r SCAFFOLDING & PROTECTION

- 100 TO BE READ with Preliminaries and General Conditions, Drawings and Specification, which have been prepared specifically for this Contract
- 110 GENERALLY: this Specification sets out the trade materials and workmanship requirements for the repair work in the Contract, which must be read with the General Conditions and other Contract Documents, particularly those listed above. The Contractor is required by this Specification to provide details of proposed scaffold sub-contractor with his tender. Design drawings, calculations and method statements are required at least THREE WEEKS in advance of the work commencing. These dates should be indicated on the Contractor's programme.

MATERIALS

- 110 METAL SCAFFOLDING: to BS 1139-2.2 2009. Steel scaffolding tube hot-dipped galvanised to BS EN ISO 1461:2009.
- 120 TIMBER SCAFFOLD BOARDS: 38 x 225 softwood with metal end caps to BS 2482. Replace any that warp.
- 130 SHEETING: Monarflex Flame safe sheeting with neoprene rubber anchors and straps all as made by Monarflex of Lyon Way St Albans Hertfordshire AL4 0LQ.
- 140 NETTING: Nylon woven green debris netting, with neoprene rubber anchor straps.
- 150 LADDERS: to be new timber to BS 1129. Replace any that warp or break.
- 160 PLYWOOD SHEETING: exterior quality WBP 19mm thick to BS 6566.
- 170 TIMBER FOR NON-STRUCTURAL USE: sawn softwood, graded to minimum stress grade to BS 4978: 2007 + A1:2001.
- 180 ANCHOR SOCKETS: Stainless steel, screwed-type with coloured plastic cap to match surrounding surfaces. ONLY TO BE USED WHERE SPECIFICALLY APPROVED BY CA.
- 190 PAINT SYSTEM FOR HOARDINGS: one priming coat of thinned emulsion and two finishing coats of external quality emulsion; colour: TBC.
- 192 PAINT SYSTEM FOR DOORS TO HOARDINGS: one coat of primer and two finishing coats of external quality gloss oil paint; colour: TBC.
- 194 PAINT SYSTEM FOR TIMBER CASINGS AND SCAFFOLD POLES adjacent to public walkways: one coat of primer and two finishing coats of external quality brilliant white gloss oil

paint.

195 WARNING TAPES & STRIPS: Fluorescent and/or striped plastic tape and self-adhesive strips.

WORKMANSHIP

200 COMPLY with provisions of BS EN 12811-1:2003: Temporary works equipment. Scaffolds. Performance requirements and general design, and all statutory regulations.

- 210 DESIGN, PROVIDE, MAINTAIN, ADAPT & CLEAR AWAY all platforms, ladders, hoists, scaffolding, sheeting, hoarding, temporary roofs and protection as necessary for the proper execution of the works including that required for sub-contractors. Inspect regularly in accordance with current safety regulations and maintain a record of these inspections on site. Co-ordinate the design and erection of scaffolding with general and sub-contractors' programme and working requirements.
- 225 COVERED SCAFFOLD DESIGN BY CONTRACTOR: The Contractor is required to prepare proposals, submit full details in duplicate to the CA for comment with copies to the Structural Engineer and H&S Advisor. The proposals are to be of an extent and detail commensurate with the complexity of the Contract and with the degree to which they are critical. Indicate loads from the scaffolding onto the existing structure and assist the consultant structural engineer to demonstrate that the existing building is capable of resisting such loads; undertake opening-up works as required. Indicate levels of working platforms in relation to the existing building and the scope of the works. Submit drawings of any proposals to vary those approved where required. Indicate with tender the name of the scaffolding designer, who is required to inspect on completion and verify to the CA that the scaffolding has been erected in accordance with his proposals.
- 226 SCAFFOLD DESIGNER: The contractor is required to engage a scaffolding designer/ engineer to prepare the design and calculations necessary to meet this specification, the Structural Engineer's requirements, all current regulations and the Contractor's working method; submit these for comment at least 3 weeks before commencing erection. He is also required to inspect the scaffold on completion and verify to the CA that the scaffolding has been erected in accordance with the proposals. Indicate the name of contractor's designer with tender. The scaffold sub-contractor must not vary the configuration of the scaffold from that shown on the drawings during erection without written approval from the designer and structural engineer.
- 230 PROGRAMME: Allow in the contract programme sufficient time for preparation, submission and amendment of the scaffold drawings BEFORE erection of the scaffold. No claim for delay or loss and expense will be considered in respect of a failure to provide adequate drawings in time. In all cases, allow time for safety inspections before the scaffold is used. Provide Certificate of completion/ handover to CA on date of completion.
- 235 ERECTION AND STRIKING OF SCAFFOLD must be programmed to allow CA at least TWO CLEAR WEEKS for scheduling repairs (area by area) before work commences (on the area of the works) and a further TWO WEEKS after work is completed for inspection and making good in each area or on each lift.
- 240 TAKE CARE: to prevent damage to the existing building/s, its fittings and furniture. Any damage caused to the building is to be made good to the approval of the CA at the Contractor's expense. Listed Buildings are of national historical and architectural importance and the historic fabric is vulnerable to damage and much of it is irreplaceable. All personnel should be made aware of this and treat the building with great care. When erecting high level scaffold internally, valuable fittings below the working area (eg, organs, lights, electronic equipment, monuments, woodwork, pavements) must be temporarily protected from damage and dirt during erection and striking scaffold, and this must be included in any proposal and programme.
- 250 SCAFFOLD LOADINGS: design scaffolds to carry loads at least as great as those listed below:
 Inspection, painting, light cleaning and access 0.75 kN/m²

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CLIVEDEN

CONSERVATION

Plastering, painting, stone cleaning, glazing and pointing	1.5 kN/m ²
General building work including brickwork, window and mullion fixing, rendering and plastering	2.0 kN/m ²
Blockwork, brickwork and heavy cladding	2.5 kN/m ²
Masonry work, concrete blockwork, and very heavy cladding	3.0 kN/m ²

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- 255 PLATFORM LOADS: Shall be appropriate to the designation of the scaffold given in the Schedule or Preliminaries and the type of work to be carried out. Any 2 levels may be fully loaded at any one time. The Contractor should allow for the worst condition. Co-ordinate with sub- contractors at design and tender stages the loading required for working platforms and storage of materials on the scaffold.
- 260 INDEPENDENT SCAFFOLD: provide self- supported independent scaffold, braced against imposed and wind loads within itself or, if necessary, by minimum number of points of contact to the existing building, with clear unobstructed access routes and working lifts with adequate headroom.
- 265 KENTLEDGE: Where required the scaffold will be held down with kentledge. The contractor should provide details of the proposed kentledge for approval. The following will not be acceptable; scaffold tubes, water containers, ground anchors.
- 270 RESTRAIN SCAFFOLD as far as possible by end returns and use of box and lip ties. Restrict the use of reveal cramps. Any points where the scaffold ‘butts’ the building must be protected with a polystyrene or felt pad and ply packers, designed to be removable for periods during the Contract in order to allow repair work or decoration behind. Tying-in through windows will not be allowed. **Due to the Grade I listed status of the building, restraint sockets drilled into the external walls will NOT BE PERMITTED.**
- 276 EXISTING SOCKETS: Survey the existing building for existing restraint sockets; carry- out investigation and load test if reuse is required. Mark locations on record drawing and hand to CA.
- 280 BOARD OUT every lift required for the work with solid rigid boards. Set out lifts to suit principal features of elevations and avoid cutting across windows. Ensure that boards are fully supported and lie flush, to prevent traps, particularly at corners and ladder holes. Supply stable boards of moisture content to suit situation. Discard twisted or damaged boards. Allow boards immediately adjacent to the walls to lift out. Do not create trip hazards with lapping boards. Use continuous double boarding, with polythene or tarpaulin sheeting sandwiched between, where scaffold overhangs paths and pavements and to form fans. Use double boarding covered with rubber matting over lowest lift of boards in occupied internal situations to deaden footfall. Dampen and sweep down boards regularly to keep site clean.
- 290 SAFETY: provide adequate rails to all scaffold lifts, walkways and existing parapets for the safety of personnel during works. Securely tie all ladders at a safe angle with adequate head room, guarding’s and without obstructions or pole ends near the route of ascent/ descent. Take adequate precautions, e.g. kickboards, to prevent any material falling from the scaffold. Clear all loose items, e.g. tubes, fittings, poles, boards, etc., from the scaffolding as it is constructed and on completion. Ensure loose materials and equipment are cleared from the scaffold at end of each working day during the Contract. Any intention to store materials, eg roofing tiles, on the scaffold must be clearly stated with the Contractor’s proposals. Provide storage platforms separate from access routes as required for the works
- 300 PERMISSIBLE BEARING PRESSURE: Ensure that the permissible bearing pressure of the ground or of the building structure below the scaffold is not exceeded. Set standards on double or triple layers of scaffold board to spread the load, taking care not to block drains, rainwater channels or outlets. Where founded on soil, set on timber railway sleepers or similarly sized treated timbers as sole plates. Provide protection to underlying stone, leadwork, asphalt, etc. with 50mm polystyrene and 19mm plywood as base for scaffold supports.

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- 310 TRANSFER SCAFFOLDING COMPONENTS BY HAND, PULLEY OR HOIST. THE
DROPPING OR THROWING UPWARD OF COMPONENTS IS FORBIDDEN.

- 315 **REMOTE UNLOADING:** Poles are to be carried by hand from the vehicle to the site, which may be an extended distance past or through the existing buildings and in public areas . Store the tube safely in a tidy stack until use. Store loose components- clamps, knuckles, bolts etc in baskets. Screen the route and storage area from the public and engage banksmen to supervise transfer of materials. Provide protection to doorways and gates on the route.
- 320 **COVER EXPOSED TUBE ENDS** or those closer to the building than 25mm with plastic caps. Agree all points of contact between the scaffold and the building with the CA. Keep ends back at least 100mm from any glazing. Wrap vulnerable carving or fittings with bubble wrap and cover glass or decorations in rigid sheeting where adjacent to scaffolding.
- 330 **PROTECTION OF PUBLIC:** Erect scaffolding with members set flush and to suit fixing points for netting. Fix fire- proofed sheeting, to the scaffold full height stretched flat, overlapped at junctions and clipped at one metre centres with proprietary neoprene rubber straps. Maintain in position throughout the Contract. Sheet the scaffold with plywood at ground level where this forms the site boundary and in accordance with cl.420.
- 340 **PAINT:** Hoardings and casings, poles fixed to the outside face of the scaffolding and all poles which they obstruct or are close to paths and roads to a height of at least 2m. Provide fluorescent tapes where the public are at risk.
- 350
- 360 **FIRE ESCAPE:** Do not obstruct means of escape routes from the site or adjoining buildings unless alternative routes are provided and signed.
- 370 **EARTH ALL SCAFFOLDS AND PROVIDE TEMPORARY LIGHTNING PROTECTION.**
- 380 **ALLOW SUB-CONTRACTORS** and others employed directly by the Employer, free use of scaffolds. Ensure that all users of scaffolds are aware of the maximum load for which they have been designed.
- 390 **UNAUTHORISED ACCESS:** Take all reasonable precautions to ensure that unauthorised persons cannot gain access to scaffolds. Remove and lock up all ladders from the bottom lift of scaffolding and secure all gates each night.
- 400 **WEATHER PROTECTION:** provide temporary protection to areas of building open during demolition, alterations or re-roofing. Provide temporary cover over the working area of scaffold formed from continuous rigid corrugated sheeting, laid to falls and draining into temporary rainwater goods. Do not interrupt existing rainwater disposal and provide temporary drainage if necessary, using upvc gutters and pipes with properly sealed connections, NOT polythene sleeves. Prevent temporary rainwater discharge ponding in the compound or saturating the building or working area. Provide temporary flashings to abutments lapped under tiles roofs or dressed into existing chases or string courses; over-sail open edges of scaffold and ensure weather tight lap to vertical sheeting.
- 410 **WIND UPLIFT:** Design the scaffold to resist wind loadings, particularly uplift on any temporary roof, for the calendar period named in the Schedule of Work, including any exceptional gusts given the locality of site. Refer to MET Office predictions and statistics. If none stated, assume a 12 month period including winter conditions.

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435 HOIST: Provide suitable manual or powered chain or cable lifting hoist for raising materials onto upper lifts of scaffold. Install and maintain in accordance with all current regulations. Size/ type of equipment to suit size and weight of components to be used in the repair works.

440 TREES: Comply with the requirements of BS 5837 when erecting scaffolding close to trees; protect the base of each tree and do not lop or damage branches without approval from the CA. NB trees may be protected by a Preservation Order in which case it is an offence to cut them without approval and any work must be carried out by an experienced tree surgeon.

450 DO NOT REMOVE scaffolds without the approval of the CA. When approval has been given, clear away all scaffolding components and sole plates; leave the site tidy and make good any damage to roadways and soft landscape. Ensure that the scaffold boards and the faces of the building are swept clean progressively as the scaffold is taken down and avoid dust and debris being left on the face of the building. If necessary damp down scaffold boards before taking-down.

A12r MASONRY CLEANING

GENERAL REQUIREMENTS

- 100 TO BE READ with Preliminaries, Schedule of Work, Drawings and Specialist Report / Specification (as appropriate) which have been prepared specifically for this Contract.
- 105 **GENERALLY:** This Specification sets out the trade materials and workmanship requirements for the MASONRY CLEANING work in the Contract, which must be read with the General Conditions and other Contract Documents, particularly those listed above. The Contractor is required by this Specification to provide details of proposed in-house team or sub-contractor and suppliers, and these must be supplied with his tender. Where method statements, drawings, samples and other proposals are required, these must be supplied at least three weeks in advance of the work commencing. These dates should be indicated on the Contractor's programme.
- 106 **SCOPE AND METHODS OF CLEANING:** The scope and methods of cleaning shown on the Drawings is provisional and to be confirmed by the CA, after inspection from the scaffold by the Architect, Clerk of Works and (where appropriate) the conservation officer. This specification therefore provides a 'shopping list' of possible cleaning methods which may be used, following trials on the building before a decision is made.
- 110 **FOREMAN:** The Contractor shall provide all reasonable personal supervision, including employing a thoroughly competent Foreman exclusively for this operation.
- 125 **SUB-CONTRACTORS:** The JOS cleaning (if used) is to be carried out by specialist company approved and trained by Stonehealth Ltd.
- 130 **SKILLED WORKMEN:** Cleaning is to be carried out by the cleaning contractor's own skilled operatives. Further sub-contracting of the cleaning work will NOT be permitted. Provide evidence of experience of the operatives and details of work previously carried out by them.
- 140 **DEDICATED TEAM:** Work is to be carried out by a dedicated team. Submit names to the CA with CVs and references. New operatives joining the project after its commencement will be required to prepare a range of samples for the approval of the CA before commencing any of the main works.
- 150 **CLEANING GENERALLY:** In keeping with the building's historic character, the intention of cleaning is to produce a 'sympathetic' rather than a severe clean. This means that the natural toning of surfaces (i.e. by long term weathering) is to be respected and retained, but that areas of severe grime (normally caused by soot staining) and general surface dirt are to be removed. The degree of clean will normally be expressed as a % in the schedule and will be confirmed on site after trial area/s. Hard edges and rundown stains are to be graded off. It is not necessary or desired to remove all dirt completely. Paint drips from adjacent downpipes, or around window reveals are to be removed.
- 160 **CHECK DRAINS** before cleaning begins to ensure that the drainage system is able to cope with the quantity of water to be used. Provide adequate means of disposal of water throughout the trials and cleaning work. Do not allow dirty or excess water to run indiscriminately over the face of the building or onto pavements beneath.
- 170 **ACCESS:** Provide suitable access for the work by the use of mobile lifting platforms and/ or scaffold platforms. Ensure that design of scaffolding allows operatives to stand sufficiently far from the elevation being cleaned to avoid the formation of 'snail tracks' in the finished work. Scaffold levels are to allow for sufficient convenient and safe working to cornices, enrichments, etc. Co-ordinate the scaffold design and erection with the requirements of the cleaning contractor.

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- 180 PROTECTION: Before commencing cleaning operations, protect window and door openings to prevent ingress of water and infiltration of fine dust particles to interior of building. Seal windows with tape, peelable plastic coating and sheet. Contain clouds of dust and abrasive by tightly screening the scaffold with reinforced translucent fire-proof sheeting. Ensure that window glass and painted wood are protected from damage. Finely carved or painted detail should be protected from general abrasive, water or steam cleaning, prior to any more selective cleaning. Existing electric conduits, switch boxes, sockets or other installations should be protected from excess soaking, falling dust and debris.
- 185 PAINTED SURFACES: Take care to avoid any historic painted surfaces which are to be protected and conserved only by the consultant conservator.

MATERIALS

- 190 WATER from mains supply, to be clean and uncontaminated, tested to BS 3148 if required.
- 195 DE_IONIZED WATER to be clean and uncontaminated supplied in labelled containers
- 200 BIOCIDES: LITHOFIN ALGEX, based on quaternary ammonium as manufactured by Lithodfin GmbH D-73236 Wendlingen POB 1134 (Tel: 070 24 94 03-0); distributed in Great Britain by Casdron Enterprises Ltd, Arlesford, Hampshire SO24 9QF (Tel: 01962 732126).
- 210 ABRASIVES for dry and wet systems:
Calcium carbonate fine grade white carboniferous limestone granules, 150-300 microns (wet and dry).
- 220 BRUSHES FOR USE ON STONWORK:
1. Phosphor bronze brushes to be made of phosphor bronze bristles in close formation as obtainable from Picreator Enterprises Ltd, 44 Park View Gardens, London NW4 2PN. (Under no circumstances should ferrous brushes may be used).
2. Bristle brushes: A variety of bristle brushes may be employed such as toothbrushes, nail brushes and general purpose hardware brushes. Bristle to be of uniform height in close formation.
- 230 AMMONIUM HYDRO-CARBONATE:
To be used in solution up to 5% maximum with de-ionized water
- 240 COTTONWOOL:
Acid free PH neutral natural cotton wool for swabs
- 250 PAPER
Acid free PH neutral natural tissue paper for poultices
- 260 LATEX CLEANING PASTE:
Proprietary film- producing thixotropic latex cleaning paste containing ammonia cleaning agent-
• Clean Film No. 1 by Stonehealth Ltd of Dursley Gloucester (tel. 01453 540600, dursley@stonehealth.co.uk)
• Clean Film No. 3 to selected areas only.
- 265 CHEMICAL PAINT STRIPPER:
Proprietary brush- applied chemical cleaning liquid, PAINT RID by Stonehealth Ltd of Dursley Gloucester (tel. 01453 540600, dursley@stonehealth.co.uk)
- 270 SYNTHETIC CLAY POULTICE:
Proprietary highly purified synthetic colloidal clay for poultices-
• Laponite RD by Southern Clay Products of Gonzales, Texas USA (Tel 830 672 2891;

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www.gelwhite.com)

- 280 DOFF SYSTEM:
Proprietary cleaning system using superheated water supplied by Stonehealth Ltd of Dursley Gloucester (tel. 01453 540600, dursley@stonehealth.co.uk) which can only be used by licensed companies and individual operatives trained by the supplier.

WORKMANSHIP

- 290 CODE OF PRACTICE: Comply with all the relevant British Standards and Codes of Practice; in particular with BS 8221: Part 1: 2012 Code of practice for cleaning and surface repair of buildings - Cleaning of natural stone, brick, terracotta and concrete.
- 300 CONSTANT VIGILANCE: Operatives must remain alert to changes which may become apparent in the surface which they are working and respond, as necessary, by adjustments in pressure or size of abrasive.
- 310 STEADY PACE: Work must never be hurried. Rushed air abrasive work can result in a mottled 'gun-shading' which becomes apparent with subsequent weathering.
- 320 NOZZLES: Select nozzles appropriate to nature of surface. Any nozzle employed must be capable of delivering even particle spread and a constant flow of abrasive to the work surface with the air/grit mix at any pressure being as lean as possible.
- 330 PROTECTIVE CLOTHING: Operatives must have the protection of 'air-line' helmets supplied with filtered air when cleaning with dry abrasives so as to maintain a positive pressure inside to prevent ingress of dust. Full protective clothing must be worn at all times during the application of dry and wet abrasives.
- 340 APPROVALS: Obtain all necessary approvals from Local Authorities and Public Undertakers. Comply with all police regulations and restrictions when working externally adjacent to the public highway.
- 350 HEALTH AND SAFETY: Comply with all current health and safety regulations and restrictions.
- 360 SAMPLE/S: Trial area/s of approximately 2m² in an agreed location shall be cleaned initially for approval and be retained as a reference panel for the remainder of the cleaning contract. The Contractor must allow for 3 such panels for each different method and for each different material or condition to be cleaned in order to establish the degree of clean and best method. Samples are to meet CA's approval, before proceeding with the work. Allow for samples in the programme of work and to be protected and maintained during the work for reference.
- 370 STANDARD OF CLEANING: Ensure cleaning processes are consistent throughout and reach the standard of the selected sample. Monitor the works and ensure that the methods, quantity and extent of cleaning in different areas are in accordance with CA's Instructions.
- 380 DIFFICULT AREAS, INCLUDING SEVERE RUST STAINING: If to achieve the standard of cleaning shown on the sample panel special processes are needed, these must be agreed with the CA prior to commencement.
- 390 TAR STAINS: Keep wetting to the minimum to lessen the likelihood of staining by water soluble tars. If such staining occurs, inform the CA.
- 400 CHECKING PROTECTION DURING CLEANING: The Contractor is to be responsible for ensuring that if water or dust is found to penetrate to the inside of the building cleaning should be

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stopped immediately and the point of penetration made good, and any damage promptly reported to the CA.

410 DRAINS: Prior to cleaning, all drainage systems in the affected area should be protected and, wherever possible, temporarily diverted to prevent blockages by the ingress damp cleaning powder. Land drains are to be protected using hessian, geotextile sheeting or other dust barriers to prevent infection of the drainage system. Be prepared to stop cleaning during rain so that the drains are not overloaded. Maintain the rainwater drains in working order throughout the Contract, ensuring that any abrasive materials used are prevented from entering the drains. It is important that gullies are left clear and unimpeded by debris, wires, conduits and fixings, etc during the works. Clear routes to gullies to be maintained, especially at natural blockage points.

420 WASHING DOWN: All dry debris is to be collected at the level on which it lies by means of brooms and vacuum cleaners. At the end of each day, after the removal of dust, wash down all surfaces with clean water. The scaffold is not to be swept in such a manner that materials fall to a lower level.

METHODS OF CLEANING

430 PRELIMINARY CLEAN TO ROBUST EXTERNAL SURFACES: Before any water, abrasive or chemical is applied to the face of the building, clean off heavy deposits with wooden scrapers, soft bristle or bronze wire brushes.

440 PRELIMINARY CLEAN TO FRIABLE AND INTERNAL SURFACES: Before any water, abrasive or chemical is applied to the face of the building, clean off heavy deposits of dust with specialist vacuum cleaner and gently brush down friable areas carefully. Vacuum cleaners must be backpack mounted units designed for conservation work with a variety of soft brush nozzles.

450 INSPECTION: Following preliminary brush clean, carry out an inspection of all areas with the CA to establish the method of clean in each area. Identify damaged stones that should not be cleaned. Mark up drawings and keep a record of instructions.

460 ‘ThermaTech’ SUPER-HEATED STEAM CLEANING: Clean all external masonry and rendered areas with Doff steam cleaning method. The DOFF cleaning system involves specialist equipment available from Stonehealth Limited. Cleaning is to be carried out by a qualified operator who has received instruction and whose work is, in any case, to the satisfaction of the CA. The contractor must conform to all health and safety requirements when working with dust producing appliances. Use appropriate pressure and nozzles depending upon the friability of the areas to be cleaned and avoid over cleaning or ‘tide’ marks. Use on moss growth and weathering surfaces prior to biocide treatment. Carry out trial areas prior to proceeding with general clean. Doff clean may be carried out prior to CA’s inspection with prior agreement. Agree pressure (keep to minimum level) and temperature of water (at least 90 deg. C upto 150 Deg C.) with CA after trials. Clean off remaining heavy deposits of moss or soot with wooden scrapers, brush down with soft bristle brushes after 2- 3 hours in preparation for CA’s inspection. Carry out further clean of selected areas where instructed.

470 WASHING ROBUST EXTERNAL SURFACES: Water is to be used sparingly. Rinsing and washing by water will be permissible on surfaces of the building where biocide treatment is to be applied for the removal of organic matter. Selectively spray the soiled surface of the stone using garden type mist sprays with clean water to soften deposits prior to brushing or other cleaning method. Work down in horizontal bands starting from the top and lightly brush or scrub with the specified brushes. Avoid drips and staining when rinsing down stone with clean water and scrubbing with soft bristles brushes. The final clean off of all surfaces will be a wash down with high pressure low-volume water lance.

- 475 WASHING may also be adopted as the sole cleaning method if it can be established that no previous cleaning utilising chemicals had been undertaken and where the accumulation of hardened dirt or stubborn staining is not severe. In those circumstances the washing will be achieved by scaffold-mounted, flexible-head, fine-nozzle water jets to provide a nebulous spray with intermittent (pulse) controls giving approximately 10 seconds spray in four-minute cycles.

The process is manually assisted with soft natural bristle or soft bronze bristle brushes and small gritstone blocks. Adjust cycling as required to allow the minimum effective wetting to be established and maintained.

480 LATEX COMPOUND CLEANING: Apply compound in accordance with manufacturers instructions by hand held spray or soft long haired brush or sponge as appropriate for different areas. Allow to form a continuous film coating over area to be cleaned and leave to dwell for optimum time determined following trials, to be at least 24 hours. Do not spray deep into undercut carving or mouldings so as to avoid damage. Carefully peel from surfaces as a sheet. Retain and note position of any freed fragments of stone ready for refixing. Lightly sponge surface with a damp but not wet sponge immediately to lift off the residual dirt. Second clean may be necessary in the most stubborn areas.

485 CHEMICAL PAINT REMOVAL METHOD: Apply a thick coat (2-3 mm) of Paint-Rid using a brush (can be spray applied). Protect from rain but allow the air to circulate and the product to breathe. Ensure that people or their clothing do not come into contact. Can soften and breakdown paints within hours, possibly leave overnight.

Check the sample in the morning if it has not penetrated all of the coats remove what can be removed and then re-apply. The ideal temperature is circa 15 degrees C but please note that Paint-Rid is slower to work when temperatures are low and becomes inactive if temperatures are below 5 degrees C. Will also dry out too quickly if exposed to sun or heat.

For best results to remove paint externally use hot water at medium to high pressure. To remove paint internally use a spatula/scrapper then hot water and a scrubbing brush. Alternatively, use the Stonehealth DOFF System which is perfect for removing the residue and if internal the DRS (DOFF Recovery System) will remove both the waste and water without causing a problem. Allow to dry gradually.

Repeat to any areas where paint remains.

490 SWAB CLEAN OF CARVED AREAS & SELECTED INTERNAL FEATURES: Clean carved areas of stonework or plasterwork with cotton wool swabs and de-ionized water. Use plain water in first instance, adding a solution of ammonium hydro-carbonate to more stubborn areas up to a maximum of 5% solution, following trials. Blend-in perimeters of cleaned areas to surrounding surfaces to give a consistent appearance to each wall area or bay.

500 ABRASION: One or more of the following methods may be adopted only after preliminary non abrasive clean/s have been carried out first, with the approval of the CA after trial areas:

B: Hand-held bronze bristle brush, washed down with clean water.

C: Hand rubbing with soft gritstone block, to flat ashlar, etc, but not to moulded, incised or otherwise decorated surfaces.

D: Dry Brushing Technique: Remove dirt, matter, etc, by lightly brushing with soft phosphor bronze bristle brushes or with nylon or fibre bristle brushes or wooden spatulas, or knife blades or scalpels, etc.

E: Air Abrasive cleaning of carved detail: Subject to WRITTEN CAS INSTRUCTION clean carved detail with dry abrasive air suction tool using minimum effective pressure but this not to exceed 14kPa (100 psi). Test clean areas to establish suitable abrasive and nozzle type with a preference for the final abrasives. After cleaning wash off residual dust and abrasive with a high pressure, low volume water lance or similar approved method. Stonework must be thoroughly dry before commencing air abrasive cleaning.

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- 510 POULTICE CLEAN OF STAINING: Make up paper or Laponite clay compound with pure water to form a poultice compound and apply to agreed areas. Hold in position with suitable media and

cover with polythene sealed to surrounding surfaces to retain moisture. Do not apply into undercut areas of carving. Allow to dwell for optimum time as determined during trials. Carefully remove and lightly sponge with damp cloth. Second clean may be necessary in the most stubborn areas. Add chemical agents to subsequent poultices following trials where staining is severe. Start with a weak solution and gradually increase concentration of additives by incremental degrees, recording results of trial areas before proceeding. Thoroughly rinse on completion

- 520 **REMOVING SOLUBLE SALTS FROM STONework: POULTICE METHOD**
Provide temporary drainage at base of area to undergo desalination.
Saturate specified area with clean water using fine mist sprays. Allow approximately three days to achieve full saturation. Prepare poultice by adding attapulgitic clay, or other approved absorbent clay, to clean water to make a workable paste. The clay poultice may be mixed using a small mechanical mixer or by hand.
Apply poultice using a plaster's float or broad trowel to approximately 25mm thickness, ensuring full contact with stone face. Reinforce with light gauge galvanised steel wire mesh pressed into the clay surface and carefully secured with staples into mortar joints.
Protect poultice from direct sun and wind and allow to dry slowly (approximately 1 month). Take down clay and reinforcement when instructed. Brush down wall surface to remove all remains of contaminated clay. Note that all used clay must be removed from site without being allowed to recontaminate any part of the building. Pay particular attention to the removal of dry clay dust. Repeat entire process as directed until salt concentration has been reduced sufficiently.
- 530 **CHEMICAL CLEAN:** One or more of the following methods may be adopted only with the approval of the CA after trial area:
A: Detergent wash using non-ionic, chemically neutral and biodegradable, proprietary 'soup' as an additive to clean water; warm or hand-hot water will be permitted.
B: Proprietary biocides applied strictly in accordance with manufacturer's instructions to remove biological matter.
C: Removing paints and tar from stonework
Undertake test clean to a designated area to determine exact concentration and dwell time before proceeding with the work. Prepare surface i.e. plugholes, etc. Apply Nitomors Green Range Gel with brush. Allow to dwell 15 to 30 minutes. Carefully scrape off softened paint with spatula. Rinse residual from stonework using low-pressure hot water lance (20 psi max).
- 540 **REMOVAL OF MOSS, LICHEN, etc**
Obtain approval from CA for the degree of clean and the areas to be cleaned; it is not usually appropriate to remove lichens from areas of weathered stonework; although moss should always be removed and the spores killed on copings, sills and weather moulds; the following methods to be trialled if Doff clean has not been successful or has not been deployed.

A: Dry Technique
Remove as much growth as is possible in the form of plants and thick cushions of moss, without damaging the stone beneath, using wooden spatulae, scrapers, knife blades and stiff bristle and non-ferrous soft wire brushes. If the surface below the growth is delicate or liable to be marked or scoured in any way this preparation must be limited to the lifting of moss only.

B: Minimum Water Technique with biocide
a) Remove as much growth as is possible in the form of plants and thick cushions of moss, without damaging the stone beneath, using wooden spatulae, scrapers, knife blades and stiff bristle and non-ferrous soft wire brushes.
b) Prepare a solution of biocide to the manufacturer's specification. Observe manufacturer's safety instructions. Rubber gloves and boots, masks and eye goggles should be worn.
c) Sparingly and selectively spray solution onto dry stone surface with a garden-type sprayer or sponge with a cloth. Wear gloves and other protective gear as the manufacturer directs.
d) Leave the treated area until stone is completely dry, at least 24 hours.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

- e) Brush off dead growth with stiff bristle or non-ferrous phosphor bronze soft wire brushes.
- f) If necessary, and only where instructed by the CA, repeat the process in localised areas.

C: Flood Spray Technique with biocide

a) and b) as Minimum Water Technique a) and b)

c) 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.

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.

d) Leave the treated area until the stone is completely dry and in no case for less than 24 hours.

e) Brush off as much dead growth as possible with bristle brushes, making sure that any adjacent gutters and hoppers are kept clear.

f) If necessary, and only where instructed by the CA, repeat the process in localised areas.

- 550 REMOVAL OF PERENNIAL HERBACEOUS and WOODY WEEDS FROM WALL HEADS and PAVINGS, etc. Spot spray with glyphosate in accordance with manufacturers recommendations. Leave the treated area until the plant is dead and the stone or brick is completely dry, at least 24 hours. Brush off dead growth with stiff bristle or non-ferrous phosphor bronze soft wire brushes. If necessary, repeat the process in localised areas.

UPON COMPLETION

- 560 DRAINS: Flush all drains and rod where required. Leave clean and in working order at the end of the contract. Ensure also that blockages are not left in rainwater pipes.
- 570 ON COMPLETION: Finally remove all dust and spent abrasive by final wash down with high pressure, low-volume water lance. Avoid indiscreet or careless lancing. After washing down but before removal of temporary protection and access scaffolding, gain the approval of the CA for the cleaning. Remove and take away all protection, equipment, waste and other materials.
- 580 REINSTATE any damaged material to match existing at the Contractor's expense and as instructed by the CA.
- 590 CONSERVATION RECORD
Keep a photographic record of cleaning works before, during and after the works. Mark up drawings to show the areas of the different methods employed. Present two hard and one disc copy of report at Practical Completion including reference to all materials, suppliers and specialists employed.

F21r STONEMWORK REPAIR

GENERAL REQUIREMENTS

- 100 TO BE READ with Preliminaries, Schedule of Work, and Drawings which have been prepared specifically for this Contract.
- 110 SCOPE AND METHODS: The scope and methods of stonework repair shown on the Drawings is provisional and to be confirmed by the CA, after inspection from the scaffold. This specification therefore provides a 'shopping list' of possible repair methods which may be used, following trials on the building before a decision is made.
- 115 SITE INSPECTION; Confirm type and extent of repair and conservation work after erection of scaffold and initial clean of stonework and at least 10 working days before starting each section of work. Confirm instructions issued during inspection in writing, with drawings and schedules as required, before commencing work.
Parties involved:
- Contract administrator
- Foundation Architect
- Clerk of Works
- Contractor's representative
- Foreman mason
- Structural engineer
- Conservation Officer (where appropriate)
- 120 SUBCONTRACTOR/S: The Contractor is required to provide details of any proposed sub-contractors or suppliers with his tender. The Contractor will be required to engage a dedicated team/s of skilled stonemasons and/or conservators for the repairs work described in this specification, supervised by a competent working foreman qualified and/or experienced in conservative repair techniques. The sample panels and trial areas must be carried out by the same team who carry out the main work. New operatives joining the team will be required to carry out a range of samples for approval.
- 130 CONTRACTOR'S PROPOSALS: Method statements, drawings, samples and other proposals are required at least three weeks in advance of the relevant work commencing. These dates should be indicated on the Contractor's programme.
- 140 PROGRAMME: The Contractor must allow in his programme for material delivery periods, subcontractors lead-in periods, opening-up and surveying, preparation and approval of shop drawings and samples; allow for restrictions on working season and for periods of protection during curing of lime mortars and shelter coats.
- 150 SCAFFOLD: Provide a mason's scaffold designed in accordance with performance specification A11r to carry the weight of stone required for the scheduled repairs; liaise between scaffolder and stone mason in order to ensure that scaffold lifts are provided at the correct levels, with access and hoist/s where required; ensure that loads of existing stones can be accommodated where they have to be lifted off and placed onto scaffold, particularly coping stones.
- 155 LIFTING: Provide suitable lifting equipment to carry the weight of stone required for the scheduled work and to meet health and safety requirements, considering the environment in which the stonework is to be erected. Submit proposals for approval in advance.
- 160 REPAIRS GENERALLY: In keeping with the building's historic character, the intention of the repairs in the Contract is to retain as much extant stonework as possible, staving off further decay by the use of mortar repairs, re-pointing, lime watering and shelter coating. Weathering

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The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

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CONSERVATION

mouldings and copings are to be reinstated where defective by piecing in stone in order to protect the face of walls and decorative features below. Individual decayed stones will be considered for

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The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

replacement by CA dependant upon elevation and accessibility for future repair.

MATERIALS GENERALLY

- 170 NATURAL STONE EXTERNALLY: Stones for repair are to be agreed following inspection from the scaffold and samples, drawn from those listed below or suggested by the contractor , and are to comply with the general clauses given below.

For masonry repairs:

- a. Client Supplied.

Possible alternatives:

b. Ashover Grit Stone – Available from Stanton Moor Quarry. Cumbrian Stone Ltd, Montal Place, Gilwilly Ind. Est. Penrith Cumbria, 01768 867 867

- k.
180 ORDER MATERIALS: They should match the existing adjoining stones in type, quarry, colour, texture, bed, as far as possible unless scheduled otherwise. Calculate the quantities of stone required and issue schedule to quarry following site inspection and instruction in conjunction with the CA; agree delivery dates and place a firm order for stone from the suppliers given in the Schedule of Work. The Contractor must inform the CA within one month of the start of the work on site if any stone supplies cannot be met. If advance registration has been made prior to tender, confirm that the supplies can be met. At the same time submit written guarantee from Supplier that all stone will be from the quarry and bed specified.
- 200 REPLACEMENT STONework GENERALLY: Supply only stone that is free from vents, cracks, fissures, discoloration or other defects that might adversely affect strength, durability or appearance. Select stone of similar density and of comparable quality to that to be replaced to match existing in shade, texture, finish and range of colour variation. Supply stone that is thoroughly seasoned, sawn, dressed and moulded in accordance with templates and site dimensions taken by sub-contractor. Allow for final dressing on site to fit tightly into cut recesses as necessary.
- 210 STONE FOR CARVING: Select 'free' stone for carving that is consistent in grain and colour throughout and to match existing. Supply sufficient stone for carver to have ample scope for his work.
- 220 WORKING DRAWINGS: The Contractor must provide shop drawings of all new or replacement stone to a scale of at least 1:10, showing the proposed bonding and fixing of stonework. These drawings are to be supplied to the CA at least three weeks prior to the programme date for cutting of the new stone. Prepare and submit for comment method statement/s of the method by which large or awkward members have been designed to be handled and hoisted, at least three weeks before cutting.
- 225 ASHLAR REPAIR DRAWINGS: The contractor must provide marked up elevation drawings showing each stone to be reused, reduced or replaced to each area/ panel of ashlar; number each

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

stone with an agreed locational system; chalk the new perpend joints on site and agree with CA before proceeding; allow sufficient time in the programme for each area.

- 230 SAMPLES OF STONE: Provide samples at least 300 x 150mm of each stone specified which are representative of the colour, texture and strength and from the batch quarry and bed to be used, in advance of ordering materials and allowing at least three weeks for approval by the CA. Retain samples on site during works. Provide mortar samples as described in Specification Z21r.

COMPONENTS AND ACCESSORIES

- 240 MORTARS: For mortar materials, mixes, preparation and pointing refer to Section Z21r Mortars and Pointing.
- 250 DAMP PROOF COURSES will only be used where an existing DPM is interrupted or specifically instructed by CA: use Highload Original Polymeric DPC by Ruberoid Building Products Ltd (tel. 0844 412 7228; www.hyload.co.uk)
- 260 LEAD SHEET FOR WEATHERINGS AND FLASHINGS: to BS 1178 and in accordance with Specification H71r Code and sizes to suit locations in accordance with LSA recommendations and/or as shown on Drawings.
- 270 BITUMEN SOLUTION: To BS 3416, Type 1, of brushing consistency.
- 280 METAL DOWELS AND FIXINGS: Stainless steel sheet, strip or plate or spiral to BS 1449 Pt 2; or bar to BS 970 Pt4: or Phosphor bronze to BS 1234. Size, shape and key as appropriate to situation and/or as shown on drawings; show dowels and fixings on mason's drawings and agree with CA in advance of manufacture.
- 290 RESIN ANCHOR FIXING: As specified on the Drawings or in the Schedule of Work and installed in accordance with manufacturer's recommendations.
- 300 EPOXY RESIN for gluing fine details and fragments: Paraloid B72 supplied by Brenntag NV, Mechelsesteenweg 34bus12, B-2018 Antwerp, Belgium.
(contact: Dirk De Brauwer, tel: 00 32 2384966, email: dirk.debrauwer@brenntag.be) or equal and approved.
- 310 POLYESTER RESIN for setting pins: Araldite thixotropic catalysed epoxy resin for injection manufactured by Huntsman Advanced Materials Ltd (contact Nicole Quintana tel. +41 61 966 1588; www.huntsman.com) or equal and approved.
- 320 MASONRY ADHESIVES: Not to be used on any stone without prior consent of CA in writing.
- a. For indent repairs and pinning fractures in ashlar and dressings use thixotropic catalysed polyester resin, used in conjunction with mechanical fixings all as specified.
 - b. For larger well bedded pieces, set only in mortar. Masonry adhesive should only be used in conjunction with mechanical fixings.
 - c. For pinning fine details use stainless steel wire set within an epoxy resin. Do not use polyester resin.
- 330 BIOCIDES: Use only after specific instructions from CA.
LITHOFIN ALGEX, based on quaternary ammonium as manufactured by Lithofin GmbH D-73236 Wendlingen POB 1134 (Tel: 070 24 94 03-0); distributed in Great Britain by Casdron Enterprises Ltd, Arlesford, Hampshire SO24 9QF (Tel: 01962 732126).

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

- 340 WEEDKILLER: Use only after specific instructions from CA.
a. Ammonium Sulphamate crystals.

b. Glyphosate based weedkiller: 'Murphy Tumbleweed' , or equivalent.

345 ROOT AND STUMPKILLER

a. Deep Root penetrating biodegradable stump and rootkiller ; supplied by: DeepRoot UK, 43-45 Portman Square, London W1H 6HN; steve@deeproot.com ;Tel: +44 207 969 2739, Fax: +44 207 969 2800).

350 FUNGICIDE: Use only after specific instructions from CA; Murasol 20 as manufactured by Cementone Beaver Ltd Tingewick Buckinghamshire MK18 1AN.

HANDLING AND STORAGE

390 HANDLING: Provide adequate lifting plant to unload and handle stones safely into position without damage. Protect arrisses to prevent damage. Transport stone with minimum handling and transhipment. Stack carefully in vehicle with packing materials to prevent damage.

400 STORE STONE in neat and orderly stacks on battens. Protect from damage, staining and inclement weather. Programme deliveries to suit progress of works and avoid storing stone on site for long periods. Do not store wrapped in polythene for prolonged periods.

410 ADHESIVES AND SEALANTS: Ensure that operatives observe manufacturer's recommendations and statutory requirements for storage and safe use of adhesives. Do not use adhesives in unsuitable environmental conditions or beyond the manufacturers recommended time period.

WORKMANSHIP GENERALLY

420 COMPLY with BS 8221-2:2000 Code of practice for cleaning and surface repair of buildings - Surface repair of natural stones, brick and terracotta, unless specifically specified or instructed otherwise.

425 STANDARDS: All work is to be of a consistently high standard of traditional craftsmanship appropriate to a **Grade I** listed building and to match the standard agreed on the sample panel/s. Different standards may be required in certain instances, usually to match existing work and the contractor should allow for this where necessary. Repair work to be carried out to schedule and to a standard/s agreed with CA and/ or Clerk of Works in advance.

430 FOREMAN: The contractor shall provide adequate supervision, including employing a thoroughly competent foreman mason exclusively for this contract, who is experienced in the repair of historic buildings.

435 OPERATIVES: Cutting, dressing, laying and jointing of stone to be carried out by skilled masons. Provide evidence of previous experience and details of work previously carried- out. Work is to be carried- out by a consistent team of masons and/or conservators in accordance with clause 120.

440 PUTLOG SCAFFOLDING will not be permitted.

450 TOOLS: All dressing, shaping, finishing, carving and tooling of the stone is to be done by hand using traditional hand-held chisels and tools by skilled masons. Pre- cutting and banking of blocks to be done off site; minimum amount of work to be carried out on site. Cutting-out existing stone and mortar for repairs is to be done likewise, carefully by hand. Small diameter hand-held diamond drills or specialist mechanical tools may be used on hard mortar with written consent of CA in advance and after trials. Disk Cutters and percussion tools shall NOT be used at

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

any time. Holes for pins and fixings to be drilled using non- percussion diamond drills.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

- 460 REMOVAL OF FITTINGS/ FIXTURES: Identify items to be removed from site before work commences with the CA and/or Clerk of Works and as set out in the Preliminaries; attach labels or otherwise mark items using durable, non-permanent means, to identify location and describe re-fixing instructions. Protect against damage, and store until required. Agree storage location with CA and/or Clerk of Works. Reinstall and refit in original locations using original installation methods. Do not damage masonry surfaces during removal and replacement of fittings/ fixtures.
- 470 REMOVAL OF PLANT GROWTHS FROM MASONRY: Carefully remove plants, root systems and associated soil/ debris from joints, voids and face work following requirements of Specification A12r. 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.

PREPARATION OF NATURAL STONE

- 480 PRODUCTION: Stone to be cut and dressed after seasoning but before delivery to site, including shaping, finishing, and all sinking for fixing and lifting devices, so that exposed surfaces and joints are square, true planes free from hollow or rough edges and with minimal deviation from the specified dimensions. Ensure that specified joint widths are maintained and that the natural bed is horizontal in plain walling, vertical and at right angles to the wall face in projecting stones and at right angles to the line of thrust in arches. Face bedding will be rejected. Finish the stone to match the approval sample in profile, jointing and surface tooling.
- 490 IDENTIFICATION: Mark each stone on an unexposed face clearly to indicate its natural bed and position in the finished work, referenced to the drawings.
- 500 INSPECT STONE: All blocks/ dressings must be carefully inspected and checked by the sub-contractor for match with the approved sample(s) and compliance with the sawing schedule and specification before dispatch to site.
Further inspections should be made for stone defects and cutting accuracy during and after molding and dressing. The foreman must carry out his own checks when receiving delivery of stones to site. Inform the CA at appropriate stages so that he/she may inspect the stones.
- 510 CUT STONE: After seasoning, but before delivery to site cut stones to required sizes and profiles with lines of all moldings, curves, angles, etc. worked to true and proper forms out of solid, ensuring that joints do not occur at mitred corners, and that stones are 100mm minimum depth measured from finished face of wall. Work the exposed and joint faces of each stone to a surface compatible with the adjacent existing stonework. Finish off stone to match existing adjacent surfaces in plane, profile, jointing and surface tooling. Minimize the amount of cutting on site by preparing stones in advance in the mason's yard.
- 515 DUST: Take adequate precautions to control dust from cutting and dressing stone; avoid site working and mechanical tools as far as possible; carry-out work away from openings into building and public areas; double-seal windows and openings into building; sheet scaffold and working areas; wear protective clothing. Where mechanical tools are permitted these should have vacuum dust extraction fitted.

LAYING AND JOINTING

- 520 BEDDING REPLACEMENT STONE: Dampen stones and lay on a full bed of mortar with all joints filled. Use temporary lead or stainless steel distance pieces to ensure consistent joint width of 5mm maximum; remove when mortar is sufficiently strong.
Fit and grout solid all dowels and cramps as the work proceeds.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

Keep courses level and in line, and accurately plumb all wall faces, angles and features. Set out carefully to ensure satisfactory junctions and joints with adjoining or built-in elements and

components.

New stonework is to follow the jointing pattern of the surrounding stonework.

Bed cramps and dowels in mortar, as specified elsewhere - tamp to expel air.

Form openings using rigid templates accurately fabricated to the required size.

Finish joints flush as the work proceeds, avoiding feathered edges.

Keep stonework clean during construction and until practical completion. Ensure that no mortar encroaches on the face when laying. Turn back scaffolding boards at night and during heavy rain. Rubbing to remove marks or stains will not be permitted.

- 530 DAMP PROOF COURSES: Stonework to start not less than 150mm below finished level of external paving or soil except where shown otherwise.
Damp proof course to be installed not less than 150mm above finished level of external paving or soil.
Fully bed DPC in mortar full depth of wall, with lapped joints. Finish flush with external face and neatly point.

PROTECTION

- 540 INCLEMENT WEATHER: Do not use frozen materials and do not lay on frozen surfaces.
Do not carry out any stonework repairs when air temperature is at or below 5 °c on a falling thermometer, or 3°c on a rising thermometer. Non-hydraulic or un-gauged lime mortars are not to be used between 1 November and 1 March without agreement of CA.
Maintain temperature of the work above freezing until the mortar has achieved structural strength, by the use of suitable protection to section Z21r. Adequately protect newly laid stonework and mortar repairs against wind, sun, rain and snow by covering during and at completion of each days work. Rake out and replace any mortar damaged by frost; rebuild any stone work damaged by frost. Maintain protection to completed work until mortar has achieved adequate set in accordance with Specification Z21r.
- 550 WARM WEATHER: Ensure stonework and lime mortars do not dry out too rapidly during periods of warm or windy weather by protecting using damp hessian covered in polythene. Monitor conditions until mortar has gone off, lightly spraying to maintain in moist conditions as required. Maintain protection to completed work until mortar has achieved adequate set in accordance with Specification Z21r.
- 560 PROTECTION: Prevent damage to existing and repaired stonework, particularly arrises and projecting features, with wooden slats, boards etc., as well as padding and Hessian, securely fixed. Remove protection on Practical Completion. Prevent staining and other disfigurement of stonework during repairs and by following trades.
- 570 CLEAN: Keep a vacuum cleaner on sit at all times to keep works clean of dust and debris daily. Rub down and leave stonework clean to approval at the completion of each area of work and before scaffolding is taken down. Do not wash down with excessive water at anytime during the contract. Ensure scaffold is cleaned down thoroughly before dismantling to prevent dust lines across stonework. Clean all plain glazing in vicinity of works with distilled water and cotton wool swabs at completion; engage specialist for cleaning down stained glass.

WORKMANSHIP FOR REPAIRS

- 580 REPAIR METHODS described below are typical of repairs anticipated and correspond to items in the Schedule of Works or on drawings. Further repair methods specific to the contract may be itemised in the Schedule or instructed following inspection.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

585 SAMPLE OF REPAIR METHODS: Provide samples of each repair method itemised in the Schedule of Work in a location agreed with CA and seek approval before proceeding with the

work. Retain and protect samples on site until Practical Completion for reference and ensure standard of work matches samples. Samples to be carried out by the same mason/conservator who is to carry out the work.

590 **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.

- 600 **PROTECTION & DISTURBANCE TO RETAINED MASONRY:** Retained masonry in the vicinity of repair works to be disturbed as little as possible; do not cut or adjust to accommodate replacement stone; prop or wedge firmly in correct position, any loose masonry vulnerable to movement during repair works. Prevent damage, particularly to arises, 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.

CRAMPS & EMBEDDED METALWORK

- 610 **REPLACEMENT OF CORRODING CRAMPS:** Carefully remove corroding ferrous cramps where exposed and/ or embedded cramps where stone is cracked or spalling away. Re-cut stone to receive new cramps and mortar or indent stone repair.
Replace with appropriate keyed cramps in stainless steel to agreed design. Bed cramps and dowels in mortar to Section Z21r. Form indent repair to match surrounding work.

- 620** **IN SITU TREATMENT OF EMBEDDED IRONWORK: HIGH BUILD EPOXY**
Reveal cramp by neatly cutting out a section of stone to be indented subsequently.
Clean off all rust by chipping, wire brushing, air abrasive etc.
Apply 1no coat of high build epoxy zinc phosphate coating immediately.
Leave to cure before priming and decorating to Specification M60.

- OR**
625 **IN SITU TREATMENT OF EMBEDDED IRONWORK: RUST CONVERTER**
Prepare as clause 620. Apply proprietary rust converter to accessible parts of the cramp immediately e.g. 'Fertan' or similar approved in accordance with manufacturer's recommendations. Leave to cure before priming and decorating to Specification M60.

- 630 **CORRODED FIXINGS/ METALWORK:** Where ever possible remove redundant and corroded metalwork from stone by carefully cutting or drilling out, causing the least possible disturbance to surrounding masonry; do not cut off too close and damage face of stone. Remove associated rust debris in accordance with A12r. Replace with compatible fixings as cl. 610 if required. If removal will cause too much damage treat in accordance with cl.s 620 or 625.

RESETTING STONE

- 640 **RESETTING STONE:** Rake out mortar joints around perimeter of stone; lever stone loose using timber shims etc. to protect the arises and carved detail; clear backing and bedding mortar. Reset stone to new line as agreed with CA in lime mortar as specified in Section Z10r using slate shims if necessary. Install new cramps as instructed.

REPLACING STONE

- 650 **REPLACING ASHLAR:** Cut out defective stone completely or to a minimum depth of 150mm, using hand tools and diamond drills to minimise vibration; take care to avoid damage to arises and surfaces of adjacent stonework; protect surfaces below from debris and clear-up dust immediately. Provide support to surrounding stonework as necessary. Fix new stone as specified in clause 520, worked and finished to conform with existing detail, bedded with lime mortar as specified in

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

accordance to Section Z21r. Grout all voids and point up with lime mortar finished in accordance

with agreed sample panel and to slightly reveal arises keeping the work clean to prevent staining. Protect as specified in clauses 540- 560 incl.

- 660 **REPLACING MOULDED SECTIONS:** Cut out existing stone as described in Clause 650. Carve stone to match original profile and finish. Agree profile with CA and take template of existing. Allow for a minimum 150mm depth of block to be built into the wall. Set in place of defective stone with lime mortar as described in Clause 650.
- 670 **REPLACING CARVED DETAIL:** Agreed extent of replacement with CA. Provide drawings for approval. Allow minimum 100mm depth of block to be built into wall. Cut out existing stones described in Clause 650. Carve stone to match existing style, detail and finish. The Carver is not necessarily required to mechanically copy existing work, but to carve in the same style, and spirit as the existing. Carry out carving sample for approval of CA. Set in place of defective stone with lime mortar as described in Clause 650.
- 680 **REPLACING STONE SLAB PAVINGS:** Replace existing broken flagstone where scheduled or instructed, matching the existing in pattern, thickness, dimensions and finish. Match stone type unless specifically instructed otherwise. Bed on continuous sand or mortar bed as shown on drawings and point as specified in section Z21r. Do not brush mortar over face of stones Lay with falls away from building and into gullies. Follows the level/s of the existing paving without leaving edges proud adjacent stones.

DRESSING/CUTTING

- 690 **DRESSING OFF:** The intention is to eliminate water traps and/or to remove loose surface stone encouraging the newly exposed areas to harden. Remove loose stone carefully with phosphor bronze soft wire brushes and seek further instructions. If instructed by the CA carefully remove further material with a chisel, avoiding damage to the sound surface underneath, and/or rub down to hard stone with a carborundum forming feathered edges to avoid ledges and water-traps.
- 700 **FORM/ RE-FORM CHASE FOR LEAD:** Form regular chase 25mm deep with hand tools to take the turn up of lead; 10mm high for traditional wedged lead detail, up to maximum 15mm for thicker codes. Where existing hard mortar has to be removed carefully drill along centre line of chase with small diamond drill at close centres, stop short at ends and use hand chisels to avoid damaging arrises and edges of surrounding stones. Chisel of along length of chase to required depth. Protect surfaces below from debris and clear-up dust immediately. Flush-out chase with vacuum &/or water spray and check consistent depth throughout.
- 705 **CUT NEW CHASE FOR LEAD:** Form regular chase 50mm deep with hand tools to take the turn up of lead; 20mm high for screw-fixing detail in accordance with LSA recommendations and where indicated on drawings. Use mechanical cutting tools if a fresh chase is to be formed, with prior approval of CA and/or Clerk of Works as cl.450.

INDENT REPAIRS

- 710 **INDENTED REPAIR:**
1. Agree extent of indent repairs to CA in advance and mark up on site for approval.
 2. Carefully cut out defective area of stone to minimum depth of 100mm, to vertical and horizontal joints, square to the face and with sharp arises follow line of existing joints. Use light hand tools or, with prior approval, small disc cutters (100mm diameter) to minimise vibration.
 3. Measure up after cutting out and cut new stone sawn square to provide joint width no greater than 2mm, worked and finished to conform to existing detail.
 4. Fix stone into position with minimum 5mm diameter stainless steel threaded pins secured in annulus of polyester or epoxy resin. Protect surrounding surfaces and avoid getting resin on

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

adjacent stone faces.

5. Point up with lime mortar finished flush with the face. Mortar colour to match as closely as possible and differentiated from repointing if joints.
6. Protect repair in accordance with clauses 540- 560 incl.

720 **REPAIR TO MOULDED SECTION:** Where a moulded section is defective the full section is to be cut out and the new stone pinned to the end of the remaining stone. Retain original jointing pattern. Take profiles of existing mouldings where best condition and reinstate to original un-weathered section unless instructed otherwise.

730 **REPLACING OLD INDENTED REPAIRS:** Where old indent is defective/causing damage to surrounding stone, carefully rake out joints and carefully cut out defective indent and defective stone as Clause 710. Cut and fix new stone as Clause 710. Allow for cutting out cementitious mortar repairs in accordance with Section Z21r, and piecing-in new indent repair.

LIME MORTAR REPAIRS

740 **SAMPLES OF LIME MORTAR:** Prepare ‘biscuit’ samples of mortar on a piece of stone or tile, to match the various conditions of weathering judged on the appearance dry and wet. Seek instructions from the CA. Retain samples on site for future reference during Contract.

745 **BIOCIDE TREATMENT:**
Mix Lithofin Algex with water at rate recommended by manufacturer; try weaker solution first and increase if successful. Apply by hand or back- mounted spray and allow to dwell for 24 hours; repeat as required; when moss growth has died back brush off with stiff bristle or non-ferrous brush. Use on sky facing surfaces and ledges or off sets, not generally on areas of ashlar or walling, in order to preserve lichens.

750 **LIME MORTAR REPAIRS:**

1. Cut out the decayed areas including defective existing repairs, undercutting the edges to provide key.
2. Wash and sterilise the cavity with water and formalin.
3. Saturate the cavity with lime rich water from the top of the coarse stuff curing bin to prevent dewatering of the repair mortar.
4. Place the repair mortar, compacting in layers not exceeding 12mm in thickness in any one application and having no feathered edges. Allow each layer to dry out before rewetting and placing the next.
5. Apply mortar firmly, ensuring good adhesion with no voids. Form a mechanical key to undercoats by combing or scratching to produce evenly spaced lines.
6. For cavities exceeding 25mm depth and extending over 50mm square surface area, drill holes to take austenitic stainless steel reinforcement mesh, pins or armatures and set in epoxy mortar; allowing minimum 18mm cover for reinforcement.
7. Finish repair to the required profile using a wood or felt-covered float, or with a damp sponge or coarse cloth. Follow joints or tooling in the original work, forming false joints for later pointing where appropriate to match existing work.
8. Protect repairs in accordance with clauses 540- 560 incl.
9. Keep moist and ‘push-back’ shrinkage during curing process, inspecting daily.

760 **IN SITU REPAIRS TO SKY FACING SURFACES:** Brush down surface to be repaired and remove debris.

1. Remove all loose or friable material.
2. Key surface as necessary by tooling.
3. Treat with biocide and allow to dry.
4. Wash and sterilise the cavity with water and formalin. Saturate the cavity with lime rich water from the top of the coarse stuff bin to prevent dewatering of the repair mortar.
5. Place the mortar repair building-up in layers and using stainless steel armature in accordance with Clause 750.

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The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

6. Form a smooth continuous weathering surface to conform to original profile unless otherwise instructed to improve the fall.
7. Finish as Clause 750.
8. Clean down thoroughly.
9. Protect and tend repairs in accordance with clauses 540- 560 incl.

PINNING & GLUEING

770 PINNING FRACTURES TO LARGE BLOCKS:

1. Provide lifting equipment and scaffold platform as required to remove stones for repair.
2. Agree with CA and mark-up for approval locations for pins.
3. Drill test hole using small diameter bit to test strength of fractured stone.
4. Using a 12mm diameter diamond-lipped using non-percussion drill bit drill with great care at an angle downwards into the stone at 150mm from the fracture to cross it at a depth of 150mm. Depth of hole to be approximately 500mm. Drill holes at approximately 300mm centres, or as agreed with CA.
5. Clean dust from hole using suction and flushing out with a volatile solvent compatible with the resin adhesive.
6. Cut 10mm diameter stainless steel or phosphor bronze threaded rod to fit the hole so as to keep it 25mm back from the stone face.
7. If necessary apply 2no. coats of latex paint or modelling clay to the adjacent stone faces to prevent the resin from leaking out of interconnected fissures.
8. Inject low viscosity polyester or epoxy resin into the hole with a hypodermic syringe or gun allowing for the rod to be reinserted and ensuring no air is entrapped. Take care not to spill resin onto face of stone.
9. Any resin left on the face of the stone should be removed immediately with the appropriate solvent.
10. Point hole recess with lime mortar to match stone, once resin has cured in accordance with Section Z21r.

780 PINNING FRACTURES TO SMALL DETAILS:

1. Select locations for pins with CA and mark up for approval.
2. Using an 8mm diameter diamond-lipped bit drill with great care using non-percussion drill at an angle downward into the stone. Size, depth and centres of holes to suit conditions and agreed with CA in advance.
3. Drill test hole using small diameter bit to test strength of fractured stone.
4. Clean dust from hole using suction and flushing out with a volatile solvent compatible with resin adhesive.
5. Cut 6mm diameter stainless steel or phosphor bronze threaded rod to fit the hole so as to keep it 6mm back from the stone face.
6. If necessary apply 2no. coats of latex paint or modelling clay to the adjacent stone faces to prevent the resin from leaking out of interconnected fissures.
7. Inject low viscosity polyester or epoxy resin into the hole for two-thirds of its depth with a hypodermic syringe and ensuring no air is entrapped. Take care not to spill resin onto face of stone. Any resin left on the face of the stone should be removed with the appropriate solvent.
8. Point hole recess with lime mortar to match stone, once resin has cured in accordance with Section Z21r.

790 PINNING FINE DETAILS: Following procedure in Clause 780 but using a 5mm diameter drill bit and 3mm diameter rod. Size, depth and centres of holes to suit conditions and agreed with CA in advance.

800 PINNING OLD DETAILS: Cut out cement pointing or repair, ensuring as much cement is removed from face of crack as possible. Drill stone, pin and fill crack as clauses 770, 780 or 790, as appropriate.

810 PINNING RUBBLE STONEWORK: Use stainless steel pins specified by structural engineer.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

Either:

- Tamp pins firmly into fresh mortar. Ensure mortar is thoroughly compacted into voids and that leveling and load distribution functions of pinnings are retained.
- Follow manufacturer's recommendations for proprietary systems.

820 GLUING FRACTURED STONE:

1. Assess condition of each stone for gluing and agree method and type of adhesive with CA in advance. Surfaces to be of sufficient smoothness and evenness to suit gap filling and bonding characteristics of adhesive.
2. Surfaces to receive adhesive to be sound, unfrozen, free from dust, grease and any other contamination likely to affect bond. Where necessary, clean surfaces using methods and materials recommended by the adhesive manufacturer.
Apply adhesives using recommended spreaders / applicators to ensure correct coverage. Bring surfaces together within the recommended time period and apply pressure evenly over full area of contact surfaces to enable full bonding.
Remove surplus adhesive using methods and materials recommended by adhesive manufacturer and without damage to affected surfaces.

TILE REPAIRS

- 830 TILE REPAIRS: Carefully cut out loose or friable stone, old repair or decayed masonry as instructed; flush out and prepare void as cl.750; set clay creasing tiles in lime mortar in accordance with Z21r packing mortar to fill all voids; joints between tiles approximately 10-12mm; bed tiles horizontally unless instructed otherwise; cut tiles to suit size of void and set back from surrounding stone edges by approximately 12- 15mm or in accordance with approved sample; finish mortar joints in accordance with Z21r or render over face flush with surrounding surfaces with lime mortar as cl.750..

GROUTING

- 840 GROUTING JOINTS: Grout joints that cannot be fully filled with bedding mortar: Grout thoroughly around replacement stones. Grout mix to be proprietary hydraulic lime based mix as specified by Structural Engineer . Control spread of grout by using appropriate liquidity and injection equipment; keep grout back from exposed face to allow for the depth of pointing, using an approved temporary sealing material. Prevent grout staining exposed face of stone.
- 850 GROUTING RUBBLE FILLED WALL CORES: REFER TO STRUCTURAL ENGINEER'S INFORMATION.
Carry out site investigations and trials before proceeding and consult manufacturers' representative/ recommendations. Thoroughly point up both faces of wall and fill voids in outer leaves of stonework; allow pointing mortar to form set to structural engineer's satisfaction. Drill holes of diameter and depth instructed into core of wall at intervals instructed, angled downwards at approximately 45°; provide clay 'birdsnest' 'reservoir cups beneath each inlet hole to contain grout; provide outlet holes at base of wall at intervals to be instructed with means of containing excess grout. Pour in grout in holes slowly and gradually in equal measured quantities to each hole across the whole length of wall; monitor for outpour and deformations in the wall. Do not pour in grout too rapidly; pace work over a period of time to be agreed with engineer. Provide temporary support to face of wall until grout has cured to structural engineer's satisfaction. Drill core samples and send to laboratory for strength test samples.

CONSOLIDATION AND SHELTER COATING

- 860 GENERALLY: These techniques should be carried-out by a conservator or conservation-trained

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

mason. State with tender the name of the conservator to be used, giving names of the individuals

concerned and their experience. Where necessary undertake a limited clean in accordance with Section A12r and as instructed by the CA. Review and agree scope of consolidation works with CA before proceeding. Record the works undertaken on drawings and by photography.

- 870 **CHEMICAL CONSOLIDATION:** Do not carry-out chemical consolidation unless specifically described in Schedule at Work and/or Drawings. Confirm with CA that Listed Building faculty or CFCE approval has been received for its use. Submit a detailed method statement for approval in advance of proceeding and follow manufacturer's instructions.
- 880 **LIME WATERING:** Carefully apply successive applications of limewater by hand held or back-pack spray, avoiding excessive wetting of the stone. Use water from slaking of lime putty. Spray onto surface of stone until it will take no more water and allow to dry-out slowly over night. Apply 20-40 applications in consultation with CA. Protect while drying in accordance with clauses 540- 560 incl.
- 890 **MORTAR DENTISTRY REPAIRS:**
1. Agree areas for repairs with CA in advance and mark on drawings.
 2. Carefully brush-back loose and friable material and clean surfaces with air brushes.
 3. Fill hollows and water traps on the surface of weathered stonework, following procedure in Clauses 750- 760. Provide weathered horizontal surfaces to ledges. Do not attempt to reinstate missing features or decoration unless specifically instructed.
 4. Protect and tend repairs until set in accordance with clauses 540- 560 incl.
- 900 **LIME SHELTER COATING:** At the completion of consolidation and lime mortar repairs, and in consultation with CA, apply two coats of limewash by fine hair brush to cover stone and repairs. Limewash to be of a thick cream constituency made from matured non- hydraulic lime putty with added stone dust to give body where required. Colour limewash with natural pigments and provide samples to be agreed with CA. Apply further coat to weathering surfaces. Dilute washes where applied to fine detail. Break up large areas or pick out mouldings with different colours as instructed. Undertake trials for approval of the CA and conservation officer, before proceeding.

COMPLETION

- 940 **CLEAN:** Keep a vacuum cleaner on site at all times to keep works clean of dust and debris daily. Rub down and leave stonework clean to approval at the completion of each area of work and before scaffolding is taken down. Do not wash down with excessive water or acid solution at anytime during the contract. Ensure scaffold is cleaned down thoroughly before dismantling to prevent dust lines across stonework. Clean all plain glazing in vicinity of works with distilled water and cotton wool swabs at completion. Engage specialist for cleaning stained glass. Flush or rod through all drainage pipes and gullies.
- 950 **SCAFFOLD:** Allow at least two working weeks in the programme for CA to inspect works and for remedial work, prior to taking down scaffold. Dismantle scaffolding carefully avoiding any damage to completed works. Clear all poles connections, boards, sheeting, protection and temporary works from site.
- 960 **RECORD** the repairs and conservation work photographically and on marked-up drawings; submit two copies of a conservation record report to the CA at Practical Completion to include a description, photographs and drawings of condition before, scope of repairs and completed repairs. Include specification of materials used (e.g. lime, resins), details of quarries for stones and sands; recipes of mortar mixes; colour/s of lime washes.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

H71 LEAD SHEET COVERINGS / FLASHINGS

- 100 *TO BE READ with Preliminaries, General Conditions, Schedule of Work, Drawings, which have been prepared specifically for this Contract.*
- 105 GENERALLY: this Specification sets out the trade materials and workmanship requirements for the leadwork in the Contract, which must be read with the General Conditions and other Contract Documents, particularly those listed above. The Contractor is required by this Specification to provide details of proposed sub-contractor, with his tender.
- 106 SCOPE OF WORK includes refixing or replacement of existing lead flashings where roofs abut the tower and at string courses.
- 107 **THEFT**
Do not deliver to site more lead than can be fixed during the day; do not store unfixed lead on site; ensure the site is secure at night and protected by hoardings, security lighting and alarms in accordance with Preliminaries.

TYPES OF LEADWORK

- 110 Replacement lead shall be sand cast lead of the following thicknesses current standards and guidance in 'Rolled lead sheet. The complete manual' :
- Flashings: Code 5
 - Weatherings: Code 5 or 6 depending on projection
 - Gutter linings code 6 or 7 depending upon size and length
 - Roofing: Code 7 or 8 depending upon bay size

GENERAL REQUIREMENTS/ PREPARATORY WORK

- 510 **WORKMANSHIP GENERALLY**
- Standard: To BS 6915:2001+A1:2014 and current edition of 'Rolled lead sheet. The complete manual' published by the Lead Sheet Training Academy.
 - Fabrication and fixing: Provide a secure, free draining and completely weathertight installation.
 - Operatives: Trained in the application of lead coverings/ flashings. Submit records of experience on request.
 - Preforming: Measure, mark, cut and form lead prior to assembly wherever possible.
 - Marking out: With pencil, chalk or crayon. Do not use scribes or other sharp instruments without approval.
 - Bossing and forming: Straight and regular bends, leaving sheets free from ripples, kinks, buckling and cracks.
 - Solder: Use only where specified.
 - Sharp metal edges: Fold under or remove as work proceeds.
 - Finished work: Fully supported, adequately fixed to resist wind uplift but also able to accommodate thermal movement without distortion or stress.
 - Protection: Store lead rolls undercover to prevent staining, discolouration and damage from water prior to laying; protect from damage after fixing during subsequent works.
- 514 **LIGHTNING CONDUCTOR**
- To allow the lead works to be carried out, temporarily amend or remove existing lightning conductor by a specialist employed by the Contractor. Contractor to allow for reinstatement and testing of lightning conductor system upon completion of the lead works. Method statements for the proposed removal of lead roofs, flashings, etc. will be required for comment prior to works being carried-out on site.

515 LEADWELDING

- All new lead work is to be performed off site or in an on- site workshop away from the building, including all lead welding to form sumps, boxes, chutes, return ends etc.
- In situ lead welding is only permitted on site for connections to or repairs to existing lead work which cannot be removed from site; obtain a Hot Works Permit for each instance; follow fully EIG guidelines as set out in the Preliminaries; provide protection and fire extinguishers as required by guidelines; do not carry out any hot works after 1pm each day; supervise the work and inspect the surrounding area at regular intervals after completion of hot works and at end of working day as required by guidelines.

525 LEAD SHEET

- Production method:
 - Sand cast, clean, labelled, from lead free from bitumen, solder, other impurities, inclusions, laminations, cracks, air, pinholes and blowholes; to code thicknesses but with a tolerance (by weight) of $\pm 10\%$.
- Identification: Labelled to show thickness/ code, weight and type.
- Supplier: to be nominated by the Contractor with a written undertaking on quality.

526 PRE-TREATMENT:

- Apply chalk slurry coat to underside of lead and allow to dry before laying, followed by chalk paste coat after bossing but before final fixing.

580 EXISTING METAL REUSED

- Type/ Location/ existing gutter linings and flashings to be reused a rescast lead for new linings and flashings .
- Handling/ Storage: Reuse in the Works; obtain weigh bridge certificate and delivery note; to be returned to site as freshly cast sheet; to remain property of Employer.

610 SUITABILITY OF SUBSTRATES

- Condition: Dry and free of dust, debris, grease and other deleterious matter.

620 PREPARATION OF EXISTING TIMBER SUBSTRATES

- Remedial work: Adjust boards to level and securely fix. Punch in protruding fasteners and plane or sand to achieve an even surface.
- Defective boards: Give notice.
- Moisture content: Not more than 16% at time of covering.

640 TIMBER FOR USE WITH LEADWORK

- Quality: Planed, free from wane, pitch pockets, decay and insect attack (ambrosia beetle excepted).
- Type: treated ungraded softwood to G20.240; treated to G20/330.
- Moisture content: Not more than 16% at time of fixing and covering.
- Preservative treatment: Organic solvent as section Z12 and Wood Protection Association Commodity Specification C8.

645 NEEDLE PUNCHED NONWOVEN POLYESTER GEOTEXTILE TO TIMBER SUBSTRATES:

- Manufacturer: British Lead Ltd.
- Product: British Lead Ltd A1F Building paper t reference: BLM Standard underlay.
- Weight: 220 g/m².
- Recycled content: None permitted.

646 BUILDING PAPER TO MASONRY SUBSTRATES:

- Manufacturer: British Lead Ltd
- Product: A1F Building paper
- To BS 1521 Class A reinforced

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The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

- Recycled content: None permitted.

- 650 LAYING UNDERLAY
USE BUILDING PAPER ABOVE MASONRY OR PLYWOOD SUBSTRATES; USE GEOTEXTILE ABOVE PENNY GAP BOARDING WHERE THERE IS AIR CIRCULATION.
- Handling: Prevent tears and punctures.
 - Laying:
 - Butt joint edge to geotextile membrane; avoid folds or wrinkles which will distort lead
 - Lap building paper min 100mm in direction of fall.
 - Lay onto dry substrate.
 - Fixing edges: With copper or stainless steel staples or clout nails for building paper.
 - Do not lay over roof edges or steps or turn up at abutments.
 - Wood core rolls: Fixed over underlay.
 - Protection: Keep dry and cover with lead at the earliest opportunity; avoid walking traffic on underlay.
- 660 ROOF VENTILATORS
- Manufacturer: Nicholson Specialist Trade Supplies Ltd, PO Box 10943, London N12 9SJ (tel. 0845 0098 980; info@nicholsonsts.com)
 - Type: Airtrack LV15 stainless steel reinforced lead 'mushroom' vents with integral fly mesh
 - Fix in accordance with the manufacturers recommendations, one per lead bay
 - Fix in a line along the length of the roof at equal centres to suit the setting out of the leadwork.
 - Pre- fix to the lead sheet by welding to give water tight finish
- 670 CONTINUOUS VENTILATORS
- Manufacturer: Nicholson Specialist Trade Supplies Ltd, PO Box 10943, London N12 9SJ (tel. 0845 0098 980; info@nicholsonsts.com)
 - Type: Airtrack EAsp stainless steel support for cover flashing with integral fly mesh
 - Fix in accordance with the manufacturers recommendations
 - Fix to existing stone string course or to new timber fillet in a continuous line along the length of the roof or gutter abutment ; step up and down at changes in roof level; form mitred junctions at returns
 - Trim or adapt individual lengths to suit site conditions as required by neatly cutting, bending, etc. to Specification Z11

FIXING LEAD

- 705 HEAD FIXING LEAD SHEET
- Top edge: Secured with two rows of fixings, 25 mm and 50 mm from top edge of sheet, at 75 mm centres in each row, evenly spaced and staggered.
 - Sheets less than 500 mm deep: May be secured with one row of fixings, 25 mm from top edge of sheet and evenly spaced at 50 mm centres.
 - For steep pitches over 60°, heavy codes of lead and exposed conditions increase number of fixings in accordance with LSA recommendations
- 710 FIXINGS
- Nails to timber substrates: Copper clout nails to BS 1202-2, or stainless steel (austenitic) clout nails to BS 1202-1.
 - Shank type: Annular ringed, helical threaded or serrated.
 - Shank diameter: Not less than 2.65 mm for light duty or 3.35 mm for heavy duty.
 - Length: Not less than 20 mm or equal to substrate thickness.
 - Screws to concrete or masonry substrates: Brass or stainless steel to BS 1210, tables 3 or 4.
 - Diameter: Not less than 3.35 mm.
 - Length: Not less than 19 mm.
 - Washers and plastic plugs: Compatible with screws and lead.

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The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

CLIVEDEN

CONSERVATION

- Screws to composite metal decks: Self tapping as recommended by the deck and lead manufacturer/ supplier for clips.

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The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

- 716 CLIPS
- Manufacturer: Submit proposals.
 - Material: copper or stainless steel to contractor's proposal to suit situation
 - Copper clips:
Thickness: 0.70 mm.
Temper: BS EN 1172, designation R220 in welts, seams and rolls, R240 elsewhere;
dipped in solder if exposed to view.
 - Stainless steel clips:
Thickness: 0.46 mm.
Grade: BS EN 10088, 1.4301(304)terne coated if exposed to view.
 - Dimensions:
 - Width: 50 mm where not continuous.
 - Length: To suit detail.
 - Fixing clips: Secure each to substrate with either two screw fixings not more than 50 mm from edge of lead sheet. Use additional fixings where lead downstands exceed 75 mm.
 - Fixing lead sheet: Welt clips around edges and turn over 25 mm.
- 761 CONTINUOUS CLIPS
- Material: copper or stainless steel to contractor's proposal to suit situation
 - Copper continuous clips:
Thickness: 0.60 mm.
Temper: BS EN 1172, designation R220 in welts, seams and rolls, R240 elsewhere.
 - Stainless steel continuous clips:
Thickness: 0.38 mm.
Grade: BS EN 10088, 1.4301(304).
 - Dimensions:
 - Width: To suit detail.
 - Fixing clips: Secure at maximum 200mm centres.
 - Fixing lead sheet: Welt edge around continuous clip and dress down.
- 770 WEDGE FIXING INTO JOINTS / CHASES
- Joint/ chase: Rake out to a depth of not less than 25 mm for 10mm wide chases and 2 ½ x width for wider joints; clean out all mortar to leave square sided recess; flush out dust and debris.
 - Lead: Dress into joint/ chase and turn up at back of recess.
 - Fixing: Lead wedges at not more than 450 mm centres, either side of every at every change of direction and with at least three for each piece of lead; hammer home to give tight fit without tearing lead; leave at least 10mm cover to wedge behind face of wall; check each length of flashing is secure.
 - Sealant: Not applicable.
 - Pointing: All joints to be pointed up in lime putty mortar with coarse sharp gritty aggregate sized to suit width of joint and as approved sample.
 - Application: As section Z21r; build up in layers into depth of recess; protect and push back during curing period to avoid shrinkage cracks.
 - Review condition after first season weathering and replace any defective lengths
- 791 SCREW FIXING INTO JOINTS/ CHASES
- Joint/ chase: Carefully cut 20mm high chase into stonework; cut- out to a depth of not less than 25mm; clean and flush out
 - Lead: Dress into joint/ chase and up back face.
 - Fixing: Into back face with stainless steel screws with washers and plastics plugs at not more than 300 mm centres, at every change of direction, and with at least two fixings for each piece of lead.
 - Sealant: lime mortar with coarse aggregate to approved sample; in two applications; isolate from top of lead with 'FrogTape' multi-Surface painters masking tape; prepare & tend mortar in accordance with specification; finish mortar with brush to expose aggregate and cut off

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

visible edge of tape .
- Application: As section Z21r.

JOINTING LEAD

810 FORMING DETAILS

- Method: Bossing preferred except where lead welding is specifically required for awkward shapes or corners; agree with Architect in advance.
- Lead welded seams: Neatly and consistently formed.
- Seams: Do not undercut or reduce sheet thickness.
- Filler strips: Of the same composition as the sheets being joined.
- Butt joints: Formed to a thickness one third more than the sheets being joined.
- Lap joints: Formed with min. 25 mm laps and two loadings to the edge of the overlap.
- Bossing: Carried out without thinning, cutting or otherwise splitting the lead sheet.
- Details where bossing must be used: generally all rolls, steps, flashings and abutments
- samples; carry out sample details of bossing to rolls ends, steps, laps and corners for approval before proceeding with work.

845A WOOD CORED ROLL JOINTS WITH SPLASH LAP

- Wood core:
- Size: 45 x 45 mm round tapering to a flat base 45 mm wide.
- Fixing to substrate: Brass or stainless steel countersunk screws at not more than 300 mm centres.
- Undercloak: Dress three quarters around core.
- Fixing: Nail to core at 150 mm centres for one third length of the sheet starting from the head.
- Overcloak: Dress around core and extend on to main surface to form a min.40 mm splash lap.

862 DRIPS WITH SPLASH LAPS

- Underlap: Dress up full height of drip upstand.
- Fixing: Two rows of nails to lower level substrate, 25 mm and 50 mm from face of drip. At 75 mm centres in each row, evenly spaced and staggered. Seal over nails with a soldered or leadwelded dot.
- Overlap: Dress over drip and form a 75 mm splash lap.
- Fixing: Lead clips, leadwelded to underlap, with not less than one per bay.

970 PATINATION OIL

- Manufacturer: British Lead Ltd.
- Product reference: Submit proposals.
- Location: weatherings, flashings which run off over stonework.
- Application: As soon as practical, apply a smear coating to lead, evenly in one direction and in dry conditions
- Use where lead flashings or weatherings will run off onto tiled roofs, stone cornices or other materials and where lead roofs are visible.

980 SMART WATER:

- Apply forensic traceable identification fluid provided by Employer to each sheet beneath laps and rolls using small soft brush; complete paperwork and submit to supplier; post signs provided.

990 COMPLETION

Provide temporary protection to the new lead work during following trades, including repairs to rainwater goods, pointing and dismantling of scaffolding; use suitable membrane and solid sheeting. Clear away on completion; sweep down and clear out all outlets, hopper heads and pipes. Water test roofs before handover.

L40r PLAIN GLAZING REPAIRS

- 100 TO BE READ with the Preliminaries, General Conditions, Schedule/s of Work, Drawings and specialist report, which have been prepared specifically for this Contract.
- 105 GENERALLY: This Specification sets out the trade materials and workmanship requirements for the leaded light repairs in the Contract, which must be read with the other Contract Documents, particularly those listed above. The Contractor is required by this Specification to provide details of proposed sub-contractor, conservator/s and/or supplier/s with his tender. Method statements, drawings, samples and other proposals are required at least three weeks in advance of the work commencing. These dates should be indicated on the Contractor's programme.
- 110 SCOPE: This section deals only with repairs to existing plain glass leaded lights Work to stained glass to be carried out by accredited conservator in accordance with agreed method statement. Metalwork repairs are specified in Section Z11r; Joinery repairs are specified in Section Z10r; Redecorations are specified in Section M60r.
- 120 FOREMAN: The Contractor shall provide all reasonable personal supervision, including employing an experienced glazier foreman exclusively for this operation.
- 130 SUB-CONTRACTOR: The glazing repair work should be carried out by a specialist sub-contractor, the Contractor must submit the company name and references with his tender for approval of the CA.
- 140 SKILLED TRADESMEN: The glazing repair work is to be carried out by a dedicated team of the specialist contractor's own skilled operatives. Further sub-contracting of the work will NOT be permitted. Provide evidence of experience of the operatives and details of work previously carried out by them. New operatives joining the project after its commencement will be required to prepare a range of samples for the approval of the CA before commencing any of the main works.
- 150 CLEANING AND REPAIRS GENERALLY: In keeping with the building's historic character, the intention is to produce a 'sympathetic' rather than a severe clean and repair of the glazing. This means that the natural variations and deformities of glass and leading are to be respected and retained. Areas of severe griming (normally caused by soot staining) and general surface dirt are to be removed where possible and areas of structural instability rectified. It is not necessary or desired to remove all dirt completely, nor leave the glazing panels flat and 'perfect'.
- 160 **HISTORIC GLASS, both plain and coloured, is irreplaceable and every effort must be made to protect it from damage during the works, both damage from other trades and during the glazing repairs. No existing glass or leadwork is to be replaced without specific instruction from the CA. Any damage to glazing caused during the progress of the works is to be made good at the Contractor's own expense by the specialist sub-contractor.**
- 165 REPLACEMENT GLASS quarries or panes are to match the existing surrounding glass in that situation, selected from the list of materials given below..

MATERIALS

- 180 CYLINDER BLOWN SHEET GLASS:
a. Polish Cylinder Blown Sheet: Tatra Restoration Glass Type P1, Thickness: 2- 3 mm; supplied by Tatra Glass (UK) (Tel 01509 235 387; www.tatraglass.co.uk).
- 190 MACHINE DRAWN HERITAGE GLASS
Machine drawn glass made by Schott in Germany using the Fourcault method.
a. Goethe – 4.5mm thick – Sheet size approx. 1500 x 2400 – colourless
b. De-Rest – 3mm thick – Sheet size approx. 1000 x 1500 – colourless
Supplied by Tatra Glass (UK) (Tel 01509 235 387; www.tatraglass.co.uk).
- 200 TOUGHENED & LAMINATED HERITAGE GLASS
Heritage glass toughened or laminated to meet safety regulations.
Supplied by Tatra Glass (UK) (Tel 01509 235 387; www.tatraglass.co.uk).
- 210 PLAIN FLOAT GLASS
6mm thick clear plain float glass supplied by Pilkington Glass Ltd.
- 215 TOUGHENED SAFETY GLASS
Toughened tempered safety glass to BS 6206, BS EN 12600 & BS EN 12150, permanently marked in accordance with BS EN12600:2002; Class A, B or C depending upon location in accordance with BS 6262. Supplied by Pilkington Glass Ltd.
- 220 SPRIGS: Non-ferrous cut metal sprigs sized so as not to project above putty line.
- 230 SPACERS: Hardwood or non- ferrous metal blocks cut to size
- 240 BEADS: Hardwood or Douglas Fir beads with moulding profile to match existing; mitred corners; primed on all faces before fixing.
- 250 PUTTY:
a. For timber frames: Genuine pure linseed oil putty to BS 544.
b. Metal Casement putty supplied by Hodgson Sealants Ltd of Beverley (tel. 01482 868321; www.hodgson-sealants.co.uk); Type O setting compound to BS 7000 pt. 7 and BS 6262: 1982, Table 5.
- 255 SEALANT BETWEEN FRAMES & STONEWORK: Rubber polymer solvent sealant for thin joint between steel and stone; Seamseal BR by Hodgson Sealants Ltd of Beverley (tel. 01482 868321; www.hodgson-sealants.co.uk); plastic sealant as defined in BS 6213:1982 Selection of Construction Sealants.
- 260 DERUSUTNG AND DECORATIONS TO METALWORK: To match existing colour in accordance with sections Z11r and/ or M60r.
- 270 HYDRAULIC LIME MORTAR: To match existing mortar in accordance with section Z21r.
- 280 WATER: Use de-ionized or distilled water only for cleaning.
- 290 CLOTHS: Use only soft neutral lint- free cloths for cleaning
- 300 BRUSHES: Use only glass fibre brushes for cleaning of a variety of hardness and size to suit condition of glass

- 310 BIOCIDE: TEGO 51B, mixed to a solution with de-ionised water
- 320 LINSEED OIL: Boiled pure linseed oil to BS 6900.

330 KNOTTING: To be best shellac knotting in accordance with BS 1336.

340 TURPENTINE: Pure natural turpentine from John Mylands Ltd or equal and approved.

STORING AND HANDLING

350 GLASS: Store glass in secure, dry, shaded and ventilated area; ensure glass is dry before stacking; stack on edge on firm straight supports that will not fragment edges or otherwise harm the glass; use packers and spacers as required. Prevent water collection (e.g. condensation) between panes. Protect against damage and minimize handling by stacking in order of work.

WORKMANSHIP

360 GENERALLY: All glass is to be accurately cut to size and glazed with beads or putty to match existing. In all cases the panes are to be back puttied, pressed gently into place on spacers, sprigged, neatly trimmed and cleaned off to finish slightly behind sightlines and left watertight.

370 DAMAGE: to glazing caused during the progress of the works is to be made good at the Contractor's own expense.

380 BEADS: for glazing to wood with beads are to include for taking off all pinned or screwed beads' redecorating all faces and re-fixing after re-glazing.

390 PUTTIES: all loose or cracked putty is to carefully cut out and renewed; take care not to cut into timber frame nor break glass; when removing sound old glass from frames, heat the putty slowly using specialist equipment to allow putty to be removed without cracking glass.

400 OVERHAULING WINDOWS: Where specified the overhaul of windows is to include all or some of the following , subject to the schedule or instructions:

a) Taking out all cracked or damaged glass, preparing rebates/grooves as necessary and re-glazing with new glass to match existing and prime all rebates before re-glazing

b) Cutting out any defective or loose putties, lead comes etc., and replacing as necessary.

c) Removing existing, badly corroded bars, ferramenta, etc., replacing with new and additional non-ferrous bars as appropriate including forming holes, fixings etc. and making good on completion.

d) De-rusting, overhauling, easing, redecorating and lubricating opening hoppers; renew all cords in waxed cotton cord and check or renew wall hooks.

e) Repairing and redecorating timber sashes, casements and sub frames to Section Z10r

d) Leaving the whole clean, weathertight and in good order on completion; clean off all putty marks, paint, dirt, etc. from new and existing glass; wash glass with minimum of de-ionized water, brushing where necessary to clean engrained dirt; use diluted

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The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

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biocide treatment where surface mould growth is present; polish glass on completion with spirit based cleaner.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.
The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

410

SEAL between perimeter of steel frames and stone mullions with proprietary sealant applied in accordance with manufacturer's instructions and Health and safety regulations; mask surrounding surfaces with low tack masking tape; apply with injection tool to fill gap as deeply as possible; finish off with miniature trowel neat to edge of frame; apply after decorating windows; protect from dust while allowing to dry; remove masking tape as soon as possible after curing.

M21r LIME PLASTER AND RENDER REPAIRS

GENERAL REQUIREMENTS

- 100 READ with Preliminaries, Schedule of Work & Drawings which have been prepared specifically for this Contract.
- 105 GENERALLY: This Specification sets out the trade materials and workmanship requirements for the repair work in the Contract, which must be read with the General Conditions and other Contract Documents, particularly those listed above. The Contractor is required by this Specification to provide details of proposed sub-contractors or suppliers, with his tender. Where method statements, drawings, samples and other proposals are required, these must be supplied at least three weeks in advance of the work commencing. These dates should be indicated on the Contractor's programme.
- 110 DEDICATED TEAM: The successful use of lime plasters and renders requires a special level of skill and understanding and therefore all sample panels, repairs and new plastering and rendering are to be carried out by the same dedicated team, who are to be experienced in traditional craft skills, the use of lime plasters and current conservation techniques. New operatives joining the team are to carry out a range of samples for approval by CA before commencing work on the main works. The team must be supervised by a competent and experienced foreman, who could be a working foreman.
- 115 PROGRAMME: Lengthy periods are required for preparation, application, curing, setting and protection of each coat of lime plasters and renders; the Contractor must therefore allow for this in his programme. Mixes must be agreed on site in advance by trial and error, and sample panels produced for approval, and this preliminary work must also be indicated on the Contractors programme.
- 120 HEALTH & SAFETY: Comply with all current health and safety regulations and restrictions and all requirements of the General Conditions and Preliminaries; take particular care with the slaking, storage and use of lime, and the removal of old lime plasters, ensuring that all operatives use adequate protective clothing and equipment.

MATERIALS

- 125 MATERIALS GENERALLY: This Specification covers the repair and re-plastering of existing internal lime plaster and external lime render finishes, which are generally to be carried out on a like-for-like basis; the use of gypsum plasters or cement based renders is to be restricted to new elements of work as scheduled/ specified elsewhere, or to repairs only where specifically instructed by the CA in writing, and are specified elsewhere.

MATERIALS: CONSTITUENTS

- 110 PURE LIME PUTTY: Lime putty, ready prepared to BS EN 459-1 from CL.90 high calcium, non-hydraulic quick lime ('air lime'); burnt in a traditional coal-fired kiln; fully slaked, run to putty and matured for not less than 90 days; density when matured to be 1.3- 1.4 kg/l. To be delivered and stored in sealed containers in an excess of water as long as possible to exclude air and be air-tight. From time to time draw off 'water' from surface and retain, stored separately, for use elsewhere. Type to the following or otherwise as instructed by the CA before ordering:

- Singleton Birch Lincolnshire Chalk Lime Putty (Singleton Birch Ltd, Barnetby, tel. 01652 686000; www.singletonbirch.co.uk) available from: Rose of Jericho Ltd (Tel. 01935 836

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

76; www.rose-of-jericho.demon.co.uk) or equal and approved.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.
The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

- 120 HYDRAULIC LIME: NHL 2 or 3.5 Hydrated hydraulic quick lime, properly slaked, sieved and free of lumps to BS EN 459-1. Inspect on delivery and before use; discard all damaged bags. Moderately and feebly hydraulic lime, as specified or instructed, Hydraulic lime only to be used in exposed positions or for out of season working where specifically instructed.
Type to be or otherwise as instructed by the CA before ordering:
- Manufactured by St Astier Ltd available from: Rose of Jericho Ltd (Tel. 01935 836 76; www.rose-of-jericho.demon.co.uk) or equal and approved.
- 130 READY-MIXED LIME PUTTY AND SAND: Ready-mixed, covered and kept for at least 1 hour before use. With or without animal hair. Available from:
- Rose of Jericho Ltd (Tel. 01935 836 76; www.rose-of-jericho.demon.co.uk) or equal and approved
- To be stored in sealed airtight containers, kept away from extremes of temperature.
- 135 READY-MIXED HYDRAULIC LIME AND SAND: to BS EN 998-2:2016. Mechanically mixed on site , covered and kept for at least 1 hour before use. Coloured mortar, where required, to be made using a proprietary coloured ready-mixed lime:sand, colour to approval where not specified.
Product: Unilit 30 or 60 available from:
- Telling Lime products of Knutsford, Cheshire WA16 8GS (Tel: 01565 756110; Sales Tel/Fax: 01565 872999; Email: info@tellinglime.com; sales@tellinglime.com; technical@tellinglime.com) or equal and approved.
- 150 PROPRIETARY LIME PUTTY REPAIR PLASTER: For repairs to fine finishing plaster; ready- mixed lime plaster made from matured, sived lime putty and superfine silica sand and stone/ marble dust.
- Coridecor Start lime bonding and finishing plaster supplied by Telling Lime Products
 - Corical Rasocal smooth- finish lime putty compound supplied by Telling Lime Products Limited, (Tel: 01902 789 777. Fax: 01902 398 777. Email: info@telling.co.uk Web: <http://www.telling.co.uk>).
 - or equal and approved.
- 160 SAND: To BS 1199 and BS 1200:1976, Table 1 unless specified otherwise. To be clean, well graded, sharp, pit or freshwater sand, free from loam, salts and other impurities. Sands used throughout works are to be from the same source as those used in approved samples. Different loads to be mixed if necessary to ensure consistency of colour and texture. To be stored on free-draining base away from trees and covered with tarpaulins.
- 165 SANDS: Provide samples of sharp sand from local suppliers/ quarries or those specified/ instructed for preparation of sample biscuits and sample pointing panels; select and sieve sands as required to match the existing mortar in colour and texture in each location; compare with analysis of the existing mortar samples when binders dissolved; receive instruction from the CA and obtain supplies of sand for mortar/s for the works to match approved sample.
- 170 STONE DUST: Portland Stone dust, ground below 850 microns, clean well washed.
- 180 OTHER AGGREGATES: As specified in Schedule of Work or analysis report to match existing mix.
- 200 ADDITIVES: No plasticisers, workability agents, anti-freeze compounds, air entrainers or

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

other additives shall be used.

- 210 POZZOLAN FOR EXTERNAL RENDER: *Argical* metakolin additive made from fired English China Clay and available from Rose of Jericho (tel: 01935 83676) or equal and approved with proven hydraulic properties.
- 240 GYPSUM FOR GAUGING LIME PLASTERS: Class A fine casting plaster (Plaster of Paris) from approved supplier; to be used only where specifically instructed by Architect.
- 250 WATER: Clean, pure and obtained from mains supply. Tested to BS 3148:1980 if required. To be conveyed and stored in clean containers. Containers should not be used for any other purposes.

MATERIALS: LIME PLASTER ASSESSORIES

- 260 HAIR: Natural ox or goat hair free from grease, washed, cut and bound into bundles; cut to approx. 50mm lengths and to approval of the CA. Quantities given in mixes are minima.
- 265 MANMADE FIBRES: Polypropylene Fibre - 18mm - 0.91kg bag; 12-18mm long monofilament polypropylene fibres added to Lime Plaster and Render to reduce shrinkage and cracking whilst adding reinforcement and strength. available from. Chalk Down Lime Ltd. (Phone: 01580 830 092; Email: sales@chalkdownlime.com ; Office & Yard: The Lime Yard, Staplecross, East Sussex, TN32 5RP) or equal and approved.
- 270 JUTE SCRIM: 90mm wide natural jute scrim tape.
- 280 FUNGICIDE: Type recommended by the plaster manufacturer; only to be used where specifically instructed by CA.
- Trisol 23 by Triton Systems Ltd (Tel +44 (0)1322 318830; www.tritonsystems.co.uk ; technical@tritonsystems.co.uk) or equal and approved.
- 290 BONDING AGENT: Unibond as manufactured by Unibond-Copydex Limited Stanhope Road Camberley Surrey GU15 3DD. (tel. 01 409 0414); only to be used where specifically instructed by CA.
- 300 SEALANT: Primal WS24 Acrylic Emulsion.
- 310 SHELLAC: 2000 Pure Shellac Sealer from John Myland Ltd (tel. 020 8670 9161; info@mylands.co.uk) or equal and approved.
- 320 GELATINE: Natural animal gellatine
- 330 GLUE SIZE: C Roberson Prepared Rabbit Skin Glue Size from Pegasus Art, Stroud (tel. 01453 886 560; info@pegasusart.co.uk)
- 340 METHYLATED SPIRIT from John Myland Ltd (tel. 020 8670 9161; info@mylands.co.uk) or equal and approved.
- 350 PAINTERS' KNOTTING to be best shellac knotting in accordance with BS 1336 from John Myland Ltd (tel. 020 8670 9161; info@mylands.co.uk) or equal and approved.

MATERIALS: FIXINGS AND LATHS

- 360 PLASTIC PLUGS: As manufactured by Rawlplug Company Limited Rawlplug House London Road Kingston upon Thames Surrey KT2 6NR.

365 PLASTIC LARGE DIAMETER WASHERS for fixing render carrier boards and mesh;

- 60mm diameter; available from
Cornish Lime, Bodmin, Cornwall PL31 2DZ (Tel. 01208 79779; <https://cornishlime.co.uk>)
- 370 METAL FIXINGS GENERALLY: All screws, nails, staples, washers, tying wire and other fixings to be stainless steel nails and screws generally in conjunction with lime plaster/ render, unless specified otherwise; fixings to be used when compatible with steel lathing as recommended by manufacture.
- 380 CLOUT NAILS to BS 1202-1:2002; galvanized to BS EN ISO 1461:2009; check compatible with steel lathing.
- 385 STAINLESS STEEL NAILS FOR LATHS: Annular ring shank nails that are not corroded by oak or chestnut tannins. 30mm x 2.65mm
- 390 WOODSCREWS: Brass to BS EN 12163:1998, 12167:1998.
- 400 STAPLES: Galvanized steel wire staples
- 410 RIVEN WOOD LATHS for use with lime putty plaster and repairs to existing; approx. 6 x 25mm riven oak or chestnut to match existing in lengths of 1.0- 3.0 m. From Whippletree Oak of Milestone Farm, Barley Rd, Royston, Hertfordshire SG8 7QD (Tel. 01763 208 966; sales@whippletree.co.uk) or equal and approved.
- 420 CLAY COVERED STAINLESS STEEL LATHING: Proprietary lathing recommended by manufacturer for situation: Brick Mesh; Manufacturer: Tellings Ltd.
- 430 RENDER CARRIER BOARD: water resistant, vapour permeable wood fibre boards, 1200 x 60mm, 25mm thick for external use, 15mm thick internal use.
 - Celenit boards available from: Cornish Lime, Bodmin, Cornwall PL31 2DZ (Tel. 01208 79779; <https://cornishlime.co.uk>)
OR
 - Savolit Plus wood wool boards produced in accordance to standard EN 13168 and are CE marked; from forests certified PEFC that are sustainably managed; Manufactured by: SKANDA Acoustics Ltd, Wrexham LL13 9XN (Tel: 01978 664255; <https://www.savolit.co.uk/products/savolit-plus/>).
- 440 HANGERS: 25 x 34mm galvanized steel strip to BS 4449: Part 1.
- 445 TYING WIRE: 1.63mm or doubled 1.22mm.
 - 1 For galvanized mesh: annealed iron wire soft galvanized min. Gauge 16 (1.6mm diameter) to BS EN 10244-2
 - 2 For bronze or brass mesh: drawn copper wire min. 2 mm diameter to BS EN 13602
- 450 COPPER MESH REINFORCEMENT for reinforcing plaster ceilings: **18 gauge 6mm** copper as manufactured by F W Potter & Soar Limited, Beaumont Road Banbury Oxon OX16 7SD. Tel. 0925 53344.
- 460 BRASS STRIP: 37 x 3mm.
- 470 BRASS ROD: 9mm diameter.

MATERIALS: PROPORTIONS OF MIXES

- 480 LIME PLASTERS AND RENDERS GENERALLY: All constituent materials and mix proportions are to be agreed with the CA on site after carrying-out samples for approval. A degree of experimentation will be necessary on site in order to achieve the most suitable and workable mix or mixes. The Contractor must allow in the programme for these trials to be carried-out in conjunction with the CA. The assumption is that plasters and renders will be based upon lime putty, rather than hydraulic lime or cement binders and the Contractor must take account if this in the programming of the work drying times, and the need for protection.
- 490 SAMPLES OF EXISTING PLASTERS: Sample/s of existing plasters have been taken before tender and a copy of the report/s is attached. The mortar mixes specified or described on the Drawings are therefore intended to imitate these existing mixes. The Contractor must allow for taking further samples of existing mortars in each different condition where re-pointing has to be carried-out and washing-out binder in order to analyse aggregate.
- 500 GUIDANCE MIXES FOR INTERNAL PLASTERS: The mixes given below are for guidance only, exact mix proportions will be determined on site after approval of samples etc.
- P1: FOR BASE COAT/S – 1:2- 2.5, putty lime: quartz silica sand (1.2mm down), reinforced with animal hair at min. 5kg per m³.
- P2: FOR FLOATING COAT – 1: 2- 2.5, putty lime: quartz silica sand (1.2mm down), reinforced with animal hair at min. 3kg per m³.
- P3: FOR FINISHING COAT – 1:1 putty lime: fine silver sand (gauged with gypsum)
- 510 GUIDANCE MIXES FOR EXTERNAL LIME PUTTY RENDERS: The mixes given below are for guidance only, exact mix proportions will be determined on site after approval of samples etc.; pozzolan to be used out of season.
- R1: FOR BASE COAT/S – 1: 2½, putty lime: sharp quartz silica sand (2.36mm down) with pozzalan at 5% by volume.
- R2: FOR FLOATING COAT – 1:2½, lime putty: sharp quartz silica sand (2.36mm down) with pozzalan at 5% by volume.
- R3: FOR FINISHING COAT – 1:1: 1- 1½, lime putty: sharp quartz silica sand; fine sharp silver sand (proportions TBC) with pozzalan at 5% by volume.
- 515 GUIDANCE MIXES FOR EXTERNAL HYDRAULIC LIME RENDERS: The mixes given below are for guidance only, exact mix proportions will be determined on site after approval of samples etc.;
- R1: FOR BASE COAT/S – 1: 2, NHL3.5 Hydraulic lime: sharp quartz silica sand (2.36mm down) with animal hair at min. 5kg per m³.
- R2: FOR FLOATING COAT – 1:2 ¼, NHL3.5 Hydraulic lime: sharp quartz silica sand (2.36mm down) with animal hair at min. 3kg per m³.
- R3: FOR FINISHING COAT – 1:2- 2 ½, lime putty: sharp quartz silica sand; fine sharp silver sand (size & proportions TBC after samples).

- 520 SAMPLES OF MIXES: Samples are to be approved before ordering bulk materials, on the *For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.*

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

basis of broken samples in the first instance. The contractor will be expected to produce

variants on the basic mixes given above, slightly altering proportions of constituents to achieve a suitable match with the existing. Allow for up to 20no. variants on each mix type quoted above. Dry broken samples are to be stored on site for reference, clearly marked and protected until Practical Completion. Ensure executed work matches approved samples by careful control of on-site mixing or by ordering ready-mixed mortar.

WORKMANSHIP: GENERALLY

- 530 COMPLY with BS EN 13914:2016 External rendering and internal plastering and BS 8481:2006, and with manufacturers' recommendations for all products and materials. Traditional materials and practice should be followed where this demands a higher or different standard than the British Standards and the contractor is to seek clarification from the Architect if necessary.
- 540 SUB-CONTRACTOR: Lime plastering to be carried out by a plasterer experienced in traditional lime plasters: supply name of sub-contractor to Architect for approval with tender. Provide references and evidence of experience if requested.
- 550 SCOPE OF WORK: The provisional scope of re-plastering/ rendering is described in the Schedule of Work and on the Drawings. Confirm the scope of work with the Architect before proceeding. Carry-out patch repairs and re-plastering of each area in one operation to give consistent appearance across existing and repaired surfaces.
- 560 WORKING SEASON: Do not carry-out work with ungauged lime plasters/renders between the end of September and the beginning of March. During working period monitor maximum and minimum temperature daily and programme work accordingly. Do not carry-out external work when the air temperature is below +5°C on a falling thermometer or below +3°C on a rising thermometer, or while materials or background are frozen. Monitor internal temperature during cold weather where work is being carried out inside and follow same guidelines.
- 570 SAMPLES PANELS: Prepare sample panels in agreed location(s) 900 x 900mm approximately, for each condition and each type of plaster/render required. Submit panel(s) first prepared for plastering/rendering. When this stage is approved, plaster/render panel(s) using the approved mix/s with CA present and obtain further approval once the finishing coat has cured before proceeding. Retain and protect sample(s) for reference until Practical Completion and ensure executed work matches the panel(s).
- Any work not complying with the standard established in the sample work is to be redone at the Contractor's expense. Note that it may be necessary for the Architect to obtain approval from the Local Planning Authority, English Heritage or funding body for the sample panel(s) and the Contractor should prepare them well in advance of the work commencing. Indicate on the Contract Programme.
- 580 STORAGE: Store all materials in separate stock piles on clean dry bases and under cover; store lime putty in sealed containers; store premixed plasters in sealed containers; do not use any cement or hydraulic lime affected by damp; avoid inter-mixing or contamination between stored materials.
- 590 PREPARING PLASTERS/RENDERS: Keep plant and banker boards clean at all times. Measure materials accurately by volume using clean gauge boxes made to sizes to suit volumes required. Overfill gauge boxes and strike off excess material with straight edge. Proportions of mixes are for dry sand; allow for bulking if sand is damp. Where a range is given (e.g.1:1:5-2), use higher value for well graded sand (Grade S sands) and lower value for coarse or uniformly fine sand (Grade G sands).

Mix materials thoroughly so that all individual constituents are incorporated evenly to a

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The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

consistency suitable for the work and free from lumps.

- 600 LIME: Coarse stuff to be prepared as early as possible and storage time to be as long as possible and no less than two weeks. To be stored in sealed airtight containers and kept away from extremes of temperature. Ensure all pure lime putty is well sieved and well beaten or rammed into the mortar mix to ensure thorough mixing. No pure lime pieces will be acceptable in the mix. At each stage the constituents are to be consistently mixed, well rammed and beaten and should contain the minimum of water
- 610 HAND MIXING of plaster/render will be permitted only with approval and where small quantities are required. Where approved, carry out on a clean hard platform. Thoroughly mix all other materials prior to the addition of water which is to be sprayed from a watering can fitted with a rose. Add only sufficient water to make the mix workable. After initial trowel mixing, use hand held paddle mixer for at least 15 minutes to give a homogeneous plastic mix (at least 15 minutes).
- 620 MECHANICAL MIXING: Mix plaster/render in a mechanical mixer of a size suitable for the quantities required in one batch. Use horizontal paddle mixer for lime renders. Mix continuously, for a minimum of 15 minutes, after the addition of water until a homogeneous plastic mix is obtained. No water is to be added until all other materials have been thoroughly mixed in the mixer. Add only sufficient water to make the mix workable. Wash out mixer 4 times daily if in continuous use; do not use the same mixer for cement- based mixes.
- 630 HYDRAULIC ADDITIVES: Use plaster/renders within about two hours of addition of hydraulic material (HTI, brick dust or other pozzolanic material) when mixing at normal temperatures. Do not use after the initial set has taken place and do not re-temper.
- 640 PLASTICISER: Plasticisers are not to be used in mixes without the explicit written instructions of the CA.
- 650 KNOCK-UP: When required for use, thoroughly knock-up sufficient quantity of plaster/render to a workable consistency on a clean board; compress, beat, chop the mortar by hand or using a roller pan mixer. DO NOT ADD WATER. During use prevent dry-out or wetting and retain workability by chopping and beating.
- 660 PREMIXED PLASTER/RENDER: Where specified obtain pre-mixed plasters and renders from supplier and store in air tight sealed containers until use. Thoroughly work up by hand before use into a working consistency; take off excess liquid before use; DO NOT ADD WATER.

WORKMANSHIP: PREPARATION

- 670 PREPARE BACKGROUNDS: To BS 8000-10:2014 to receive plaster or render; remove efflorescence, laitance, dirt and other loose material by thorough dry brushing with natural bristle of mixed bristle/bronze wire brushes: remove traces of mould oil, paint, grease, dirt and other materials incompatible with plaster render work by scrubbing with water containing approved detergent; rinse off .

Ensure that backing is suitable for plastering and reasonably dry before starting work. Prepare backgrounds as specified for the type of coating rendering to be applied. Methods other than those specified may be submitted for approval before proceeding.

- 680 BRICKWORK: Carefully brush down face of brickwork removing surface deposits, algae and friable material. Inspect all joints closely to establish soft or failed mortar over area to be re-plastered/rendered, and defective brick requiring replacing. Only repoint where necessary, leave joints pointed flush. Carry out brick repairs as agreed with CA on site in
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The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

accordance with specification F10r. DO NOT RAKE OUT JOINTS FOR LIME RENDER/PLASTER.

- 685 STONework: Carefully brush down face of stonework removing surface deposits, algae and friable material. Inspect all joints closely to establish soft or failed mortar over area to be re-plastered/rendered, and defective brick requiring replacing. Only repoint where necessary, leave joints pointed flush. Rebed loose stones and fill voids with new stones or gallets (rubble work). Carry out ashlar stone repairs as agreed with Architect on site in accordance with specification F10r. DO NOT RAKE OUT JOINTS FOR LIME RENDER/PLASTER.
- 690 TREATMENT OF ORGANIC GROWTHS: Treat organic growths with fungicidal wash to control dry rot, algae and organic growths allow to dry and brush off remaining organic matter. Use only biocides recommended for the purpose and cleared under the Control of Pesticides Regulations 1986, EU Biocides Regulations, Control of Pollution Act 1974, The Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2010 (as amended).
- 700 REMOVAL OF WALL PAPER, PAINT, etc: Carefully remove wallpaper or paint where instructed or scheduled minimising damage to plaster beneath; explore and experiment with different methods and seek instructions before proceeding. Use minimum amount of water and protect floors before commencing work.
- 710 REMOVAL OF EXISTING PLASTER OR RENDER: Explore by taping walls to be repaired and mark-up specific areas suspected as being 'live'; seek instruction from CA before proceeding. Carefully remove agreed areas, take care not to remove more plaster/render than agreed and seek further instructions if condition appears worse than expected; cut around areas to be remove with knife or chisel, through to background in order to limit extent of removal. Screen-off areas and damp down in order to control spread of dust; wear suitable protective clothing; and provide adequate ventilation; sweep down, bag up and cart away immediately. ALL PROTECTION TO ORGANS, ELECTRICAL EQUIPMENT, FURNISHINGS, GLASS & FITTINGS MUST BE IN PLACE AND INSPECTED BY CA OR CLERK OF WORKS BEFORE COMMENCING REMOVAL OF PLASTER INTERNALLY. Protection must be erected to surrounding areas externally, particularly brickwork and glazing before removal of render.
- 720 RISING DAMP: Agree and mark-up extent of effected area with Architect before proceeding; remove plaster affected by rising damp up to height of 450 above line of damp, or as instructed. Rake out all perished and salt-contaminated joints and cut out and renew any heavily salt-laden bricks or blocks in background.

WORKMANSHIP: BACKGROUND & INITIAL COAT/S INTERNALLY

- 730 DISSIMILAR BACKGROUNDS: Where scheduled or instructed at junctions between dissimilar solid backgrounds in the same plane and with the same coating, fix clay-covered steel lathing in strips not less than 250mm girth over building paper; fix with 38mm clout nails or with staples at 150mm minimum centres; drive into drilled and plugged holes.
- 740 DUBBING OUT: If necessary to correct inaccuracies or irregularities in background, dub out in thickness of not more than 10mm in same mix as base coat. Allow to set but not dry out before the next coat is applied. Cross scratch surface of each coat immediately after initial set.
- 750 MOVEMENT JOINTS: Where scheduled or instructed form joints between different coatings or to coincide with movement joints in background, using galvanized steel stop beads. Please note that the locations of these MUST be agreed with the Architect on site

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

and marked up before plastering is carried out.

- 760 SERVICES CHASES: When all services installations are completed and tested, cover chases with timber laths or clay-covered steel mesh strip held to lap min 100mm each side with plaster dabs at not more than 600mm centres; nail or screw fix into background with 38mm clout nails or with screws at 150mm minimum centres.
- 770 METAL CONDUITS: Fix galvanized conduits to background and bed in dubbing coat, cover with 90mm wide jute scrim bedded in subsequent coat mix, pressed flat and trowelled in. Do not lap ends of scrim. ensure minimum 15mm plaster cover.
- 780 METAL ANGLE BEADS AND STOPS: Where specified fix clay-covered steel beads and stops plumb, square and true to line- with plaster dabs to masonry, with 38mm clout nails or screws, or with wire ties to metal lathing, at no more than 600mm centres.
- 790 WOOD LATHS: Fix wood laths with butt ends using 25mm flat headed galvanised or non-ferrous wire nails at a maximum 400mm centres leaving 8-10mm gap between laths. Stagger joints at approximately 1m intervals.
- 800 TIMBER ANGLE BEADS AND STOPS: Where specified fix treated softwood angle beads and stops, scribed to background to be plump square and true to line; fix to with brass screws or copper nails into plugged holes at minimum 100mm centres.
- 810 SCRIM: Reinforce junctions and filled cracks with 90mm wide jute scrim bedded centrally over joints in neat plaster similar to first coat. Do not lap ends of tape. Press well in, trowel flat and smooth and allow to set but not to dry out before plastering.
- 820 DAMPING: After initial set keep coatings damp by spraying or other suitable method for at least 7 days to delay evaporation.

WORKMANSHIP: PLASTER REPAIRS INTERNALLY

- 830 ACCURACY IN RELATION TO EXISTING WORK: Ensure that repaired plaster surface and line follows pattern of existing work, in keeping with the building's historic character; neither straighten-out historic irregularities nor create artificially 'aged' appearance.
- 840 APPLICATION GENERALLY:
- Apply each coating firmly to achieve good adhesion and in one continuous operation in each area between edges, angles and joints.
 - Carry-out each wall or ceiling surface in a continuous operation and in a logical order relative to other areas, commencing with ceilings and upper areas of wall.
 - All coatings to be not less than the thickness specified, firmly bonded, of even and consistent appearance, free from rippling, hollows, ridges, cracks and crazing.
 - Finish surfaces to a true plane, to correct line and level, with all angles and corners to a right angle unless specified otherwise, and with walls and reveals plumb and square.
 - Ensure every precaution is taken to prevent the plastering from blistering or cracking; such defects are to be made good at the contractors expense.
- 850 LIME PLASTER ON LATHS:
- Laths should still be damp, lightly spray with water if they have dried out.
 - Apply 9mm thick (or to match existing) base coat thickness, from face of laths, allowing the nibs to penetrate between the laths and curl over to ensure a good key.
 - Protect to prevent too rapid drying if necessary.
 - Scour the face of the plaster prior to scratching.
 - Spray plaster lightly to ensure it dries out slowly, taking up and reworking cracks.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

- Apply 6mm thick or (to match existing) floating coat, and rule to line.
- Floating to be true fair and flat without undulations or distortion.

- Any existing distortions in the adjacent plaster are to be continued in the new work so that it does not stand out as flat in the new work.
- Once the plaster is at the point of 'turning', wet up, scour and scratch to provide a key. Ensure the key does not penetrate the top of coat below.
- Spray plaster lightly to ensure plaster dries out slowly.
- Apply 3mm thick or to match existing setting coat with wooden floats to match existing.
- Finish with dry wood float as soon as wet sheen has disappeared from surface to give an even overall texture.

860 JOINING EXISTING PLASTER TO NEW PLASTER:

- Neatly trim existing plaster edge with a sharp knife.
- Under cut edge such that the existing plaster layers will be held to the backing of the new plaster.
- Seal existing plaster edges with Primal WS24 Acrylic Emulsion in solution, to manufacturer recommendations.
- Plaster up to existing and allow base coats to dry thoroughly before applying setting coat. Set to existing and tend to take up any hairline cracks.

870 FILLING CRACKS:

- Enlarge crack carefully to a minimum of 2mm width with appropriate sharp tool and undercut edge.
- Blow out dust, flush with 50/50 water alcohol solution.
- Partially seal sides of crack with Primal WS24. Remove excess immediately with water.
- Fill crack to slightly proud of plaster surfaces. Use 3:2 lime putty: fine sand for cracks in lime plaster. Use Polyfilla or equal approved proprietary filler to gypsum plaster.
- Sand back surfaces with fine grit wet and dry paper.

880 IN SITU PLASTER CORNICE AND MOULDING REPAIRS: Mouldings are to be repaired on a like for like basis; run in-situ in limeplaster over bracketing formed with timber lathing on profiled formers, where this replicates the originals.

Running moulds are to be cut from sheet tin or zinc (for smaller sections only) or softwood boards horsed up with softwood blocks using screwed rather than nailed construction. Moulds for all sections are to be handed to the client's representative labeled, on completion of the work. All horsed moulds are to be run on fixed rules, set level unless otherwise specified, and are to have rebated slippers to prevent any scuffing of wall surfaces etc. Ensuring that the scaffolding does not obstruct the clear run of working along the length of cornice. Apply base coat by trowel, ensuring good adhesion to the backing. Key coat with lath or wire scratcher. Muffle coat is to be applied by trowel and profiled with a muffle former on the running mould shaped accurately with running to leave 5-6mm for the subsequent finish coat. Finish coat to be run accurately with the running mould, leave a smooth finish as close as possible to that achieved on plain areas of plasterwork.

WORKMANSHIP: RENDERING EXTERNALLY

890 DUB OUT: Hollows up to 16mm deep to be covered in one coat. For hollows deeper than 16mm build up in coats not exceeding 13mm in thickness; scratch surface of each coat to provide key; allow each coat to cure, dry and shrink before another application is made.

900 COAT THICKNESSES: Apply render with laying trowel working from top to bottom in three coats each to match adjacent thickness; each coat thinner than that preceding commencing with a maximum of 16mm thickness for the first coat.

910 PRESSURE: Throw initial coat onto dense backgrounds to ensure good adhesion; apply each subsequent coat firmly by trowel to achieve a good uniform compaction and

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

adhesion, and rule to even surface. Apply coats to wall surface in one continuous

cooperation to full thickness. Work well into lathing or previous coat to obtain maximum key. Apply three coats of diminishing thickness and strength. Comb undercoats to reduce shrinkage cracking and to provide key for following coats. Brush down each coat. Dampen thoroughly and uniformly before applying following coat to control suction.

FINISHING

- 920 FINISH GENERALLY: Finish surfaces to follow character, line and plane of existing adjacent work in each area and in accordance with the sample panel; finishes should be consistent, across each area and between comparable areas, without blemishes and trowel marks; the general finished result should be harmonious with the original work. Agree the required finish on the sample panel/s with the Architect in advance.
- 930 FINISH each coat with a cross-grained wood float with the minimum of working necessary, to reduce the likelihood of laitance being brought to the surface and bring to even overall texture. Do not apply water to final coat while working up.
- 940 SCORE final coat to imitate stone coursing as sample panel and to match existing work where appropriate.
- 950 DAYWORK LINES: Take beyond 'course' lines and cut back to true line the following day before the next section is begun. Positions of daywork lines to the final coat to be agreed with CA.

PROTECTION

- 960 CURING: After initial set keep each coat damp by gentle spraying or other suitable method, and control ventilation, for at least 7 days to delay evaporation; inspect daily and 'knock-back' at any shrinkage or movement; after 7 days curing period allow undercoats to dry out thoroughly to ensure that drying shrinkage is substantially complete before applying subsequent coat. For lime gauged with gypsum, allow at least 5 days for setting of each coat before subsequent coats are added.
- 970 PROTECT work from sun, wind, rain and frost, until full set is complete. Use dampened hessian covered in polythene in dry, warm or windy conditions; use insulating sheeting over in frosty conditions. Maintain cover for at least 7 days and up to 3 weeks. Prolong drying longer by keeping hessian moist if conditions require. Monitor conditions and alter protection as required.
- 980 DECORATE EXTERNAL RENDER with casein limewash or proprietary lime paint in accordance with Section M60r, coloured to match surrounding render/ stonework once final set is achieved.
- 990 DECORATE INTERNAL LIMEPLASTER when thoroughly dried with distemper, limewash or proprietary lime paint in accordance with Section M60r, coloured as scheduled. DO NOT USE OIL- BOUND DISTEMPER, SOLVENT OR ACRYLIC- BASED EMULSION OR EGGSHELL PAINTS ON NEW LIME PLASTER.

CLIVEDEN

CONSERVATION

V91r LIGHTNING PROTECTION

- 100 TO BE READ with Preliminaries, Schedule of Work & Elevation Drawings (as appropriate), which have been prepared specifically for this Contract
- 105 GENERALLY: This Specification sets out a performance specification, including materials and workmanship requirements, for the Lightning Protection work in the Contract, which must be read with the General CONDITIONS and other Contract Documents, particularly those listed above. Where the Contractor is required by this Specification to provide details of proposed sub-contractors or suppliers, these must be supplied with his tender. Where method statements, drawings, samples and other proposals are required, these must be supplied at least three weeks in advance of the work commencing. These dates should be indicated on the Contractor's programme.
- 110 SUB-CONTRACTOR: The Lightning Protection System is to be designed and installed by an experienced and suitably qualified specialist installer, who will provide the Employer with an certificate and design warranty. The Sub-Contractor is to be one of those named below, or another named by the Contractor with his tender.

MATERIALS

- 120 GENERALLY: All components are to comply with BS EN 62305-1, 2, 3 & 4: 2011; 140210:1995, Quality Assessment of Electrical Components.
- 130 ALUMINIUM CONDUCTOR TAPES to BS 3988:1970, 3 x 25mm UPVC sheathed aluminium tapes; colour of sheathing to BS 6746C:1993, colour to be approved.
- 140 COPPER CONDUCTOR TAPE to, BS 6360:1991. 3 x 25mm UPVC sheathed copper tapes; colour of sheathing to BS 6746C:1993, colour to be approved.
- 150 CONDUCTOR TAPE JUNCTIONS: screwed aluminium T and cross shaped junctions compatible with conductors.
- 160 JUNCTION TAPE: Aluminium self adhesive tape to compatible with conductors.
- 170 PRINCIPAL TERMINALS formed from short lengths of aluminium conductor tape in conical shape to suit location.
- 180 INTERMEDIATE TERMINALS TO TILED ROOFS: Aluminium folded tags to BS 215-2:1970.
- 190 FIXING CLIPS TO BRICK & STONWORK: UPVC direct contact clips with isolated fixings into masonry; colour too match down tape.
- 200 BIMETALLIC TEST CLAMPS with isolated fixings into brickwork compatible with conductor tapes.
- 210 EARTH RODS: 15mm diameter copper clad steel rod to BS 1432:1987.
- 220 INSPECTION HOUSINGS: Concrete boxes with lid lifting ring to approval of CA.

CLIVEDEN

CONSERVATION

WORKMANSHIP

- 230 COMPLY with BS EN 62305-1,2,3 and 4: 2011, current Building Regulations Part P and current IEE Regulations for the design and installation of the Lightning Protection System.
- 233 SCOPE : Divert existing system during works, protect temporary works, reinstate and/or repair existing system on completion of the works.
- 235 NOTE; traditional single point terminal and ‘cone coverage’ principle of protection will not comply with BS EN 62305-1, however in some circumstances may be acceptable to listed buildings. Survey the existing system, report condition and make recommendations for upgrading to Architect and engineer, who will seek agreement from client, Historic England and the insurance company BEFORE REPOCEEDING.
- 240 SCAFFOLD: Provide, maintain and adapt all platforms, ladders, hoists, scaffolding, sheeting, hoarding, temporary roofs and protection as necessary for the proper execution of the lightning conductor installation in accordance with BS 5973: 1993, Schedule A11s and Specification A11r. Co-ordinate the design, erection and programme of scaffolding with general contractors. Provide temporary protection to any scaffolding and clear away on completion.
- 250 ATTENDANCE: The Main Contractor is to provide the Sub-Contractor with all required attendances for the installation, including, power supply, access, storage and lifting of equipment, excavation and back filling, messing and toilet facilities.
- 270 PROGRAMME: Where required, allow in the contract programme sufficient time for preparation, submission and amendment of the proposals BEFORE ordering materials. No claim for delay or loss and expense will be considered in respect of a failure to provide adequate drawings in time.
- 280 TAKE CARE to prevent damage to the existing building/s, its fittings and furniture. Any damage caused to the building is to be made good to the approval of the CA at the Contractor's expense. All conductor routes, fixing, terminal and earth pit positions are to be chalked-up on site and confirmed with the CA before commencing the work.
- 290 PARAPET CONDUCTORS: Provide and install a roof conductor system to meet the standards, comprising lengths of 3x25mm UPVC sheathed aluminium conductor tape, secured at maximum 500mm centres with non-metallic clips coloured to match sheathing. Provide samples of colour sheathing and confirm with CA. Fixings to be carefully drilled into joints in brickwork or stonework. Plug and screw-fix with solid brass or stainless steel maximum N°.6 dome-headed screws, minimum 38mm long; fit isolating washers; use more frequent fixings in preference to larger screws.
- 300 ROOF CONDUCTORS: Provide and install conductors as described in C1.290. Welded fixings to lead roof to be carried out strictly in accordance with Hot Works Procedure described in Preliminaries; seek alternative routes to avoid lead welding where ever possible. Run conductors beneath tiled roofs with aluminium tape terminals protruding neatly from lower edge of tiles; fix to roof joists; thoroughly seal any penetrations through roofing underlay membrane and co-ordinate fixing with roofing Sub-Contractor to avoid disturbing newly laid roofs. DO NOT OBSTRUCT GUTTERS OR RAINWATER OUTLETS WITH CONDUCTORS.
- 310 TERMINALS: Form tape finials from short lengths of 3x25mm conductor, joined and shaped to suit site conditions; connect to roof conductor with purpose made aluminium tape clamps; all to be coloured to match sheathing.
- 320 DOWN TAPES: Provide and install down tape conductors, connecting the roof conductor system

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

CLIVEDEN

CONSERVATION

to earth rods to meet the standards, comprising 3x25mm UPVC sheathed aluminium conductor tapes, secured at maximum 1000mm centres with non-metallic clips coloured to match sheathing.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.
The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

CLIVEDEN

CONSERVATION

Provide samples of colour and seek confirmation from CA; note: down tapes may not be the same colour as roof tapes. Fixings into brick or stonework as Clause 290; fixings through render to be carefully drilled and secured in sound substrate.

- 330 TEST CLAMPS: Terminate down tapes with bi-metallic test clamps fixed to walls in accessible positions to be agreed with CA before proceeding.
- 340 EARTH ELECTRODES: Connect down tapes to 15mm diameter copper clad steel earth electrodes of minimum 2.4m length driven into ground within 2m from external walls to provide resistance reading to meeting standards; confirm locations with CA before proceeding. Install additional electrodes, linked together, as required to suit site conditions.
- 350 INSPECTION HOUSINGS: Provide and install flush with surrounding final ground surface, precast concrete inspection housings with lift up lids; label and provide stainless steel lifting eye.
- 360 BONDING: Ensure that all metal pipework and electrical services intakes are properly earthed in accordance with the standards and in a compatible manner with the lightning conductor installation.
- 370 TEST & COMPLETION: On completion of the installation, test in accordance with BS EN 62305 -1,2,3 and provide the Employer with a test certificate at Practical Completion indicating resistances at ground level. Leave whole installation clean, tidy and serviceable on completion. Test all fixings and ensure they are secure before dismantling scaffold. Notify CA when work is programmed for completion and arrange inspection while Sub-Contractor in attendance.

M60r PAINTING AND DECORATING

GENERAL REQUIREMENTS

- 100 TO BE READ with Preliminaries, Schedule of Work & Drawings which have been prepared specifically for this Contract.
- 105 GENERALLY: This Specification sets out the trade materials and workmanship requirements for the repair work in the Contract, which must be read with the General Conditions and other Contract Documents, particularly those listed above. the Contractor is required by this Specification to provide details of proposed sub-contractors or suppliers with his tender. Where method statements, drawings, samples and other proposals are required, these must be supplied at least three weeks in advance of the work commencing. These dates should be indicated on the Contractor's programme.
- 110 CODE OF PRACTICE & TRADITIONAL PAINTS: Comply with BS 6150 Painting of Buildings subject to any qualifications given below. Where this specification or traditional practice requires a higher or different standard, this should take precedence over the BS; seek clarification from the CA where necessary. Note that traditional paints, where specified, require careful preparation, mixing, application and longer drying times; sample areas will be required as detailed below and the Contractor must ensure adequately skilled labour and supervision; allow for these requirements in the programme.
- 115 SCHEDULE & PRICING: See the painting schedule for the type of coatings and the locations of the surfaces to be decorated; colours will be instructed later, but allow for the number of different colours indicated on the schedule. The prices are to include for all preparatory work, removing refixing ironmongery, etc, access and attendances and for setting up various tints and sample panels for the approval of the CA. Prices should also include for executing work in parti-colours where directed, cutting into window frames, mouldings, decorative work and the like.
- 120 HEALTH & SAFETY: Comply with all health & safety regulations and restrictions and all requirements of the General Conditions and Preliminaries; take particular care when removing old paints, which may contain lead, and applying solvent-borne paints; ensure adequate ventilation throughout application and drying; lead based paints can only be used on Grade I Listed Buildings with an appropriate License and strictly in accordance with Health and Safety legislation.

MATERIALS

- 130 MATERIALS GENERALLY for painter's work shall comply with the relevant BS Specification if one exists for that formulation and be obtained from the following suppliers or an alternative supplier with the approval of the CA; apply strictly in accordance with the manufacturer's written instructions, retain copies of all technical literature on site for reference.

PAINT FOR PLASTER/RENDER/MASONRY

- 140 LIMEWASH TO MASONRY OR PLASTER/ RENDER INTERNALLY:
- Pure Limewash as manufactured from lime putty by: Rose of Jericho Ltd. - internal use on lime plaster.
 - Casein Limewash as manufactured from lime putty and natural casein protein with fungicide and algaecide by: Rose of Jericho Ltd. of Evershot, Dorset (Tel. 01935 836760) info@roseofjericho.co.uk)- external use and internal hydraulic lime or gypsum plaster. Colours: mix with powdered natural pigments mixed to Architect's approval; subject to approval of sample panels. Coats: at least 4 thin coats.
 - or equal and approved.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

- 145 LIME SHELTERCOAT TO MASONRY OR PLASTER/ RENDER EXTERNALLY:
- Lime shelter coat as manufactured from pure lime putty, limewater, fine sharp sand and stone dust by: Rose of Jericho Ltd.of Evershot, Dorset (Tel. 01935 836760) info@roseofjericho.co.uk)- external use; subject to trial samples
Colours: mix with powdered natural pigments mixed to Architect's approval; subject to approval of sample panels.
Coats: 2 coats subject to trial samples.
or equal and approved.
- 165 CASEIN DISTEMPER TO EXISTING PLASTER & NEW LIME PLASTER WALLS INTERNALLY: traditional matt distemper based on both natural gelatine binder, lactic casein and fine chalk
- Casein Distemper as manufactured by Rose of Jericho Ltd.of Evershot, Dorset (Tel. 01935 836760; info@roseofjericho.co.uk)
Colour/s: as scheduled or selected by Architect from 'Classic' or Traditional;' ranges and/or tinted with powdered pigments mixed to Architect's approval.
Coats: 1 coat diluted 10% to bare plaster plus 2 coats diluted 5%.
• or equal and approved.
- 180 WATERBASED PRIMER TO PLASTER INTERNALLY:
- Problem Solving Primer by Blackfriar Paints Ltd of Bristol (tel. 01275 858 108). Use to block- out dark colours or staining after fire, mould growth etc. DO NOT USE ON NEW LIME PLASTER.

LINSEED OIL PAINT FOR WOODWORK & METALWORK

- 250 LINSEED OIL BASED PAINT FOR WOODWORK EXTERNALLY (& INTERNALLY) (ONLY USE INTERNALLY IN SPACES WELL VENTILATED DURING APPLICATION)
- Linal linseed and vegetable oil- based gloss paint as manufactured Potmolen Paints Ltd of Warminster; (Phone: +44 (0) 1985 213960; <http://www.potmolenpaint.co.uk>)
Colour/s: as scheduled or selected by Architect from manufacturer's ranges.
Coats: 1 coat linseed oil Wood Primer on bear timber
2 build coats diluted 5- 10% with pure turpentine
1 full top coat
Additional top coat to sills and weathering members
 - Linseed oil and zinc white exterior eggshell paint as manufactured by Brouns & Co. of Leeds LS25 2AG (Telephone: +44 (0) 1423 500694; <https://linseedpaint.com>)
Colour/s: as scheduled or selected by Architect from manufacturer's ranges.
Coats: 1 coat diluted: 50% paint: 35% raw linseed oil: 15% pure turpentine on bear timber
2 full top coats
Additional top coat to sills and weathering members

OR

PAINT FOR METALWORK

- 260 SOLVENT- BASED PAINT FOR METALWORK INTERNALLY & EXTERNALLY:
- Dulux Trade Metalshield Satin as manufactured Akzo Nobel Ltd :Portland House 26th Floor, Bressenden Place, London SW1E 5BG; Phone:020 7009 5000 (Dulux Trade Datasheet 541); tel. 0333 222 70 70; <http://www.duluxtradepaintexpert.co.uk>).
Primer: Metalshield Zinc Phosphate Primer to prepared ironwork; Metalshield Quick Dry Primer to galvanized and non- ferrous metals; use grey primer
Coats: 1 coat primer onto bare metal Plus 1 full coat primer to all areas
Coats: 2 full top coats (3rd coat over white primer)
Colours: 30 YY 13 035 ('Roman Bronze') or as instructed

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

GENERAL PAINTERS MATERIALS

- 420 WHITE SPIRIT: to comply with BS 245.
- 430 LINSEED OIL: Boiled pure linseed oil to BS 6900.
- 440 KNOTTING: To be best shellac knotting in accordance with BS 1336.
- 450 TURPENTINE: Pure natural turpentine from John Mylands Ltd or equal and approved.
- 460 LINSEED OIL PUTTY: Pure Linseed seed oil putty to comply with BS 544.
- 470 DEEP FILLER:
1. Sikkens Componex HR as first filler.

2. Osmo Water-Based Wood Filler (Clear base or coloured for clear finished wood)
3. Dulux Weathershield Exterior Flexible Filler (water- based)
4. Polyfiller Woodflex Exterior filler (water- based)
Or equal and approved compatible will substrate.
- 480 SPATULA FILLER:
1. Sikkens Kodrin Spachtel as fine surface filler.
2. Potmolen linseed oil-based spatula filler.
3. Or equal and approved compatible with paint finish.
- 490 SOFT INTERIOR WALL SURFACE FILLER:
1. Polycell Polyfilla Smooth Interior filler.
2. Toupret Fine Surface Filler
- 500 ABRASIVE PAPER: Wet and dry mineral paper or sponges or varying degrees down to finest finish paper.
- 510 PAINT STRIPPER: Langlows Safer Stripper or other chemical stripper approved by the CA.
- 520 ADHESIVE FOR PAPER HANGING: To BS 3046 containing fungicide, unless otherwise specified by the lining manufacturer.
- 530 GLUE SIZE: to comply with BS 3357; traditional Rabbit Skin Glue from Old House Store, Henley on Thames (tel. 0118 969 7711, www.oldhousestore.co.uk).
- 540 PRESERVATIVES FOR TIMBER: to be as Section G20r.
- 550 PIGMENTS powdered natural pigments from Old House Store of Henley on Thames (tel. 0118 969 7711) or paint supplier or equal and approved.

STORING AND HANDLING MATERIALS

- 560 STORING PAINTS: Store in dry stable conditions at temperature between 10 degrees C and 20 degrees C limits. Protect paints containing volatile solvents from heat and paints containing water from frost.
- 570 CONTAINERS: All painters' material containers are to be kept securely covered with tight fitting lids when not in use. The Contractor will only be allowed to use materials delivered to the site in sealed cans or drums bearing the name of the manufacturer and properly labelled as to content and quality and free from adulteration.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

590 ORDERING MATERIALS: Obtain liquid materials in containers sized to suit the extent of the work and to prevent the deterioration of residual quantities in opened containers. Maximum generally 5 litres. Order early for non-standard colours and any other non-standard materials.

WORKMANSHIP GENERALLY

600 PRELIMINARY CHECKS: Ensure that the following conditions exist before commencing work:

- a) Timing and sequence arranged to suit programme, other trades and seasonal conditions.
- b) Work by others (that could affect decorations) completed.
- c) Area of internal work weathertight and maintained at temperature and humidity levels similar to those to prevail after the Works are occupied.
- d) Provision for good lighting, equivalent to final designed lighting in colour and direction.
- e) Provision for clean dust free conditions when decorating work is in progress.

610 ORDER OF WORKING: Work in sequence that ensures that finished work is not spoiled by dust and debris arising from subsequent preparatory work. When planning the work, consider the need for heating or drying equipment.

620 ACCESS: Provide and relocate as necessary step ladders, towers, platforms and all other necessary access to suit the site conditions and sequence of work.

630 HEALTH AND SAFETY: At all times and particularly when using solvent-borne finishes, ensure that safe working conditions prevail; provide adequate ventilation throughout the working areas; in relevant circumstances, such as when large areas are being worked on, provide eye protection, gloves and face masks.

640 UNSUITABLE CONDITIONS: Do not apply coatings when:

- a) Air borne dust and grit are present.
- b) Air temperature is below 5 degrees C (or higher limit if coating requires).
- c) Relative humidity exceeds 80 degrees (or lower limit if coating requires).
- d) The surface temperature is too low, (e.g. heavy metalwork, plastered external walls).
- e) There is condensation on surfaces.
- f) Substrates have not dried out.
- g) Lighting is inadequate, particularly when applying specified high quality finishing coats.
- h) There is inadequate ventilation, particularly when volatile coatings are being applied.

650 PROTECTION: Provide and relocate as necessary, adequate clean dust sheets and coverings, to floors, joinery, paintings, mirrors, furniture fittings and fixtures, and to surrounding surfaces both inside and outside; wash dust sheets regularly through out Contract; ENSURE THAT ALL ORGANS, ELECTRICAL EQUIPMENT AND OTHER SENSITIVE OR DECORATIVE FEATURES ARE PROPERLY PROTECTED WITH SEALED COVERS BEFORE ANY PREPARATION OR REMOVAL OF COATINGS IS COMMENCED. Provide temporary weather protection externally to areas being decorated in adverse conditions.

660 ANCILLARY SURFACES:
The descriptions of areas to be coated given in schedules, etc. are of necessity simplified. All ancillary exposed surfaces are to be coated to match similar or adjacent materials or areas except where a fair faced natural finish is required or items are completely prefinished. in cases of doubt obtain instructions from the CA before proceeding.

670 COMPATIBILITY:
Check that all materials to be used are recommended by their manufacturers for the particular surface and conditions of exposure and that they are compatible with each other. Where surfaces have been treated with preservatives or fire retardant, check with treatment manufacturer that coating materials are compatible with the treatment and do not inhibit performance, Inform CA

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

of any discrepancy in specification of coatings and obtain instructions before proceeding with

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.
The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

application.

PREPARATION

- 680 STRIPPING-OFF PAINT is only to be undertaken where instructed by the CA. Stripping is to be kept to a minimum consistent with the removal of loose, flaking or crocodile paint surfaces, or exposing bare wood for repair and leaving surfaces ready for painting. Follow Health and Safety recommendations of the British Coatings Federation, James House, Bridge Street, Leatherhead, Surrey KT22 7EP (tele. 01372 360 660) when removing old coatings, particularly lead-based paints on joinery or metalwork.
- 690 DEFECTIVE COATINGS: Remove flaking, peeling and poorly adhering areas of upper coatings, either to a firm coating or to the original coating, initially by mechanical scraping and sanding. If paint failures are due to some unsuitable condition, such as dampness, of the background, seek directions. Do not strip back to bare timber unless specifically instructed. Do not use chemical or hot air strippers unless specifically instructed.
- 700 METHOD OF REMOVAL OF COATINGS:
- a) Firstly remove all loose and friable paint mechanically using pallet knives and scrapers.
 - b) Prepare a method statement and obtain approval for using hot air or chemical strippers.
 - c) Do not use paint removers that could harm the background.
 - d) Take all necessary precautions for preventing paint removers damaging adjacent surfaces, and obtain approval for the proposed methods before proceeding.
 - e) Carryout trial areas as agreed with CA before proceeding with larger areas.
 - f) Protect surfaces and people beneath from falling scrap.
 - g) Ensure that chemical strippers are completely removed and neutralised before proceeding with decoration.
 - h) Follow Hot Works procedure for use of hot air guns, obtaining a Permit in advance.
- 710 EVIDENCE OF HISTORIC DECORATIVE SCHEMES:
Agree with CA representative areas of approximately 1m² for each type of surface where all existing paint layers are to be retained intact for future reference; record on drawing and hand copy to CA.
- 720 FILLER: Only the bare minimum amount of filler is to be used to bring the surface to level. Filler is not to be used at internal angles in joinery or to make up differences in level between adjacent work. Fill minor defects that become apparent, or persist between coats and carefully rub down. Where existing paintwork is chipped the edges should be rubbed down (not filled) to contour smoothly from one to another.
- 730 EXISTING WOODWORK: Refer to specification Section Z12r Joinery Repairs. Remove defective coatings locally, particularly externally where old paint layers may have lost their key to the base layer or substrate; explore all cracks and blisters with pallet knife or scraper thoroughly. Fill minor cracks, pockets and cavities with putty or soft filler; cut out or rub down filler, snots, paint runs and other minor imperfections. Rub down thoroughly; abrade existing alkyd paint finishes with coarse mineral paper to ensure a good key, particularly for new linseed oil finishes. Feather- down edges of existing paint layers and bring forward repaired or damaged areas with patch primer, undercoats and inter-coat filling to give a smooth even surface. Ensure all panels are free to move in rebates at edges, and all split boards are glued and cramped before decorating. Larger holes are to be pieced-in with timber to match; open joints are to be glued and cramped together. Take care not to damage arises; clean out excessive paint build- up from mouldings; wash down with sugar soap, rinse- off and leave to dry. Bring forward areas of bare timber with primer.
- 740 NEW WOODWORK: Deliver new joinery components to site primed on all surfaces including back face; prime all cut ends on site before fixing. Prepare new woodwork in both internal and external locations by sealing knots and filling shakes. In bare wood use a filling knife or injection

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

gun, and carefully rub- down, subsequently apply fine filler coloured to match surrounding

timber; carefully rub down and wash bare wood; rub- down surfaces with successively finer abrasive paper and wipe off dust with cloth dampened in white spirit or turpentine. DO NOT USE PAINTERS CAULKING/ MASTIC FILLER.

- 750 MASONRY: The surfaces of brickwork, stonework, blockwork or concrete are to be well brushed down with bristle and/or non-ferrous wire brushes immediately before application of decorations. Use soft brushes initially and progressively stronger brushing so as to avoid removing excessive amounts of friable surface. Remove all vegetable matter and treat algae with approved chemical treatment to Spec. F10r. Stabilise friable surface with proprietary sealant if instructed.
- 760 EXISTING PLASTERWORK is to be brought forward to provide a smooth, even surface, free from snots and cavities. All loose and flaking paint is to be removed to sound coating as specified above; do not remove earlier layers where they are sound. Vigorously abrade all remaining emulsion or oil based coatings to give good key and wash down. Allow CA to inspect condition of surfaces before over coating. Minor cracks should be raked out, nail-holes and small cavities etc. should be made good using soft filler applied in thin coats. Minor lumps and existing poorly finished repairs are to be carefully cut back and made good with plaster and/or filler. Thoroughly wash with sugar soap solution and rinse off; allow to dry thoroughly.
- 770 NEW LIME PLASTERWORK: Wipe and dust down; fill any minor blemishes with soft filler or plaster of Paris, rub-down. Do not apply oil-bound distemper, emulsion paint or solvent-based paint to new lime-putty based plasters or renders. Thoroughly wash with sugar soap solution and rinse off; allow to dry thoroughly.
- 780 METALWORK: All metalwork is to be entirely cleaned of grease, rust or scale and touch primed immediately before new painting, whether previously primed or not. All surfaces of new and existing metalwork removed for repair must be delivered to the site cleaned, treated and primed and undercoated at works; all but the final coat should also be applied in the works if possible. Existing metalwork removed for repair should be blast cleaned to SA 2.5 in accordance with specification section Metalwork Repair, unless instructed otherwise. Thoroughly degrease with solvent compatible with coatings and allow to evaporate before decorating.
- 790 IRONMONGERY: Remove from surfaces to be coated and refix on completion. Do not remove hinges or disturb old locks unless instructed to do so; protect if left in situ. Remove all old paint and varnish marks from existing ironmongery unless to be painted over. Thoroughly clean and polish before refixing ironmongery.
- 800 CLEANING: All surfaces to be painted shall be well cleaned before application of any decorative material and all work shall have the number of coats specified hereafter in addition to the preparation and priming and be properly rubbed down and faced up between each coat. Identify the causes of stains and discolouration (e.g. knots, tobacco, bitumen, thermal differences, moisture or mould) and take approved remedial action; prime stubborn stains with Problem Solving Primer, where instructed, in accordance with manufacturers instruction.
- 810 DISPOSAL: Do not dispose of any paint, cleaners or solvents into drains or water courses; comply with the Environmental Protection Act 1990 and contact local authority and/or local Environmental Agency office for disposal procedures and sites.

FINISHING GENERALLY

- 820 GENERALLY: Carry out the painting and decorating in accordance with BS 6150:2006+A1:2014 unless this specification or traditional good practice dictate a better or different standard. Follow manufacturers recommendations in all respects for preparation, application, conditions, drying time, number of coats and finishing. Agree or standards of work with the Architect in advance by preparing sample areas for approval. DO NOT CARRY OUT DECORATIONS AT THE SAME TIME AS OTHER TRADES ARE CREATING DUST – E.G JOINERY WORKS, DRILLING, SANDING OR REPOINTING. SWEEP AND WASH DOWN ALL INTERNAL AREAS

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

BEFORE COMMENCING DECORTATIONS AND ISOLATE FROM OTHER AREAS OF

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.
The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

SITE.

- 830 CONTROL SAMPLES: Prepare sample areas of each type of finish, including preparation, and colour mixing to CA's satisfaction, in advance of the remainder of the work; maintain approved samples as control samples. Samples required for each of the finishes set out in the Schedule of Work.
- 840 TRIAL SAMPLES: Where colours for limewash and distemper finishes are to be mixed on site, and where woodwork is to be stained prior to finishing, carry out trial samples under direction of CA on pre-primed/prepared boards, in order to agree colour for control sample; allow up to maximum of 10 trials for each colour; apply agreed colour to surface in agreed area/s prior to proceeding. Retain sample boards until completion. Note that samples may need to be approved by Employer, Conservation Officer and/or Historic England and the contractor must allow sufficient time for this in the programme.
- 850 MOISTURE: Painting is only to be executed when the surfaces to be painted are perfectly free from moisture of any kind and no paintwork is to be carried out during wet, excessively humid or frosty weather.
- 860 STIRRING: The contents of the cans and drums are to be well stirred before pouring into kettles in order to incorporate thoroughly all the ingredients. Use electric whisk/ paddle mixer for limewashes, distempers and lime paints to ensure solids are evenly distributed. Under no circumstances will the addition of any thinners or dryers of any kind be permitted, unless required by the manufacturer's written instructions. Traditional oil based paints require careful mixing and straining to remove skin. Stir periodically during use and thoroughly at start of each working shift.
- 870 PATCH PRIMING: Where there are marked differences between the condition of the original paintwork, obtain approval to retain sound coatings and redecorate by the process of bringing forward the areas where defective coats have been removed to provide a uniform surface.
- 880 PUTTY GLAZING: Allow putty to set for 14 days, then, within a further 14 days, seal with primer to suit specified system. Ensure that all new putty is fully protected by coating system as soon as it is sufficiently hard. Extend finishing coats slightly on to glass extending each subsequent coat slightly further up to sight line.
- 890 INSPECTION: Prepared surfaces and each coat of paint are to be offered to the CA for inspection before subsequent operations are commenced.
- 900 BRUSH: All paint to woodwork is to be applied by brush, all top coats to plasterwork are to be applied by brush; all limewash, distemper and lime paint is to be applied by longhaired, long handled distemper brush for all coats; all nail holes and other imperfections are to be carefully stopped and filled and carefully rubbed down. On woodwork, brush consistently in same direction; do not over brush. Brush limewash and distemper with long strokes in opposing directions diagonally as well as horizontally and vertically.
- 910 OPERATIONAL COMPONENTS: Do not paint sliding gear, valves, ironmongery, electric switch plates, etc.; cover sprinkler heads or anything else likely to be reduced in efficiency by paint coatings. Do not paint over the edges of switches and sockets or other pre-finished fixtures adjacent to painted surfaces; release plates and protect with masking tape. Primer and undercoats to metalwork to be applied by spray where possible in workshop; all site applied coating to be applied by brush.
- 920 SAMPLING AND TESTING: Should any of the coating materials appear to be defective, arrange for tests in accordance with 47.3 of BS 6150:2006 by an approved testing laboratory.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

APPLICATION OF SPECIFIC COATINGS

- 930 LIMEWASH: Do not carry out limewashing externally between November 1st and March 1st, at other times when temperatures are below 5 deg. C internally or externally, or during hot, dry or windy weather without protected enclosure. Dilute lime putty with clean water in robust container of suitable size for quantities required; thoroughly mix to thin cream with electric whisk. Dilute pigment first in clean warm water until thoroughly stirred; add progressively to achieve colour, noting quantities for future mixture. Thoroughly mix proprietary lime wash with electric whisk. Prepare surfaces by brushing and washing down to remove all loose particles, dust, lichen, etc; ensure all defects in the back-ground (e.g. algae growth, dampness, decay) are rectified. Areas to be treated should be dampened down to cut the suction of the background (apply to new lime render before completely dry). Apply at least four thinned coats of limewash by distemper brush, worked well into cracks and joints, but not allowing it to build up too thickly. Allow each coat to dry out slowly before applying the next, after lightly damping down again. Protect each coat from drying out too quickly.
- 935 SHELTERCOATS are to be applied in a similar manner to Limewash, except that the coats are thicker and not thinned; the wall surface and / or previous coat is to be well dampened before application; protection is essential to prevent too rapid drying. See Specification F21r/900.
- 940 DISTEMPER: Thoroughly mix distemper in decorators kettle before thinning and after addition of water up to maximum 10% water of volume; use electric whisk for mixing. Ensure surfaces are suitable for distemper and thoroughly prepared; damp down. Apply by large soft bristle distemper brush, using diagonal cross and counter- cross sweeping strokes; do not apply too thickly. DO NOT APPLY BY ROLLER. Avoid touching-in.
- 1000 SOLVENT BASED PAINT ON WOODWORK INTERNALLY & EXTERNALLY:
Remove all ironmongery before decorating. Ensure all repair work is complete before decorating. Rub down, wash down, allow to dry; touch-in primer and undercoat to bear patches to existing woodwork. Prime new woodwork with two coats primer in workshop, including all hidden surfaces; undercoat existing woodwork with one coat and new with two, filling with spatula filler between coats; Apply paint by brush in direction of grain/ mouldings with well- charged fine bristle brush; use wedge shaped brushes to cut into edges and against glass. Lap over glass very slightly with each coat but not excessively. Keep thickness of paint as even as possible over all surfaces; do not let excessive paint build up in mouldings, mitres or corners; do not over brush; do not let paint run. Rub down lightly with superfine moistened mineral paper between coats and wipe down; ensure good eggshell finish internally by repeated rubbing down and filling and if necessary additional coat/s. Follow manufacturer's instructions regarding recoating time. Protect final coat until thoroughly dry. Re-fix ironmongery on completion.
- OR
- 1005 LINSEED OIL PAINT TO WOODWORK
Thoroughly prepare existing painted surfaces before painting. Either strip back to bare wood, ensuring that all mouldings and rebates are clean' neutralise' solvent strippers prepare as clause 740.
If existing alkyd paint surfaces are to be retained, prepare as clause 730 ensuring all loose and unstable paint is removed and retained painted surfaces are thoroughly abraded to give good key. Prime all bare timber and retained paint in accordance with manufacturer's recommendations- either special primer or diluted top coat.
Fill any open joints or holes with linseed oil putty or suitable filler after priming. Fill any hairline cracks, small holes and grain with linseed oil- based spatula filler between coats.
Lightly abrade with finishing paper between coats and wipe off any dust with cloth dampened in turpentine.
Apply successive coats evenly by hair brush, carefully cutting into corners and mouldings to ensure even coverage; do not apply too thick.
Drying time between coats will vary considerably with temperature; allow at least 24 hours

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The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

between coats and at least 48 hours for final coat; protect from dust while drying.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.
The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

- 1020 **SOLVENT BASED PAINT ON EXISTING METALWORK INSITU:**
Ensure all repair work is complete before decorating. Thoroughly prepare existing metalwork by scraping and abrading to remove all loose paint and rust in accordance with Spec. Z11r; rub thoroughly with wire wool and white spirit; clean off; immediately degrease and prime. Fill water traps and bring forward areas where paint surface has been lost with one or more coats of undercoat to give a even a finished surface as possible. Apply coatings generally as specified above for new metalwork.
- 1030 **COMPLETION GENERALLY:** Ensure all specified coats have been applied in accordance with manufacturers instruction and allowed to dry fully; touch-in all blemishes and damage; refix and clean all ironmongery, fittings and fixtures; clean all gloss; remove all protection and clean off any accidental splashes; buff-up polished finishes. Present whole of work for inspection in a fully complete condition. If work by other trades is required to follow-on after completion of decorations, ensure all vulnerable areas are protected, especially floor, doors and frames, ironmongery, and remove on completion. Touch in any damage. Ensure that finished decorations are left clean and protected from any possible source of soiling until handover. Leave on site at least 1L of each type of paint used on the project to allow touching-in and colour matching by Employer after completion.
- 1040 **FINAL INSPECTION:** Undertake a thorough visual inspection with the CA of the completed decorations. The general quality will be judged as follows:
a) Satisfactory stopping and filling.
b) Uniformity of gloss, sheen or texture.
c) Uniformity of colour and obscuration of the substrate.
d) Freedom from film defects such as runs, sags, wrinkling, bulking or thinning at edges, entrained dust, dirt or paint.
e) Accuracy of cutting-in.
f) General cleanliness and an overall appearance of the work.
g) Colour applied correctly to decorations schedule. All defects identified during the inspection are to be made good by the Contractor before Practical Completion.

Z11r METALWORK REPAIRS
DRAFT

100 TO BE READ with the Preliminaries, General Conditions, Schedule/s of Work, specifically for this Contract.

105 GENERALLY: This Specification sets out the trade materials and workmanship requirements for the metalwork repairs in the Contract, which must be read with the other Contract Documents, particularly those listed above. The Contractor is required by this Specification to provide details of proposed sub-contractor, conservator/s and/or supplier/s with his tender. Method statements, drawings, samples and other proposals are required at least three weeks in advance of the work commencing. These dates should be indicated on the Contractor's programme.

110 SCOPE: This section deals only with repairs to existing fabric, including structural straps and ties, window ferramenta, balustrades as well as certain new elements of purpose-made metalwork ; any structural metalwork is to be in accordance with the Engineer's specification

MATERIALS

120 MATERIALS GENERALLY: Grades of metals, sectional dimensions and properties to be to the appropriate British Standard, unless the drawings or this specification require a greater or different standard. Where not specified, select grades and sections appropriate for the purpose in accordance with cl. 130. Fastenings to be to the appropriate British Standard and, unless specified otherwise, to be of the same material as the component, with matching coating or finish. If there is a discrepancy between these requirements and the need to follow the existing work or the drawings, the contractor is to refer to the CA for instruction. The requirements of this Specification take priority where they conflict with the relevant British Standard, where this Specification calls for a higher standard.

130 CONTRACTOR'S RESPONSIBILITY REGARDING GRADES OF METALS: When a precise grade or alloy of metal is not specified, the Contractor shall obtain the metal from a specialist supplier or fabricator who shall be informed of the particular application of the metal in the works. By this method, or by otherwise obtaining specialized advice from reliable sources, it shall be the Contractor's responsibility to use the correct material suited to its application in the works.

140 MILD STEEL: The terms 'steel' or 'mild steel' mean steel to BS1 1449-1-:1991, BS EN 10029:1991, BS EN 10155:1993 and /or BS EN 10210-2:1997 as appropriate.

150 STAINLESS STEEL: to be austenitic steel alloy with high chromium and nickel content to BS 970: Part 4.; type 304/ S17 generally for structural elements and fixings or type 316/ S16 where greater corrosion resistance is required; grade selected in accordance with British Stainless Steel Association "Guide to Stainless Steel Specifications".

160 COPPER, PHOSPHOR BRONZE & BRASS: (ie copper alloys) to BS 2860 and BS 2874.

170 WROUGHT IRON: Best quality, low carbon (<1%), true wrought iron formed in the traditional manner in charcoal or coke furnace and hammered to form a laminated structure;

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The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

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in square, rectangular, flat or T bars as required. Recycled iron may be acceptable. Obtain from The Real Wrought Iron Company of Carlton Husthwaite, Thirsk, North Yorkshire (Tel: 01845 501415; Fax: 01845 501072; Email: enquiry@realwroughtiron.com), or equal and approved.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.
The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

- 180 CAST IRON: Grey cast iron of high carbon content (<5%), run in sand moulds in the traditional manner. Obtain from supplier approved by CA
- 185 CAST IRON GRATINGS: Square mesh pattern grey cast iron gratings manufactured by Metalcraft Tottenham Ltd. of London N15 (020 8802 1715; sales@makingmetalwork.com); ref. G055 LCC; sizes: 610mm long x 152mm wide for treads or other widths as required for landings.

MECHANICAL FIXINGS

- 230 FIXINGS GENERALLY: Unless otherwise specified, fastenings to be to the appropriate British Standard and to be in the same metal and finish as the work being fixed. Use countersunk rivets filed-down flush in preference to exposed fixings unless otherwise specified to be demountable.
- 235 ISOLATE FIXINGS of dissimilar metal from components with neoprene washers.
- 240 BOLTS, SCREWS AND NUTS: To BS 4190 for general purposes. To BS 3692 when a greater degree of precision is required. Unless otherwise stated, steel grade 4.6 with matching grade nuts. Where screw heads are visible these are to be domed or raised counter- sunk, with slots NOT Phillips, cross, hex or Possidrive heads, unless otherwise stated; bolt heads to be domed.
- 250 EXPANDING BOLTS: A proprietary fixing comprising corrosion-resistant expanding insert and removable bolt or threaded stud to suit the work being fixed. Note that expanding bolts and not to be used into brickwork and stonework unless stated by the Architect.
- 260 SET SCREWS to BS 4183.
- 270 MACHINE SCREWS: Countersunk Allen key machine screws as shown on the drawings, the heads of which are to be neatly finished on site with brush applied paint to match the powder coating colour.
- 280 SELF TAPPING SCREWS: Steel thread forming or thread cutting screws to BS 4174 with rustproof finish
- 290 CHEMICAL ANCHORS: Where shown on the relevant drawings, the chemical anchors are to be stainless steel threaded sleeve type; the M size bolts and washers are also to be of stainless steel. All bolts to chemically anchored fixings must be removable; any bolts, which are fully bonded, will not be acceptable.

SCOPE OF REPAIRS:

- 300 SCHEDULE REPAIRS: Carry out any necessary opening up work and initial de-rusting and preparation to enable inspection of condition of components. The contractor is then to undertake a detailed review of the repairs in conjunction with the CA; seek instructions confirming of the scope of work, in advance of preparing drawings, ordering materials or commencing repairs.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

WORKMANSHIP GENERALLY:

320 SUB-CONTRACTOR: The metalwork repair is to be undertaken by an experienced and suitably qualified specialist metalworker. Wrought steel or iron to be worked and fabricated by a blacksmith using traditional craft methods in a fully equipped forge. The

work both on site and in the forge is to be supervised by an experienced master craftsman or working foreman. The Sub-Contractor is to be a specialist to be suggested by the Contractor and approved by Architect

340 HEALTH & SAFETY: Comply with all health & safety regulations and restrictions and all requirements of the General Conditions and Preliminaries; take particular care when working at height, dismantling and lifting heavy components, using naked flames and machinery, removing old paints, which may contain lead, and applying solvent-borne paints. Ensure that adequate scaffolding is provided and adapted as necessary for the work and coordinate the requirements of various sub-contractors. Provide all necessary craneage and lifting equipment for large or heavy components. No hot works will be permitted on site

350 ON / OFF-SITE WORKING: Wherever possible, restrict site work to minor repairs and mechanical fixings and other operations that cannot be undertaken off site. Carefully dismantle and remove components from site to workshop for cleaning and repair, unless the repair is of a minor nature or the CA requires historically important items to be retained on site. Dismantle in the reverse order to original manufacture, where this can be determined. Where large structures or elements are to be dismantled, carefully analyse the existing construction and plan the work before commencing. Provide method statement/s to CA for approval in advance.

360 RECORDING: Where structures or elements are to be dismantled and / or removed from site, record photographically and on drawings before dismantling; tag and number each part separately and number on drawings; use zinc or similar numbered tags and metal ties which will not be destroyed during the cleaning process. Dismantle in the reverse order to which it was originally manufactured; dismantling to be carried- out by blacksmith who is to be responsible for reassembly . Keep a photographic record of repairs carried out note on drawings and hand to CA at or before Practical Completion.

370 PROTECTION
Provide adequate protection to all surrounding surfaces when undertaking work on site to protect against sparks during cutting, impact damage, dust, debris and all other risks. Protect metalwork during and on completion of repairs against damage from other operations or trades. Components stored off site during the contract must be properly identified and protected from the weather and damage. Protect during transit and lifting by wrapping with wadding. Do not permit work to rust or otherwise deteriorate between fabrication and final treatment.

CLEANING/ DERUSTING

410 DE-GREASING: Remove all grease and oil by scraping, wiping and washing with detergent. Rinse and dry. Wipe with white spirit and clean cloths. Repeat immediately prior to decorating.

420 MECHANICAL DE-RUSTING: Remove all rust from iron and steel components, using mechanical means in the first instance. Carefully chip, scrape and brush major rust build up, taking care not to damage sound material or joints. Progressively brush with wire brushes back to sound material in order to expose condition of metalwork. For severe

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

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corrosion, use mechanical rotary brushes and needle guns. Finish areas on site with fine wire brushes and emery paper.

- 440 INSITU TREATMENT WITH RUST CONVERTOR: Degrease, wire brush loose rust and treat with Fertan proprietary tannic acid-based rust convertor. Paint or spray on insitu in

accordance with manufacturers recommendations and leave to dwell for 24-48 hours. Brush off and retreat if required. Wash off, prime and decorate when dry. As manufactured by Fertan UK, Hamble. Hants (02380 456 600, www.fertan.co.uk).

- 450 **CLEANING GENERALLY:** Do not remove all paint finishes from a component without prior agreement of CA and before analysis in accordance with cl. 390. Agree extent and method of cleaning with CA before proceeding. Carry out test areas before proceeding. Provide method statement/s for approval of CA. Ensure that all defective and loose paint is removed and all areas requiring repair are exposed. Mask off those areas which are not to be cleaned.
- 480 **480 WET OR DRY ABRASIVE CLEANING OF STEEL & SOUND CAST IRON (NOT wrought iron or fine decorative components):** When instructed, remove all paint and residual rust by carefully cleaning the surface of metalwork with fine grit propelled in pressurized air or water. Carefully control work using the minimum pressure of 40 psi working up to a greater pressure in stages to a maximum of 70 psi. Carry out trial areas first. Carry-out in carefully controlled workshop conditions with vacuum extract for dry abrasive and careful disposal of water for wet. Avoid excessive pitting or damage to the surface of the metal. Do not use Ultra-high pressure water jetting methods. Take care not to damage moulded detail. Thoroughly wash and dry without applying heat to stress metal. When dry, vacuum, de-grease and de-rust and prime immediately. Finished surface to be SA 2.5 to BS EN8501-3: 2007; suitable for decoration in accordance with BS 4232 and Cl. 810.
- 485 **CLEANING OF WROUGHT IRON & FINE DECORATIVE CAST DETAILS:** After mechanical de-rusting to cl.420, carefully removal all residual unstable paint and rust without eroding the surface of the remaining sound metal. If required and surfaces are robust enough, use with very fine grit propelled in low pressure water and air jet. Carefully control work up to a maximum pressure of 50 psi in stages. Follow procedure in cl.480. Finished surface to be SA 1or 2 to BS EN8501-3: 2007; suitable for decoration in accordance with BS 4232 and Cl. 810 or 820 depending upon circumstances or Specification M60/ M60r.
- 490 **SPECIALIST CLEANING:** Cleaning of copper, brass, bronze or other metals to be undertaken by a conservator after trials. Prepare method statement in advance or follow recommendations of pre-tender report. The conservator to be one approved by the CA.

FABRICATION

- 500 **FABRICATION GENERALLY:** Fabricate repairs and replacement components carefully and accurately using traditional craft methods to ensure compliance with design and performance requirements. Agree methods of fabrication and jointing with CA in advance either on site, in workshop or by way of shop drawings as the work demands. Follow the adjoining existing work with respect to component size, construction, jointing methods, style of work and quality of finish. Ensure finished components are rigid, free from distortion and cracks and within specified tolerances. Ensure that the complete installation is plumb and true unless it is following the line of the existing work. Remove burrs, sharp edges and angles, coarse file marks, excess weld metal and similar imperfections from all classes for work. Moving parts must move freely without binding and be suitably lubricated. All external components must be protected from the weather and drain holes

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

made to serve cavities.

- 510 DISSIMILAR METALS: Do not permit contact between dissimilar metals in components which are to be fixed where moisture may be present or occur. Use neoprene washers where necessary to separate metals.

- 520 JOINTS AND FIXINGS to be finished flush, filed- down and filled so as to be invisible, unless otherwise shown or instructed. Form joint faces to fit accurately in full contact. Exposed fixings to be neatly set out at equal centres using hammered, domed or screw heads to match existing. Cross, star or hexagonal type screw heads will not be permissible. The use of adhesive connections of metal to metal will not be acceptable.
- 530 CUTTING AND HOLING: Undertake in a manner that does not deform or damage the material. Generally, cut by shearing or sawing, form holes by drilling or punching. Do not cut or form holes and slots by hand-held flame. Do not use the same mechanical cutting tools for incompatible metals.
- 540 BENDING METAL: Machine bend, press, cold roll, forge or otherwise shape metal without weakening or damaging. Complex bending or bending alloys for special purposes shall be undertaken under competent metallurgical supervision.
- 550 COLD FORMED WORK: Unless otherwise stated, use brake presses or cold rolling to produce accurate profiles with straight arises.
- 560 THERMAL CUTTING OF STAINLESS STEEL: After cutting, grind off material which is liable to corrode.

WELDING AND BRAZING

- 570 WELDING GENERALLY: In accordance with the appropriate BS for the type of metal being joined; by welders who have recently passed the BS welding test appropriate to the metals being joined.
- 580 WELDING/BRAZING GENERALLY: Thoroughly clean surfaces to be joined. Ensure accurate fit using clamps and jigs where practicable. Use tack welds only for temporary attachment unless specified otherwise.
Make joints with parent and filler metal fully bonded throughout with no inclusions, holes, porosity or cracks. Prevent weld splatter falling on surfaces of materials which will be self-finished and visible in completed work. Prevent damage due to incorrect temperatures when carrying out work requiring heat. If necessary undertake heat treatment to provide stress relief. Apply quality control procedures with a suitable inspection and testing regime for welds serving stressed or critical duties.
- 590 WELDING OF STEEL: Metal arc welding to BS 5135, or other methods subject to approval.
- 600 WELDING OF STAINLESS STEEL: TIG welding to BS 3019: Part 2, or other methods subject to approval. Use double bevel butt welds, backing bars to remove heat, jiggling, tack welds and any other measures necessary to minimize distortion. Remove slight distortion by light hammering, taking care not to damage surface finish.
- 610 BRAZING: To BS 1723.
- 620 BRONZE WELDING: To BS 1724.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

WELDING OF ALUMINIUM: Provide sheltered draught-free conditions.

630

FINISHING WELDED/BRAZED JOINTS:

Remove all traces of flux residue, slag and weld spatter. Butt joints which will be visible

in completed work to be smooth, flush with adjacent surfaces. Fillet joints which will be visible in completed work to be executed neatly. Grind smooth where specified.

WROUGHT IRON REPAIRS

- 640 GENERAL REPAIRS AND ALTERATIONS: Carry out in workshop conditions; degrease and de-rust to clauses 330- 340. Repair breaks and build up wasted sections in real wrought iron using traditional welding techniques. Avoid working adjacent to existing joints and rivets. Remake defective joints to match existing. Modifications, where specified, may be carried out in stainless steel of same sections as existing but welded. Grind down and finish repairs flush.

CAST IRON REPAIRS

- 640 INSITU REPAIRS: Minor repairs can be carried out on site in controlled conditions. Clean off rust and paint locally in accordance with cl.s 330-340 realign the fractured members and hold in place with jigs or bracing; remove gates from hinges to work on them flat. Breaks in principal members (>6mm thick) to be mechanically repaired by stitching or strapping. Smaller members (<6mm thick) may be welded if conditions are suitable. Do not use welding on principal structural members. Fill voids and wasted members. Carefully finish-off repairs; immediately prepare and prime.
- 650 OFF-SITE REPAIRS: Where components can be removed to workshop, follow procedures in cl.s 270-280. Carefully dismantle into component elements; number and record each; access strength and condition of each and agree repair or replacement with CA. Follow construction and jointing techniques of original work.
- 660 WELDING FOR CAST IRON: Carry-out only where mechanical techniques are unsuitable and on smaller members (<6mm) using low temperature metallic bond (gas) welding techniques. Carefully control application of heat to avoid distraction or fracture.
- 670 METAL STITCHING OF CAST IRON: Carry-out to fractures in principal structural members (>6mm) using proprietary system. Clean and prepare member; realign fracture accurately on bench and hold in clamps or jig. Drill holes either side of fracture at equal centres as recommended for size of member (min 50mm). Tap and fill with interlocking studs of nickel alloy or stainless steel which bridge the fracture. Grind down and finish flush with surrounding metalwork.
- 680 STRAPS AND BRACES: At multiple breaks or where members are wasted, fix stainless steel straps to one or both sides. Drill member at equal centres (min 50 mm) in two rows, staggered for longer members. Fix with through studs, ground down and finished flush with face. Straps to be full depth of member and wherever possible, concealed within the wasted original thickness.
- 690 FILLING: Where members are corroded but have at least 75% of their original thickness remaining (50% for non-structural secondary members), build-up to the original thickness using metal filler. Fill all hollows and water traps and finish flush following original profile. Use proprietary epoxy-resin and steel particle mixture.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

REPLACEMENT CASTINGS: Where instructed that original members are unserviceable, provide replacement castings can be taken by making a mould from a matching existing component. Clean off all paint finishes and fill pits and imperfections before making a mould. Otherwise from a wooden pattern to replicate the lost or broken component. Form

sand moulds in traditional manner, allowing for shrinkage and cast from moulton grey iron. File down joins and fill pits.

SPECIFIC CLAUSES

720 **EMBEDDED IRONWORK:** Any redundant iron pins which are embedded in wall are to be removed and discarded unless doing so would damage the surrounding masonry unduly. Take out built- in ironwork, e.g. window ferramenta, where it is corroding and causing damage to the surrounding masonry. De-rust and treat with rust inhibitor. Where tips are severely corroded cut off and tip with stainless steel bar of the same section. Form welded butt joint 12mm outside the masonry face. Flush out masonry pocket and repair any associated damage. Prime and decorate metalwork and re-fix into pocket with lead wedges or lead wool packing and grout in lime mortar.

730 **IRONMONGERY:**
All existing ironmongery and its position is to be recorded prior to removal for overhaul or cleaning and retained securely on site. Items may only be removed from site with the written permission of the CA.
Where specified metalwork to be thoroughly cleaned, manually, to remove all scale, corrosion and paint finishes.
Redecoration of joinery should generally be undertaken prior to the reinstatement of existing ironmongery.
Ironmongery to be replaced in original position unless otherwise directed by the CA, making good surrounding materials
New fixings to be used for fitting of existing ironmongery of same material; unless specified otherwise use slot headed semi- domed counter- sunk screws.

FINISHING AND PROTECTING:

790 **PREPARATION:** Remove all burrs and sharp arises which would be visible after fixing or a hazard to the user. Make good all defects which would show after application of coating and finish surfaces smooth. Protect against damage, dirt, moisture and other deleterious substances. Clean off all rust and degrease immediately prior to treating surface.

COATINGS

795 **GENERALLY:** In addition to specified surface finishes, treat or seal all the surfaces of metalwork, including these to be permanently hidden parts from deterioration and corrosion
(excluding interior of standard hollow sections).

796 **PRIMERS:** As specified in Section M60.
Apply after fabrication is complete and all fixing holes have been drilled, unless otherwise specified.
Before applying coating remove all paint, grease, flux, rust, burrs and sharp arrases wash galvanized surfaces with Maudant solution.
Make good all defects which would show after application of coating and finish surfaces smooth.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

PREPARATION FOR APPLICATION OF COATINGS

- General: Complete fabrication, and drill fixing holes before applying coatings.
- Paint, grease, flux, rust, burrs and sharp arises: Remove.

GALVANIZING

- Standard: To BS EN ISO 1461.
- Preparation:
 - Vent and drain holes: Provide in accordance with BS EN 14713-1 and -2. Seal after sections have been drained and cooled.
 - Components subjected to cold working stresses: Heat treat to relieve stresses before galvanizing.
 - Welding slag: Remove.
 - Component cleaning: To BS EN ISO 8501-3.
 - Grade: St 2.

800 SPECIALIST HIGH PERFORMANCE PAINT SYSTEM:

PAINT SYSTEMS TO BE SUPPLIED BY: Sherwin- Williams Ltd (formerly W.J. Leighs) of Tower Works, Kestor Street, Bolton BL2 2AL (Tel: 01204 521 771); Data sheets and other further information are available on the following website -www.sherwin-williams.com; follow the manufacturer's Coatings Specification M1 and guidance sheets.

810 PAINT SPECIFICATION FOR BLAST PREPARED IRONWORK TO STANDARD SA 2.5 IN WORKSHOP

PAINT COAT	SPECIFICATION	PRODUCT CODE
Primer Coat (first coat brush applied on cast iron)	1 Coat 'Macropoxy' Epoxy Surface tolerant primer (See note A&B below)	M902
Primer Coat (second coat- spray applied)	1 Coat 'Macropoxy' Epoxy Surface tolerant primer (See Note C)	M902
Mid Coat (spray applied)	1 Coat 'Macropoxy' Epoxy high-build undercoat Micaceous Iron Oxide (MIO)	M905
Top Coat For Semi gloss Finish	2 Coats 'Acrolon' Acrylic Urethane (See Note D)	C7300

Note A: First primer coat to be applied with a brush and stippled in to surface of iron

Note B: Can be thinned to a maximum of 10% using cleansing thinner No.5

Note C: Subsequent coats to be spray applied in workshop under controlled conditions

Note D: Final top coat to be applied by brush on site; not required to areas to be concealed.

820 PAINT SPECIFICATION FOR PREVIOUSLY DECORATED IRONWORK INSITU

PAINT COAT	SPECIFICATION	PRODUCT CODE
Primer Coat (first coat brush applied to touch-in bear areas)	1 + 1 coats 'Macropoxy' Epoxy Aluminium -(See Notes A and B)	M902
Mid Coat	1 Coat 'Macropoxy' Epoxy high-build undercoat Micaceous Iron Oxide (MIO) (Note C)	M905
Top Coat For Semi-gloss Finish	2 Coats 'Acrolon' Acrylic Urethane (Note E)	C7300

Note A: First primer coat to be applied with a brush and stippled in to surface of iron

Note B: Number of primer coats as necessary to build up areas flush with surrounding existing paint

Note C: Carry out a trial areas on the existing decorations and leave to dwell for 2-3 hours to test for reaction.

Note E: All coats to be applied by brush on site.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

830 PAINT COLOUR: TBA

Supply sample before proceeding; supply at least 1no. full 2.5l. can to client for touching in after Practical Completion.

CLIVEDEN

CONSERVATION

- 840 Inspections will be made after each paint coat is applied to ensure that full and effective coverage has been achieved.
- 850 The Contractor may submit an alternative paint specification in his method statement for approval in advance. Any alternative paint suggested should be of a quality to provide a minimum of seven years before top coat maintenance painting is required.
- 880 DECORATIONS: to be carried out in accordance with Specification M60r. Carry out trial areas in advance. Metalwork should be installed with primer and undercoats applied in workshop. Touch up any damage after fixing but before over coating. Present-work to CA for inspection before over coating.
- 890 Prior to painting the ironwork and existing painted surfaces *insitu* should be cleaned of all loose dust or corrosion. Thoroughly degrease with solvent compatible with coatings and allow to evaporate before decorating
- 900 Existing structural metalwork exposed for repair should be needle gun cleaned *insitu* to SA 2.5 in accordance with specification, unless it is too fragile and instructed otherwise by CA
- 910 IRONMONGERY: Remove from surfaces to be coated and refix on completion. Do not remove hinges or disturb old locks unless instructed to do so; protect if left *insitu*. Remove all old paint and varnish marks from existing ironmongery unless to be painted over. Thoroughly clean and polish before refixing ironmongery; protect during decoration and until practical completion
- 920 After the application of the first primer coat, any surface defects such as pinholes, cavities or craters in the cast or wrought iron shall be filled with appropriate synthetic filler, which is compatible with the paint system to be used. All potential water traps in water leaves, collars or laminated bar sections are to be filled with inert filler such as Sikaflex 221 adhesive sealant after the mid-coat painting. Note: Alternatives to this sealer filler must be approved by the CA and be compatible with the paint finish.
- 930 All potential water traps in the waterleaves are to be filled with an appropriate filler material. The filler should prevent water being allowed to access the joint between the leaf and the scroll bar and should be formed in such a way as to allow easy evaporation of standing water from the recessed areas; seek clarification as to the amount of filler to be applied or the method to be used if in doubt.
- 940 The filled areas are to be rubbed down to a finish matching the surrounding area.
- 950 All disassembled items of ironwork including decorative work should be painted separately up to mid-coat stage before these elements are reassembled, to ensure adequate protection is afforded from paint in potentially inaccessible areas. Retouching of mid-coat and topcoat should be applied after final fitting.

Z21r MORTARS AND POINTING

GENERAL REQUIREMENTS

- 100 READ with Preliminaries, Schedule of Work, Drawings (as appropriate) which have been prepared specifically for this Contract.
- 105 GENERALLY: This Specification sets out the trade materials and workmanship requirements for the repair work in the Contract, which must be read with the General Conditions and other Contract Documents, particularly those listed above. the Contractor is required by this Specification to provide details of proposed sub-contractors or suppliers, these must be supplied with his tender. Where method statements, drawings, samples and other proposals are required, these must be supplied at least three weeks in advance of the work commencing. These dates should be indicated on the Contractor's programme.
- 110 DEDICATED TEAM: The successful use of lime mortars requires a special level of skill and understanding and therefore all sample panels, repairs and pointing are to be carried out by the same dedicated team, who are to be experienced in traditional craft skills, the use of lime and current conservation techniques. New operatives joining the team are to carry out a range of samples for approval by CA before commencing work on the main works. The team must be supervised by a competent and experienced foreman, who could be a working foreman.
- 115 PROGRAMME: Lengthy periods are required for preparation, application, curing, setting and protection of lime mortars; the Contractor must therefore allow for this in his programme. Mixes must be agreed on site in advance by trial and error, and sample panels produced for approval, and this preliminary work must also be indicated on the Contractors programme.
- 116 HEALTH & SAFETY: Comply with all current health and safety regulations and restrictions and all requirements of the General Conditions and Preliminaries; take particular care with the slaking, storage and use of hot lime, and the removal of old lime plasters, ensuring that all operatives use adequate protective clothing and equipment.

MATERIALS: CONSTITUENTS

- 120 MATERIALS GENERALLY: This Specification covers the laying and pointing of brick and stonework as well as 'plastic' mortar repairs, which are generally to be carried out on a like-for-like basis, using lime- based mortars; the use of cement based is to be restricted to new elements of work as scheduled/ specified elsewhere, or to repairs only where specifically instructed by the CA in writing, and are specified elsewhere.
- PURE LIME PUTTY: Mortar grade lime putty, ready prepared to BS EN 459-1 from CL.90 high calcium, non-hydraulic quick lime ('air lime'); burnt in a traditional coal-fired kiln; fully slaked, run to putty and matured for not less than 90 days; density when matured to be 1.3- 1.4 kg/l. To be delivered and stored in sealed containers in an excess of water as long as possible to exclude air and be air-tight. From time to time draw off 'water' from surface and retain, stored separately, for use elsewhere. Type to the following or otherwise as instructed by the CA before ordering:
 - Non-hydraulic superfine lime putty slaked from fine grade quicklime, matured for a minimum of 12 months available from: Rose of Jericho Ltd (T: 01305 237619; E: info@roseofjericho.co.uk; www.roseofjericho.co.uk) or equal and approved.
Type: Singleton Birch Mortar Grade Chalk Lime Putty

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

CLIVEDEN

CONSERVATION

- 140 HYDRAULIC LIME: Hydrated naturally hydraulic lime, properly slaked, sieved and free of lumps to BS EN 459-1. Inspect on delivery and before use; discard all damaged bags. Moderately and feebly hydraulic lime, as specified or instructed, Hydraulic lime only to be used in exposed positions or for out of season working where specifically instructed. Type to be or otherwise as instructed by the CA before ordering:
- Astier NHL 3.5 available from Rose of Jericho Ltd (T: 01305 237619; E: info@roseofjericho.co.uk; www.roseofjericho.co.uk) or equal and approved

- or equal and approved.

- 150 READY-MIXED LIME AND SAND: Ready-mixed to BS EN 998-2:2016, covered and kept for at least 1 hour before use. Coloured mortar, where required, to be made using a proprietary coloured ready-mixed lime:sand, colour to approval where not specified. Available from:
- Rose of Jericho Ltd (T: 01305 237619; E: info@roseofjericho.co.uk; www.roseofjericho.co.uk) or equal and approved.

To be stored in sealed airtight containers, kept away from extremes of temperature.

- 160 PROPRIETARY REPAIR MORTAR: Ready – mixed hydraulic lime and aggregates repair mortar; self- coloured to match existing stone; consult manufacturer as to suitable product for application. SUBJECT TO CONFIRMATION

- St Astier ST- ONE (Lithomex) stone restoration and repair mortar supplied by Masons Mortar Ltd, Unit 14, Landmann Way, London SE14 5RL (Tel: 0207 394 6700; www.masonsmortar.co.uk)
- Unilit 35 repair mortar supplied by Telling Lime Products Limited, (Tel: 01902 789 777. Fax: 01902 398 777. Email: info@telling.co.uk Web: http://www.telling.co.uk)
- or equal and approved.

- 170 SAND: To BS EN 13139 (2013), unless specified otherwise. To be clean, well graded, sharp, pit or freshwater sand, free from loam, salts and other impurities. Sands used throughout works are to be from the same source as those used in approved samples. Different loads to be mixed if necessary to ensure consistency of colour and texture. To be stored on free-draining base away from trees and covered with tarpaulins.

- 175 SANDS: Provide samples of sharp sand from local suppliers/ quarries and/ or the following sands listed below for preparation of sample biscuits and sample pointing panels; select and sieve sands as required to match the existing mortar in colour and texture in each location; compare with analysis of the existing mortar samples when binders dissolved; receive instruction from the CA and obtain supplies of sand for mortar/s for the works to match approved sample.

List of Sands for samples:

Yellow/ light brown:

- b. Sutton Courtenay Quarry, Appleford, Abingdon, Oxfordshire OX14 4PP (tel. 0330 123 0763; Southwestaggregatesales@uk.heidelbergmaterials.com)

Grey/ whiter sand

- c. Portfield quarry, Chichester- Tarmac Quarry Products Southern, Shepperton TW17 0NF (tel. 01932 568 561)

OR other local sands to be suggested by the supplier/ contractor

- 180 GRIT: Clean, well-washed and graded sharp grit to produce a properly graded

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

CLIVEDEN --- CONSERVATION

aggregate mix with sharp sand (2.36 - 1.18 mm).

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.
The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

CLIVEDEN

CONSERVATION

- 185 AGGREGATE: Concreting aggregate from same quarries as sand, sived to 6mm down or required size; clean, well graded, sharp, pit or freshwater quartz sand, free from loam, salts and other impurities.
- 190 STONE DUST: Portland Stone dust or a stone to match the surrounding masonry, ground below 850 microns, clean well washed.
- 195 STONE PARTICLES: Crushed Portland Stone or a stone to match the surrounding masonry, crushed in to particles 6mm down; clean, well washed and graded.
- 200 CHALK OR OTHER AGGREGATES: As specified in Schedule of Work or analysis report to match existing mix; clean, well washed and graded..
- 210 BRICK DUST: Finely ground dust from red rubber bricks specifically prepared for purpose; supplied by Bulmer Brick and Tile Ltd of Suffolk or equal and approved.
- 215 POZZOLAN FOR OUT OF SEASON WORKING: Argical Metakolin additive made from fired English China Clay and available from Rose of Jericho (tel: 01935 83676) or equal and approved with proven hydraulic properties.
- 220 WATER: Clean, pure and obtained from mains supply. Tested to **BS 3148** if required. To be conveyed and stored in clean containers. Containers should not be used for any other purpose.
- 230 ADDITIVES: No plasticisers, workability agents, anti-freeze compounds, air entrainers or other additives shall be used.
- 235 HAIR: Natural ox or goat hair free from grease, washed, cut and bound into bundles; cut to approx. 50mm lengths and to approval of the CA. Quantities given in mixes are minimal.
- 237 MANMADE FIBRES: Polypropylene Fibre - 18mm - 0.91kg bag; 12-18mm long monofilament polypropylene fibres added to Lime Plaster and Render to reduce shrinkage and cracking whilst adding reinforcement and strength. available from. Chalk Down Lime Ltd. (Phone: 01580 830 092; Email: sales@chalkdownlime.com ; Office & Yard: The Lime Yard, Staplecross, East Sussex, TN32 5RP) or equal and approved.

MATERIALS: PROPORTIONS OF MIXES

- 240 LIME MORTARS GENERALLY: All constituent materials and mix proportions are to be agreed with the CA on site after carrying-out samples for approval. A degree of experimentation will be necessary on site in order to achieve the most suitable and workable mix or mixes. The Contractor must allow in the programme for these trials to be carried-out in conjunction with the CA. The assumption is that mortars will be based upon lime putty or hydraulic lime, rather than cement binders and the Contractor must take account if this in the programming of the work and the need for protection.
- 250 SAMPLES OF EXISTING MORTARS:
The Contractor must allow for taking samples of existing bedding mortars in each different condition where re-pointing has to be carried-out. Dispatch samples for testing to Rose of Jericho or another approved laboratory and forward the results to the CA for instructions. Test report to give proportions and details of the type/s of binder and aggregates in the existing mortar.
- 260 GUIDANCE MIXES FOR STONework: The mixes given below are for guidance only at

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

CLIVEDEN --- CONSERVATION

tender stage; exact mix proportions will be determined on site after approval of samples etc.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.
The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

CLIVEDEN

CONSERVATION

S1a FOR LAYING LIMESTONE GENERALLY/ EXTERNALLY/ LOAD BEARING: 1:2 1/2, NHL 3.5 Naturally Hydraulic lime : sharp sand (particle size to suit joint width and selected for colour).

S1b FOR LAYING LIMESTONE 1:3, Mature Lime Putty: sharp sand (particle size to suit joint width and selected for colour); pozzolan when required to cl..215

S2 FOR BEDDING CRAMPS AND DOWELS: 1:2, NHL 3.5 Naturally hydraulic lime: Fine sharp sand.

S3a FOR POINTING LIMESTONE ASHLAR EXTERNALLY: 1: 1: 1 ½, NHL 2 Naturally Hydraulic lime : sharp sand (sieved down to suit joint width and selected/ mixed for colour): Portland stone particles/ dust (size selected to suit joint width).

S3b FOR POINTING SOFT LIMESTONE/ MOULDINGS/ INTERNALLY : 1: 1: 2, Mature Lime Putty: sharp sand (particle size to suit joint width and selected for colour): Portland stone particles/ dust (size selected to suit joint width).

S4 FOR BEDDING FLAGS EXTERNALLY: Semi dry mix of 2.5 parts Sharp sand : 1 part NHL 3.5.

S5 FOR POINTING FLAGS EXTERNALLY: 3 parts sharp sand (sieved down to suit joint width and selected for colour): 1 part Naturally hydraulic lime NHL 3.5 : 0.5 parts stone dust to match flags.

S6 FOR POINTING WIDE JOINTS & CHASES ABOVE LEAD FLASHINGS: 1 part Lime Putty: 2 parts Sutton Courtenay course sharp sand; add grit for very wide joints sized to suit joint; add animal or glass fibres to allow for movement.

- 265 SPECIALIST MORTAR FOR POINTING LIMESTONE COPINGS AND SKY-FACING SURFACES: Unilit 30 waterproof hydraulic lime pre-mixed mortar with 3mm down aggregate from Telling Lime Products Limited, Primrose Avenue, Fordhouses, Wolverhampton, WV10 8AW. Tel: 01902 789 777. Fax: 01902 398 777. Email: info@telling.co.uk Web: <http://www.telling.co.uk/>
SUBJECT TO CONFIRMATION

- 275 SAMPLES OF POINTING MIXES: Samples are to be approved before ordering bulk materials, in the first instance, on the basis of broken biscuit samples. The contractor will be expected to produce variants on the basic mixes given above, slightly altering proportions of constituents to achieve a suitable match with the existing.

Allow for up to 10no. variants on each mix type quoted above or in the Schedule of Work. Dry broken samples are to be stored on site for reference, clearly marked and protected until Practical Completion. Ensure executed work matches approved samples by careful control of on-site mixing or by ordering ready-mixed mortar.

WORKMANSHIP:

- 280 PREPARING MORTARS:

Keep plant and banker boards clean at all times.

Measure materials accurately by volume using clean gauge boxes made to sizes to suit volumes required. Overfill gauge boxes and strike off excess material with straight edge.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

CLIVEDEN

CONSERVATION

Proportions of mixes are for dry sand; allow for bulking if sand is damp. Where a range is

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.
The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

given (e.g.1:1:5-6), use higher value for well graded sand (Grade S sands) and lower value for coarse or uniformly fine sand (Grade G sands).

Mix materials thoroughly so that all individual constituents are incorporated evenly to a consistency suitable for the work and free from lumps.

- 290 LIME: Coarse stuff to be prepared as early as possible and storage time to be as long as possible and no less than two weeks. To be stored in sealed airtight containers and kept away from extremes of temperature. Ensure all pure lime putty is well sieved and well beaten or rammed into the mortar mix to ensure thorough mixing. No pure lime pieces will be acceptable in the mix. At each stage the constituents are to be consistently mixed, well rammed and beaten and should contain the minimum of water
- 300 HAND MIXING of mortar will be permitted only with the approval of the CA and where small quantities are required. Where approved, carry out on a clean hard platform. Thoroughly mix all other materials prior to the addition of water which is to be sprayed from a watering can fitted with a rose. Add only sufficient water to make the mix workable but stiff not sloppy.
- 310 MECHANICAL MIXING: Mix mortar in a mechanical mixer of a size suitable for the quantities required in one batch. Use horizontal paddle mixer for lime mortars. Mix continuously, for a minimum of 15 minutes, after the addition of water to hydraulic mix, until a homogeneous plastic mix is obtained. No water is to be added until all other materials have been thoroughly mixed in the mixer. Add only sufficient water to make the mix workable. Wash out mixer 4 times daily if in continuous use; do not use the same mixer for cement- based mixes.
- 320 HYDRAULIC ADDITIVES FOR OUT OF SEASON WORK: Add 'Argical' pozzolan (obtained from Rose of Jericho or equal approved) at rate of 5- 10% by volume to mortar; mix thoroughly mechanically ; use mortar within two hours of addition of hydraulic material when mixing at normal temperatures. Do not use after the initial set has taken place and do not re-temper. (Brick dust from Bulmer Brick and Tile or other pozzolanic material may be used as instructed).
- 330 PLASTICISER: Plasticisers are not to be used in mixes.
- 340 PREMIXED MORTARS: Where specified obtain pre-mixed mortars from supplier and store in air tight sealed containers until use. Empty required quantities onto clean board or paddle mixer and work up by hand before use; allow excess liquid to be absorbed by the board or evaporate off before use.

WORKMANSHIP: POINTING AND REPOINTING

- 350 GENERALLY: The scope of pointing and re-pointing work to be described in the Schedule of Work and on the Drawings. Confirm the scope of work with the CA before proceeding. Carry-out pointing to new work and re-pointing of surrounding masonry in one operation to give consistent appearance across existing and repairs.
- 360 WORKING SEASON: Do not carry-out work with ungauged lime mortars between the end of October and the beginning of March. Do not carry-out external work when the air temperature is below +3°C on a falling thermometer or +1°C on a rising thermometer or while materials or background are frozen. Monitor internal temperature during cold weather.

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

CLIVEDEN

CONSERVATION

- 370 SAMPLES PANELS: Prepare sample panels in agreed location(s) 900 x 900mm approximately, for each condition and each type of joint/colour required. Submit

CLIVEDEN

CONSERVATION

panel(s) first raked out and prepared for re-pointing. When this stage is approved point panel(s) using the approval mortar (see Clauses 260 & 265) and obtain further approval before proceeding. Retain and protect sample(s) for reference until Practical Completion and ensure executed work matches the panel(s). Any work not complying with the standard established in the sample work is to be removed and redone at the Contractor's expense. Note that it may be necessary for the CA to obtain approval from the Local Planning Authority, English Heritage or funding body for the sample panel(s) and the Contractor should prepare them well in advance of the work commencing. Indicate on the Contract Programme.

- 390 CUT OUT existing joints in brickwork and stonework for re-pointing to depth at least twice their width and leave cavity clean with a square face to the remaining old mortar, and no mortar remaining to the sides of the stone/brick. Take great care not to damage arises of adjacent bricks/stones when cutting out or raking out. Use only hand tools approved by the CA before any work is done such as fine chisels, fine toothed saw blades, hooked knives or small drills. Joints to be cut out only by skilled craftsmen under direction of competent mason, experienced in type of work to be tackled.
- 400 DEEP REPOINT: Where specified existing joints to be raked out to a minimum depth of 38mm for re-pointing, work sequenced as required to maintain integrity of structure.
- 410 HARD POINTING: **Removal of cement pointing:** Rake out loose cement from joints using a hooked knife blade or pointing spatula. Where cement pointing is solid, manually drill 2mm holes along centre of joint at 50mm centres and carefully cut out remaining cement using a 6mm chisel and mallet.
Where adjacent stones or bricks have weathered back, leaving projecting cement mortar, gently pick off with a 6mm chisel and mallet. Work methodically along the line and break each piece into the cleared joint, ensuring arises are not damaged. Rake out and repoint as Clauses 390 and 460.
Specialist mechanical cutting tools may be used with prior written approval after trials; DISC CUTTERS WILL NOT BE PERMITTED.
- 430 TREATMENT OF ORGANIC GROWTHS: Treat organic growths with fungicidal wash to control dry rot, algae and organic growths allow to dry and brush off remaining organic matter. Use only biocides recommended for the purpose and cleared under the Control of Pesticides Regulations 1986, EU Biocides Regulations, Control of Pollution Act 1974, The Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2010 (as amended).
- 445 LOOSE AND REPLACEMENT STONES: Carry out all repairs in accordance with Spec. F21r before repointing; carefully remove loose bricks/stones. Clean out cavity and wash with water to remove dust, pre-wet adjacent material and re-set removed or replacement stones in a full bed of mortar. Set stones to follow adjacent course lines/to a true and level line and as directed by the CA.
- 450 CLEAN JOINTS: Carefully clean out joints to full depth with a bristle brush, then air hose or vacuum cleaner to remove all loose material. Wash out cleared cavities with fine gentle spray of water working downwards from top of wall, protecting the level below. DO NOT WASH WALL WITH TOO MUCH WATER OR ALLOW DUST TO BE WASHED OVER FACE OF ASHLAR OVER HEIGHT OF WALL.
- 460 REPOINTING GENERALLY: Begin from top of wall. Do not begin repointing until all masonry repairs, all cutting and raking-out and all cleaning-out has been completed and approved by the CA.
Immediately before repointing flush out joints with water to remove all dust and to control suction. Wet surface until it remains wet. In dry conditions keep it damp as work

For the Conservation of Statuary, Masonry, Plasterwork, Wall Paintings & Decorative Arts.

The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

CLIVEDEN

CONSERVATION

proceeds to prevent dewatering of the mortar. While damp fill joint with specified mortar using narrow headed tool to suit joint width. Thoroughly compact mortar to fill all voids

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The Tennis Courts, Cliveden Estate, Taplow, Berks, SL6 0JA

and to ensure mortar adheres well to each side of joint. Iron mortar in with pointing tool that neatly fits the full joint width (not trowel), keeping finished mortar face back from damaged arises and to width of original joint. Use mortar as dry as possible and avoid smearing mortar over face of stone. Remove excess mortar immediately from adjacent faces and protect the work from rapid drying out and rain.

Pointing profile is to be slightly recessed (approx 2- 3mm) from the face of the wall to reveal arises.

Use waxed twine as a backing gasket where joints prove hollow beyond the specified re-pointing depth. Narrow joints may not be widened to make re-pointing easier. Voids in the re-pointing will not be acceptable.

- 470 REPOINTING FINE JOINTS: For filling fine joints less than 3mm wide use one of the following methods as appropriate and agreed with the Architect.

‘Adhesive tape method’: Apply 50mm wide heavy-duty tape over the joint. Slit tape with a sharp knife along centre of joint. Push mortar with pointing iron through slit in tape and compact. Peel away adhesive tape.

[OR]

‘Putty sandwich method’: Spread finely screened lime putty in a strip on a sheet of thin polyester film. Lay second polyester sheet on top to form sandwich. Insert sandwich into joint. Hold mortar in position with pointing iron whilst withdrawing top sheet of film, and then bottom sheet. Compress newly placed mortar with pointing iron. Trim off surplus mortar with the end of a sharp, bent knife blade.

[OR]

‘Pointing gun with modified nozzle method’: Adapt nozzle of a proprietary mortar gun by sweating on a piece of sheet copper 2mm across, 10mm wide and 25mm long. Fill gun with mortar of 2 parts lime putty and 1 part silver sand. Insert nozzle into joint and squeeze mortar into joint filling the back of the joint in first. Tamp the mortar with thick wire when the joint is half full and upon completion.

- 480 REPOINTING STANDARD AND WIDE JOINTS more than 3m wide: Cut out and prepare as specified above and instructed on site by the CA. Thoroughly compact the mortar into the joint to fill all voids and ensure it adheres to each side of the joint. Iron- in the mortar using appropriate pointing tools of same width as joint. The work is to be carried-out by skilled craftsmen who have previously prepared the sample panels. Ensure a range of suitable pointing irons are available for the work. Pointing must not be undertaken using brick-laying trowels.

- 485 REPOINTING WIDE JOINTS TO LEAD FLASHINGS: Lead to be screw fixed into back of min.25mm deep recess/ chase in accordance with Specification H71r. Upper surface of lead within chase to be isolated with ‘Frog’ type marking tape. Deep pack the joint with haired mortar in two or more layers; add hair by teasing out and adding slowly just before use, at rate recommended by supplier. Ensure key between layers; protect while curing to ensure slow drying out and tend by pushing back. Brush surface to expose aggregate just before final carbonation. Cut back excessive marking tape where visible.

- 490 ASHLAR STONEMASONRY POINTING: Iron in mortar with pointing tool (not trowel) of width to suit joint width. Press mortar into joint and strike off flush, keeping mortar off face of stonework.

- 500 REPOINTING SKY FACING JOINTS WITH SPECIALIST MORTAR: Rake out all deteriorated joints and open joints to be pointed, using fine-toothed saw blade or hooked

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knife blade, for the full height of the joint and to a minimum depth of 2x width.

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All prepared joints, by whatever method, must leave a clean square face at the back of the joint to provide optimum contact with the mortar. All joints on completion of raking or cutting out will be washed and brushed clean of all debris and loose material before progressively wetting the stonework as pointing proceeds.

Product reference: Unilit 30 waterproof hydraulic lime mortar.

Preparation: The substrate must be clean and free of all traces of oil and grease. When the substrate has been treated with an impregnating product (silicones or similar) it is recommended to consult the supplier or manufacturer.

Application: Mix Unilit 30 with clean water - 4.5 to 5.25 litres of water to 30 kg of powder depending on the temperature and substrate. Mix manually or mechanically for 3 to 4 minutes. Apply by trowel to the desired bed depth. Avoid overworking the face of the mortar and do not steel trowel finish, or strike the face of the mortar with a pointing iron, which would close off the pore structure. Allow approximately 1-2 days before brushing the mortar down with a stiff bristle brush to reveal the aggregate and give a weathered finish. Unilit 30 can be applied to damp but not saturated backgrounds, dampen down excessively dry backgrounds or masonry prior to application. Do not use mortar if the substrate has been saturated by rainfall, as this will affect the bond and weatherproofing of the mortar. Do not apply in temperatures below 5°C or above 40°C. The mortar remains workable for 2 hours and dries in 24-48 hours. Protect from frost for 48 to 72 hours. Pointing is to be flush or given a slight fall to avoid water traps.

OR
505

REPOINTING COPINGS & SKY FACING JOINTS GENERALLY: Rake out all deteriorated joints and open joints to be pointed, using fine-toothed saw blade or hooked knife blade, for the full height of the joint and to a minimum depth of 2x width.

All prepared joints, by whatever method, must leave a clean square face at the back of the joint to provide optimum contact with the mortar. All joints on completion of raking or cutting out will be washed and brushed clean of all debris and loose material before progressively wetting the stonework as pointing proceeds. The substrate must be clean and free of all traces of oil and grease.

Application: Apply mortar by pointing iron of correct width for joint; push well into joints and build up in layers of max 15mm thick to suit bed depth. Avoid overworking the face of the mortar and do not steel trowel finish, or strike the face of the mortar with a pointing iron, which would close off the pore structure. Allow approximately 1-2 days before brushing the mortar down with a stiff bristle brush to reveal the aggregate and give a weathered finish.

Apply to damp but not saturated backgrounds, dampen down excessively dry backgrounds or masonry prior to application. Do not use mortar if the substrate has been saturated by rainfall, as this will affect the bond and weatherproofing of the mortar. Do not apply in temperatures below 5°C or above 40°C. Protect from frost for 48 to 72 hours. Pointing is to be flush or given a slight fall to avoid water traps.

510

PAVEMENTS: Carefully cut out defective pointing to depth 25mm leaving square base. Brush, then wash out loose material and leave clean. Press dry mortar mix into joints taking care not to mark stone face. When the full depth of mortar is consolidated brush away excess and spray overall with fine water spray.

520

SETTING: Keep pointing damp until full set has occurred. Take particular care to reduce suction of existing fabric with small areas, and to maintain dampness until full set has occurred. IN DRY WEATHER keep area of work damp for a minimum of four hours before pointing and three days after completion. Protect as set out below.

530

AFTER INITIAL SET: Lightly spray surface with water spray and stipple with stiff bristle brush or dab with coarse sacking or brush with small bronze brush to give roughened texture to match existing work and as approved sample panel. All workers are to use identical finishing tools to maintain a uniform appearance. Do not brush mortar onto surface of surrounding bricks/stones.

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- 540 **CLEANLINESS:** Keep face of brick/stonework clean during pointing. Wipe and brush off excess mortar carefully to remove lime staining as soon as it occurs. **DO NOT WASH DOWN** with water until mortar has carbonated, to avoid lime staining the stonework; then wash down completed sections of wall from top to bottom using high pressure, minimum volume water spray; avoid saturating the stonework.

PROTECTION

- 550 **PROTECT:** All pointing work from sun, wind, rain and frost, until full set is complete, using dampened hessian, polythene or foam rubber sheeting as appropriate. Monitor the condition of the pointing during the setting process and modify condition as required to prevent too speedy set of lime mortars. Ensure that the Contract Programme allows for sufficient setting time and the access scaffold remains in place until all pointing work has set and been inspected by the CA.
- 560 **COVER:** Arises, moulding, carvings and other finished work with adequate protection until completion. Keep completed work clean and free from damages staining by other trades until completion.
- 570 **CLEAN OFF:** Rub down and leave stonework clean, brush down brickwork, all to approval of the CA as scaffolding is taken down.
- 580 **HEALTH & SAFETY:** Comply with all current health and safety regulations and restrictions and all requirements of the General Conditions.