GENERAL SPECIFICATION FOR STRUCTURAL WORKS

76 FLEET ROAD, LONDON, NW3 2QT

1.0 GENERAL

1.1 "C A" refers to the Contract Administrator who in the absence of any appointed professional is the Contractor's Employer. "*uno*" means "unless notified otherwise on drawings". If there is any doubt the Contractor should seek advice.

1.2 *Structural details for alterations to existing buildings are necessarily prepared on the basis of limited information and certain reasonable assumptions as to the nature of the hidden structural elements. The Contractor is to open up all key areas related to the intended alterations at the earliest opportunity. Items noted on the drawings as "verify" are to be exposed by the Contractor, checked against the information supplied on the drawing, verified to be in good condition throughout and reported to the CA.*

If any discrepancy or lack of soundness or ability to support the new or temporary works is noted, the C A is to be notified immediately.

Do not order materials until this has been fully attended to.

1.3 Drawings are not to be scaled and the contractor is to check all dimensions on the drawings which affect setting out on site before carrying out works, and is to determine, from site, lengths of structural members, which are to be continuous without joints *uno*.

1.4 This specification is to be read in conjunction with all Consultants' drawings, which should be used to verify layout, setting out, finishes etc. Any discrepancies are to be brought to the attention of the C A prior to construction.

1.5 Do not cut or cast in concrete any holes or cut chases through any structural members without first obtaining the written consent of the Consulting Engineer.

1.6 Where new foundations are required, prior to commencement of the works, the Contractor shall dig trial holes and agree footing depths.

1.7 The Contractor shall obtain all necessary approvals from Local Authority and other interested parties. If the Building Inspector accepts work or drawings, it should be understood that this is subject to the Building Control department's structural engineers' approval of our calculations and details. Work started before official approval from Building Control and their structural engineers is at the risk of the Contractor and client.

1.8 If the Building Inspector requests amendments to any structural elements, the C A is to be notified immediately. The Contractor shall not proceed without instructions from the C A. It is the contractor's responsibility to record what is said on site and, notwithstanding what is said on site, to build correctly.

1.9 All lintel types and beams on the drawings are subject to modification as a result of existing wall thickness/configuration found on site. Contractor is to verify these as soon as possible and at any rate prior to ordering

1.10 All damage to adjoining buildings arising from the works is the responsibility of the contractor, and he may be asked to rectify same at his cost or to pay a sum to the neighbour to allow them to do this.

2.0 DEMOLITION AND TEMPORARY WORKS

2.1 For the purpose of this specification 'demolition' means **'intentional dismantling and/or reduction of a building or part of a building which has structural value'**.

The Contractor is entirely responsible for maintaining in a safe manner the stability of all existing buildings, structures and services within and adjacent to the works and of all the works from the date of possession of the site until handover. He must identify load paths for each structural change. A detailed inspection of the structure is to be taken before demolition or alteration work is commenced. Personnel should be competent and should include at least one individual who is experienced in the type of work to be undertaken. Proper communication amongst the contractor's team is vital for safe working.

2.2 The Contractor shall design, install, maintain and adjust if appropriate all necessary temporary works and shall advise the C A before commencement of the works, of his proposals for temporary supports and sequence of construction for the works. These proposals shall be supported by design calculations if requested. If any queries arise as to the sequence, manner and/or type of support needed, the C A should be consulted. The contractor shall prevent overloading of any completed or partially completed elements.

2.3 The contractor is invited to discuss his proposals with the Engineer and obtain any relevant loadings from him. In the absence of a specific method statement by the Engineer it should be taken that the sequence of works is non critical and that the contractor is to formulate his preferred method, observing the loads to be carried at all times. It should be particularly noted that apparently non load bearing elements may be assisting stability. This paragraph should be read with 1.2 and the ability of elements of the structure left after removal of certain parts should be verified without making assumptions. The contractor must satisfy himself at each stage of the works that the structure is stable. If anything unexpected occurs or is exposed, works should stop and be reconsidered. Also consult the CA if necessary.

2.4 Arrangements for carrying out demolition (including temporary works) shall be recorded in writing before commencement of work.

3.0 TOLERANCES

3.1 All tolerances are to be agreed with the C A. The Contractor will be responsible for ensuring that sufficient tolerances are provided and integrated throughout the works. The Contractor is to take account of tolerances given in the drawings and specifications.

4.0 MATERIALS AND WORKMANSHIP

4.1 All materials shall be new and of good quality suitable for the required purpose. All materials and workmanship shall conform to the latest version of the appropriate British Standard, to the Building Regulations and to the NHBC requirements.

4.2 All proprietary products shall be used / installed strictly in accordance with the manufacturer's recommendations.

5.0 SPECIAL MORTARS, PADSTONES, SPREADERS

5.1 Mortar levelling beds for beams to be 1:3 cement : sharp sand. Dry pack mortar to be 1:2 cement: sharp sand with Conbex 100 additive mixed according to manufacturer's instructions. Any beam bearings should be avoided over the movement joints, should this be inevitable then use a slip membrane under the beam using polythene or other similar approved to allow for the movement.

5.2 Padstones in blockwork walls are to be single whole dense blocks 10 N/mm^2 *uno.* Where noted as MC (Mass Concrete), an alternative would be to use 140 mm high precast lintels as item 8.1 to the length specified on the drawing.

5.3 Where slots are cut into existing walls, only the minimum disturbance to masonry is permitted. Padstones, spreaders and beams are to be positioned on a mortar levelling bed and are to be fully packed up to ensure proper load transfer of masonry loads above.

6.0 FOUNDATIONS

7.0 MASONRY

7.1 Workmanship is to comply generally with BS EN 1996: Parts 1 to 3.

7.2 All masonry below d.p.c. is to be set in 1:3 mortar with sulphate resisting cement.

7.3 New brickwork below d.p.c. is to be Class B engineering bricks.

7.4 New blockwork below d.p.c. is to be specified as suitable for such use by the manufacturer and of minimum strength 7.3N/mm^2, *uno*.

7.5 New brickwork above d.p.c. is to be minimum Class 3 set in 1:1:5 ½ mortar
cement : lime : sand with plasticiser *uno*. Use bagged cement : lime mix with plasticiser e.g. Limebond or similar equivalent approved. Gauge by volume with sand and mix for 5 minutes maximum. Do not knock up mortar or add water to mixed product.

7.6 New blockwork is to be minimum strength 7.3N/mm^2 set in 1:1:6 mortar *uno*.

7.7 Brickwork and blockwork are to be laid properly bonded as agreed with the C A and fully bonded into existing work. Brickwork is to be laid frog up. Do not lay masonry when ambient air temperature is less than 5° C. Cavities to be kept clear of mortar droppings.

Anti-freeze or other mortar additives are not permitted. Bricks and blocks before being laid and tops of walls to be raised are to be wet.

7.8 Cavity wall ties shall be stainless steel chevron twist to BS EN 845-1 spaced at 450 crs vertically, 900 crs horizontally staggered and at 225 crs vertically 150mm from all openings, corners and reveals. Minimum embedment to be 50mm into each masonry leaf.

7.9 Masonry shall be built to within 15mm / storey height and to within 25mm / full height.

8.0 LINTELS

8.1 Precast concrete lintels are to be BS EN 845-2 by "Tarmac" or similar approved and as indicated on the drawings. End bearing lengths are to be at least 150mm, *uno*.

8.2 Galvanised steel lintels are to be to BS EN 845-2 by "Catnic Ltd" or similar approved. End bearing lengths are to be at least 150mm, *uno*.

8.3 The Contractor shall obtain the C A's written approval, prior to commencement of the work, to the use of lintels by alternative manufacturers and if so desired, the Contractor shall be responsible for correct selection.

9.0 STEELWORK

9.1 The steelwork fabricator is to obtain dimensions from site. Setting out dimensions are to be obtained from the C A's drawings.

9.2 All workmanship is to comply with BS EN 1993; Parts 1-6 and to National Structural Steelwork Specification. All structural steel sections are to be Grade S275 *uno*. All bolts are to be grade 8.8 Black Bolts to BSEN ISO 4014 & 4017 and bolts and studs etc. are to be galvanised or sherardised.

9.3 Site welding is permitted only with written approval. If given, welding is to comply with BS EN 1011 using consumables giving deposit not inferior to parent metal. Evidence of welders' competence is to be provided and they must have been tested to BS 4872: Part 1 using equivalent materials, thicknesses and positions. Welds are to be 6mm fillet or full strength butt, as appropriate, unless noted otherwise on the drawings. Do not weld when below 0°C or when surfaces are moist. Welds (including tack welds) not indicated on drawings are not permitted without approval. Carefully dress finished welds to remove slag without deforming surface of weld.

9.4 All steelwork is to be cleaned free of all mill scale, rust, oil etc to standard CSt2 and painted with one coat on all sharp edges and corners followed by two coats throughout of zinc phosphate modified alkyd primer to dry film thickness of 75 microns before erection, *uno*.

Ends of steels built into or onto external masonry or below DPC shall have two additional coats of compatible bituminous paint taken 150 mm past internal wall face / above DPC (as appropriate).

9.5 Fire protection to all steelwork is to be to the Building Control Officer's requirements and Architect's specifications.

9.6 All beams bear centrally over full width of padstones *uno* and ends of steels embedded in party / flank walls are to be fully encased in concrete

9.7 Concrete encased steelwork shall have 75 cover with D49 mesh positioned centrally.

9.8 Double beams are to be joined together with M12 bolts at 450mm centres *uno*. Where webs do not meet, use barrel spacers *uno*.

9.9 **HSFG BOLTED CONNECTIONS**: **Faying surfaces** are to be free of scale, rust flakes and deformities which may affect slip. DO NOT PAINT. **Load indicating washers**: When placed under bolt head, prevent bolt turning when tightening. When placed under nut, protect with hardened washer and prevent both washers from turning when tightening. After final tightening of bolts, without delay, thoroughly degrease and clean bare steel at joint edges and prime whole assembly as in para 9.4. Bolt run out to be at least three clear threads.

9.10 **BEDDING OF STANCHION BASES:**

9.11 If the contractor wishes to splice beams he is to obtain the design loads from the Engineer, procure the design for the joint from his fabricator and submit to the Engineer and Building Control officer in good time for approval.

10.0 CONCRETE

10.1 Materials and workmanship are to comply generally with BS EN 1992 and BS 8500 and BS EN 206. Concrete is specified by Designated Mix *uno*. Use 20mm max aggregate *uno*.

10.2 Concrete for foundations and for ground bearing slabs is to be FND 2. Concrete for beams, lintels and for suspended slabs is to be C35/40. Concrete for padstones and beam end surrounds is to be GEN3 using 10mm max aggregate.

10.3 Ready mixed concrete must be obtained from a plant which holds a current Certificate of Accreditation under the Quality Scheme for Ready Mixed Concrete.

10.4 Do not place concrete when the ambient air temperature is less than 5° C

10.5 All holes shall be formed and all inserts cast in at the time of pouring concrete. No part of the concrete works shall be drilled or cut away without the approval of the CA

10.6 Reinforcement shall be lapped 40d (where d is diameter of the larger bar) *uno* and:

i) plain bars to BS 4449, grade 250 (mild steel); prefix R on drawings and schedules.
ii) deformed bars to BS 4449 or BS 4461, grade 460 (high yield) type 2, prefix T on drawings and schedules.
iii) mesh to BS 4483

10.7 Reinforcement shall be fixed adequately using tying wire or steel clips. Concrete cover is to be 35mm, or 50mm for faces in contact with soil, *uno*. Chairs and spacers are to be provided as necessary to maintain the specified cover.

10.8 suspended slabs over shrinkable clay with roots shall be on a layer of collapsible board according to NHBC Standards Chapter 4.2 "Building near Trees".

11.0 TIMBER

11.1 New timber in the works is to be selected structural timber not inferior to grade C16 to BS EN 1995, *uno*. Timber is to be maintained at below 18% moisture content at all times.

11.2 All existing timber is to be inspected at the beginning of the project by a specialist employed by contractor. Refer to specialist's report for all information in connection with timber treatment / replacement.

11.3 New timber in the works is to be vacuum impregnated with preservative to BS EN 1995 and the manufacturer's recommendations. Cut ends, bores etc. are to be thoroughly treated with brush applied coats of appropriate preservative before fixing. All preservatives are to be to the C A's approval.

11.4 Timber joists and rafters may be notched and bored but only in strict adherence to the Building Regulations. Timber trimmers may not be notched. Sizes of new structural timbers noted on the drawings are sawn basic sizes.

11.5 In attics where binders to existing ceiling joists are to be removed the joists are to be propped from below at the binder positions, taking care not to overtighten props and to protect ceiling finishes. During installation of the new structure the ceiling joists are to be rehung off the new structure using framing anchors, LRS straps or similar appropriate methods. Subsequently remove props and make good finishes.

11.6 Joist hangers, straps, connectors etc shall be by Simpson Strong-Tie and all components are to be galvanised or sherardised. All such items are to be fixed in accordance with the manufacturer's recommendations *uno*; fix all items fully to timbers, using all holes *uno*. All nails are to be 3.75 x 30 square twisted *uno* or in the manufacturers instructions. Use "Safety Fast" joist hangers and "MiniStrap" *uno*. Do not alter stiffeners on top of hangers. Where possible, build joists into masonry (not protruding into cavities). Minimum bearing 100mm *uno*.

11.7 All multiple joists/rafters/trimmers are to be bolted together with M12 bolts at 600 centres *uno*, (where spans exceed 3.0m, seek instructions from Engineers.) Use 38mm x 3mm washers at all bolt or nut/timber interfaces. Retighten just before application of finishes.

11.8 Where solid blocking is called up on drawings this requires adequate bolting to steel flanges or webs or other secure fixing to adjacent members in order to keep it secure

11.9 Provide solid strutting between joists at ends and at other supports. Also at mid span for spans of 2.5 m to 4.5 m or at third spans for spans of over 4.5 m. Double joists under bath feet, new partitions and at trimming positions *uno*. All 100 x 100 posts are to be fixed to carried and supporting members with E2/2.5 angle brackets nailed to timber and shot fired to steels.

11.10 Where L straps are marked on the drawing at right angles to joists, the strap legs are to be fixed to the strutting and also the tops of joists. Where L straps are shown parallel with joists, they are to be fixed along the tops of the joists. In either case, Notch only where necessary to obtain finish levels. In both cases the short leg of the L strap is to be tight against the outer face of the inner leaf.

11.11 Where 'close boarding' is indicated on the drawings, full size sheets should be used as much as possible and in a staggered fashion, with edges closed so that there are no gaps. All edges are to be screwed down at 150 mm c/c. Where the edge of a board is at right angles to a joist/rafter, noggins should be introduced under the edge so that all four edges are secured fully.

12.0 RESIN BONDING IN MASONRY

13.0 BRICK STITCHING

13.1 Remove mortar along selected bed joints.
13.2 Flush with clean water and bond helical bars into each slot using WHO-60 grout by 'Twistfix' or similar approved. Bars should extend 500mm each side of crack. Where several cracks in close proximity they can be stitched in tandem using one continuous bar.
13.3 Fill and seal fissure to prevent the ingress of water
13.4 Depth of the slots should be 45mm (considering the party-wall is a solid double brick wall).
13.5 Bars should be spaced at 400mm intervals

14.0 REPOINTING

15.0 MASS CONCRETE UNDERPINNING SPECIFICATION

15.1 Preliminary

15.1.1 The Contractor is responsible for ensuring that his operations do not in any way impair the safety or condition of the existing structure, including adjacent properties. He shall provide any temporary supports required for this purpose and shall carefully inspect the condition of the structures both before and after execution of the work and immediately inform the Engineer if he considers that any more stringent procedure than that specified is necessary. Adequate supervision of the operatives shall be provided to ensure that this specification is strictly adhered to.

15.1.2 Underpinning is to be carried out to the widths, minimum depths and thicknesses and in the numbered sequences shown on the drawings and to the satisfaction of the Engineer and the Local District Surveyor/Building Control Officer. Adjacent completed sections are not to be

undermined.

15.1.3 If the Contractor wishes to propose different sequences or depths or widths then he should do this immediately after receipt of this document by submission of a marked-up copy of the original drawing.

15.1.4 Under no circumstances will the use of pneumatic spades or any other tools which cause vibration in the foundation of this or adjacent properties be permitted.

15.1.5 Upon appointment, the contractor is to provide a programme indicating for each pin:

(i) commencement of excavation
(ii) completion of excavation
(iii) Concreting
(iv) dry-packing

Should any events occur during the works which alter this programme the Engineer is to be informed immediately.

15.1.6 Before undertaking any excavations the Contractor is to locate any existing services in the vicinity. Any damage and/or resultant losses shall be borne by the Contractor.

15.1.7 Backfilling of access trenches is to be made with properly compacted hardcore (in appropriate layers) or other suitable material. On no account is concrete to be used

15.2 Excavation

15.2.1 Excavation to any section of underpinning shall not be commenced until at least 24 hours after drypacking to previous sections of work. The excavations are to be carried out in such a manner that not more than 25% of the foundation of each wall is left unsupported at any time.

15.2.2 The bottoms of the excavations are to be cleaned of all loose material and kept dry before concreting. The Contractor is to allow for any pumping necessary to drain the excavation. If the excavation is wet, damp soil is to be removed just prior to laying a blinding layer of concrete at least 50 mm thick. In the case of substantial quantities of water the excavation is to incorporate a sump for pumping. Excavation beneath any section of wall and underpinning of that section shall be carried out on the same day. Notice of at least one full working day shall be given for inspections of the excavations.

15.2.3 The undersides of the footings are to be cleaned of any dirt, sand or loose material before underpinning. Projecting portions of footings are not to be cut off unless directed by the Engineer/until after all dry packing is fully hardened.

15.2.4 When excavating a section for underpinning the adjacent sections shall be inspected and further drypacking carried out to these sections if necessary before concreting the excavated section. The exposed sides of the cast sections shall be cleaned thoroughly before casting adjacent sections.

15.2.5 If lateral temporary support of trenches is considered necessary, then it is either to be removed during concreting or, if left in, it is not to be comprised of deleterious materials.

15.2.6 Ensure that excavations reach to the far face of the foundation being underpinned, but do not overdig the underpin excavation and no back shuttering is to be used.

15.3 Concreting

15.3.1 The underpinning concrete foundation is to be taken down to the depth shown on the drawings and is to be founded on firm bearing stratum. The underpinning width is to be the full width of the existing foundation unless otherwise shown on the drawing. The Contractor is to confirm that these conditions prevail throughout the length of the wall. Any deviations from this condition are to be reported immediately to the Engineer.

15.3.2 The mass concrete is to be stopped off 75mm below the underside of the existing footings and the final pinning up over the whole extent of the latter is to be carried out with a dry pack well rammed in 72 hours after pouring the concrete. The pinning-up concrete is to consist of 1 part by volume of rapid hardening Portland cement to 2 parts sharp sand (well graded mix as dry as workability will permit) together with Conbex 100 additive mixed according to the manufacturer's instructions.

15.3.3 Materials and workmanship for mass concrete are to comply generally with BS8110 and BS5328. Concrete is specified by Designated Mix *uno*. Concrete is to be FND 2 with SRPC with 40mm maximum aggregate size.

15.3.4 Joining of foundation sections is to be by means of tapered concrete keys projecting by 150 mm and with height and depth equal to $^1/_3$ underpin height and width. Keys are to be cleaned of soils etc. once adjacent pins are excavated.

15.4 Contractor's Records

15.4.1 The Contractor shall keep a record drawing of the sequence and dimensions of underpinning as actually executed, including the dates of starting and completing excavation, casting concrete and pinning-up for each section. This record drawing shall be forwarded weekly to the CA.