SCHEDULE OF WORKS
February 2021

	Section 1 **SCHEDULE OF WORKS FOR MONUMENT REPAIRS BY SPECIALIST CONSERVATOR** **Refer to drawings SOR016596.01, J20-077.1000, 1001, 1004, 1005, 1006, 2020, 3020, 3023, 3024, 3025, 3026, 3028, 5001, Proforma Condition and Repair Schedules for the Congregationalist and Jewish Cemeteries, and NBS Specification for Monument Repairs and Re-Setting for specialist conservator works.**	
1.00	**Repairs to Monuments**	
1.01	Ashlar Stonework (Generally) 1 Clean ashlar stonework with a water spray and soft brush (volunteer operation, not to be priced). 2 Carefully rake out cracked, eroded or weathered mortar joints with hand tools. Repoint with 1:2.5 NHL3.5 hydraulic lime/sand mortar, sand graded in size to suit the width of the mortar joint. PLM-M grout may be required. 3 Carefully cut out all corroding non-ferrous cramps and fixings. Replace with Grade 316 stainless steel fixings fabricated to match, set in epoxy resin. 4 Grout and point delamination, erosion and surface weathering with PLM-M grout and hydraulic lime mortar, coloured to match the stone.	
1.02	Repairs to Broken Ashlar Monument Panels (Limestone or Sandstone) 1 Accurately record monuments before dismantling. 2 Carefully dismantle ashlar stone panels sufficient to repair those that are broken or damaged, or that require resetting, or the replacement of corroding cramps. The minimum dismantling possible should be undertaken. 3 Remove broken sections to a workshop and allow to dry out. 4 Trial fit sections together in the workshop and drill aligned dowel holes or slots for assembly on site. 5 Clean panels before re-assembly with water and soft brush (volunteer operation not to be priced). 6 Assemble panels with 6mm dia Grade 316 threaded stainless steel rod bedded in epoxy resin into holes, or 3 to 8mm thick x 30mm wide x approx 350mm long stainless steel bar as cramps bedded in epoxy resin into slots, with resin also spread over mating faces. 7 Grout and point joints between sections with PLM-M grout and hydraulic lime mortar, coloured to match the stone. 8 Losses and fragmentary edges to be similarly pointed.	
1.03	Repairs to Kerbs and Plinths (Granite and Slate) 1 Accurately record kerbs before dismantling. 2 Remove and set aside kerbs that have been displaced by trees or roots.	

	3 Excavate to the original level of the kerb base and remove roots. 4 Supply and install replacement granite kerbs to match original colour, size and profile, picked finish or to match existing. 5 Reset kerbs in their original location, and to their original line and level where possible. Install replacement kerbs similarly. A sand or weak mix limecrete bed may be used to assist with resetting. Fill perpends and point the kerb joints with 1:2.5 NHL3.5 hydraulic lime/sand mortar, sand graded in size to suit the width of the mortar joint. In granite, this will generally be 10mm±.	
1.04	Brickwork Core Walls to Monuments 1 New core walls to table tombs to be constructed of honeycomb brickwork, spaced 50mm from the line of the back of the side panels, and 10mm higher than the top of the side panels to support the lid. Brickwork to be bedded and pointed in 1:2.5 NHL3.5 hydraulic lime/sand mortar. Side panels to be fixed to core walls with fabricated Grade 316 stainless steel cramps.	
1.05	Brickwork Repairs 1 Carefully take down loose brickwork and set aside for re-use. 2 Clean all remaining mortar off salvaged bricks. 3 Rebuild larger areas of brickwork in 1:2.5 NHL3.5 hydraulic lime/sand mortar to original line and level. 4 Piece in missing single bricks, or small areas of brickwork in 1:2.5 NHL3.5 hydraulic lime/sand mortar 5 Carefully rake out cracked, eroded or weathered mortar joints with hand tools. Repoint with 1:2.5 NHL3.5 hydraulic lime/sand mortar.	
1.06	Render Repairs 1 Carefully rake out cracks in render and fill with 1:2.5 NHL3.5 hydraulic lime/sand mortar, with sand graded to match the width of the crack. 2 Carefully remove areas of loose, cracked or hollow render back to a well adhered edge. Undercut edges if possible and rake out cracks. Re-render with two or three coat 1:2.5 NHL3.5 hydraulic lime/sand render in thicknesses to match the existing. New Render Cappings 3 Form new cappings on rebedded core of monument with three coat 1:2.5 NHL3.5 hydraulic lime/sand render at least 25mm thick and profiled to match the existing.	
1.07	Ironwork 1 Round off sharp edges of broken elements of ironwork to be retained with hand tools. Remove the minimum necessary material to make the ironwork safe. 2 De-rust ironwork to remain in situ with hand tools. 3 For ironwork that is to be removed, carefully blast clean to remove rust in the workshop. 4 For ironwork that is to be reassembled and reinstalled, provide matching components to replace those that are missing or broken, or weld in sections of matching profile, trial assemble in the workshop, and reassemble on site. Fix railing bases to kerbs with molten lead caulk.	

	5 Redecorate all ironwork with micaceous iron oxide primer, undercoat and two coats of gloss paint. 6 Include for all railing removal and reinstatement work, including consequential repairs to the stone plinths, arising from the need to remove ironwork from them.	
1.08	Samples and Analysis of Existing Mortars and Renders 1 Include for taking samples and obtaining analysis of materials including recommended limes, sands and mixes to replicate as closely as possible the original materials. 2 Requirements for samples and analysis are included in Specification sections C41 and M20.	
2.00	**Repairs to Gravestones**	
2.01	Fragmented Slate Headstones 1 Excavate base section if headstone broken off. Remove fragments to workshop and allow to dry out. 2 Obtain 25mm thick slate backing slab, monumental quality, slightly narrower and shorter than the original to leave a margin when viewed from the back. Splayed top to shed water. 3 Stabilise edges of fractures with injection resin. 4 Arrange fragments on support slab and drill aligned dowel holes in the fragment and backing slab. 5 Fix fragments together with epoxy resin and fix to backing slab with 6mm dia Grade 316 threaded stainless steel rod bedded in epoxy resin, as the assembly of the original headstone proceeds. 6 Grout and point joints between fragments, and joint between fragments and support slab with PLM-M grout and hydraulic lime mortar, coloured to match the slate. 7 Losses and fragmentary edges to be similarly pointed. 8 Clean headstone before re-erection with water and soft brush (volunteer operation not to be priced). 9 Re-erect as 2.09 (a) or lay down as 2.09 (b).	
2.02	Laid Down but Complete Slate Headstones 1 Clean headstone before re-erection with water and soft brush (volunteer operation not to be priced). 2 Re-erect as 2.09 (a) or lay down as 2.09 (b).	
2.03	Split/Delaminating Slate Headstones to be Repaired In-Situ 1 Provide temporary covering over headstone to allow to dry out. 2 Clean headstone with water and soft brush (volunteer operation not to be priced). 3 Grout split or delamination with PLM-M grout and hydraulic lime mortar, coloured to match the slate. 4 Glue flaked stone back onto main part of headstone with epoxy resin, and secure with a new slate backing of the minimum necessary size if required, fixed as 2.01.	

2.04	Fragmented Limestone or Sandstone Headstones (broken into large pieces) 1 Excavate base section if headstone broken off. Remove fragments to workshop and allow to dry out. 2. Trial fit sections together in the workshop and drill aligned dowel holes or slots for cramps, for assembly on site. 3 Clean headstone before re-assembly with water and soft brush (volunteer operation not to be priced). 4 Assemble fragments with 6mm dia Grade 316 threaded stainless steel rod bedded in epoxy resin into holes (where headstone to be re-erected without backing slate support), or 3 to 8mm thick x 30mm wide x approx 350mm long stainless steel bar as cramps bedded in epoxy resin into slots (where headstone to be re-erected with backing slate support or laid down), with resin also spread over mating faces. 5 Over the back of the headstone, place a layer of Kevlar matting (210g 2x2 Twill 3k Carbon Kevlar Cloth) with EL2 epoxy laminating resin (where headstone is to be laid down and requires reinforcement). 6 If headstone is to be re-erected and requires additional support, omit Kevlar and pin fragments to 25mm thick slate backing with 6mm dia threaded stainless steel rod bedded into epoxy resin filled holes. 7 Grout and point joints between fragments with PLM-M grout and hydraulic lime mortar, coloured to match the stone. 8 Losses and fragmentary edges to be similarly pointed. 9 Re-erect as 2.09 (a), or if headstone is to be laid down, prepare bed and install headstone as section 2.09 (b).	
2.05	Fragmented Limestone or Sandstone Headstones (broken into small pieces) 1 Excavate base section if headstone broken off. Remove fragments to workshop and allow to dry out. 2. Trial fit sections together in the workshop. 3 Clean headstone with water and soft brush (volunteer operation not to be priced). 4 Prepare site location for laying down headstone as 2.09c.	
2.06	Upright Limestone or Sandstone Headstones (broken corners or broken off at base) to be Repaired In-Situ 1 Provide temporary covering over headstone to allow to dry out. 2 Clean headstone with water and soft brush (volunteer operation not to be priced). 3 Trial fit sections together on site and drill aligned dowel holes for assembly. 4 Assemble broken section to main part of headstone, or main part of headstone to base with 6mm dia Grade 316 threaded stainless steel rod bedded in epoxy resin into holes, with resin also spread over mating faces. 5 Grout and point joints between fragments with PLM-M grout and hydraulic lime mortar, coloured to match the stone. 6 Losses and fragmentary edges to be similarly pointed.	
2.07	Delaminating/Weathered Upright Limestone or Sandstone Headstones to be Repaired In-Situ	

	1 Provide temporary covering over headstone to allow to dry out. 2 Grout and point delamination, erosion and surface weathering with PLM-M grout and hydraulic lime mortar, coloured to match the stone. 3 Losses and fragmentary edges to be similarly pointed. 4 Clean headstone (specialist operation not to be priced).	
2.08	Corroding Fixings, Upright Limestone or Sandstone Headstones to be Repaired In-Situ 1 Provide temporary covering over headstone to allow to dry out. 2 Clean headstone with water and soft brush (volunteer operation not to be priced). 3 Disassemble headstone, removing corroding ferrous cramps. 4 Trial fit sections together on site and drill aligned dowel holes for assembly. 5 Assemble sections together with 6mm dia Grade 316 threaded stainless steel rod bedded in epoxy resin into holes, with resin also spread over mating faces. 6 Grout and point joints between sections with PLM-M grout and hydraulic lime mortar, coloured to match the stone. 7 Losses and fragmentary edges to be similarly pointed.	
2.09	Re-Erection of Slate and Sandstone/Limestone Headstones **Note: All excavations to be hand dig only and subject to archaeologist watching brief.** a <u>If headstone is to be re-erected</u>, excavate trench up to 500mm deep, support base of headstone with concrete blocks isolated from headstone with 1:2.5 NHL3.5 hydraulic lime mortar/sand, backfill around blocks with hydraulic lime mortar, and backfill to ground level with retained soil. Refer to drawing 3028. Laying Down Slate and Sandstone Headstones broken into large pieces b <u>If headstone is to be laid down</u>, Lay a minimum 50mm thick bed of hydraulic limecrete at a minimum slope of 1.5° (1 in 40) on a 50mm bed of 10mm gravel on a layer of Terram or similar weed control fabric within a surround of 50 x 150mm pc concrete path edging kerbs bedded into soil, to the dimensions of the headstone less 25mm all around. Incorporate slate or pc concrete slabs if necessary as sleepers to provide additional support to monuments. Finish limecrete flush with top of kerb and lay headstone on hydraulic lime mortar bed. Refer to drawing 3028. Laying Down Fragmented Sandstone/Limestone Headstones broken into small pieces c Excavate for and lay a minimum 50mm thick bed of hydraulic limecrete at a minimum slope of 1.5° (I in 40) on a 50mm bed of 10mm gravel on a layer of Terram or similar weed control fabric within a surround of 50 x 200mm pc concrete path edging kerbs bedded into soil, to the dimensions of the headstone plus the thickness of the kerb. Finish limecrete below the top of the kerb equivalent to the thickness of the headstone. Incorporate slate or pc concrete slabs if necessary as sleepers to provide additional support to monuments.	

	Assemble fragments into recess formed by kerb, bedding and pointing the fragments together and to the kerbs with PLM-M grout and hydraulic lime mortar, coloured to match the stone. Losses and fragmentary edges to be similarly pointed. Refer to drawing 3028.	
2.10	Cleaning by Volunteers 1 The conservator will be responsible for liaising with the volunteer team to organise a programme for the cleaning of the monuments either before or following conservation work. However, the conservator will not be responsible for the progress or quality of the cleaning work, or for managing the volunteers.	
2.11	Site Workshop 1 Include for the provision, erection and removal of a temporary workshop if required, and for temporary protection of monuments on site whilst they are being repaired.	
2.12	Welfare Facilities 1 The main contractor will act as Principal Contractor, and will be responsible for Health and Safety on site, as well as the provision and maintenance of welfare facilities for all contractors working on the site.	
3.00	**Revisions:**	
3.01	* - 5th February 2021 – Issue for Tender	RG
3.02	A - 15th February 2021 – Final Issue for Tender	RG