SF

Hampshire County Council

Countryside Services

Staunton Farm

T1

P13926 Gothic Library

Tender

16-01-2024

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C40
Cleaning masonry/ concrete

General/ preparation

110 Scope of work

1. The external facade render of the Gothic library including render and stonework (wet) Refer to drawings P13926 / 301 - 308. And the external stonework and internal masonry (Dry). Refer to drawings P13926 / 301 - 308 and 311 - 317 .

120 Related repair and remedial works

1. Work to be carried out before cleaning work: First complete a trial clean on a sample of render 300 x 300mm and seek approval of CA, before progressing further.

   First complete the roof works, and then all of the masonry repairs shown on drawings Refer to drawings P13926 / 301 - 308 and 311 - 317.
   Allow access for the client grounds maintenance team to mange the shrub planting around the building.

160 Protection

1. Surfaces not designated for cleaning: Prevent damage, including marking and staining.
2. Openings: Prevent ingress of water, cleaning agents, and detritus.
   2.1. Vents and grilles: Seek instructions before sealing up.
3. Additional protection: Protection required to all glass and stone window surrounds.
   Submit proposals.

175 Control and disposal of wash water and detritus

1. Disposal: Safely. Obtain approvals from relevant Authority.
2. Control of wash water: Collect and divert to prevent ingress and damage to building fabric and adjacent areas.
3. Above and below ground drainage systems: Keep free from detritus and maintain normal operation.

190 Cleaning generally

1. Timing: Avoid saturation if the temperature is dropping below 5°C
2. Operatives: Appropriately trained and experienced for each type of cleaning work.
   2.1. Evidence of training: Submit on request.
3. Control of cleaning: Confine cleaning processes and materials to designated areas. Prevent wind drift.
4. Detritus: Remove regularly. Dispose of safely.
5. Monitoring
   5.1. Frequently check results of cleaning compared to approved trial samples. If results established by trials are not achieved, seek instructions.
   5.2. Works to be inspected and approved in accordance with the requirements of the local planning authority.
6. Modifications to cleaning methods and materials: Seek instructions.

215 Record of cleaning works

1. Written report: Record cleaning methods and procedures used for each type of surface and deposit.
   1.1. Content: Relevant attributes of cleaning methods used including:
      1.1.1. Equipment and settings.
      1.1.2. Dwell times.
      1.1.3. Number of applications.
      1.1.4. Ambient temperatures.
2. Additional documentation:
3. Submission: At completion of cleaning works.

230 Trial samples

1. Trial sample reference: Face 5 only - 300 x 300mm on previously uncleaned part of the render.
   1.1. Surface: External render
   1.2. Location/ Size: 300 x 300mm
   1.3. Type of soiling: Atmospheric soiling Biological growths
   1.4. Cleaning methods: Water spray Submit proposals
2. Records: Maintain written records for each trial area, including cleaning methods and conditions, to enable replication of results elsewhere.

Products/ equipment

332 Water spray (mounted nozzles)

1. Equipment
   1.1. Spray/ Nozzle types: Subject to site trials
   1.2. Nozzles: Position and direction adjustable, relative to surfaces and profiles.
   1.3. Controls: Submit proposals

Application

462 Water sprayed cleaning (mounted nozzles)

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

Ω End of Section

C41
Repairing/ renovating/ conserving masonry

Clauses

2 To be read with preliminaries/ general conditions

Generally/ preparation

110 Scope of work

1. Conservation and Repairs to External Facade: Refer to drawings P13926 / 301 - 308. Parapet repointing, External render, Window stone insert repairs, Window mortar repairs, window cornice moulding render repairs, removal of nails and fixings, chimney
2. Conservation and Repairs to Internal Facade: Refer to drawings P13926 / 311 - 317, and Structural report 10009001279-N2337. Opening up to inspect beam ends. Brickwork replacement to window arches. Pointing and repointing etc..
3. Records of masonry to be repaired: Before starting work, use measurements and photographs as appropriate to record bonding patterns, joint widths, special features, etc.
4. Identification of masonry units to be removed, replaced or repaired: Special bricks to internal window arch. 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.

120 Site inspection

1. Purpose: To confirm type and extent of repair/ renovation/ conservation work shown on drawings and described in survey reports and schedules of work.
2. Parties involved: - Contract administrator;- Contractor's representative; and- Structural engineer
3. Timing: At least 7 working days before starting each section of work
4. Instructions issued during inspection: Confirm in writing, with drawings and schedules as required, before commencing work

130 Removal of plant growths from masonry

1. Plants, root systems and associated soil/ debris: Carefully remove from joints, voids and facework.
2. Removal of roots: Where growths cannot be removed completely without disturbing masonry seek instructions.

140 Record of work

1. General: Record work carried out to masonry clearly and accurately using written descriptions, sketches, drawings and photographs, as necessary.
2. Specific records: digital photographs
3. Documentation: Submit on completion of the work.
   3.1. Number of sets: Two

Workmanship generally

150 Power tools

1. Usage for removal of mortar: Not permitted

155 Putlog scaffolding

1. Usage: Not permitted

160 Protection of masonry units and masonry

1. 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.
2. 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

1. 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

1. Retained masonry in the vicinity of repair works: Disturb as little as possible.
2. Existing retained masonry: Do not cut or adjust to accommodate new or reused units.
3. 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

1. Skill and experience of site operatives: Appropriate for types of work on which they are employed.
   The following trades should be experienced conservation contractors
   Lime mortar repointing
   lime render conservation and repairs
   Masonry cleaning
   Stone inserts to windows.
   Leaded glass repairs
   Glass cleaning.
   1.1. Documentary evidence: Submit contractor details to CA and seek approval.

185 Adverse weather

1. General: Do not use frozen materials or lay masonry units on frozen surfaces.
2. Air temperature: Do not bed masonry units or repoint:
   2.1. 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.
   2.2. 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.
   2.3. In nonhydraulic lime:sand mortars in cold weather, unless approval is given.
3. Temperature of the work: Maintain above freezing until mortar has fully set.
4. Rain, snow and dew: Protect masonry by covering during precipitation, and at all times when work is not proceeding.
5. Hot conditions and drying winds: Prevent masonry from drying out rapidly.
6. New mortar damaged by frost: Rake out and replace.

190 Control samples

1. General: Complete an area of each of the following types of work, and arrange for inspection before proceeding with the remainder: Internal brickworks repointing. External render repairs and window jamb cornice repair. Render cleaning. Stone proposed for inserts.

Materials/ production/ accessories

215 Material samples

1. Representative samples of designated materials: Submit before placing orders.
   1.1. Designated materials: Each stone type, and lime mortar and lime render.
2. Retention of samples: Unless instructed otherwise, retain samples on site for reference. Protect from damage and contamination.

220 Recording profiles

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

240 Stone

1. Supplier: Contractor to submit proposals
2. Type: Carved and shaped sandstone to match existing.
   The contractor shall put forward samples for approval prior to carving.
3. Quality: Free from vents, cracks, fissures, discolouration, or other defects that may adversely affect strength, durability or appearance. Thoroughly seasoned, dressed and worked in accordance with shop drawings prepared by the supplier.
4. Finish: To match existing.

245 Replacement stone units

1. Sizes and profiles: To match existing masonry. Maintain existing joint widths.
2. Sinkings for fixings, joggles and lifting devices: Accurately aligned and positioned in relation to existing masonry.
3. Marking: Mark each block/ dressing clearly and indelibly on a concealed face to indicate the natural bed and position in the finished work.

250 Stone orientation

1. Orientation of natural bed
   1.1. In plain walling: Horizontal.
   1.2. In projecting stones and copings: Vertical and perpendicular to wall face.
   1.3. In arches: Perpendicular to line of thrust.

260 Bricks

1. Manufacturer: Contractor to submit a choice of matching bricks for approval by the CA
   1.1. Product reference: To match existing in terms of size, shape, colour, and texture
2. Size: Imperial, and specials.
3. Special shapes: Arch brick specials. Accurate dimensions shall be taken and agreed, when the high level access is available.

265 Salvaged and second hand bricks

1. Source: Will be considered, subject to achieving adequate compressive strength.
   provide evidence of the source of salvaged materials.
2. Condition

2.1. Free from matter such as mortar, plaster, paint, bituminous materials and organic growths.

2.2. Sound, clean and reasonably free from cracks and chipped arrises.

Dismantling/ rebuilding

310 Dismantling masonry for reuse

1. Masonry units to be reused: Remove carefully and in one piece.
   1.1. Treatment: Clean off old mortar, organic growths and dirt, and leave units in a suitable condition for rebuilding.
   1.2. Identification: Mark each unit clearly and indelibly on a concealed face, indicating its original position in the construction. Transcribe makings to drawings/ photographs.

320 Rebuilding Internal Face Brickwork (structural)

1. Description: Internal brickwork to previously plastered walls.
   "Eroded/cracked bricks to brick arch at cross beam bearing".
   Refer to drawings P13926 / 311 - 317, and Structural engineers report as clause 110.
2. Replacement materials: Bricks as clause 260 and 265.
3. Mortar: For internal use, NHL mortar As section Z21.
   3.1. Mix: 1:2-3 NHL 5, hydraulic lime:sand, subject to agreement of sample.
   Details to be submitted for approval by CA and structural engineer.
   3.2. Sand source/ type: Well graded sand to include stone dust to match existing mortar colour.
   Contractor shall provide samples for approval.
   Pigmented pre-blended NHL mixes will not be acceptable.
4. Rebuilding: To match previous face and joint lines, joint widths and bonding. Adequately bonded to retained work/ backing masonry, as appropriate.
5. Joint surfaces: Dampen, as necessary, to control suction.
6. Laying masonry units: On a full bed of mortar; perpend joints filled.
7. Exposed faces: Remove mortar and grout splashes immediately.
8. Joints: To match existing
9. Other requirements: None

325 Rebuilding Internal Face Brickwork (non-structural)

1. Description: Internal brickwork to previously plastered walls.
   "Brickwork other than cracked bricks to brick arch at cross beam bearing" as clause 320.
   Refer to drawings P13926 / 311 - 317, and Structural engineers report as clause 110.
2. Replacement materials: Bricks as clause 260 and 265.
3. Mortar: For internal use, NHL mortar As section Z21.
   3.1. Mix: 1:3 NHL 2, hydraulic lime:sand, subject to agreement of sample.
   Details to be submitted for approval by CA and structural engineer.
   3.2. Sand source/ type: Well graded sand to include stone dust to match existing mortar colour.
   Contractor shall provide samples for approval.
   Pigmented pre-blended NHL mixes will not be acceptable.
4. Rebuilding: To match previous face and joint lines, joint widths and bonding. Adequately bonded to retained work/ backing masonry, as appropriate.
5. Joint surfaces: Dampen, as necessary, to control suction.
6. Laying masonry units: On a full bed of mortar; perpend joints filled.
7. Exposed faces: Remove mortar and grout splashes immediately.
8. Joints: To match existing
9. Other requirements: None

Replacements and insertions

350 Stone inserts

1. Description: Damaged cornice and stone window repairs,
   Refer to drawings P13926 / 301 - 308
2. Stone: Carved and faced sandstone to match existing
3. Finish: Flush and to match existing.
4. Preparation and insertion: As clause 395.
5. Mortar: As section Z21.
   5.1. Mix: 1:2-3 Hot mix lime:agg mortar with aggregate made by pulverizing matching stone to create stone dust
   5.2. Sand source/ type: Fine sand to approval, to match stone colour.
6. Joints: Very fine.
7. Other requirements: Shaped stone inserts and repairs to be inspected at close quarters from scaffold to confirm material and condition

365 Replacement of bricks

1. Description: Internal brickwork to previously plastered walls.
   Refer to drawings P13926 / 311 - 317.
2. Bricks: Bricks as clause 260 and 265.
   Some salvaged.
   The shortfall made up with similar bricks new or reclaimed bricks, subject to approval of the structural engineer.
3. Mortar: For internal use, NHL mortar As section Z21.
   3.1. Mix: 1:2-3 NHL 5 hydraulic lime:sand, subject to agreement of sample.
   Details to be submitted for approval by CA and structural engineer.
   3.2. Sand source/ type: Well graded sand to include stone dust to match existing mortar colour.
   Contractor shall provide samples for approval.
   Pigmented pre-blended NHL mixes will not be acceptable.
4. Fixings: Not required
5. Joints: to match existing
6. Other requirements: To match previous face and joint lines, joint widths and bonding. Adequately bonded to retained work/ backing masonry, as appropriate.
   Dampen, as necessary, to control suction.
   Remove mortar and grout splashes immediately.

385 Laying replacement masonry units

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

395 Installing stone inserts

1. Pockets to receive inserts
   1.1. Cut out accurately. Undercut sides of pocket where necessary to provide space for bonding material.
   1.2. Adjust depth so that insert stands proud of existing stone for finishing in situ.

1.3. Clean out thoroughly.

2. Inserts: Cut to the smallest tapered rectangular shape necessary to replace the defective area and provide a firm seating. Install accurately and securely.
   2.1. Exposed faces: Keep clear of bonding material.
3. Existing joint widths: Maintain. Do not bridge joints.

410 Corroded metal fixings

1. Removal: Cut out carefully, causing the least possible disturbance to surrounding masonry. Remove associated rust debris.

Tooling/ dressing stone in situ

458 Redressing stone

1. Requirement: Carefully dress back stones to the extent agreed.
2. Method: Suitably graded carborundum blocks or tooling as appropriate.

Mortar repairs

510 Preparation for mortar repairs

1. 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.
2. 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.
3. Precautions: Do not weaken masonry by removing excessive material. Do not damage adjacent masonry.
4. Top and vertical reveals of repair area: Undercut.

540 Applying mortar

1. Surfaces to receive mortar: Clean, and free from dust and debris. Dampen to control suction.
2. 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.
3. 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.
4. Finishing mortar coat: Form accurately to required planes/ profiles, and finish flush with adjacent masonry.
5. Protection: Protect completed repairs from adverse weather until mortar has set.

555 Float finish to mortar repairs

1. Finish: Use a shaped wood float and steel float to match existing mouldings to give an even overall texture to match existing.

Crack repairs/ ties/ reinforcement

610 Mortar repair of cracks

1. Description: External render.
   Refer to drawings P13926 / 311 - 317.
2. Mortar: As section Z21.

2.1. Mix: Preblended Hot-mix mortar, As Section Z21. Feebly hydraulic lime:sand, to approval

3. Preparation: Clean out cracks to remove debris, dust and dirt. Dampen recesses, as necessary, to control suction.
4. 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.
5. Other requirements: None

Grouting rubble filled cores - Not Used

Pointing/ repointing

810 Preparation for repointing

1. Existing mortar: Working from top of wall downwards, remove mortar carefully, without damaging adjacent masonry or widening joints, to a minimum depth of 2.5 times joint thickness.
   1.1. Loose or friable mortar: Seek instructions when mortar beyond specified recess depth is loose or friable and/ or if cavities are found.
2. Raked joints: Remove dust and debris.

820 Pointing

1. Description: Internal brickwork as clauses 320 and 365.
   Internal brickwork repairs, and external parapet capping repointing.
2. Preparation of joints: as Clause 810
3. Mortar: As section Z21.
   3.1. Mix: As clause 365
   3.2. Sand source/ type: As clause 365
4. Joints profile/ finish: Recessed back from weathered arrises to retain original joint widths. Brushed finish as clause 860

840 Pointing with tools/ Irons

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

860 Brushed finish to joints

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

Ω End of Section

C51
Repairing/ renovating/ conserving timber

Clauses

2 To be read with preliminaries/ general conditions

General

110 Inspection

1. Purpose: To confirm nature and extent of repair/ renovation/ conservation work.
   Refer to drawing P13926 / 113 and
   Structural Report ref N2337 / 10009001279, dated 23 May '23.
2. Parties involved: Contract administrator; Structural engineer, Foreman carpenter.
3. Timing: At least 7 days before starting each section of work
4. Instructions issued during inspection: To be confirmed by CA

130 Opening up

1. Purpose: To reveal the condition of the beam ends embedded into the masonry.
2. Extent: Gothic Library main roof beam. Both ends
3. Timing: Give notice before starting opening up.
   3.1. Period of notice: At least 5 working days
4. Retained building structure/ fabric: Do not damage or destabilize.

Structural repairs/ alterations

210 Timber section strengthening – internal reinforcement

1. Reinforcement
   1.1. Type: Following the opening up to inspect the beam ends, seek instruction from the structural engineer.
   1.2. Number/ size: One beam, both ends
2. Grout: Seek instruction from the structural engineer.

Products

370 Hardwood for joinery repairs

1. Description: Following the opening up to inspect the beam ends, seek instruction from the structural engineer.
2. Species: To match existing
3. Quality: Generally to BS EN 942; free from decay and insect attack (except pinhole borers).
   3.1. Appearance class: Class J20.
4. Treatment: None required
5. Moisture content on delivery: 12-16%

Execution

600 Workmanship

1. Skill and experience of site operatives: Appropriate for types of work on which they are employed.

1.1. Documentary evidence: Submit on request.

610 Temporary supports/ propping

1. General: Provide adequate temporary support at each stage of repair work to prevent damage, overstressing or uncontrolled collapse of any part of the structure.
2. Bearings for temporary supports/ propping: Suitable to carry loads throughout repair operations.

620 Protection of timber and wood components before and during installation

1. Storage: Keep dry, under cover, clear of the ground and with good ventilation. Support sections/ components on regularly spaced, level bearers on a dry, firm base.
2. Handling: Do not overstress, distort or disfigure sections or components during transit, storage, lifting, erection or fixing.

650 Dimensions generally

1. Site dimensions: Take as necessary before starting fabrication.
   1.1. Discrepancies with drawings: Report without delay and obtain instructions before proceeding.

790 Pegs for mortise and tenon joints in structural timber

1. Wood species: Oak.
2. Condition: Dry, preferably oven 'baked' before use.
3. Shape: Round and tapered.
4. Second hand pegs: Do not use.
5. Peg holes: Slightly offset such that when pegs are driven home, sections being joined are pulled together.

800 Condition of dowels to be bonded into timber

1. Condition at time of installation
   1.1. Dowels generally: Free from corrosive pitting, loose mill scale, loose rust and contaminants that may adversely affect dowels, adhesive, or bond between the two.
   1.2. Carbon steel dowels: As above, and free from corrosive pitting, loose mill scale and loose rust.

840 Fixing framing anchors and cleats

1. Before installation: Submit details if joint geometry prevents installation to manufacturer's recommendations.
2. Installation: Secure using not less than number of fasteners recommended by manufacturer.

860 Moisture content checking

1. Procedure: When instructed, check moisture content of timber sections with an approved electrical moisture meter.
2. Test results: Keep records of all tests. If moisture content falls outside specified range, obtain instructions.

Completion

910 Mechanicallyfastened joints

1. General: Inspect accessible bolted, coach screwed and timber pegged joints and tighten fasteners if necessary.

1.1. Timing: On Completion and at end of Defects Liability Period or Rectification Period.

920 Dating timbers used in structural repairs

1. Principal replacement members: Mark by carving or branding with date of repair and, when appropriate, initials of carpenter, in characters 20-25 mm high.
2. Location of marks: TBA

Ω End of Section

H71
Lead sheet fully supported roof coverings/ flashings

To be read with preliminaries/ general conditions.

10 Gutter linings

1. Substrate: Subject to inspection
   1.1. Preparation: Timber boarding to match existing.
2. Sheet underlay: Building paper to BS 1521, Class A1
3. Lead
   3.1. Type: To match existing. probably sand cast. Subject to inspection.
   3.2. Thickness: 2.50 or 2.65 mm (Code 6)
4. Cross joints: Drips
   4.1. Spacing: At gutter watersheds
5. Outlets: Chute outlet through wall to hopper head
6. Accessories: Apply chalk slurry coat to underside of lead and allow to dry before laying

30 Apron flashings

1. Description: Abutment of gutter to external wall parapet, to dress gutter .
   provide high level access so that a condition survey can be undertaken, and a scope of work agreed.
2. Lead
   2.1. Type: To match existing. probably sand cast. Subject to inspection.
   2.2. Thickness: 1.75 or 1.80 mm (Code 4).
3. Dimensions
   3.1. Lengths: Not more than 1500 mm.
   3.2. End to end joints: Laps not less than 100 mm.
4. Fixing
   4.1. Top edge: Lead wedges into bed joint.
   4.2. Bottom edge: Clips.
   4.3. Material: Lead
   4.4. Spacing: At laps and 500 mm centres

52 Chimney flashings Subject to Survey

1. Lead
   1.1. Type: The contractor shall provide high level access so that a condition survey can be undertaken, and a scope of work agreed.
   1.2. Thickness: 1.75 or 1.80 mm (Code 4).
2. Front apron
   2.1. Dimensions
      2.1.1. Length: Width of chimney plus not less than 150 mm underlap to each side flashing.
      2.1.2. Upstand: Not less than 75 mm.
      2.1.3. Cover to roof: Not less than …….
   2.2. Fixing: Lead wedges into bed joint.
3. Back gutter

3.1. Dimensions

3.1.1. Length: Width of chimney plus not less than 100 mm overlap to each side flashing.

3.1.2. Upstand: Not less than 100 mm.

3.1.3. Gutter Sole: Not less than 150 mm.

3.1.4. Cover up roof: Not less than 225 mm.

4. Back gutter cover flashing

4.1. Dimensions

4.1.1. Length: Width of chimney plus not less than 100 mm overlap to each side flashing.

4.1.2. Cover: Overlap to back gutter upstand not less than 75 mm.

4.2. Fixing: Lead wedges into bed joint.

60 Materials and workmanship generally

1. Lead production method: Rolled, to BS EN 14783 Rolled, to BS EN 12588 Machine cast: BBA-certified
2. Identification: Colour marked for thickness/ code, weight and type.
3. Workmanship standard: To BS 6915 and latest editions of 'Rolled lead sheet. The complete manual' published by the Lead Sheet Training Academy
4. Fabrication and fixing: To provide a secure, free draining and weathertight installation.
5. Marking out: Do not use scribers or other sharp instruments to mark out lead without approval.
6. Solder: Use only where specified.
7. Finished leadwork: Fully supported, adequately fixed to resist wind uplift but also able to accommodate thermal movement without distortion or stress.
8. Patination oil: Apply smear coating to all visible lead, evenly in one direction and in dry conditions.

64 Sheet underlay

1. Manufacturer: Submit proposals

1.1. Product reference: Submit proposals

75 Timber for use with leadwork

1. Quality: Planed, free from wane, pitch pockets, decay and insect attack (ambrosia beetle excepted).
2. Moisture content: Not more than 22% at time of fixing and covering. Give notice if greater than 16%.
3. Preservative treatment: Organic solvent as section Z12 and Wood Protection Association Commodity Specification C8.

76 Laying sheet underlay

1. Handling: Prevent tears and punctures.
2. Laying: Butt or overlap jointed onto a dry substrate.

2.1. Fixing edges: With copper or stainless steel staples or clout nails.

2.2. Do not lay over roof edges.

2.3. Turn up at abutments.

3. Wood core rolls: Fixed over underlay.
4. Protection: Keep dry and cover with lead at the earliest opportunity.

77 Preparation of existing timber substrates

1. Remedial work: Adjust boards to level and securely fix. Punch in protruding fasteners, and plane or sand to achieve an even surface.
2. Defective boards: Give notice.
3. Moisture content: Not more than 22% at time of covering. Give notice if greater than 16%.

78 Fixing lead sheet

1. Top edge: Secured with two rows of fixings, 25 and 50 mm from edge.
2. Fixings
    2.1. Nails to timber substrates: Copper clout nails to BS1202-2 , or stainless steel (austenitic) clout nails to BS 1202-1.
        2.1.1. Shank type: Annular ringed, helical threaded or serrated.
        2.1.2. Length: Not less than 20 mm or equal to substrate thickness.
    2.2. Screws to concrete or masonry substrates: Brass or stainless steel.
        2.2.1. Diameter: Not less than 3.35 mm.
        2.2.2. Length: Not less than 19 mm.
        2.2.3. Washers and plastics plugs: Compatible with screws.

80 Clips

1. Material
    1.1. Lead clips: Cut from sheets of the same thickness/ code as sheet being secured.
    1.2. Copper clips: Cut from 0.70 mm thick sheet to BS EN 1172, temper R220 (soft) or R240 (half hard) depending on position, dipped in solder if exposed to view.
    1.3. Stainless steel: Cut from 0.38 mm sheet to BS EN 10088-1, grade 1.4301(304), terne coated if exposed to view.
2. Dimensions
    2.1. Width: 50 mm where not continuous.
    2.2. Length: To suit detail.
3. Fixing clips: Secure each to substrate with either two screw or three nail fixings not more than 50 mm from edge of lead sheet. Use additional fixings where lead downstands exceed 75 mm.
4. Fixing lead sheet: Welt clips around edges and turn over 25 mm.

83 Wedge fixing into joints/ chases

1. Joint/ chase: Rake out to a depth of not less than 25 mm.
2. Lead: Dress into joint/ chase.
    2.1. Fixing: Lead wedges at not more than 450 mm centres, at every change of direction and with at least two for each piece of lead.
    Lime mortar pointing to match existing

91 Wood-cored roll joints without splash lap

1. Wood core
    1.1. Size: 45 x 45 mm round tapering to a flat base 25 mm wide.
    1.2. Fixing to substrate: Brass or stainless steel countersunk screws at not more than 300 mm centres.
2. Undercloak: Dress half way around core.
3. Copper or stainless steel clips: Fix to core at not more than 450 mm centres. Do not restrict thermal movement of the undercloak.

4. Overcloak: Dress around core with edge welted around ends of clips, finishing 5 mm clear of main surface.

92 Wood-cored roll joints with splash lap

1. Wood core
   1.1. Size: 45 x 45 mm round tapering to a flat base 25 mm wide.
   1.2. Fixing to substrate: Brass or stainless steel screws at 300 mm centres.
2. Undercloak: Dress three quarters around core.
   2.1. Fixing: Nail to core at 150 mm centres for one third length of the sheet starting from the head.
3. Overcloak: Dress around core and extend on to main surface to form a 40 mm splash lap.

94 Drips with splash laps

1. Underlap: Dress into rebate along top edge of drip.
   1.1. Fixing: One row of nails on centre line of rebate.
2. Overlap: Dress over drip and form a 40 mm splash lap.

96 Drips with splash laps

1. Underlap: Dress up full height of drip upstand.
   1.1. Fixing: Two rows of nails to lower level substrate. Seal over nails with a soldered or lead-welded dot.
2. Overlap: Dress over drip and form a 75 mm splash lap.
   2.1. Fixing: Lead clips lead-welded to underlap at bay centres.

98 Welted joints

1. Joint allowance: 50 mm overlap, 25 mm underlap.
2. Copper or stainless steel clips: Fix to substrate at 450 mm centres.
3. Overlap: Welt around underlap and clips and lightly dress down.

99 Patination oil

1. Manufacturer: Submit proposals
   1.1. Product reference: Submit proposals
2. Location: New lead
3. Application: As soon as practical, apply a smear coating to lead, evenly in one direction and in dry conditions.

Ω End of Section

L40
General glazing

General requirements

130 Removal of glass/ plastics for reuse

1. Existing glass/ plastics and glazing compound, beads, etc.: Remove carefully, avoiding damage to frame, to leave clean, smooth rebates free from obstructions and debris.
2. Deterioration of frame/ surround: Submit report on defects revealed by removal of glazing.
   2.1. Affected areas: Do not reglaze until instructed.
3. Reusable materials: Clean glass/ plastics, beads and other components that are to be reused.

150 Workmanship and positioning generally

1. Glazing generally: In accordance with BS 6262 series.
2. Integrity: Glazing must be wind and watertight under all conditions with full allowance made for deflections and other movements.
3. Dimensional tolerances: Panes/ sheets to be within ± 2 mm of specified dimensions.
4. Materials
   4.1. Compatibility: Glass/ plastics, surround materials, sealers, primers and paints/ clear finishes to be used together to be compatible. Avoid contact between glazing panes/ units and alkaline materials such as cement and lime.
   4.2. Protection: Keep materials dry until fixed. Protect insulating glass units and plastics glazing sheets from the sun and other heat sources.

151 Preparation

1. Surrounds, rebates, grooves and beads: Cleaned and prepared.

Types of glazing

210 Lime Mortar Putty- repairs to existing single-glazing

1. Description: Existing leaded glass windows
2. Pane material: Existing retained historic lead glazing
3. Surround: Existing stone recess.
   Remove loose material and debris. retain existing where possible.
   3.1. Sealer: Priming/ sealing not required
4. Type of putty: Lime mortar with linseed oil. Seek advice from the CA
5. Glass installation
   5.1. Glass: DO NOT REMOVE GLASS. Retain as installed, and straighten insitu.
   5.2. Front putty: Profile to match existing.
   Finished to a smooth, neat triangular profile. Sight line to match exiting.. Surface lightly brushed to seal lime mortar putty to glass
6. Opening lights: Keep in closed position until putty has set sufficiently to prevent displacement of glazing when opened.

611 Window Cleaning

1. Decription: Internal and External glass cleaning of original leaded and stained glass
2. Cleaning method: By specialist conservator.
   A light touch clean only.
   Surface damage should not be repaired, but equally not made worse.

Do not use intensive treatments, chemical, mechanical or abrasives.
Use slightly warmed deionised water

3. other information: Intent to remove damaging contaminants, and to remove surface deposits to improve translucency and legibility.
4. Samples: Do one pane of glass internally and externally, and seek instruction from CA.

Ω End of Section

R12
Below ground drainage systems

To be read with preliminaries/ general conditions.

3 Existing drains

1. Setting out: Before starting work, check invert levels and positions of existing drains, sewers, inspection chambers and manholes against drawings. Report discrepancies.
2. Protection: Protect existing drains to be retained and maintain normal operation if in use.

14 Pipes, bends and junctions – PVC-U – solid wall

1. Description: New gully and discahrge pipework to existing RWP
2. Standard: To BS EN 1401-1, with flexible joints.
3. Class: SN4
4. Manufacturer: Submit proposals
5. Sizes: 100mm

19 Formation for beddings

1. Timing: Excavate to formation immediately before laying beddings or pipes.
2. Mud, rock projections, boulders and hard spots: Remove. Replace with consolidated bedding material.
3. Local soft spots: Harden by tamping in bedding material.
4. Inspection of excavated formations: Give notice.

21 Laying pipelines

1. Laying pipes: To true line and regular gradient on even bed for full length of barrel with sockets (if any) facing up the gradient.
2. Ingress of debris: Seal exposed ends during construction.
3. Timing: Minimize time between laying and testing.

22 Jointing pipelines

1. Connections: Durable, effective and free from leakage.
2. Junctions, including to differing pipework systems: With adaptors intended for the purpose.
3. Cut ends of pipes: Clean and square. Remove burrs and swarf. Chamfer pipe ends before inserting into ring seal sockets.
4. Jointing or mating surfaces: Clean and, where necessary, lubricate immediately before assembly.
5. Allowance for movement: Provide and maintain appropriate clearance at ends of spigots as fixing and jointing proceeds.
6. Jointing material: Do not allow to project into bore of pipes and fittings.

25 Class F bedding

1. Description: Below ground pipe from new gully to soakaway
2. Type of subsoil: Clay, sandy clay - stiff
3. Granular material: Submit proposals
   3.1. Sizes: To Water Industry Specification WIS 4-08-02 (as amended by WIS 4-08-02A, 2008).
4. Bedding
   4.1. Material: Granular, compacted over full width of trench.

4.2. Thickness (minimum): 50 mm for sleeve jointed pipes, 100 mm for socket jointed pipes. Where trench bottom is uneven, increase thickness by 100 mm.

5. Pipes: Dig slightly into bedding, rest uniformly on barrels and adjust to line and gradient.
6. Initial testing before backfilling: Not required
7. Backfilling
   7.1. Material: Protective cushion of selected fill.
   7.2. Depth: 150 mm (250 mm for adoptable sewers) above crown of pipe.
   7.3. Compaction: By hand in 100 mm layers.

49 One piece gullies

1. Description: Push fit single socket square grid bottle gully
2. Standards: To BS EN 1253-1, -2, -3, -4 and -5; or
   2.1. Cast iron: To BS 437 and Kitemark-certified, or Agrément-certified.
   2.2. Clay: To BS EN 295-1 and Kitemark-certified, or Agrément-certified.
   2.3. Concrete: To BS 5911-6 and Kitemark-certified, or Agrément-certified.
   2.4. Plastics: To BS 4660 and Kitemark-certified, or Agrément-certified.
   2.5. Polypropylene: To BS EN 1852-1.
3. Sizes: 110mm
4. Outlet sizes: 110mm

66 Soakaway system

1. Description: System for new gully to RWP 1.
2. Rainwater drainage sources: Below-ground rainwater pipelines
3. Soakaways: Soakaway crates. Storage capacity required is 0.5m³.
   Typically 1000 x 500 x 500, ideally stacked 2 deep, depending on available space between tree roots.
   3.1. Accessories: Wrap with geotextile membrane, and bed and surround as clause 25
4. New Item: Location to avoid tree roots. hand digging only. If roots are encountered seek advice.

84 Testing and inspection

1. Dates for testing and inspection: Give notice to the employers agent.
   1.1. Period of notice: 3 days

91 Backfilling to pipelines

1. Backfilling above top of surround or protective cushion: Material excavated from trench, compacted in layers 300 mm (maximum) thick.
2. Heavy compactors: Do not use before there is 600 mm (total) of material over pipes.

94 Backfilling under roads and pavings

1. Backfilling from top of surround or protective cushion up to formation level: Granular sub-base material, laid and compacted in 150 mm layers.

Ω End of Section

Z21
Mortars

Cement gauged mortars - Not Used

Lime:sand mortars

310 Lime:sand mortar mixes

1. Specification: Specification for repointing, repairs and rebuilding parts of existing walls built with traditional lime mortar. Having looked at and understood the character of the original host mortar, the method of its
preparation, and the relative proportions of aggregate to lime through analysis and comparison to historic precedents, agree with the Project Officer or his Conservation Architect a suitable mix for a compatible mortar.

311 ANALYSIS OF EXISTING MORTAR

1. The purpose of analysis, is to identify and then use mortar of the same strength as that in the existing wall to avoid creating hard spots which will not move with the wall and eventually separate from it.
Locate sound original mortar within the structure avoiding recent repointing and repaired areas which might be a harder cement or NHL based material.
- extract a sufficiently large sample for analysis for each varying type of mortar encountered in the structure to be repaired or if many variations are found, a representative range of samples.
- **acid digestion test** to release aggregates then carry out insoluble aggregate analysis sorting by size :
>4.75mm, 3.35mm, 2.36mm, 1.18mm, 600um, 300um, 150um, 75um, <75um.
- **porosity test** to compare dry weight of sample with saturated weight of sample. (A lime mortar will absorb water, a cement mortar will not.)
- **close visual inspection** to identify:
angular limestone fragments indicating free hydrated lime which has subsequently calcified to become a porus particulate,
charcoal and /or brick dust indicating the use of pozzolanic ingredients.
- **manual crushing** to identify lime mortar. (Cement and mature NHL based mortars are generally too hard to scrape away or crush by hand)

312 Lime:sand Mortar Samples

1. Specification: 1. The contractor should allow for three different trial mixes for the brickwork and a further three for the stone window repairs and a further three for the render repairs.
1.1. Propose combination of sands to approximate to range of aggregatres exposed in sample analysis.
2. Retain bagged samples for inspection.
2.1. Select differing colours to achieve a range across the colour of the original mortar or anticipated
3. colouring
3.1. Agree with CA site for trials
3.2. Trial areas size 300 x 300mm undertake as for finished work including tending.
3.3. Programme: allow time in construction programme for analysis, mortar design, trial areas,
4. assessment and repeat trial.

320 Sand for lime:sand masonry mortars

1. Type: Sharp, well graded to match the original aggregates used as closely as possible including but not limited to
sharp sand 5mm to fine
White sand

Golden brown sand
Ginger soft sand
Silver sand
Stone just derived from same stone type as present in the construction

1.1. Quality, sampling and testing: To BS EN 13139.

1.2. Grading/ Source: Where sample analysis is not possible, combine different sands to imitate the mix of aggregates present in the original mortar for trials, typically using:
well graded sharp sand - 5mm to fine for flintwork and 3mm to fine for brickwork.
The colour of the sands may need to be blended to achieve the require colour, texture and grit exposure.

342 Pozzolanic additives for nonhydraulic lime:sand mortars

1. Manufacturer/ Supplier: Imerys Performance Additives Metastar HP or similar.
Submit proposals

   1.1. Product reference: Alternatives for pozzlanic additives such as:
   Charcoal, wood ash, crushed terracotta, polestar, PFA (Pulverised Fuel Ash), NHL (Natural Hydraulic Lime), Prompt, Bentolite.

2. Mixing: Mix thoroughly into mortar during knocking up.

350 Storage of lime:sand mortar materials

1. Sands and aggregates: Keep different types/ grades in separate stockpiles on hard, clean, free-draining bases.
2. Ready prepared nonhydraulic lime putty: Prevent drying out and protect from frost.
3. 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.
4. Bagged hydrated hydraulic lime: Store off the ground in dry conditions.

360 Making lime:sand mortars generally

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

375 GOLDEN RULES FOR HOT MIX LIME:SAND MORTARS

1. - Hot lime or quicklime is often favoured for conservation work. One of the issues with this type of mortar is that, like non-hydraulic lime, it has a low resistance to frost and it cures in air. That isn't always ideal if the repair extends into the depth of a wall. For this reason a pozzolan is often used to induce hydraulic setting characteristics.
   - choose the right type of lime and aggregate for the application.
   - the mortar should be very well mixed - balling must be avoided.
   - always measure using a gauging box or bucket.
   - mortar must not be allowed to dry out too quickly. Dampen surrounding masonry.
   - tend the mortar over the days following it being used
   - do not use if the temperature is too low i.e. likely to fall to 5°C or below before carbonation has started (note full carbonation will take months / years after application).
   - protect from frost, excessive sunlight and drying winds.
   - After the mortar has been applied, make periodic checks to ascertain when it is ready for tending.
   - If shrinkage cracks develop within the fresh mortar, firmly push back and repeat as necessary. When ready, use a churn brush to knock back the mortar and a bronze brush to bring out the aggregate in the joint and clean the surrounding stones. Tending regimes will be dependent on environmental conditions and application methods.
   - depending on the mix and the time of year it should be possible to build at a greater rate before having to wait for the lower courses to set as with NHL mortars. The mortar will continue to

gain strength for many years although an adequate set will be achieved in a matter of a week or two

380 Ready to use nonhydraulic lime:sand mortars

1. Manufacturer: Hot Mix, As clause C41/215
   Pre-Mixed Non-Hydraulic Lime Mortars are available from a number of suppliers such as:- Ty-Mawr (tymawr@lime.org.uk), and Conserv (support@conserv.co.uk)
   1.1. Product reference: Submit proposals to match existing mortar.
2. Materials: Select from:
   2.1. Quicklime to BS EN 459-1 slaked directly with sand.
3. Maturation period before use (maximum): Seek instructions from the supplier. Hot mix limes will be aged by a few days and kept bagged. Then knocked-up on the day of use as clause 390.

390 Knocking up nonhydraulic lime:sand mortars

1. Knocking up before and during use: Achieve and maintain a workable consistency by compressing, beating and chopping. Do not add water because lime is thixotropic and its viscosity will change during knocking up. If more water is required after knocking up add it then.
   1.1. Equipment: Hand held double whisk or Roller pan mixer or submit proposals.

400 Making hydraulic lime:sand mortars

1. Mixing hydrated hydraulic lime:sand: For NHL, Follow the lime manufacturer's recommendations for each stage of the mix.
   1.1. Water quantity: Only sufficient to produce a workable mix.
2. Working time: Within limits recommended by the hydraulic lime manufacturer.

Ω End of Section

Specification created using NBS Chorus