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Bridgewater House
Whitworth Street
Facade Refurbishment

SPECIFICATION

Client:
Cording Real Estate Group

Date: December 2015



3437 - Bridgewater House - Facade Works

Revision B - 28 October 2016

Amended to reflect face only replacement.

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C
Demolition/ Alteration/ Renovation

C40
Cleaning masonry/ concrete

C40 Cleaning masonry/ concrete

To be read with Preliminaries/ General conditions.

GENERAL/ PREPARATION

110 SCOPE OF WORK

- Cleaning of Faience work to Whitworth Street and part Atwood Street of Bridgewater House - Instruction to undertake cleaning works, if deemed necessary, will be issued by the Project Manager - Paul Crowe of Savills .

120 RELATED REPAIR AND REMEDIAL WORKS

- Work to be carried out before cleaning work: Replacement of damaged faience units and pointing to joints in masonry, as section C41.

160 PROTECTION

- Surfaces not designated for cleaning: Prevent damage, including marking and staining.
- Openings: Prevent ingress of water, cleaning agents and detritus.
  - Vents and grilles: Seek instructions before sealing up.
- Temporary mechanical fastenings:
  - In masonry: Locate in joints.
  - In other surfaces: Seek instructions.
- Additional protection: None .

161 PROTECTION

In addition to the requirements of clause 160, provide the following:-
Plastic sheeting to all elevations of scaffold. The colour of the sheeting to be either clear or white.

162 PROTECTION

At th elevel of the first scaffold, double board and sheet the scaffold so as to avoid water going onto pavement or wetting the public. Construct water disposal system to take away and discharge into street gullies via settlement tanks.

175A CONTROL AND DISPOSAL OF WASH WATER AND DETRITUS

- Disposal: Safely. Obtain approvals from relevant Authority.
- Control of wash water: Collect and divert to prevent ingress and damage to building fabric and adjacent areas.
- Above and below ground drainage systems: Keep free from detritus and maintain normal operation.
  - Provide suitable temporary catchment boards/sheeting, gutters etc. to collect wash water and to divert it to suitable discharge points.
  - Do not let wash water build up at outlets or above levels of flashings or anywhere else where there is a risk of penetrating it or causing damage to the building fabric.
  - Ensure that water does not penetrate interiors and damage finishes etc. Monitor the interior of the building and seek instructions if any signs of damp appear internally.

180 COLD WEATHER

- Cleaning procedures using water: Do not use when air temperature is at or below 5°C. Protect damp surfaces from frost.
- Chemical cleaning agents: Do not use when surface temperatures are below those recommended by manufacturer.

190A CLEANING GENERALLY

- Operatives: Appropriately trained and experienced for each type of cleaning work.
  - Evidence of training: Submit on request.
- Control of cleaning: Confine cleaning processes and materials to designated areas. Prevent wind drift.
- Detritus: Remove regularly. Dispose of safely.
- Monitoring: Frequently check results of cleaning compared to approved trial samples. If results established by trials are not achieved, seek instructions.
- Modifications to cleaning methods and materials: Seek instructions.
  - Clean, collect and safely dispose of debris from scaffolding, ledges etc. at the end of every day.
  - Prevent debris from falling to lower levels.
  - Prevent marking of cleaned areas from dirt and debris splashing up from scaffold boards.
  - At the end of the cleaning and at the end of the renovation works wash down with a fan spray.

215 RECORD OF CLEANING WORKS

- Written report: Record cleaning methods and procedures used for each type of surface and deposit.
  - Content: Relevant attributes of cleaning methods used including:
    Equipment and settings.
    Dwell times.
    Number of applications.
    Ambient temperatures.
- Additional documentation: None.
- Submission: At completion of cleaning works.

230 TRIAL SAMPLES

- Trial sample reference: to be agreed.
  - Surface: Terracotta.
  - Location/ Size: to be agreed.
  - Type of soiling: Atmospheric soiling.
  - Cleaning methods: Contractor's choice.
- Records: Maintain written records for each trial area, including cleaning methods and conditions, to enable replication of results elsewhere.

PRODUCTS/ EQUIPMENT

300 COMPATIBILITY OF CHEMICAL PRODUCTS

- Products: Compatible and produced by the same manufacturer.

312 SURFACE BIOCIDES

- Types: Registered by the Health and Safety Executive (HSE) and listed on the HSE website under non-agricultural pesticides.
- Compatibility with surface: Free from staining or other harmful effects.

313 BIOCIDE TREATMENT FOR ORGANIC GROWTH

- Biocide(s): Neolith
- Carefully remove as much loose groth as possible without damaging or abraiding the surface.
- Protect alll surfaces that are excluded from chemical cleaning. Containg biocide within each treatment area.
  Apply biocidal solution(s) to kill and inhibit further growths.

314 BRUSHING AND SCRAPING

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

323 DRY ABRASIVE CLEANING

Equipment type: Hodge Clemco

Nozzles: Standard

Micro

Piccolo

Abrasives: Calcite 0.05-0.4mm 3.0-3.5 hardness

Calcium carbonate 0.05-0.4mm 2.5-3.0 hardness

Unil-fine 0.1-0.5mm 6.0-6.5 hardness

Unil-standard 0.1-0.8mm 6.0-6.5 hardness

Max pressure: Standard nozzle 55psi

Micro nozzle 40psi

Piccolo nozzle 25psi

- Apply abrasive at the lowest pressure that will remove deposits whilst causing the minimum of abrasion to the surface(s). Where deposits are ingrained seek instructions.
- For each surface, establish the optimum settings (pressure and abrasive volume), nozzle type and distance of nozzle from the surface. Keep a written record of these variables.
- Remove and collect dust and debris from each completed surface as work proceeds and finish by rinsing off thoroughly with clean water using suitable low pressure spray equipment.

324 WET ABRASIVE CLEANING

Equipment type: Torc

Nozzles: Standard

Micro

Piccolo

Abrasives: Calcite 0.05-0.4mm 3.0-3.5 hardness

Calcium carbonate 0.05-0.4mm 2.5-3.0 hardness

Unil-fine 0.1-0.5mm 6.0-6.5 hardness

Unil-standard 0.1-0.8mm 6.0-6.5 hardness

Max pressure: Standard nozzle 55psi

Micro nozzle 40psi

Piccolo nozzle 25psi

- Apply abrasive at the lowest pressure that will remove deposits whilst causing the minimum of abrasion to the surface(s). Where deposits are ingrained seek instructions.
- For each surface, establish the optimum settings (pressure, water and abrasive volumes), nozzle type and distance of nozzle from the surface. Keep a written record of these variables.
- Rinse debris/slurry thoroughly from each completed surface with clean water using suitable low pressure spray equipment. Do not allow slurry to dry out on the surface.

325 WET ABRASIVE CLEANING

Equipment type: Hodge Clemco

Nozzles: Standard
Micro
Piccolo

Abrasives:

Calcite	0.05-0.4mm	3.0-3.5 hardness
Calcium carbonate	0.05-0.4mm	2.5-3.0 hardness
Unil-fine	0.1-0.5mm	6.0-6.5 hardness
Unil-standard	0.1-0.8mm	6.0-6.5 hardness

Max pressure: Standard nozzle 55psi
Micro nozzle 40psi
Piccolo nozzle 25psi

- Apply abrasive at the lowest pressure that will remove deposits whilst causing the minimum of abrasion to the surface(s). Where deposits are ingrained seek instructions.
- For each surface, establish the optimum settings (pressure and abrasive volume), nozzle type and distance of nozzle from the surface. Keep a written record of these variables.
- Remove and collect dust and debris from each completed surface as work proceeds and finish by rinsing off thoroughly with clean water using suitable low pressure spray equipment.

332A WATER SPRAY (MOUNTED NOZZLES)-

- Equipment: Spray/nozzle type(s): fine spray
- Nozzle support and water delivery system: A type that allows position and direction of nozzles to be readily adjusted relative to surfaces and profiles.
- Timing Controls:
  5mins first application
  3mins subsequent applications with 15min between applications
- Timing to be controlled with a programmer which automatically cuts off the water after the prescribed time.
- For each surface, establish nozzle positions and spraying cycles that enable deposits to be removed/softened whilst keeping the water running off the surface to a minimum.
- Monitor and adjust washing cycle and nozzle positions regularly as work proceeds. Ensure that water spray/mist is not blown away from surfaces by draughts.
- Reduce heaviest deposits first. Remove softened deposits with suitable corrosion resistant brushes that do not abrade the surface. Do not use brushes with steel bristles.
- Timing
  5mins first application
  3mins subsequent applications with 15min between applications
- Timing to be controlled with a programmer which automatically cuts off the water after the prescribed time.

333 HAND HELD WATER SPRAY CLEANING

- Equipment type: Hand held spray
- Spray water at the lowest pressure that will soften/loosen deposits without abrading or disrupting surfaces and joints.
- For each surface, establish the optimum settings (pressure and water volume), nozzle type and distance of nozzle from the surface. Keep a written record of these variables.
- Reduce heaviest deposits first. Assist removal with suitable corrosion resistant brushes that do not abrade the surface. Do not use brushes with steel bristles.
  Rinse off debris thoroughly.

352A STEAM CLEANING EQUIPMENT

- Equipment type: Doff
- Apply steam at the lowest pressure and temperature that will soften/loosen deposits without abrading or disrupting the surface(s).
- For each area/surface, establish the optimum settings (temperature, volume and pressure), nozzle type and distance of nozzle from substrate. Keep a written record of these variables.
- Assist removal of softened deposits with suitable corrosion resistant brushes and scrapers/spatulas that do not abrade or gouge the surface.

357 TESTING PH VALUES FOR CHEMICAL CLEANING

- Type of pH indicator: Strip with nonbleeding colours, capable of distinguishing between pH values 1 to 14.
- Before applying cleaning agent, test and record pH 'control' values of both the clean water used for rinsing and the wetted surface.
- After neutralisation/water rinsing procedures as clause 405, test and record pH values of the wetted surface including joints. Repeat water rinsing and pH testing procedures as necessary, until the pH value is the same as the control pH value for the surface.

359 NEUTRALISATION OF ALKALINE?ACIDIC AGENTS

After the removal of each application of cleaning agent and water rinsing as Clause 362A carry out the following procedures for each type of agent:

- Alkaline agents (pH 11 or more): Unless the application is followed by an acidic agent as part of cleaning system, apply a compatible weak neutralising acid. Rinse off agents thoroughly using clean water applied by low pressure spray. Test pH values as clause 357.
- Alkaline agents (not exceeding a pH of 11): Rinse off agents thoroughly using clean water applied by low pressure spray. Test pH values as clause 357.
- Acidic agents: Rinse off agents thoroughly using clean water applied by low pressure spray. Test pH values as clause 357.

362A CHEMICAL AGENTS

- Type(s): Neolith 39N

  For each area/surface, establish the lowest possible concentration of agent and the shortest dwell times. Keep written records of concentrations, dwell times and number of applications.
- Follow chemical agent manufacturer's recommended procedures for water rinsing and completing the cleaning.

372 PLAIN POULTICESFOR MARKINGS AND SALTS REMOVAL

- Poulticing medium manufacturer: Submit proposals.
  - Product reference: Submit proposals.
- Softening agent: Deionized water.

APPLICATION

412 REMOVAL OF LOOSELY ADHERED DEPOSITS

- Timing: Before commencement of other cleaning methods.
- Surfaces: Prevent damage, including abrasion.

422 BIOCIDE APPLICATION

- Preparation: Dampen dry growths and Remove loose growths.
- Surfaces: Prevent damage, including abrasion.
- Biocide treatment: Appropriate solutions to kill growths and inhibit further growths.
  - Dead growths: Remove.

432A TOOLING

To remove thick encrustations of dirt is permitted providing that:

- The work is carried out by skilled and experienced stone masons.
- The original surface/detail is not removed unless agreed otherwise with the Project Manager

442 ABRASIVE BLOCKS

- Types: Suitable grades of carborundum or gritstone.
- Application: Lubricate with water. Remove detritus.
- Abrasive power tools: Prohibited.

452 ABRASIVES CLEANING

- Surfaces: Minimize abrasion.
  - Ingrained deposits: Seek instructions.
- Equipment settings (including nozzle type and distance from surface): Adjust regularly to achieve optimum cleaning performance for each surface.
- Detritus: Remove with clean water.

457 ABRASIVE BLOCKS

May be used to reduce surface deposits providing that:

- Suitable grades of carborundum or gritstone blocks are used with water lubrication.
- The original surface is not removed unless agreed otherwise with the Project Manager.
- Loose surface debris is rinsed off with clean water.

462 WATER SPRAY CLEANING (MOUNTED NOZZLES)

- Surfaces: Minimize water run-off. Prevent damage.
- Adjustment of washing cycle and nozzle positions: Regularly to achieve optimum cleaning performance.

472 PRESSURIZED WATER CLEANING

- Surfaces: Prevent damage, including abrasion.
- Equipment settings (including nozzle type and distance from surface): Adjust regularly to achieve optimum cleaning performance for each surface.

482 STEAM CLEANING

- Surfaces: Prevent damage, including abrasion.
- Equipment settings (including nozzle type and distance from surface): Adjust regularly to achieve optimum cleaning performance for each surface.

500 CHEMICAL CLEANING

- Surfaces: Prevent damage, including discolouration, bleaching and efflorescence.
- Product variables (including concentrations, dwell times and number of applications): Adjust for each surface to achieve optimum cleaning performance.
- Application: To wetted surfaces.
  - Drying out: Prevent unless recommended otherwise by cleaning product manufacturer.
- Removal of chemicals and neutralization: As recommended by product manufacturer, including rinsing with clean water.
  - Additional treatment: Where water rinsing is insufficient to neutralize surface, apply compatible neutralizing agent.
  - Surfaces and joints: Minimize absorption of chemicals. Prevent damage, including abrasion.

515 PLAIN POULTICING

- Surfaces: Prevent damage, including abrasion.
- Application: To wetted surfaces. Maintain contact with surfaces as poultice dries out.
- Poultice reinforcement: Submit proposals.
- Drying: Prevent excessively rapid or localized drying out.
- Spent poultice material: Do not reuse.

525 COMPLETION

- Obtain Project Managers approval of cleaning to each area/surface and before removal of temporary protection.
- After removal of temporary protection, thoroughly clean all glazing, windows frames, doors, sills and other affected surfaces.
- Check that all gutters, hoppers, downpipes and gullies are free from obstructions and debris arising from cleaning works.
- Give Project Manager 2 Days notice before striking each stage of scaffolding, to allow for final inspections.

C41
Repairing/ Renovating/ Conserving masonry

C41 Repairing/ Renovating/ Conservation masonry

To be read with Preliminaries/ General conditions

GENERALLY/ PREPARATION

110 SCOPE OF WORK

- Schedule: Full repair and refurbishment of faience/teracotta work up to second dentil level, above second floor, and interim repair and replacement of defective units above the second dentil level.
- Records of masonry to be repaired: Before starting work, use measurements and photographs as appropriate to record bonding patterns, joint widths, special features, etc.
- Identification of masonry units to be removed, replaced or repaired: Mark clearly, but not indelibly, on face of masonry units or parts of units to be cut out and replaced. Transcribe markings to drawings/ photographs.

120A SITE INSPECTION FOR BOTH FAIENCE AND GENERAL MASONRY

- Purpose: To confirm type and extent of repair/ renovation/ conservation work shown on drawings and described in survey reports and schedules of work.
- Parties involved: Contract administrator and Structural engineer.
- Timing: At least 2 working days before starting each section of work.
- Confirm type and extent of work required.
  - Marking: Mark clearly, but not indelibly, on face of masonry units or parts of units to be cut out and replaced.
  - Identification of masonry units to be removed, replaced or repaired: Code number crossreferenced to drawings/ photographs.
  - Records of masonry to be repaired: Before starting work, use measurements and photographs as appropriate to record bonding patterns, joint widths, special features, etc.
- Instructions issued during inspection: Confirm in writing, with drawings and schedules as required, before commencing work.

130 REMOVAL OF PLANT GROWTHS FROM MASONRY

- Plants, root systems and associated soil/ debris: Carefully remove from joints, voids and facework.
- Removal of roots: Where growths cannot be removed completely without disturbing masonry seek instructions.
- Unwanted plants close to masonry: Where removal of root system is not possible or desirable, cut through stem as close to the ground as possible. Remove bark from stump and apply herbicide paste. Leave stump to wither.

140 RECORD OF WORK

- General: Record work carried out to masonry clearly and accurately using written descriptions, sketches, drawings and photographs, as necessary.
- Specific records: None.
- Documentation: Submit on completion of the work.
  Number of sets: Two.

WORKMANSHIP GENERALLY

149B WORKMANSHIP
The work is to be in accordance with BS 8221-2 and English Heritage Guide on Scaffolding and Temporary Works for Historic Buildings.

150A POWER TOOLS
- Usage: Only on hard mortar.
  - Fien cutter.
    100mm diamond bladed 1.2mm angle grinder

155 PUTLOG SCAFFOLDING
- Usage: Not permitted .

160 PROTECTION OF MASONRY UNITS AND MASONRY
- Masonry units: Prevent overstressing during transit, storage, handling and fixing. Store on level bearers clear of the ground, separated with resilient spacers. Protect from adverse weather and keep dry. Prevent soiling, chipping and contamination. Lift units at designed lifting points, where provided.
- Masonry: Prevent damage, particularly to arrises, projecting features and delicate, friable surfaces. Prevent mortar/ grout splashes and other staining and marking on facework. Protect using suitable nonstaining slats, boards, tarpaulins, etc. Remove protection on completion of the work.

165 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.

170 DISTURBANCE TO RETAINED MASONRY
- Retained masonry in the vicinity of repair works: Disturb as little as possible.
- Existing retained masonry: Do not cut or adjust to accommodate new or reused units.
- Retained loose masonry units and those vulnerable to movement during repair works: Prop or wedge so as to be firmly and correctly positioned.

180 WORKMANSHIP
- Skill and experience of site operatives: Appropriate for types of work on which they are employed.
  - Documentary evidence: Submit on request.

185 ADVERSE WEATHER
- General: Do not use frozen materials or lay masonry units on frozen surfaces.
- Air temperature: Do not bed masonry units or repoint:
  - In cement gauged mortars when ambient air temperature is at or below 3°C and falling or unless it is at least 1°C and rising, unless mortar has a minimum temperature of 4°C when laid and the masonry is adequately protected.
  - In hydraulic lime:sand mortars when ambient air temperature is at or below 5°C and falling or unless it is at least 3°C and rising.
  - In nonhydraulic lime:sand mortars in cold weather, unless approval is given.
- Temperature of the work: Maintain above freezing until mortar has fully set.
- Rain, snow and dew: Protect masonry by covering during precipitation, and at all times when work is not proceeding.
- Hot conditions and drying winds: Prevent masonry from drying out rapidly.
- New mortar damaged by frost: Rake out and replace.

190 CONTROL SAMPLES

- General: Complete an area of each of the following types of work, and arrange for inspection before proceeding with the remainder:
  - Cutting out and replacement of faience block.
  - Mortar / Render / Repair Mortar
  - Protection: Protect from adverse weather and damage .

195 SAND SAMPLES

- Sand to be;
  - 1 Part Westerham Sand and 2 Parts Bath Dust - or equivalent.
    1 Part Hrdraulic Lime (NHL 3.5) = 1

MATERIALS/ PRODUCTION/ ACCESSORIES

215 MATERIAL SAMPLES

- Representative samples of designated materials: Submit before placing orders.
  - Designated materials: New faience units plus sands for bedding and pointing.
- Retention of samples: Unless instructed otherwise, retain samples on site for reference. Protect from damage and contamination.

220 RECORDING PROFILES

- Profiles: Take measurements from existing masonry units, as instructed, to allow accurate matching of replacements.
- Recording in situ: If there are no suitable joints to allow use of inserts, seek instructions.
- Drawings and templates: Prepare as necessary. Templates must be clearly and indelibly marked to identify use and location.

230 INSPECTION OF DRAWINGS, TEMPLATES, CASTS, ETC

- Timing: Before starting production of masonry units associated with the following items: St andard, profiled and embossed features.
- Period of notice (minimum): Two weeks.

260A BLOCKS

- Manufacturer: Contractors' choice but of type and size to match existing.
  - Product reference: Contractors' choice.
- Size: to match existing.
- Special shapes: none required.
- Recycled content: only re-use of existing unbroken blocks required.

270 TERRACOTTA / FAIENCE _ REPLACEMENT UNITS (BOTH COMPLETE UNITS AND FACE ONLY)

- Definition
  Self coloured, frost resistant, fine clay materials suitable for exterior and interior application, comprising two groups:-
  - Group A: Load bearing blockwork; usually hollow form and designed to be filled before final installation.
  - Group B: Cladding, slabwork designed to be employed as a facing applied to a structural substrate.
- Manufacturer to be agreed.
- Finish: To match existing.
- Colour / texture: To match existing and approved samples.

271 TECHNICAL SPECIFICATIONS

- Physical properties of terracotta and faience, tested in accordance with the British Standards (BS) and The American Society for Testing and Materials (ASTM), by Ceram Research, British Ceramic Research Ltd.
  - Compressive Strength
    BS3921, ASTM C67
    50 N/mm²
  - Thermal Measurement
    BS3921, ASTM C67
    3.6 x 10E-6 in 20-100℃ range
    Thermal Conductivity: 1.3 W/mK
  - Thermal Shock Resistance
    ASTMC484
    No damage
  - Absorption
    BS3921, ASTM C67
    5 hour boil - 12%
    24 hour soak - 5.8%
  - Frost Resistance
    BS3921 ("F" Category), ASTM C67
    No damage
  - Acid Resistance
    Resistant to chemicals found in normal service conditions
    Susceptable to damage in contact with Hydroflouric Acid
  - Craze Resistance
    BS6431, ASTM C424
  - Surface Hardness
    Minimum 6 on Mohs Scale
  - Tolerance
    BS3921, BS5385, ASTM C67
    Warpage - 1mm (305 Unit Test)
    Generally - 2% Linear Dimensions
  - Fire Resistance
    Non-combustable
  - Durability
    Vitrified ceramic materials are unaffected by aging, weathering, ultraviolet radiation or atmospheric polution.
- For some restoration projects or specific design requirements, it may be more important to achieve a good aesthetic match that to achieve specific physical properties and tolerances. Seek instruction from the Project Manager if any of the above listed properties may be compromised in order to achieve a match with existing.

272 MANUFACTURE

- The Faience / Terracotta shall be made from selected clays, free from surface cracks and manufacturered to BS6431, 3921 and 5835 part 2 1990
- Dimensional tolerance to be plus or minus 2% from the design size and shape.
- It is usual that some cutting of units may be required on site. This shall be undertaken taking into account all site safety protocols.
- Prior to fixing blocks and to ensure the best possible accuracy it is beneficial to set down the blocks "dry" to equalise joints and take up any tolerances.
- Colour and finish to be to the approval of the CA/Architect/PM, allowing for natural shade and finish variation that is a characteristic of this material. Material to be hand finished on all seen and exposed surfaces prior to (glazing+) kiln firing.

273 SITE WORKS

- Hollow form blocks must be prefilled at least a day prior to installation with weal lightweight aggregate to clause 400.
- Blocks to be filled , NOT pressure filled or rammed.
- When laying and pointing, bed joints should be wetted, not soaked, and pointed with sharp washed well graded sand : 1 hydraulic lime.
- All proprietary fixings to Faience / Terracotta to be stainless steel.
- The cellular voids to the blocks are to be filled with weak mix concrete, or alternatively with Lytag concrete.

275A REPLACEMENT TERRACOTTA UNITS (BOTH COMPLETE UNITS AND FACE ONLY)

- Dimensions of existing units and joint widths: Reproduce accurately within agreed manufacturing tolerances.
- Any holes for pre-existing fixings to be accurately aligned and positioned.
- Drain Holes: Provided where there is any risk of water entering the voids in exposed blocks (e.g. copings / cornices / projecting features)
- Quality: Free from imperfaections that will have an adverse effect on durability.
- Marking: Each unit to be clearly marked on concealed face to indicate the position in the finished works.
- Where face only replacement is undertaken, the new terracotta shall be subject to all the relevant clauses in respect of manufacture and the like as for full blocks.
- Where face only replacement is to be undertaken, the face is to be dowelled to the backing in accordance with clause 405A

276 DESIGN AND CO_ORDINATION

- The terracotta supplier will be required to liaise with the masonry contractor to identify how the fixing method affects the shape of the terracotta blocks and any provision for fixing. The responsibilityu for the structural adequacy of the fixings lies with the masonry contractor.

277 JOINT WIDTH

- Block sizes are to be calculated to allow for joint widths of between 6mm and 12mm but always to match the existing.

278 COLOUR AND FINISH

- The new terracotta is to match the overall effect of the existing as closely as possible.
- Colour variation may be achieved by using a selection of coloured blocks in a mix on site.
- Once colour and surface texture have been agreed sample blocks shall be produced to construct a 1m x 1m area for the purpose of agreeing the quality of modelling and the general appearance of the finished works.
- In addition to the sample panel, the following samples should be provided :-
    - Typical profiled and moulded units.
    - Hand carved sculpting so that final approval can be granted by the PM and for Listed Building Consent.
    - Sufficient samples to achieve approval will be required.
- Approval must be obtained from :-
    - PM / Architect
    - Local Authouriy Conservation Officer
      English Heritage if applicable.

280 PROPRIETARY FIXINGSFOR FAIENCE

- Manufacturer: Ancon or similar approved.
    - Product reference: to be determined.
- Material: Austenitic stainless steel.
- Size: to be determined.

281 FIXINGSFOR FAIENCE

- Type: Submit proposals.
- Material: Austenitic stainless steel.
- Size, strength and number: As necessary to resist loads likely to occur during the life of the building, and to prevent lateral displacement or pulling apart of the construction.

DISMANTLING/ REBUILDING

311 DISMANLTING OF TERRACOTTA / FAIENCE

- Existing mortar to be cut out using a high pressure water jet or 1.2mm diamond blade.
- Hard mortar can be cut out by cutting down the centre of the joint using a 1.2mm diamond blade in a 100mm angle grinder. The mortar is then to be removed by flat chisel tapping into the centre of the joint.

320 REBUILDINGOF ALL ELEMENTS

- Replacement materials: Terracotta as clause 270.
- Mortar: As section Z21.
  - Mix: 1 NHL 3.2 : 2 sand.
  - Sand source/ type: Mix to be agreed.
- Fixings: Cramps and dowels as clause 281.
- Rebuilding: To match previous face and joint lines, joint widths and bonding. Adequately bonded to retained work/ backing masonry, as appropriate.
- Joint surfaces: Dampen, as necessary, to control suction.
- Laying masonry units: On a full bed of mortar; perpend joints filled.
- Exposed faces: Remove mortar and grout splashes immediately.
- Joints: To match existing.
- Other requirements: None.

320A REBUILDINGOF ALL ELEMENTS

- Replacement materials: Terracotta as clause 270.
- Mortar: As section Z21.
  - Mix: 1 NHL 3.2 : 2 sand.
  - Sand source/ type: Mix to be agreed.
- Fixings: Cramps and dowels as clause 281.
- Rebuilding: To match previous face and joint lines, joint widths and bonding. Adequately bonded to retained work/ backing masonry, as appropriate.
- Joint surfaces: Dampen, as necessary, to control suction.
- Laying masonry units: On a full bed of mortar; perpend joints filled.
- Exposed faces: Remove mortar and grout splashes immediately.
- Joints: To match existing.
- Other requirements: Surface of new mortar to be rubbed with a brush to remove laitence.

REPLACEMENTS AND INSERTIONS

330 PREPARATION FOR REPLACEMENT MASONRY

- Defective material: Carefully remove to the extent agreed. Do not disturb, damage or mark adjacent retained masonry.
- Existing metal fixings, frame members, etc: Report when exposed.
- Redundant metal fixings: Remove.
- Recesses: Remove projections and loose material; leave joint surfaces in a suitable condition to receive replacement units. Protect from adverse weather if units are not to be placed immediately.

365A REPLACEMENT OF BLOCKSWHERE CRACKED

- Blocks: to match existing.
- Mortar: As section Z21.
  - Mix: 1:3:12 white cement:lime:sand.
  - Sand source/ type: Well graded crushed stone to approval.
- Fixings: Not required.
- Joints: to match existing.
- Other requirements: None.

375A REPLACEMENT OF TERRACOTTA TYPICALLY

- Terracotta: Faience blocks as clause 270 .
- Filling to blocks As clause 400 .
- Mortar: As section Z21.
  - Mix: 1 NHL 3.5 : 2 sand .
  - Sand source/ type: Well graded from 1.18 mm sieve size down .
- Fixings: As clause 281 .
- Joints: to match existing .
- Other requirements: None .

385 LAYING REPLACEMENT MASONRY UNITS

- Exposed faces of new material: Keep to agreed face lines.
- Faces, angles and features: Align accurately. Set out carefully to ensure satisfactory junctions with existing masonry and maintain existing joint widths.
- Joint surfaces: Dampen to control suction as necessary.
- Laying units: On a full bed of mortar, all joints filled.
- Exposed faces: Keep clear of mortar and grout.

390A GROUTING JOINTS

- Grout mix: 1 NHL 3.5 : 2 sand.
- Joints that cannot be fully filled with bedding mortar: Grout thoroughly around replacement masonry units.
- Grouting: Keep grout back from exposed face to allow for the depth of pointing, using an approved temporary sealing material. Prevent grout staining exposed face.

400A FILLING TERRACOTTA BLOCKS

- Voids in blocks: Fill material 1 : 8 cement : coarse aggregate
  - Coarse aggregate: Lytag or alternative approved .
  - Water content: Low ("semi-dry") mix, mixed thoroughly to a uniform consistancy.
  - Filling: Completely, but but compacted by ramming or tamping.

405A BONDED DOWELSTYPICAL

- Dowels: Duplex stainless steel 6mm rods secured into clean dry holes with adhesive.
  Adhesive: Epoxy resin.
- Holes for dowels: Suitably sized and accurately aligned in masonry background and in rear of replacement/ insert stone; clean and dry.
- Other requirements: Do not use adhesive to bond stones at joints unless instructed.

410 CORRODED METAL FIXINGS

- Removal: Cut out carefully, causing the least possible disturbance to surrounding masonry. Remove associated rust debris.
- Replacement: Compatible fixings as clause 280.

MORTAR REPAIRS

510 PREPARATION FOR MORTAR REPAIRS

- Repair area: Scribe area of masonry to be removed using straight horizontal and vertical lines parallel to joints. Where repair area abuts joints, maintain existing joint widths and do not bridge joints.
- Decayed masonry: Cut back carefully to a minimum depth of 20 mm to a sound background. Where the depth of removal exceeds 50 mm, seek instructions.
- Precautions: Do not weaken masonry by removing excessive material. Do not damage adjacent masonry.
- Top and vertical reveals of repair area: Undercut.

515 REINFORCEMENT FOR MORTAR REPAIRS

- Material: Austenitic stainless steel, phosphor bronze or copper alloy wire, 3 mm diameter.
- Armatures: Form to suit profiles of mortar repair and provide effective reinforcement.
- Cover to reinforcement: Not less than 18 mm.
- Installation: Drill holes into background to receive reinforcement, and bond firmly with a suitable epoxy resin.

520A MORTAR REPAIRS

- Reinforcement: To be agreed
  Undercoats: As section Z21.
  - Mix: 1 NHL 3.5 : 1 Stone dust : 1 Sand.
  - Sand source/ type: Fine sand to approval.
  - Building up: In layers where necessary, each layer not exceeding 12 mm.
- Finishing coat: To match approved samples.
  - Mix: 1 NHL 3.5 : 1 Stone dust : 1 Sand.
  - Sand source/ type: To be agreed.
  - Finished thickness: To be agreed.
  - Finish: To match existing.

540 APPLYING MORTAR

- Surfaces to receive mortar: Clean, and free from dust and debris. Dampen to control suction.
- Applying coats: Build up in layers to specified thickness. Apply mortar firmly, ensuring good adhesion with no voids. Form a mechanical key to undercoats by combing or scratching to produce evenly spaced lines.
  Allow each layer to achieve an initial set before applying subsequent coats. Prevent each layer from drying out rapidly by covering immediately with plastics sheeting and/ or dampening intermittently with clean water.
- Finishing mortar coat: Form accurately to required planes/ profiles, and finish flush with adjacent masonry.
- Protection: Protect completed repairs from adverse weather until mortar has set.

545 THUMB REPAIRS

- Small holes are to be wetted and filled with mortar repair compound

550 SCRAPED FINISH TO MORTAR REPAIRS

- Procedure: Finish final coat of repair mortar proud of existing masonry face. When mortar is set, but not too hard, scrape back to required face line using fine saw blade or other suitable means, to achieve required finish.

555 FLOAT FINISH TO MORTAR REPAIRS

- Finish: Use a wood float and/ or a felt faced float to give an even overall texture. Do not use steel floats.

CRACK REPAIRS/ TIES/ REINFORCEMENT

610 MORTAR REPAIR OF CRACKSTYPICAL

- Mortar: As section Z21.
  - Mix: 1 NHL 3.5 : 2 Sand.
  - Sand source/ type: Not applicable.
- Preparation: Clean out cracks to remove debris, dust and dirt. Dampen recesses, as necessary, to control suction.
- Applying mortar: Press well into cracks so that they are fully filled. Ensure that mortar does not encroach upon exposed faces. Finish mortar flush with masonry face.
- Other requirements: Exclude isolated hair line cracks (less than about 1.0 mm wide).

620 RESIN INJECTION REPAIR OF CRACKSINTERIM REPAIR AS INDICATED FOR FAIENCE UNITS AND MASONRY GENERALLY

- Resin injection system manufacturer: Rotafix or similar approved.
  - Product reference: 3552-400cc or equivalent.
- Preparation: Clean out cracks to remove debris, dust and dirt. Secure loose masonry units.
- Exposed faces: Keep clean and free from stains.
- Resin application: Use methods recommended by system manufacturer to fully bond masonry.
- Completion: After resin has cured, remove temporary crack plugging material and protective coatings.
- Pointing to cracks and injection holes: Compatible filler recommended by resin manufacturer, colour match to approval.

630 TIESWHERE APPROPRIATE

- Tie system manufacturer: Ancon.
  - Product reference: As appropriate.
- Type/ Diameter: Stainless steel.
- Grout: 1 NHL 3.5 : 2 Sand.
- Holes: Drill carefully and accurately, in locations shown on drawings, to suit types and lengths of tie. Remove drilling dust and debris.
- Adjacent masonry: Do not damage during drilling. Keep cavities behind facings free from debris.
- Tie installation:
  - Expansion type anchor fixings: Set to the correct torque.
  - Bonded ties: Grouted.
  - Ends of ties: Keep back from face of masonry to allow for making good.
- Exposed masonry faces: Clean and free from grout/ mortar stains.
- Making good: Repair mortar as clause 690.

640 PINNINGWHERE APPPROPRIATE

- Dowels/ Pins:
  - Type: Austenitic stainless steel threaded rods.
  - Diameter: 6 mm.
  - Additional requirements: Length of dowels 125 mm.
- Resin: Low viscosity resin to approval.
- Holes: Drill carefully, sloping downwards into the background. Remove drilling dust and debris and keep dry.
- Filling holes:
  - Check that dowel lengths are correct before filling with resin.
  - Use sufficient resin so that when the dowel is inserted the resin is dispersed to achieve an effective repair.
- Exposed faces: Keep clean and free from resin stains. Use temporary plugging material and/ or isolating membranes as necessary.
- Clearances: Keep ends of ties and resin back from face of masonry.
- Making good after resin has cured: Either mortar as clause 690 or stone plugs as clause 692 .

675 JOINT REINFORCEMENTFOR STITCHING ACROSS CRACKS

- Existing construction: Solid block wall.
- Joint width: 10 ± 2 mm.
- Reinforcement system:
  - Manufacturer: Contractors' choice.
    Product reference: Contractors' choice.
  - Type: Stainless steel.
- Grout: Not required.
- Installation: Remove existing mortar without damaging adjacent masonry or widening joints. Form recess to depth recommended by reinforcement manufacturer. Remove dust and debris. Install reinforcement using methods recommended by manufacturer.
- Joints: Repoint as clause 820.

690 MAKING GOOD TO INJECTION AND INSERTION HOLES

- Preparation: Clean out holes thoroughly.
- Repair mortar: To match existing masonry units/ joints in colour and texture. Fill holes and finish mortar neatly and flush with surrounding masonry.
- Finished appearance: Obtain approval for first 10 holes before completing the remainder.

692 MAKING GOOD TO TIE AND DOWEL INSERTION HOLES USING CORE DRILLED PLUGS

- Plugs: Cut plug from masonry face before drilling hole for each tie/ dowel. Where resulting plug is unusable, prepare plug from matching material.
  - Plug diameter: Smallest practicable.
- Holes: Clean.
- Method of securing plug: A spot of epoxy resin and nonhydraulic lime:sand mortar.
- Joints: Fine and flush.
- Finished appearance: Obtain approval for first 10 holes before completing remainder.

POINTING/ REPOINTING

810 PREPARATION FOR REPOINTING

- Existing mortar: Working from top of wall downwards, remove mortar carefully, without damaging adjacent masonry or widening joints, to a minimum depth of twice joint thickness .
  - Loose or friable mortar: Seek instructions when mortar beyond specified recess depth is loose or friable and/ or if cavities are found.
- Raked joints: Remove dust and debris.

820 POINTINGSTONEWORK GENERALLY

- Preparation of joints: Dampen joints, as necessary, to control suction.
- Mortar: As section Z21.
  - Mix: 1 NHL 3.5 : 2 Sand.
  - Sand source/ type: Crushed stone fine pointing sand to approval.
- Joints profile/ finish: To match existing.
- Other requirements: None.

840 POINTING WITH TOOLS/ IRONS

- General: Press mortar well into joints using pointing tools/ irons that fit into the joints, so that they are fully filled.
- Face of masonry: Keep clear of mortar. Use suitable temporary adhesive tape on each side of joints where necessary. Finish joints neatly.

850 POINTING WITH INJECTION MORTAR

- General: Inject mortar into joints so that they are fully filled with no voids.
- Face of masonry: Keep clear of mortar. Finish joints neatly.

860 BRUSHED FINISH TO JOINTS

- Timing: After initial mortar set has taken place remove laitance and excess fines by brushing, to give a coarse texture. Do not compact mortar.

Z
Building fabric reference specification

Z21
Mortars

Z21 Mortars

To be read with Preliminaries/ General conditions.

CEMENT GAUGED MORTARS

110 CEMENT GAUGED MORTAR MIXES

- Specification: Proportions and additional requirements for mortar materials are specified elsewhere.

120 SAND FOR SITE MADE CEMENT GAUGED MASONRY MORTARS

- Standard: To BS EN 13139.
- Grading: 0/2 (FP or MP).
  - Fines content where the proportion of sand in a mortar mix is specified as a range (e.g. 1:1: 5-6):
    Lower proportion of sand: Use category 3 fines.
    Higher proportion of sand: Use category 2 fines.
- Sand for facework mortar: Maintain consistent colour and texture. Obtain from one source.

131 READY-MIXED LIME:SAND FOR CEMENT GAUGED MASONRY MORTARS

- Standard: To BS EN 998-2.
- Lime: Nonhydraulic to BS EN 459-1.
  - Type: CL 90S.
- Pigments for coloured mortars: To BS EN 12878.

135 SITE MADE LIME:SAND FOR CEMENT GAUGED MASONRY MORTARS

- Permitted use: Where a special colour is not required and in lieu of factory made ready-mixed material.
- Lime: Nonhydraulic to BS EN 459-1.
  - Type: CL 90S.
- Mixing: Thoroughly mix lime with sand, in the dry state. Add water and mix again. Allow to stand, without drying out, for at least 16 hours before using.

160 CEMENTS FOR MORTARS

- Cement: To BS EN 197-1 and CE marked.
  - Types: Portland cement, CEM I.
    Portland limestone cement, CEM II/A-L or CEM II/A-LL.
    Portland slag cement, CEM II/B-S.
    Portland fly ash cement, CEM II/B-V.
  - Strength class: 32.5, 42.5 or 52.5.
- White cement: To BS EN 197-1 and CE marked.
  - Type: Portland cement, CEM I.
  - Strength class: 52.5.
- Sulfate resisting Portland cement:
  - Type: To BS EN 197-1 Sulfate resisting Portland cement, CEM I/SR and CE marked.
    To BS EN 197-1 fly ash cement, CEM II/B-V and CE marked.
  - Strength class: 32.5, 42.5 or 52.5.
- Masonry cement: To BS EN 413-1 and CE marked.
  Class: MC 12.5.

180 ADMIXTURES FOR SITE MADE CEMENT GAUGED MORTARS

- Air entraining (plasticizing) admixtures: To BS EN 934-3 and compatible with other mortar constituents.
- Other admixtures: Submit proposals.
- Prohibited admixtures: Calcium chloride, ethylene glycol and any admixture containing calcium chloride.

190 RETARDED READY TO USE CEMENT GAUGED MORTAR

- Standard: To BS EN 998-2.
- Lime for cement:lime:sand mortars: Nonhydraulic to BS EN 459-1.
  - Type: CL 90S.
- Pigments for coloured mortars: To BS EN 12878.
- Time and temperature limitations: Use within limits prescribed by mortar manufacturer.
  Retempering: Restore workability with water only within prescribed time limits.

200 STORAGE OF CEMENT GAUGED MORTAR MATERIALS

- Sands and aggregates: Keep different types/ grades in separate stockpiles on hard, clean, free-draining bases.
- Factory made ready-mixed lime:sand/ ready to use retarded mortars: Keep in covered containers to prevent drying out or wetting.
- Bagged cement/ hydrated lime: Store off the ground in dry conditions.

210 MAKING CEMENT GAUGED MORTARS

- Batching: By volume. Use clean and accurate gauge boxes or buckets.
  - Mix proportions: Based on dry sand. Allow for bulking of damp sand.
- Mixing: Mix materials thoroughly to uniform consistency, free from lumps.
  - Mortars containing air entraining admixtures: Mix mechanically. Do not overmix.
- Working time (maximum): Two hours at normal temperatures.
- Contamination: Prevent intermixing with other materials.

LIME:SAND MORTARS

310 LIME:SAND MORTAR MIXES

- Specification: Proportions and additional requirements for mortar materials are specified elsewhere.

320A SAND FOR LIME:SAND MASONRY MORTARS

- Type: Sharp, well graded.
  - Quality, sampling and testing: To BS EN 13139.
  - Grading/ Source: Grading to be well graded from third width of joint down. No more than 30% retained on any one sieve size
    Sand to be from: To be agreed.

325 LIMES FOR LIME : SAND MORTAR

- Type: NHL 3.5 from Castle Cement or St Astier.or Singleton Birch

337 READY PREPARED HYDRAULIC LIME MORTAR

- Pre-mixed Moderately Hydraulic Mortar from Limetec Ltd (Tel: 0118 969 6949) can be used or similar approved.

350 STORAGE OF LIME:SAND MORTAR MATERIALS

- Sands and aggregates: Keep different types/ grades in separate stockpiles on hard, clean, free-draining bases.
- Ready prepared nonhydraulic lime putty: Prevent drying out and protect from frost.
- Nonhydraulic lime:sand mortar: Store on clean bases or in clean containers that allow free drainage. Prevent drying out or wetting and protect from frost.
- Bagged hydrated hydraulic lime: Store off the ground in dry conditions.

360 MAKING LIME:SAND MORTARS GENERALLY

- Batching: By volume. Use clean and accurate gauge boxes or buckets.
- Mixing: Mix materials thoroughly to uniform consistency, free from lumps.
- Contamination: Prevent intermixing with other materials, including cement.

400A MAKING HYDRAULIC LIME:SAND MORTARS

- Mixing hydrated hydraulic lime:sand: Follow the lime manufacturer's recommendations for each stage of the mix.
  - Water quantity: Only sufficient to produce a workable mix.
- Working time: Within limits recommended by the hydraulic lime manufacturer.
- Mixing: Mix materials thoroughly by compressing, beating and chopping.
  - Equipment: Roller pan mixer
  - Screed mixer, or
  - M-tec high shear mixer eg D50

Z22
Sealants

Z22 Sealants

To be read with Preliminaries/General conditions.

PRODUCTS

310 JOINTSTYPICAL AGAINST GLAZING

- Primer, backing strip, bond breaker: Types recommended by sealant manufacturer.

EXECUTION

610 SUITABILITY OF JOINTS

- Presealing checks:
  - Joint dimensions: Within limits specified for the sealant.
  - Substrate quality: Surfaces regular, undamaged and stable.
- Joints not fit to receive sealant: Submit proposals for rectification.

620 PREPARING JOINTS

- Surfaces to which sealant must adhere:
  - Remove temporary coatings, tapes, loosely adhering material, dust, oil, grease, surface water and contaminants that may affect bond.
  - Clean using materials and methods recommended by sealant manufacturer.
- Vulnerable surfaces adjacent to joints: Mask to prevent staining or smearing with primer or sealant.
- Backing strip and/ or bond breaker installation: Insert into joint to correct depth, without stretching or twisting, leaving no gaps.
- Protection: Keep joints clean and protect from damage until sealant is applied.

630 APPLYING SEALANTS

- Substrate: Dry (unless recommended otherwise) and unaffected by frost, ice or snow.
- Environmental conditions: Do not dry or raise temperature of joints by heating.
- Sealant application: Fill joints completely and neatly, ensuring firm adhesion to substrates.
- Sealant profiles:
  - Butt and lap joints: Slightly concave.
  - Fillet joints: Flat or slightly convex.
- Protection: Protect finished joints from contamination or damage until sealant has cured.