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**5236 CROSSACRES
STRUCTURAL SPECIFICATION**

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C20 DEMOLITION

To be read with Preliminaries/ General conditions.

GENERAL REQUIREMENTS**110 DESK STUDY/ SURVEY**

- Scope: Before starting deconstruction/ demolition work, examine available information, and carry out a survey of:
 - the structure or structures to be deconstructed/ demolished,
 - the site on which the structure or structures stand, and
 - the surrounding area.
- Report and method statements: Submit, describing:
 - Form, condition and details of the structure or structures, the site, and the surrounding area.
 - Type, location and condition of features of historical, archaeological, geological or ecological importance.
 - Type, location and condition of adjoining or surrounding premises that might be adversely affected by removal of the structure or structures, or by noise, vibration and/ or dust generated during deconstruction/ demolition.
 - Identity and location of services above and below ground, including those required for the Contractor's use, and arrangements for their disconnection and removal.
 - Form and location of flammable, toxic or hazardous materials, including lead-based paint, and proposed methods for their removal and disposal.
 - Form and location of materials identified for reuse or recycling, and proposed methods for removal and temporary storage.
 - Proposed programme of work, including sequence and methods of deconstruction/ demolition.
 - Details of specific pre-weakening required.
 - Arrangements for protection of personnel and the general public, including exclusion of unauthorized persons.
 - Arrangements for control of site transport and traffic.
 - Special requirements: None.

120 EXTENT OF DECONSTRUCTION/ DEMOLITION

- General: Subject to retention requirements specified elsewhere, deconstruct/ demolish structures down to ground floor level, including grubbing out of existing foundations.

130 GROUNDWORKS

- Old foundations, slabs and the like: Break out in locations and to the extents stated.
- Contaminated material: Remove, and carry out remediation required by the Enforcing Authority.

140 BENCH MARKS

- Unrecorded bench marks and other survey information: Give notice when found. Do not remove marks or destroy the fabric on which they are found.

150 FEATURES TO BE RETAINED

- General: Keep in place and protect the following: Trees and services as instructed by Contract Administrator (CA).

SERVICES AFFECTED BY DECONSTRUCTION/ DEMOLITION**210 SERVICES REGULATIONS**

- Work carried out to or affecting new and/ or existing services: Carry out in accordance with the byelaws and/ or regulations of the relevant Statutory Authority.

220 LOCATION OF SERVICES

- Services affected by deconstruction/ demolition work: Locate and mark positions.
- Mains services marking: Arrange with the appropriate authorities for services to be located and marked.
 - Marking standard: In accordance with National Joint Utilities Group 'Guidelines on the positioning and colour coding of underground utilities' apparatus'.

- 230 SERVICES DISCONNECTION ARRANGED BY CONTRACTOR
- General: Arrange with the appropriate authorities for disconnection of services and removal of fittings and equipment owned by those authorities prior to starting deconstruction/ demolition.
- 240 DISCONNECTION OF DRAINS
- General: Locate, disconnect and seal disused foul and surface water drains.
 - Sealing: Permanent, and within the site.
- 250 LIVE FOUL AND SURFACE WATER DRAINS
- Drains and associated manholes, inspection chambers, gullies, vent pipes and fittings:
 - Protect; maintain normal flow during deconstruction/ demolition.
 - Make good any damage arising from deconstruction/ demolition work.
 - Leave clean and in working order at completion of deconstruction/ demolition work.
 - Other requirements: None.
- 260 SERVICE BYPASS CONNECTIONS
- General: Provide as necessary to maintain continuity of services to occupied areas of the site on which the deconstruction/ demolition is taking place and to adjoining sites/ properties.
 - Minimum notice to adjoining owners and all affected occupiers: 72 hours, if shutdown is necessary during changeover.
- 270 SERVICES TO BE RETAINED
- Damage to services: Give notice, and notify relevant service authorities and/ or owner/ occupier regarding damage arising from deconstruction/ demolition.
 - Repairs to services: Complete as directed, and to the satisfaction of the service authority or owner.

DECONSTRUCTION/ DEMOLITION WORK

- 310 WORKMANSHIP
- Standard: Demolish structures in accordance with BS 6187.
 - Operatives:
 - Appropriately skilled and experienced for the type of work.
 - Holding, or in training to obtain, relevant CITB Certificates of Competence.
 - Site staff responsible for supervision and control of work: Experienced in the assessment of risks involved and methods of deconstruction/ demolition to be used.
- 320 GAS OR VAPOUR RISKS
- Precautions: Prevent fire and/ or explosion caused by gas and/ or vapour from tanks, pipes, etc.
- 330 DUST CONTROL
- General: Reduce airborne dust by periodically spraying deconstruction/ demolition works with an appropriate wetting agent. Keep public roadways and footpaths clear of mud and debris.
 - Lead dust: Submit method statement for control, containment and clean-up regimes.
- 340 HEALTH HAZARDS
- Precautions: Protect site operatives and general public from hazards associated with vibration, dangerous fumes and dust arising during the course of the Works.
- 350 ADJOINING PROPERTY
- Temporary support and protection: Provide. Maintain and alter, as necessary, as work proceeds. Do not leave unnecessary or unstable projections.
 - Defects: Report immediately on discovery.
 - Damage: Minimize. Repair promptly to ensure safety, stability, weather protection and security.
 - Support to foundations: Do not disturb.
- 360 STRUCTURES TO BE RETAINED
- Extent: Refer to CA for instruction.
 - Parts which are to be kept in place: Protect.
 - Interface between retained structures and deconstruction/ demolition: Cut away and strip out with care to minimize making good.

370 PARTLY DEMOLISHED STRUCTURES

- General: Leave in a stable condition, with adequate temporary support at each stage to prevent risk of uncontrolled collapse. Make secure outside working hours.
- Temporary works: Prevent overloading due to debris.
- Access: Prevent access by unauthorized persons.

380 DANGEROUS OPENINGS

- General: Provide guarding at all times, including outside of working hours. Illuminate during hours of darkness.
- Access: Prevent access by unauthorized persons.

390 ASBESTOS-CONTAINING MATERIALS - KNOWN OCCURRENCES

- General: Materials containing asbestos are known to be present in: As per CA instruction.
- Removal: As per CA instruction.

391 ASBESTOS-CONTAINING MATERIALS - UNKNOWN OCCURRENCES

- Discovery: Give notice immediately of suspected asbestos-containing materials when discovered during deconstruction/ demolition work. Avoid disturbing such materials.
- Removal: Submit statutory risk assessments and details of proposed methods for safe removal.

410 UNFORESEEN HAZARDS

- Discovery: Give notice immediately when hazards such as unrecorded voids, tanks, chemicals, are discovered during deconstruction/ demolition.
- Removal: Submit details of proposed methods for filling, removal, etc.

420 OPEN BASEMENTS, ETC

- Temporary support: Leave adequate buttress walls or provide temporary support to basement retaining walls up to ground level.
- Safety: Make remaining sections of retaining and buttress walls safe and secure.
- Water movement: Make holes in basement floors to allow water drainage or penetration (depending on water table). Provide a hole for every 10 m², not less than 600 mm in diameter.

430 FILLING OF BASEMENTS, ETC

- Temporary support: Leave adequate buttress walls or provide temporary support to basement retaining walls up to ground level.
- Water movement: Make holes in basement floors to allow water drainage or penetration (depending on water table). Provide a hole for every 10 m², not less than 600 mm in diameter.
- Filling: Remove organic material and soil from basements and other voids. Fill and consolidate in accordance with D20 section of specification.

442 SITE SURFACE AT COMPLETION

- Levels: Grade the site to follow the levels of adjacent areas.
- Temporary surface: Cover the site with material suitable for piling mat (i.e. sheet piling at Tree Protection Zone).

450 SITE CONDITION AT COMPLETION

- Debris: Clear away and leave the site in a tidy condition.
- Other requirements: None.

MATERIALS ARISING**510 CONTRACTOR'S PROPERTY**

- Components and materials arising from the deconstruction/ demolition work: Property of the Contractor except where otherwise provided.
- Action: Remove from site as work proceeds where not to be reused or recycled for site use.

511 EMPLOYER'S PROPERTY

- Components and materials to remain the property of the Employer: Octagon.
- Protection: Maintain until these items are removed by the Employer or reused in the Works, or until the end of the Contract.
- Special requirements: Refer to Client for details.

520 RECYCLED MATERIALS

- Materials arising from deconstruction/ demolition work: Can be recycled or reused elsewhere in the project, subject to compliance with the appropriate specification and in accordance with any site waste management plan.
- Evidence of compliance: Submit full details and supporting documentation.
 - Verification: Allow adequate time in programme for verification of compliance.

D20 EXCAVATING AND FILLING

To be read with Preliminaries/ General conditions.

GENERALLY/ THE SITE**110 SITE INVESTIGATION**

- Report:by Albury S.I. Ltd, March 2012 Report No 12/9528/KJC .

145 VARIATIONS IN GROUND WATER LEVEL

- Give notice: If levels encountered are significantly different from levels in the site investigation report or previously measured.

150 EXISTING SERVICES, FEATURES AND STRUCTURES

- Services: See section A12 for locations.
- Site features to be retained: See section A12 for details.
- Structures: See section A34 for details of protection.

CLEARANCE/ EXCAVATING**240 ADJACENT EXCAVATIONS**

- Requirement: Where an excavation encroaches below a line drawn at an angle from the nearest formation level of another higher excavation, the lower excavation, all work within it and backfilling thereto, must be completed before the higher excavation is made.
- Angle of line below horizontal: 45°
- Backfill material: as clause 248.

242 EXCAVATIONS ADJACENT TO EXISTING BACKFILLED TRENCHES

- Proximity: When width of undisturbed ground between the two excavations will be less than 2m.
- Action: Assume that the ground between the trenches is unstable and provide side support accordingly.

244 EXCAVATIONS ADJACENT TO EXISTING FOUNDATIONS

- Prior to commencing excavation:
 - Excavate trial pits adjacent to existing foundations to determine extent and formation levels.
 - Allow for inspection of trial pits.
 - Allow time for amendment of details if required.
- Time period: Two working days.
- Backfill material to new excavation: Imported graded fill.

248 BACKFILL TO EXCAVATIONS LOWER THAN FOUNDATION FORMATION LEVEL

- Backfill material: Lean mix concrete.

250 PERMISSIBLE DEVIATIONS FROM FORMATION LEVELS

- Beneath mass concrete foundations: ±25 mm.
- Beneath ground bearing slabs and r.c. foundations: ±15 mm.
- Embankments and cuttings: ±50 mm.
- Ground abutting external walls: ±50 mm, but such as to ensure that finished level is not less than 150 mm below dpc.

255 ACCURACY - LINEAR DIMENSIONS

- Permissible deviations from linear dimensions generally: Refer to Ciria C709.

260 INSPECTING FORMATIONS

- Give notice: Make advance arrangements for inspection of formations for the basement slab.
 - Notice (minimum): Two working days.
- Preparation: Just before inspection remove the last 150 mm of excavation.
- Trim to required profiles and levels.
 - Loose material: minor compaction.
- Seal: Within 4 hours of inspection, seal formations with concrete blinding.

267 INSPECTION OF FORMATIONS IN SHRINKABLE SOILS

- Inspect formation: For signs of conducting and fine moisture absorbing roots.
- Give notice: If significant quantities of roots are visible in the formation or in the bottom 75 mm of the walls of the excavation.

270 FOUNDATIONS GENERALLY

- Give notice if:
 - A natural bearing formation of undisturbed subsoil is not obtained at the depth shown on the drawings.
 - The formation contains soft or hard spots or highly variable material.

275 FOUNDATION BEARING

- Requirement: Foundations are designed to bear on:
 - Strata: clays
 - Safe bearing capacity (maximum): 200kN/m².
- Give notice: If the material at the design depth of the foundation does not comply with this description, or contains soft or hard spots or highly variable material.

280 TRENCH FILL FOUNDATIONS

- Excavation: Form trench down to formation in one operation.
- Safety: Prepare formation from ground level.
- Inspection of formations: Give notice before commencing excavation.
 - Period of notice: Agreement to be made between contractor and MBP.
- Shoring: Where inspection of formation is required, provide localised shoring to suit ground conditions.
- Concrete fill: Place concrete immediately after inspection and no more than four hours after exposing the formation.

290 FOUNDATIONS IN MADE UP GROUND

- Depth: Excavate down to a natural formation of undisturbed subsoil.
- Discrepancy: Give notice if this is greater or less than depth given.

310 UNSTABLE GROUND

- Generally: Ensure that the excavation remains stable at all times.
- Give notice: Without delay if any newly excavated faces are too unstable to allow earthwork support to be inserted.
- Take action: If instability is likely to affect adjacent structures or roadways, take appropriate emergency action.

320 RECORDED FEATURES

- Recorded foundations, beds, drains, manholes, etc: Notify CA.
- Contaminated earth: Remove and disinfect as required by local authority.

330 UNRECORDED FEATURES

- Give notice: If unrecorded foundations, beds, voids, basements, filling, tanks, pipes, cables, drains, manholes, watercourses, ditches, etc. not shown on the drawings are encountered.

350 EXISTING WATERCOURSES

- Diverted watercourses which are to be filled: Before filling, remove vegetable growths and soft deposits.

360 EXCESS EXCAVATION

- Excavation taken wider than required:
 - Backfill: Lean mix concrete.
- Excavation taken deeper than required:
 - Backfill: Lean mix concrete.

DISPOSAL OF MATERIALS

450 WATER

- Generally: Keep all excavations free from water until:
 - Formations are covered.
 - Below ground constructions are completed.
 - Basement structures and retaining walls are able to resist leakage, water pressure and flotation.
- Drainage: Form surfaces of excavations and fill to provide adequate falls.
- Removal of water: Provide temporary drains, sumps and pumping as necessary. Do not pollute watercourses with silt laden water.

454 GROUND WATER LEVEL, SPRINGS OR RUNNING WATER

- Give notice: If it is considered that the excavations are below the water table.
- Springs/ Running water: Give notice immediately if encountered.

457 PUMPING

- General: Do not disturb excavated faces or stability of adjacent ground or structures.
- Pumped water: Discharge without flooding the site or adjoining property.
- Sumps: Construct clear of excavations. Fill on completion.
 - Locations: To be agreed.

460 PERMANENT DRAINAGE SYSTEM

- Disposal of water from the excavations through system: Not permitted.

FILLING

500 PROPOSED FILL MATERIALS

- Details: Submit full details of proposed fill materials to demonstrate compliance with specification, including:
 - Type and source of imported fill.
 - Proposals for processing and reuse of material excavated on site.
 - Test reports as required elsewhere.
- Timing: 10 days before placement.

510 HAZARDOUS, AGGRESSIVE OR UNSTABLE MATERIALS

- General: Do not use fill materials which would, either in themselves or in combination with other materials or ground water, give rise to a health hazard, damage to building structures or instability in the filling, including material that is:
 - Frozen or containing ice.
 - Organic.
 - Contaminated or noxious.
 - Susceptible to spontaneous combustion.
 - Likely to erode or decay and cause voids.
 - With excessive moisture content, slurry, mud or from marshes or bogs.
 - Clay of liquid limit exceeding 80 and/or plasticity index exceeding 55.
 - Unacceptable, class U2 as defined in the Highways Agency 'Specification for highway works', clause 601.

512 LIMITATION OF SULFATE CONTENT IN FILL MATERIALS

- Test specification: To BS 1377-3.
- Sulfate content: Expressed as SO₃.
 - Water soluble sulfate (maximum): 150mg/l in 2:1.
 - Total potential sulfate (maximum): 0.6%.
 - Oxidizable sulfides (maximum): 0.3% of total potential sulphate.
- Certificates of test result: Submit.

520 FROST SUSCEPTIBILITY

- General: Except as allowed below, fill must be non frost-susceptible as defined in Highways Agency 'Specification for highway works', clause 801.8.
- Test reports: If the following fill materials are proposed, submit a laboratory report confirming they are non frost-susceptible:

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- Fine grained soil with a plasticity index less than 20%.
- Coarse grained soil or crushed granite with more than 10% retained on a 0.063 mm sieve.
- Crushed chalk.
- Crushed limestone fill with average saturation moisture content in excess of 3%.
- Burnt colliery shale.

530 PLACING FILL

- Surfaces of excavations and areas to be filled: Free from loose soil, topsoil, organic material, rubbish and standing water.
- Freezing conditions: Do not place fill on frozen surfaces. Remove material affected by frost. Replace and recompact if not damaged after thawing.
- Adjacent structures, membranes and buried services:
 - Do not overload, destabilise or damage.
 - Submit proposals for temporary support necessary to ensure stability during filling.
 - Allow 14 days (minimum) before backfilling against in situ concrete structures.
- Layers: Place so that only one type of material occurs in each layer.
- Earthmoving equipment: Vary route to avoid rutting.

535 COMPACTION GENERALLY

- General: Compact fill not specified to be left loose as soon as possible after placing.
- After compaction: Surface of each layer must be well closed, showing no movement under compaction plant, and without cracks, holes, ridges, loose material and the like.
- Defective areas: Remove and recompact to full thickness of layer using new material.

540 BENCHING IN FILL

- Adjacent areas: If, during filling the difference in level between adjacent areas of filling exceeds 600 mm, cut into edge of higher filling to form benches 600 mm minimum width and height equivalent to depth of a layer of compacted filling.
- New filling: Spread and compact to ensure maximum continuity with previous filling.

617 HIGHWAYS AGENCY TYPE 1 UNBOUND MIXTURE

- Fill: To Highways Agency 'Specification for highway works', clauses 801 and 803:
 - Crushed rock (other than argillaceous rock).
 - Crushed concrete.
 - Recycled aggregates.
 - Crushed non-expansive slag.
 - Well-burned non-plastic colliery shale.
- Amendments to requirements in Highways Agency 'Specification for highway works': None.
- Filling: To Highways Agency 'Specification for highway works', clause 802.

618 HIGHWAYS AGENCY TYPE 2 UNBOUND MIXTURE

- Fill: To Highways Agency 'Specification for highway works', clauses 801 and 804:
 - Crushed rock (other than argillaceous rock).
 - Crushed concrete.
 - Crushed non-expansive slag.
 - Well-burned non-plastic colliery shale.
 - Natural gravel.
 - Natural sand.
- Amendments to requirements in Highways Agency 'Specification for highway works': None.
- Filling: To Highways Agency 'Specification for highway works', clause 802.

620 SUBGRADE IMPROVEMENT LAYER (CAPPING)

- Fill: To Highways Agency 'Specification for highway works', Table 6/1, Class 6F1 or 6F2.
- Filling: Place and compact to Highways Agency 'Specification for highway works', Table 6/1, clause 612 and clause 613.3, 613.9 and 613.10.

626 COMPACTED GENERAL FILL

- Suitable material: Imported granular graded material.
- Excavated material: Select suitable material and keep separate.
- Filling: Spread and level material in layers. As soon as possible thoroughly compact each layer.
- Required compaction: 95% of test density.
- Proposals: Well in advance of starting work submit details of proposed:
 - Materials to be used, including quantities of each type.

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- Type of plant.
 - Maximum depth of each compacted layer.
 - Minimum number of passes per layer.
- 640 STARTER LAYER OF COMPACTED FILLING
- Fill: Suitable hard granular material. Compact thoroughly.
 - Thickness: 150mm.
- 650 PROTECTION OF COMPACTED FILLING
- Temporary protective filling: Before allowing construction traffic, raise level of compacted cohesive soil filling at least 150 mm above formation level using properly compacted temporary filling.
 - Removal: Remove temporary protective filling from site before permanent construction.
- 700 BACKFILLING AROUND FOUNDATIONS
- Under oversite concrete and pavings: Hardcore.
 - Under grassed or soil areas: Material excavated from the trench, laid and compacted in 300 mm maximum layers.
- 710 HARDCORE FILLING
- Fill: Granular material, free from excessive dust, well graded, all pieces less than 75 mm in any direction, minimum 10% fines value of 50 kN when tested in a soaked condition to BS 812-111, and in any one layer only one of the following:
 - Crushed rock (other than argillaceous rock) or quarry waste with not more binding material than is required to help hold the stone together.
 - Crushed concrete, crushed brick or tile, free from plaster, timber and metal.
 - Crushed non-expansive slag.
 - Gravel or hoggin with not more clay content than is required to bind the material together, and with no large lumps of clay.
 - Well-burned non-plastic colliery shale.
 - Natural gravel.
 - Natural sand.
 - Filling: Spread and level in 150 mm maximum layers. Thoroughly compact each layer.
- 730 BLINDING
- Surfaces to receive sheet overlays or concrete:
 - Blind with:
 - Concrete where shown on drawings; or
 - Sand, fine gravel, or other approved fine material applied to fill interstices. Moisten as necessary before final rolling to provide a flat, closed, smooth surface.
 - Sand for blinding: To BS EN 12620, grade 0/4 or 0/2 (MP).
 - Permissible deviations on surface level: +0 -25 mm.

E05 IN SITU CONCRETE CONSTRUCTION GENERALLY

To be read with Preliminaries/ General conditions.

223 STRUCTURAL DRAWINGS AND SCHEDULES

- Standards:
 - Drawings: To BS EN ISO 3766.
 - Reinforcement schedules: To BS 8666.

225 TEMPERATURE RECORDS

- Requirement: Throughout period of concrete construction record:
 - Daily: Maximum and minimum atmospheric shade temperatures.
 - Under adverse temperature conditions: Temperature at commencement and end of placing.
- Equipment: Calibrated thermometer.
 - Location: In the shade, close to the structure.

235 OPENINGS, INSERTS AND FIXINGS

- Requirement: Collate all information.
- Submit: Details where openings, inserts and fixings can only be accommodated by adjustments to reinforcement.
- Locate reinforcement: To ensure specified minimum cover at openings and inserts and to be clear of fixing positions.

290 ACCURACY OF CONSTRUCTION

- Setting out: To BS 5964-1.
- Geometrical tolerances: to NSCS.
 - Conflicts: Notwithstanding tolerances specified elsewhere, do not exceed requirements for compliance with the designated code of practice.
 - Substitution of alternative requirements: Submit proposals.

300 LEVELS OF STRUCTURAL CONCRETE FLOORS

- Tolerances (maximum):
Refer to BS6954
 - Level of floor: +/- 10mm.
 - Steps in floor level: +/- 5mm.

310 SURFACE REGULARITY OF CONCRETE FLOORS TO BS 8204 - GENERAL

- Standard: To BS 8204-1 or -2.
- Measurement: From underside of a 2 m straightedge (between points of contact) placed anywhere on surface and using a slip gauge.

315 SURFACE REGULARITY OF CONCRETE FLOORS TO BS 8204 - TOLERANCE CLASS SR3

- Location: All Surfaces.
- Abrupt changes: Not Permitted.

420 WATER RESISTANT CONCRETE CONSTRUCTION

- Description: Basement slab, basement retaining wall, external sections of ground floor slab.
- Form of construction: Waterproof admixture e.g. Caltite or similar approved.
- Requirement: Work is to be water resistant when tested to clause E05/ 450.

430 SURFACE CRACKING

- Method of measurement: Contractor to propose, to be agreed with MBP.
- Critical crack width: 0.2mm.
- Action: Should cracks occur that are wider than the critical crack width:
 - Survey: Frequency and extent of such cracks and investigate cause.
 - Report: Findings together with recommendations for rectification.

450 INSPECTION OF WATER EXCLUDING STRUCTURES

- Notification: Give not less than seven days warning before inspection.
- First inspection:
 - Purpose: To identify any defects which may lead to water penetration or damp patches.
 - Timing: As soon as possible after completion of the work and before backfilling.

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- Final inspection:
 - Purpose: To identify any points of water penetration or damp patches.
 - Timing: After backfilling, when the ground water table has returned to normal level.
- Requirement: Exposed faces of the structure must show no signs of leakage and remain apparently dry.

E10 MIXING/ CASTING/ CURING IN SITU CONCRETE

To be read with Preliminaries/ General conditions.

CONCRETE**101 SPECIFICATION**

- Concrete generally: To BS 8500-2.
- Exchange of information: Provide concrete producer with information required by BS 8500-1, clauses 4 and 5.

132 DESIGNED CONCRETE IN CONTACT WITH THE GROUND.

- Embedded metal: Deformed type 2 high tensile reinforcement.
- Compressive strength class (cylinder/ cube minimum): C32/40 unless otherwise noted on drawings.
- Target density (oven-dry): Normal.
- Fibres: Not required.
- Aggregates:
 - Size (maximum): 20mm.
 - Type/ Density: Normal weight.
 - Coarse recycled aggregates: Not permitted.
 - Additional aggregate requirements: Aggregate drying shrinkage less than 0.075%.
- Exposure Class:
 - XC3/4, Ground floor slab beneath waterproofing.
 - XD3, Basement slab.
- Design chemical class: DC-1.
- Limiting values for composition:
 - Water:cement ratio (maximum): As table A4 BS8500 part 1.
 - Cement/ combination content (minimum): As table A4 BS8500 part 1.
 - Cement/ combination content (maximum): To BS 8007, clause 6.3.
 - Air content in situ (minimum): Not applicable.
- Consistence class: Contractor to propose, to be agreed with MBP.
- Permitted cement/ combinations: CEM1, SPRC and combinations with GGBS or PFA to BS EN 206-1.
- Chloride class: General Cl 0.40.
- Admixtures: Concrete producers choice to be agreed with MBP.
- Colour: Not applicable.
- Additional mix requirements: None.

133 DESIGNED CONCRETE ABOVE GROUND.

- Embedded metal: Deformed type 2 high tensile reinforcement.
- Compressive strength class (cylinder/ cube minimum): C32/40 unless otherwise noted on drawings.
- Target density (oven-dry): Normal.
- Fibres: Not required.
- Aggregates:
 - Size (maximum): 20mm.
 - Type/ Density: Normal weight.
 - Coarse recycled aggregates: Not permitted.
 - Additional aggregate requirements: Aggregate drying shrinkage less than 0.075%.
- Exposure Class: XC1
- Limiting values for composition:
 - Water:cement ratio (maximum): As table A4 BS8500 part 1.
 - Cement/ combination content (minimum): As table A4 BS8500 part 1.
 - Cement/ combination content (maximum): To BS 8007, clause 6.3.
 - Air content in situ (minimum): Not applicable.
- Consistence class: Contractor to propose, to be agreed with MBP.
- Permitted cement/ combinations: CEM1, SPRC and combinations with GGBS or PFA to BS EN 206-1.
- Chloride class: General Cl 0.40.
- Admixtures: Concrete producers choice to be agreed with MBP.
- Colour: Not applicable.

- Additional mix requirements: None.
- 134 DESIGNED CONCRETE FOR VERTICAL COLUMNS and WALLS.
- Embedded metal: Deformed type 2 high tensile reinforcement.
 - Compressive strength class (cylinder/ cube minimum): C32/40 unless otherwise noted on drawings.
 - Target density (oven-dry): Normal.
 - Fibres: Not required.
 - Aggregates:
 - Size (maximum): 20mm.
 - Type/ Density: Normal weight.
 - Coarse recycled aggregates: Not permitted.
 - Additional aggregate requirements: Aggregate drying shrinkage less than 0.075%.
 - Exposure Class:
 - XC1, Internal above ground.
 - XC3/4, Perimeter RC inner leaf, 140thk.
 - XD1, Car park & swimming pool areas.
 - XD3, Retaining walls (in contact with the ground), refer to clause 132.
 - Limiting values for composition:
 - Water:cement ratio (maximum): As table A4 BS8500 part 1.
 - Cement/ combination content (minimum): As table A4 BS8500 part 1.
 - Cement/ combination content (maximum): To BS 8007, clause 6.3.
 - Air content in situ (minimum): Not applicable.
 - Consistence class: Contractor to propose, to be agreed with MBP.
 - Permitted cement/ combinations: CEM1, SPRC and combinations with GGBS or PFA to BS EN 206-1.
 - Chloride class: General Cl 0.40.
 - Admixtures: Concrete producers choice to be agreed with MBP.
 - Colour: Not applicable.
 - Additional mix requirements: None.

MATERIALS, BATCHING AND MIXING

- 215 READY-MIXED CONCRETE
- Production plant: Currently certified by a body accredited by UKAS to BS EN 45011 for product conformity certification of ready-mixed concrete.
 - Source of ready-mixed concrete: Obtain from one source if possible. Otherwise, submit proposals.
 - Name and address of depot: Submit before any concrete is delivered.
 - Delivery notes: Retain for inspection.
 - Declarations of nonconformity from concrete producer: Notify immediately.
- 218 SITE MIXED CONCRETE
- Batching by mass:
 - Restrictions: None.
 - Accuracy of measuring devices: To BS EN 206-1, clause 9.6.2.2.
Tolerances for quantity of constituent material: To BS EN 206-1, table 21.
 - Batching by volume:
 - Restrictions: None.
 - Mixing: To BS 8000-2.1, subsections 2, 3 and 4.
- 221 INFORMATION ABOUT PROPOSED CONCRETES
- Submit when requested:
 - Details listed in BS 8500-1, clause 5.2.
 - Additional information: None.
- 225 CHANGES TO SPECIFICATION
- Changes to specification of fresh concrete (outside concrete producer's responsibility): Prohibited.
- 230 INTERRUPTION OF SUPPLY DURING CONCRETING

- Elements without joints: Where elements are detailed to be cast in a single pour without joints, make prior arrangements for a back-up supply of concrete.
- Elsewhere:
 - Preparation: Manage pour to have a full face, and have materials available to form an emergency construction joint while concrete can still be worked.
 - Before pour is completed: Submit location and details of joint, make proposals for joint preparation.

415 ADMIXTURES

- Calcium chloride and admixtures containing calcium chloride: Do not use.

418 PROPRIETARY ADMIXTURE

- Type: Contractor to propose, to be agreed with MBP.
- Manufacturer: Submit proposals.
- Product reference: Submit proposals.
- Special requirements: To BS 5075.

490 PROPERTIES OF FRESH CONCRETE

- Adjustments to suit construction process: Determine with concrete producer. Maintain conformity to the specification.

PROJECT TESTING/ CERTIFICATION

505 PROJECT TESTING OF CONCRETE – GENERAL

- Testing: To BS EN 206-1 Annex B and BS8500-1 Annex B.
 - Nonconformity: Obtain instructions immediately.
- Recording: Maintain complete correlated records including:
 - Concrete designation.
 - Sampling, site tests, and identification numbers of specimens tested in the laboratory.
 - Location of the parts of the structure represented by each sample.
 - Location in the structure of the batch from which each sample is taken.

508 REGULAR PROJECT TESTING

- Tests: Identity tests
- Sampling:
 - Point: At point of discharge from delivery truck.
 - Rate: Each sample is to consist of 4 cubes

| | |
|-------------------|-------------------------------|
| Floors | 1 sample per 60m ³ |
| Walls and Columns | 1 sample per 60m ³ |
| Foundations | 1 sample per 60m ³ |
- Other requirements:
 - A minimum of one sample must be taken per storey for each element type
 - A minimum of one sample is to be taken per week for each element type
 - Samples must be taken from any single batch or load where there is a doubt as to the quality of concrete as per Clause B.2 of BS EN 206-1

520 TESTING LABORATORY

- Laboratory: Accredited by UKAS or other national equivalent.
- Name and UKAS reference number: Submit well in advance of making trial mixes or concrete for use in the works.

530 TESTS RESULTS

- Submission of reports: Within one day of completion of each test.
 - Number of copies: To be agreed with CA, one copy to be sent to MBP.
- Reports on site: A complete set, available for inspection.

550 BROKEN CUBES FROM FAILED STRENGTH TESTS

- Nonconformity: Keep separately the pieces of each cube which fail to meet the conformity requirements for individual results.
- Period for keeping cubes: Obtain instructions.

PLACING/ COMPACTING/ CURING AND PROTECTING**610 CONSTRUCTION/ SEQUENCE/ TIMING REQUIREMENTS**

- Normal good practice.

620 TEMPERATURE OF CONCRETE

- Application: Watertight concrete (basement slab, basement retaining walls, external sections of ground floor slab).
- Objective: Limit maximum temperature of concrete to minimize cracking during placing, compaction and curing. Take account of:
 - High temperatures and steep temperature gradients: Prevent build-up during first 24 hours after casting. Prevent coincidence of maximum heat gain from cement hydration with high air temperature and/ or solar gain.
 - Rapid changes in temperature: Prevent during the first seven days after casting.
- Proposals for meeting objective: Submit.

630 PREMATURE WATER LOSS

- Requirement: Prevent water loss from concrete laid on absorbent substrates.
 - Underlay: Select from:
 - Polyethylene sheet: 250 micrometres thick.
 - Building paper: To BS 1521, grade B1F.
 - Installation: Lap edges 150 mm.

640 CONSTRUCTION JOINTS

- Location of joints: Submit proposals when not shown on drawings.
- Preparation of joint surfaces: As section E40.

648 ADVERSE TEMPERATURE CONDITIONS

- Requirement: Submit proposals for protecting concrete when predicted ambient temperatures indicate risk of concrete freezing or overheating.

650 SURFACES TO RECEIVE CONCRETE

- Cleanliness of surfaces immediately before placing concrete: Clean with no debris, tying wire clippings, fastenings or free water.

660 INSPECTION OF SURFACES

- Notice: Give notice to allow inspections of reinforcement and surfaces before each pour of concrete.
 - Period of notice: Obtain instructions.
- Timing of inspections: Agreement to be made between contractor and MBP.

670 TRANSPORTING

- General: Avoid contamination, segregation, loss of ingredients, excessive evaporation and loss of workability. Protect from heavy rain.
- Entrained air: Anticipate effects of transport and placing methods in order to achieve specified air content.

680 PLACING

- Records: Maintain for time, date and location of all pours.
- Timing: Place as soon as practicable after mixing and while sufficiently plastic for full compaction.
- Temperature limitations for concrete: 30°C (maximum) and 5°C (minimum), unless otherwise specified. Do not place against frozen or frost covered surfaces.
- Continuity of pours: Place in final position in one continuous operation up to construction joints. Avoid formation of cold joints.
- Discharging concrete: Prevent uneven dispersal, segregation or loss of ingredients or any adverse effect on the formwork or formed finishes.
- Thickness of layers: To suit methods of compaction and achieve efficient amalgamation during compaction.
- Poker vibrators: Do not use to make concrete flow horizontally into position, except where necessary to achieve full compaction under void formers and cast-in accessories and at vertical joints.

690 COMPACTING

- General: Fully compact concrete to full depth to remove entrapped air. Continue until air bubbles cease to appear on the top surface.
 - Areas for particular attention: Around reinforcement, under void formers, cast-in accessories, into corners of formwork and at joints.
- Consecutive batches of concrete: Amalgamate without damaging adjacent partly hardened concrete.
- Methods of compaction: To suit consistence class and use of concrete.

700 LIGHTWEIGHT AGGREGATE CONCRETE

- Placing and compacting: Prevent flotation of coarse aggregate and formation of excessive blowholes.

720 VIBRATORS

- General: Maintain sufficient numbers and types of vibrator to suit pouring rate, consistency and location of concrete.
- External vibrators: Obtain approval for use.

730 PLASTIC SETTLEMENT

- Settlement cracking: Inspect fresh concrete closely and continuously wherever cracking is likely to occur, including the top of deep sections and at significant changes in the depth of concrete sections.
 - Timing: During the first few hours after placing and whilst concrete is still capable of being fluidized by the vibrator.
- Removal of cracks: Revibrate concrete.

810 CURING GENERALLY

- Requirement: Keep surface layers of concrete moist throughout curing period, including perimeters and abutments, by either restricting evaporation or continuously wetting surfaces of concrete.
 - Surfaces covered by formwork: Retain formwork in position and, where necessary to satisfy curing period, cover surfaces immediately after striking.
 - Top surfaces: Cover immediately after placing and compacting. If covering is removed for finishing operations, replace it immediately afterwards.
- Surface temperature: Maintain above 5°C throughout the specified curing period or four days, whichever is longer.
- Records: Maintain details of location and timing of casting of individual batches, removal of formwork and removal of coverings. Keep records on site, available for inspection.

811 COVERINGS FOR CURING

- Sheet coverings: Suitable impervious material.
- Curing compounds: Selection criteria:
 - Curing efficiency: Not less than 75% or for surfaces exposed to abrasion 90%.
 - Colouring: Fugitive dye.
 - Application to concrete exposed in the finished work: Readily removable without disfiguring the surface.
 - Application to concrete to receive bonded construction/ finish: No impediment to subsequent bonding.
- Interim covering to top surfaces of concrete: Until surfaces are in a suitable state to receive coverings in direct contact, cover with impervious sheeting held clear of the surface and sealed against draughts at perimeters and junctions.

812 PREVENTING EARLY AGE THERMAL CRACKING

- Deep lifts or large volume pours: Submit proposals for curing to prevent early age thermal cracking, taking account of:
 - Temperature differentials across sections.
 - Coefficient of thermal expansion of the concrete.
 - Strain capacity of the concrete mix (aggregate dependent).
 - Restraint.

815 ADDITIONAL CURING REQUIREMENT – WATER CURING

- Commencement of water curing: As soon as practicable after placing and compacting concrete.

- Surfaces covered by formwork: Expose to water curing as soon as practicable.
- Top surfaces: Cover immediately with impermeable sheeting to prevent evaporation before commencement of water curing.
- Water curing: Wet surfaces continuously throughout curing period.
 - Select methods from:
 - Mist spray.
 - Wet hessian covered with impermeable sheeting.

820 CURING PERIODS

- General: Curing periods are in days (minimum).
 - Definition of 't': The average surface temperature of concrete in degrees Celsius during the curing period.
- Curing periods for concrete made using CEM1 strength class 42.5 or 52.5, or SRPC class 42.5:
 - Drying winds or dry, sunny weather (relative humidity < 50%): $180 / t + 10$.
 - Intermediate conditions (relative humidity between 50 and 80%): $140 / t + 10$.
 - Damp weather, protected from sun and wind (relative humidity > 80%): $100 / t + 10$.
- Curing periods for concrete made using cements listed in BS 8500-1, table A.6 except for those listed above and for supersulfated cement:
 - Drying winds or dry, sunny weather (relative humidity < 50%): $140 / t + 10$.
 - Intermediate conditions (relative humidity between 50 and 80%): $100 / t + 10$.
 - Damp weather, protected from sun and wind (relative humidity > 80%): $100 / t + 10$.
- Curing periods for concretes using admixtures or other types of cements/ combinations: Submit proposals.
- Other requirements: None.

840 PROTECTION

- Prevent damage to concrete, including:
 - Surfaces generally: From rain, indentation and other physical damage.
 - Surfaces to exposed visual concrete: From dirt, staining, rust marks and other disfiguration.
 - Immature concrete: From thermal shock, physical shock, overloading, movement and vibration.
 - In cold weather: From entrapment and freezing expansion of water in pockets, etc.

E20 FORMWORK FOR IN SITU CONCRETE

To be read with Preliminaries/ General conditions.

GENERALLY/ PREPARATION**110 LOADINGS**

- Requirement: Design and construct formwork to withstand the worst combination of the following:
 - Total weight of formwork, reinforcement and concrete.
 - Construction loads including dynamic effects of placing, compacting and construction traffic.
 - Wind and snow loads.

120 FORMWORK DETAILS

- Provide the following: Details of forms for all exposed concrete.

132 PROPPING

- General: Prevent deflection and damage to the structure. Carry down props to bearings strong enough to provide adequate support throughout concreting operations.
- Method statement: Submit proposals for prop bearings and sequence of propping/ repropping and backpropping.
 - Timing of submission: Agreement to be made between contractor and MBP.

170 WORK BELOW GROUND – excluding perimeter retaining walls

- Casting vertical faces against faces of excavation: Obtain consent.
 - Requirements:
The faces are sufficiently accurate and stable.
Supports to faces are withdrawn progressively as concrete is placed.
Adequate measures are taken to prevent contamination of concrete.
Faces of walls must be cast against formwork.

185 COMPRESSIBLE BOARD SUBSTRUCTURE FORMWORK

- Type: Low density expanded polystyrene (eps),
- Manufacturer: Cordek or similar where required.
 - Product reference: Submit proposals.
- Recycled content: 25% (minimum) to BS EN ISO 14021.
- Thickness: Manufacturer to confirm.

CONSTRUCTION**310 ACCURACY**

- General requirement for formwork: Accurately and robustly constructed to produce finished concrete in the required positions and to the required dimensions.
- Formed surfaces: Free from twist and bow (other than any required cambers).
- Intersections, lines and angles: Square, plumb and true.

315 SUBSTRUCTURE FORMWORK AND UNDERSLAB INSULATION

- Cutting: Neat and accurate to edges, and around penetrations and downstands.
- Laying: Tightly butted and fully supported on firm, even substrate.
- Vertical faces: Stiffen as necessary to act as shutter.
- Formwork/ insulation surfaces: Protect from indentation by spacers and other items.
- Joints in formwork/ insulation and with edge structure and penetrations: Seal to prevent penetration of concrete.
- Concrete placement: Restrain formwork/ insulation against movement.

320 JOINTS IN FORMS

- Requirements including joints in form linings and between forms and completed work:
 - Prevent loss of grout, using seals where necessary.
 - Prevent formation of steps. Secure formwork tight against adjacent concrete.

330 INSERTS, HOLES AND CHASES

- Positions and details:
 - Dimensioned on drawings provided on behalf of the Employer: Do not change without consent.
 - Undimensioned or from other sources: Submit proposals.
- Positioning relative to reinforcement: Give notice of any conflicts well in advance of placing concrete.
- Method of forming: Fix inserts or box out as required. Do not cut hardened concrete without approval.

340 KICKERS

- Method statement: Submit proposals including means of achieving quality of concrete consistent with that specified for the column or wall.
 - Kicker height : 150mm

341 KICKERLESS CONSTRUCTION

- Except in watertight construction,
- Form horizontal construction joints at base of walls and columns without kickers, using one of the methods described in BCA Publication 47.023 'Kickerless construction'. The Contractor must satisfy himself as to the suitability of the chosen method.
- Where Kickerless are used the CA must approve hidden material.
- Expect this will only be approved where filled with a high strength grout.

350 FORM TIES

- Metal associated with form ties/ devices: Prohibited within cover to reinforcement. Compatible with reinforcement metal.

361 FORM TIES FOR WATER RESISTANT CONCRETE

- General: Maintain water resistance of construction.
- Tie type and sealing system: Submit proposals.

380 VOID FORMERS

For garage roof slab, for extent, refer to MBP structural drawings

- Manufacturer: Submit proposals.
 - Product reference: Submit proposals.

405 COLUMN SHUTTERS

- Manufacturer: Submit proposals.
 - Product reference: Submit proposals.

410 EXPANDED STEEL MESH FORMWORK LINING

- Do not use.

420 RIBBED STEEL MESH FORMWORK AND REINFORCEMENT

- Do not use.

470 RELEASE AGENTS

- Use: Submit proposals.
- General: Achieve a clean release of forms without disfiguring the concrete surface.
- Product types: Compatible with formwork materials, specified formed finishes and subsequent applied finishes. Use the same product throughout the entire area of any one finish.
- Protection: Prevent contact with reinforcement, hardened concrete, other materials not part of the form face, and permanent forms.

480 SURFACE RETARDERS

- Use: Obtain approval.
- Reinforcement: Prevent contact with retarder.

STRIKING

510 STRIKING FORMWORK

- Timing: Prevent any disturbance, damage or overloading of the permanent structure.

5236 CROSSACRES

- 521 MINIMUM PERIOD FOR RETAINING FORMWORK/ TEMPORARY SUPPORTS IN POSITION
- Concrete strength at time of formwork removal (minimum): Unless noted on the drawings, minimum periods are to be calculated using table 6.2 of BS 8110-1, Ciria report 136 and BCA publication 97.505.
 - Assumptions: Imposed load will not exceed 0.75kN/m^2 until concrete reaches full maturity.
 - Before removing formwork: Submit proposals if assumptions will not be realised.
 - Method to be used in assessing early age strength of concrete: Cube test results.

FORMED FINISHES

- 615 FINISH TO RECEIVE ASPHALT TANKING
- Finish: Even and suitable to receive asphalt.
 - Permissible deviation of surfaces:
 - Sudden irregularities (maximum): 3 mm.
 - Gradual irregularities (maximum): 3 mm, when measured from underside of a 1 m straightedge, placed anywhere on surface.
 - Surface blemishes:
 - Permitted: Blowholes less than 10 mm in diameter.
 - Not permitted: Voids, honeycombing, segregation and other large defects.
 - Projecting fins: Remove.
 - Formwork tie holes: Filled with mortar.
- 620 PLAIN SMOOTH FINISH
- Location: All locations unless noted otherwise on drawings.
 - Finish: Even and dense. Arrange formwork panels in a regular pattern as a feature of the surface.
 - Permissible deviation of surfaces:
 - Sudden irregularities (maximum): 3 mm.
 - Gradual irregularities (maximum): 3 mm, when measured from the underside of a 1 m straightedge, placed anywhere on surface.
 - Variations in colour:
 - Permitted: Those caused by impermeable formwork linings.
 - Not permitted: Those caused by contamination or grout leakage.
 - Surface blemishes:
 - Permitted: Blowholes less than 10 mm in diameter and at an agreed frequency.
 - Not permitted: Voids, honeycombing, segregation and other large defects.
 - Formwork tie holes: In a regular pattern and filled with matching mortar.
- 750 ARRISES, MARGINS AND JUNCTIONS
- Requirements: 12.5mm.

E30 REINFORCEMENT FOR IN SITU CONCRETE

To be read with Preliminaries/ General conditions.

REINFORCEMENT**110 QUALITY ASSURANCE OF REINFORCEMENT**

- Standards:
 - Reinforcement: To BS 4449, BS 4482, BS 4483 or BS 6744.
 - Cutting and bending: To BS 8666.
- Source of reinforcement: Companies holding valid certificates of approval for product conformity issued by the UK Certification Authority for Reinforcing Steels (CARES).

140 PLAIN BAR REINFORCEMENT

- Standard: To BS 4482.
- Strength grade: 250.

150 RIBBED BAR REINFORCEMENT

- Standard: To BS 4449.
- Strength grade: B500B.

210 STANDARD FABRIC REINFORCEMENT

- Standard: To BS 4483.
- Strength grade: Generally B500B, wrapping fabric plain wire grade 250.

255 PREFABRICATED CONTINUITY REINFORCEMENT STRIPS

- Source: Obtain from a manufacturer holding a valid Technical Product Approval certificate issued by the UK Certification Authority for Reinforcing Steels (CARES) or equivalent.

265 MECHANICAL COUPLERS

- Locations: As indicated on drawings only, unless otherwise approved.
- Source: Obtain from a manufacturer holding a valid Technical Product Approval certificate issued by the UK Certification Authority for Reinforcing Steels (CARES) or equivalent.

WORKMANSHIP**310 CUTTING AND BENDING REINFORCEMENT**

- General: To schedules and to BS 8666.
- Bending on site, including minor adjustments: Obtain approval.

320 PROTECTION OF REINFORCEMENT

- Dropping from height, mechanical damage and shock loading: Prevent.
- Cleanliness of reinforcement at time of pouring concrete: Free from corrosive pitting, loose millscale, loose rust and contaminants which may adversely affect the reinforcement, concrete, or bond between the two.

410 LAPS OR SPLICES

- Details not shown on drawings: Obtain instructions.

427 LAPS IN FABRIC REINFORCEMENT

- Terms: As defined in BCA publication 97.321.
- Lap type:
 - Long edge of fabric: Flying end laps.
 - Short edge of fabric: Flying end laps.
- Other requirements: Avoid 4 layer build-up.

430 WELDING REINFORCEMENT

- Standard: To BS 7123 and BS 8110-1.
- Submit proposals including confirmation of details of joint types, locations and quality control measures.

5236 CROSSACRES

Approval required from the reinforcement manufacturer and subject to approval by the CA.
Accept responsibility for cost of checking by the CA and for any supervision and testing.
Site welding: Not permitted.

451 FIXING REINFORCEMENT

- Standard: To BS 7973-1 and -2.
- Installation: In addition to any spacers and chairs shown on drawings or schedules, provide adequate support, tie securely and maintain the specified cover.
- Tying:
 - Wire type: 16 gauge black annealed. Use stainless steel wire for stainless steel reinforcement.
 - Ends of tying wire: Prevent intrusion into the concrete cover. Remove loose ends.
- Compatibility of metals: Prevent contact between ordinary carbon steel and stainless or galvanized reinforcement.

470 TOLERANCES ON COVER

- Definition of nominal cover to BS 8500-1: Minimum cover plus tolerance for fixing.
- Tolerance (maximum):
 - 5mm - Bars up to 12mm diameter.
 - 10mm - Bars 12-25mm diameter.
 - 15mm - Bars greater than 25mm diameter.
- Checking specified cover dimensions: Before concreting check that cover dimensions will be achieved.

480 NOMINAL COVER TO REINFORCEMENT

- As noted on drawings, otherwise obtain instruction.

491 SPACERS

- Spacers to formed concrete finishes, if permitted (see section E20) to be approved type(s).
- If using "TricTrac" type spacer for slab rebar, use in short lengths, and stagger to avoid continuous lines.

510 RUST STAINING

- Staining of surfaces of concrete which will be exposed to view in the finished work: Prevent.

520 COVER METER SURVEY

- Purpose of survey: To check positions of reinforcement and that the specified cover has been achieved.
- Type of cover meter: A magnetic induction digital display type selected to suit arrangement and type of reinforcement.
 - Use: In accordance with recommendations of BS 1881-204 and manufacturer as appropriate to yield accurate results.
 - Surveyor: Experienced with cover meter surveys.
 - Calibration: At the outset and thereafter regularly at 45 minute (maximum) intervals.
- Locations for checking: Include columns, beams, cantilevers, slab soffits and all faces exposed to the weather in the finished structure.
- Timing: As soon as practicable after casting.
 - Notification: Give adequate notice.
- Results: Submit. Notify immediately where specified cover has not been achieved.

E40 DESIGNED JOINTS IN IN SITU CONCRETE

To be read with Preliminaries/ General conditions.

120 CONSTRUCTION/ MOVEMENT JOINTS GENERALLY

- Accuracy: Position and form joints accurately, straight, well- aligned and truly vertical or horizontal or parallel with setting out lines of the building.
- Modifications to joint design or location: Submit proposals.
- Placing concrete to form movement joints:
 - Maintain effectiveness of joints. Prevent concrete entering joints or penetrating or impregnating compressible joint fillers.
 - Do not place concrete simultaneously on both sides of movement joints.

210 FORMED JOINTS

- Forms/ stop ends generally: Rigid and grout-tight.
- Forms/ stop ends for projecting continuity reinforcement: To accommodate bars or fabric without temporary bending or displacement.

211 FORMED JOINTS IN CONCRETE WEARING SURFACES

- Temporary forms: Square edged with a steel top surface.
- Placing concrete: Compact thoroughly at edges to give level, closely abutted joints with no lipping.

220 PRECAST CONCRETE PERMANENT SIDE FORMS

Not permitted.

230 PREPARATION OF CONSTRUCTION JOINTS

- Roughening of joint surfaces: Select from:
 - Brushing and spraying: Remove surface laitance and expose aggregate finish while concrete is still green.
 - Other methods: Submit proposals.
- Condition of joint surfaces immediately before placing fresh concrete: Clean and damp.

240 BOTTOM . OF SLAB CRACK INDUCERS

- Not permitted.

250 INSERTED STRIP CRACK INDUCERS

- Not permitted.

260 SAWN CRACK INDUCING GROOVES

- Not permitted.

310 FLEXIBLE WATERSTOPS

- Manufacturer: Refer to drawings.
 - Product reference: Refer to drawings.
- Junctions and angles: Use factory formed junction pieces.
- Placing concrete: Fully compact concrete around waterstops with no voids or porous areas.

320 HYDROPHILIC WATERSTOPS

- Manufacturer: Refer to drawings.
 - Product reference: Refer to drawings.
- Location: Located in groove in first cast concrete surface.
- Method of fixing: As per manufacturers instructions.
- Condition of concrete surface at time of fixing: Clean and free from ponded or running water.
- Protection: Prevent wetting of exposed sections of waterstop.

410 CARBON STEEL TIE BARS

- Standard: To BS 4449.
 - Product form: Plain.
 - Strength grade: 250.
- Cleanliness: Free from corrosive pitting, loose millscale, loose rust and contaminants which may adversely affect the tie bars, reinforcement, concrete, or bond between the two.

5236 CROSSACRES

- Position: Centred on joint.
 - Other requirements: None.
- 420 FABRIC TIE STRIPS
- Standard: To BS 4483.
 - Cleanliness: Free from corrosive pitting, loose millscale, loose rust and contaminants which may adversely affect the fabric, concrete, or bond between the two.
 - Position: Width of the mesh strip centred on the joint.
- 430 CARBON STEEL DOWEL BARS
- Standard: To BS 4449
 - Product form: Plain.
 - Strength grade: 250.
 - Properties: Perfectly straight, with sawn (not sheared) ends.
 - Debonding: Achieve effective debonding of each bar
 - Material: Refer to drawings.
 - Extent: Refer to drawings.
 - Position: At right angles to and centred on joint.
 - Other requirements: None.
- 440 LOAD TRANSFER SYSTEMS
- Manufacturer: Submit proposals.
 - Product reference: Submit proposals.
- 520 SHEET JOINT FILLER _____
- Manufacturer: Submit proposals.
 - Product reference: Submit proposals.
 - Joints finished with sealant: Leave sufficient space for sealant by using temporary formers.
- 530 SEALANT
- _____ For joints in garage roof slab, for locations, refer to MBP structural drawings
- Manufacturer: Submit proposals.
 - Product reference: Submit proposals.
 - Colour of surfaces exposed to view; Submit proposals.
 - Preparation and application: As section Z22.

E41 WORKED FINISHES TO IN SITU CONCRETE

To be read with Preliminaries/ General conditions.

150 FINISHING

- Timing: Carry out at optimum times in relation to setting and hardening of concrete.
- Prohibited treatments to concrete surfaces:
 - Wetting to assist surface working.
 - Sprinkling cement.

210 TAMPED FINISH

- Surface on completion: Even array of parallel ribs.

230 BRUSHED FINISH

- Surface on completion: Light even texture.

240 WOOD FLOATED FINISH

- Surface on completion: Slightly coarse, even texture with no ridges or steps.

310 SMOOTH FLOATED FINISH

- Surface on completion: Even with no ridges or steps.

320 TROWELLED FINISH

- Surface on completion: Uniform, smooth but not polished, free from trowel marks and blemishes, and suitable to receive specified flooring material.

330 TROWELLED FINISH FOR WEARING SURFACES

- Surface on completion: Uniform and smooth, free from trowel marks and blemishes.

P31 HOLES, CHASES, COVERS AND SUPPORTS FOR SERVICES

To be read with Preliminaries/ General conditions.

EXECUTION**610 COORDINATION**

- Locations and dimensions of holes and chases for services: Refer to architects drawings for setting out.

620 HOLES AND CHASES IN IN SITU CONCRETE

- Cast in: Holes larger than 10 mm diameter and chases.
- Cutting and drilling:
 - Permitted for holes not larger than 10 mm diameter.
 - Not permitted for holes larger than 10 mm diameter except as indicated on drawings.

630 HOLES AND CHASES IN PRECAST CONCRETE

- Cutting and drilling: Not permitted except as indicated on drawings.

640 HOLES IN STRUCTURAL STEELWORK

- Cutting and drilling: Not permitted except as indicated on drawings.

650 HOLES, RECESSES AND CHASES IN MASONRY

- Locations: To maintain integrity of strength, stability and sound resistance of construction.
- Sizes: Minimum needed to accommodate services.
 - Holes (maximum): 300 x 300 mm.
- Walls of hollow or cellular blocks: Do not chase.
- Walls of other materials:
 - Vertical chases: No deeper than one third of single leaf thickness, excluding finishes.
 - Horizontal or raking chases: No longer than 1 m. No deeper than one sixth of the single leaf thickness, excluding finishes.
- Chases and recesses: Do not set back to back. Offset by a clear distance at least equal to the wall thickness.
- Cutting: Do not cut until mortar is fully set. Cut carefully and neatly. Avoid spalling, cracking and other damage to surrounding structure.

670 NOTCHES AND HOLES IN STRUCTURAL TIMBER

- General: Avoid if possible.
- Sizes: Minimum needed to accommodate services.
- Position: Do not locate near knots or other defects.
- Notches and holes in same joist: Minimum 100 mm apart horizontally.
- Notches in joists: Locate at top. Form by sawing down to a drilled hole.
 - Depth (maximum): 0.125 x joist depth.
 - Distance from supports: Between 0.07 and 0.25 x span.
- Holes in joists: Locate on neutral axis.
 - Diameter (maximum): 0.25 x joist depth.
 - Centres (minimum): 3 x diameter of largest hole.
 - Distance from supports: Between 0.25 and 0.4 of span.
- Notches in roof rafters, struts and truss members: Not permitted.
- Holes in struts and columns: Locate on neutral axis.
 - Diameter (maximum): 0.25 x minimum width of member.
 - Centres (minimum): 3 x diameter of largest hole.
 - Distance from ends: Between 0.25 and 0.4 of span.

680 FIXING FLOOR DUCTING/ TRUNKING

- Bases:
 - Fixing method: Submit proposals.
 - Fixing level: So as to provide a flush smooth surface when the floor finish is laid.
 - Jointing: Submit proposals.
- Covers:
 - Applied finish: Submit proposals.
 - Fixing: Submit proposals.

5236 CROSSACRES

- Configuration: Submit proposals.
 - Intumescent fire barriers: Submit proposals.
- 690 INSTALLING PIPE SLEEVES
- Sleeves: Fit to pipes passing through building fabric.
 - Material: Match pipeline.
 - Size: One or two sizes larger than pipe to allow clearance.
 - Finish: Install sleeves flush with building finish. In areas where floors are washed down, install protruding 100 mm above floor finish.
 - Masking plates: Fit at visible penetrations, including through false ceilings of occupied rooms.
- 710 SEALING _____
- Service: Submit proposals.
 - Location: Submit proposals.
 - Sealing material: Submit proposals.
 - Method: Submit proposals.
 - Performance requirement: Submit proposals.
- 730 INSTALLING ACCESS COVERS/ GRATINGS AND FRAMES
- Seating: Submit proposals.
 - Bedding and haunching of frames: Continuously.
 - Material: 1:3 cement:sand mortar
 - Top of haunching: 30 mm below surrounding surfaces.
 - Horizontal positioning of frames:
 - Centred over openings.
 - Install square with joints in surrounding surfaces: Wherever practicable.
 - Vertical positioning of frames:
 - Level; or
 - Marry in with levels of surrounding surfaces.
 - Permissible deviation in level of external covers and frames: +0 to -6 mm.