

1. GENERAL NOTES

- STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH EKCON'S SPECIFICATIONS, RELEVANT ARCHITECTURAL, CIVIL AND OTHER BUILDING SERVICE CONSULTANTS' DOCUMENTS.
- THE CONTRACTOR SHALL CAREFULLY REVIEW ALL RELEVANT ENGINEERING, ARCHITECTURAL, CIVIL AND OTHER BUILDING SERVICE DRAWINGS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF ANY WORKS.
- IF APPLICABLE, THE CONTRACTOR SHALL VERIFY THE DIMENSIONS OF THE EXISTING STRUCTURES AT THE POSITIONS WHERE THE NEW STRUCTURE JOINS. ANY DISCREPANCIES SHALL IMMEDIATELY BE BROUGHT TO THE ENGINEER'S ATTENTION.
- THE CONTRACTOR SHALL CHECK ALL PROJECT DIMENSIONS ON SITE BEFORE ANY WORK COMMENCEMENT AND ANY DISCREPANCIES ARE TO BE IMMEDIATELY REPORTED TO THE ENGINEER.
- PRODUCTS DIFFERENT TO THOSE SPECIFIED MAY BE USED WITH THE ENGINEER'S PRIOR APPROVAL.
- THE STABILITY OF THE STRUCTURE AND EXCAVATIONS DURING CONSTRUCTION, INCLUDING TEMPORARY WORKS DESIGN AND TEMPORARY SUPPORT, IS THE RESPONSIBILITY OF THE CONTRACTOR.
- UNLESS NOTED OTHERWISE, ALL LEVELS ARE IN METERS AND ALL DIMENSIONS ARE IN MILLIMETERS.
- DIMENSIONS SHALL NOT BE OBTAINED BY SCALING ANY OF THE DRAWINGS.
- ALL COLUMNS ARE CENTRED ON GRID LINES UNLESS SPECIFIED OTHERWISE.
- THE LIVE LOADS AND WIND LOAD PARAMETERS (IF APPLICABLE) FOR WHICH THE STRUCTURE HAS BEEN DESIGNED ARE AS TABULATED BELOW IN TABLES 1A & 1B.

TABLE 1A - RELEVANT LIVE LOADS ON STRUCTURE		
SPECIFIC USE		UDL (kPa)
INACCESSIBLE ROOF		0.25
STAIRS		3.00
MECHANICAL EQUIPMENT		5.00

TABLE 1B - WIND DESIGN PARAMETERS		
PEAK WIND SPEED (Vp)		40 m/s
TERRAIN CATEGORY		B
PEAK WIND SPEED PRESSURE (q)		0.81 kPa

2. BRICKWORK

- MASONRY UNITS SHALL COMPLY WITH THE FOLLOWING SPECIFICATIONS.
 - SABS 227 - BURNT CLAY MASONRY UNIT
 - SABS 265 - CALCIUM SILICATE MASONRY UNITS
 - SABS 1215 - CONCRETE MASONRY BLOCKS
- BRICKWORK SHALL BE BUILT IN ACCORDANCE WITH SABS 0164.
- THE MINIMUM CRUSHING STRENGTH OF ALL LOAD BEARING BRICKS SHALL BE 14 MPa LIMITED TO 2 STOREYS.
- THE MINIMUM CRUSHING STRENGTH OF MORTAR CLASS FOR BRICKWORK SHALL BE AS FOR CLASS 2 MORTAR IN ACCORDANCE WITH SABS 0164 PART 1-1980.
- FOUNDATION WALL CAVITIES TO BE FILLED WITH GRADE 15/13 (MINIMUM) CONCRETE (UNLESS INDICATED OTHERWISE ON DRAWING) UP TO DPC LEVEL. CLAY PLASTER BRICK FOUNDATION WALLS TO USE NFX BRICKS UP TO DPC LEVEL.
- BRICKWORK SHALL BE REINFORCED WITH BRICKFORCE (GALV. 2.8mm ~ 3.55mm LONGITUDINAL WIRES) EVERY FOURTH COARSE BUT NOT MORE THAN 400mm VERTICAL SPACING. MINIMUM 300mm OVERLAP REQUIRED WHERE BRICKFORCE IS JOINED.
- BRICKFORCE TO BE INSTALLED AT A MAXIMUM VERTICAL SPACING OF 200mm ABOVE AND BELOW ALL WINDOWS AND ABOVE DOOR OPENINGS. BRICKFORCE TO EXTEND 500mm PAST EDGE OF OPENING ON EITHER SIDE.
- BUTTERFLY WALL TIES ARE TO BE INSTALLED IN CAVITY WALLS AT 450mm VERTICAL SPACING AND SPACED AT 600mm HORIZONTALLY (4 PER m) EVENLY STAGGERED.
- ADDITIONAL BUTTERFLY TIES TO BE PROVIDED IN CAVITY WALLS AT VERTICAL CENTRES NOT EXCEEDING 300mm WITHIN 150mm FROM THE EDGE OFF ALL OPENINGS & MOVEMENT/CONTROL JOINTS AND WHERE A LEAF INTERSECTS WITH ANOTHER WALL.
- ONLY LOAD BEARING BRICKWORK IS SHOWN ON THE DRAWINGS UNLESS NOTED OTHERWISE (U.N.O).
- SEE ARCHITECT'S DRAWINGS FOR LAYOUT OF BRICKWORK.
- V-JOINTS ARE TO BE MADE THROUGH PLASTERWORK WHERE BRICKWORK JOINS CONCRETE.
- NON-LOADBEARING BRICKWORK MAY NOT BE BUILT NEARER THAN 10 mm FROM THE SOFFIT OF BEAMS AND SLABS.
- A HORIZONTAL SLIP JOINT SHALL BE PROVIDED BETWEEN CONCRETE AND LOADBEARING BRICKWORK. THE TOP SURFACE OF THE BRICKWORK SHALL BE SMOOTHLY PLASTERED AND THE CONCRETE SHALL BE CAST ON TWO LAYERS OF MALTHOID SEPARATED BY A 250 µm PLASTIC LAYER.
- A 10mm VERTICAL MOVEMENT JOINT SHALL BE PROVIDED IN ALL EXTERIOR MASONRY LOADBEARING WALLS AT MAXIMUM 9 m CENTRES AT POSITIONS APPROVED BY THE ARCHITECT.
- A 10 mm VERTICAL MOVEMENT JOINT SHALL BE PROVIDED IN THE MASONRY WORK OVER ALL MOVEMENT JOINTS INDICATED ON THE STRUCTURAL CONCRETE DRAWINGS.
- PRECAST PRE-STRESSED CONCRETE LINTELS
 - a. MINIMUM BEARING FOR LINTELS
 - SPAN LESS THAN 1.5m = 150mm
 - SPAN BETWEEN 1.5 ~ 2.5m = 250mm
 - SPAN GREATER THAN 2.5m = 350mm
 - b. ALL PRECAST PRE-STRESSED CONCRETE LINTELS TO CONFORM TO NHRC PART 3, SECTION 3, FIGURE CM26 AND CM28 AND THE RELEVANT TABLES CONTAINED THEREIN.
 - c. FOR LINTELS ABOVE DOUBLE GARAGE OPENINGS WITH A CLEAR OPENING OF MORE THAN 5m, REFER TO NHRC PART 3, SECTION 3, FIGURE CM29 AND THE RELEVANT TABLES CONTAINED THEREIN.
 - d. MINIMUM BRICKWORK ABOVE LINTELS:
 - 4 LAYERS FOR 85mm HIGH BRICK COARSE
 - 3 LAYERS FOR 100mm HIGH BRICK COARSE
 - (REFER TO NHRC PART 3, SECTION 3, TABLE 10 FOR MINIMUM REQUIREMENTS)
18. TIMBER TRUSSES TO REST ON INNER SKIN OF BRICKWORK WITH TIMBER WALL PLATE, IF APPLICABLE, UNLESS SHOWN OTHERWISE.
19. TIMBER TRUSSES TO BE TIED DOWN USING 16 x 30mm HOOP IRONS.
20. HOOP IRON HOOKS TO BE EMBEDDED AT LEAST 70mm INTO MORTAR.
21. HOOP IRON MINIMUM EMBEDMENT DEPTH:
 - HEAVY ROOF = 300mm
 - LIGHT ROOF = 600mm
 - (REFER TO NHRC PART 3, SECTION 3, TABLE 10 FOR MINIMUM REQUIREMENT)

MASONRY WALL CHASES

CHASES WILL ONLY BE PERMITTED IN MASONRY WALLS OF SOLID UNIT CONSTRUCTION. CHASES IN HOLLOW MASONRY UNITS ARE NOT PERMITTED. PIPES AND CONDUITS IN WALLS OF HOLLOW UNIT CONSTRUCTION SHALL BE LOCATED WITHIN THE CORES OF HOLLOW MASONRY UNITS. CHASING IN ANY CONCRETE ELEMENTS (INCLUDING PRESTRESSED CONCRETE LINTOLS) IS NOT PERMITTED.

ALL SLEEVES, CHASES AND PENETRATIONS IN MASONRY WALLS SHALL, AS FAR AS POSSIBLE, BE PROVIDED DURING CONSTRUCTION OF MASONRY WALLS AND SHALL COMPLY WITH THE FOLLOWING MINIMUM REQUIREMENTS.

CAVITY WIDTHS EXCEEDING 75mm:
ENSURE THAT STRIP TIES USED IN A CAVITY WALL HAVING A CAVITY OF WIDTH EXCEEDING 75mm BUT NOT EXCEEDING 150mm ARE OF THE VERTICAL TWIST TYPE. VERTICAL TWIST TIES TO BE SPACED AT A MINIMUM OF 3/50M

VERTICAL CHASES:

VERTICAL CHASES MUST BE LIMITED TO 1/3RD OF THE LEAF THICKNESS & HALF THE WALL HEIGHT FROM EITHER THE TOP OR BOTTOM OF THE WALL (REFER TO TABLE 2A BELOW).

HORIZONTAL CHASES:

HORIZONTAL CHASES SHALL BE LIMITED TO 1/8TH OF THE LEAF THICKNESS IN DEPTH AND IN LENGTH AS GIVEN IN TABLE 2B BELOW.

TABLE 2A - VERTICAL CHASE DETAILS		
WALL TYPE	CHASE DEPTH	MAX. LENGTH OF VERTICAL CHASE
110 mm	30 mm	HALF OF TOTAL WALL HEIGHT
230 mm	60 mm	HALF OF TOTAL WALL HEIGHT
280 mm CAVITY	30 mm	HALF OF TOTAL WALL HEIGHT
90 mm (MAXI)	30 mm	HALF OF TOTAL WALL HEIGHT
190 mm (MAXI)	60 mm	HALF OF TOTAL WALL HEIGHT
230 mm CAVITY (MAXI)	30 mm	HALF OF TOTAL WALL HEIGHT

TABLE 2B - HORIZONTAL CHASE DETAILS		
WALL TYPE	CHASE DEPTH	MAX LENGTH OF HORIZONTAL CHASE
110 mm	15 mm	500 mm
230 mm	30 mm	1000 mm
280 mm CAVITY	15 mm	500 mm
90 mm (MAXI)	15 mm	500 mm
190 mm (MAXI)	30 mm	1000 mm
230 mm CAVITY (MAXI)	15 mm	500 mm

3. CONCRETE

- ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH SANS 2001-CC1 & CC2.
- THE CONTRACTOR IS TO TAKE FULL RESPONSIBILITY FOR THE PERFORMANCE OF ALL CONCRETE MIX DESIGNS AND IS TO PROVIDE - FOR REVIEW BY THE STRUCTURAL ENGINEER - ALL CONCRETE MIX DESIGNS AND RELEVANT INFORMATION INTENDED FOR USE ON SITE (AGGREGATE GRADING, CERTIFICATIONS, ADMIXTURES, OR ANY OTHER INFORMATION). CONFIRMATION/ACCEPTANCE OF REVIEW IS TO BE OBTAINED FROM STRUCTURAL ENGINEER, IN WRITING, PRIOR TO THE COMMENCEMENT OF ANY WORKS.
- CONCRETE STRENGTHS AND AGGREGATE SIZES SHALL BE AS TABULATED ON TABLE 3A OF THIS DRAWING, UNLESS SPECIFIED OTHERWISE ON CONSTRUCTION DRAWINGS.
- CONCRETE COVER TO REINFORCEMENT AS SPECIFIED ON TABLE 4B OF THIS DRAWING, UNLESS NOTED OTHERWISE ON DRAWINGS AND/OR BENDING SCHEDULES.
- TOLERANCES AND FINISHES OF CONCRETE ELEMENTS - AS SPECIFIED ON THIS DRAWING - ARE TO BE ADHERED TO UNLESS SPECIFIED OTHERWISE ON DRAWINGS OR BENDING SCHEDULES.
- THE CONCRETE DURABILITY REQUIREMENTS - SPECIFIED ON TABLE 3B OF THIS DRAWING - MUST BE ADHERED TO IN ALL CONCRETE MIX DESIGNS.
- THE CONTRACTOR MUST COORDINATE ALL SERVICE DRAWINGS' DETAILS, POSITIONS OF OPENINGS AND SLEEVES REQUIRED FOR STORMWATER, SEWERAGE, DRAINAGE, ELECTRICAL, MECHANICAL AND OTHER SERVICES. ALL OPENINGS AND PENETRATIONS TO BE APPROVED BY STRUCTURAL ENGINEER. ONLY OPENINGS LARGER THAN 200 mm DIA OR 200 mm X 200 mm ARE SHOWN ON STRUCTURAL DRAWINGS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.
- THE CONTRACTOR MUST OBTAIN PERMISSION FROM THE ENGINEER BEFORE ANY OPENINGS OR SERVICES - WHICH ARE NOT INDICATED ON THE DRAWINGS - MAY BE INTRODUCED THROUGH ANY STRUCTURAL ELEMENT.
- ALL CONCRETE SHALL BE CURED BY MEANS OF AN APPROVED METHOD. THE PROPOSED METHOD OF CURING OF ALL CONCRETE ELEMENTS IS TO BE SUBMITTED TO THE ENGINEER FOR REVIEW (BUT NOT APPROVAL).
- THE POSITION AND METHOD OF FORMING ALL CONSTRUCTION JOINTS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.
- THE SHUTTERING OF A SLAB THAT IS BEING CAST SHALL BE SUPPORTED BY THE TWO COMPLETED SLABS DIRECTLY BELOW THIS SLAB. THE CONSTRUCTION LOADS SHALL UNDER NO CIRCUMSTANCES EXCEED THE DESIGN LIVE LOADS (SHOWN ELSEWHERE) OF THESE FLOORS.
- A 20 x 20 mm CHAMFER SHALL BE PROVIDED ON ALL UNPLASTERED OFF-SHUTTER CONCRETE IN COLLABORATION WITH THE ARCHITECT.
- SEE ARCHITECT'S DRAWINGS FOR DETAILS AND POSITIONS OF V-JOINTS AND DRIP JOINTS IN CONCRETE.
- SEE ARCHITECT'S DRAWINGS FOR DETAILS AND POSITIONS OF RNDPS IN CONCRETE.
- SEE ARCHITECT'S DRAWINGS FOR THE CASTING-IN OF FINISHES FOR BRICKWORK INTO CONCRETE.
- NO BRICKWORK SHALL BE BUILT ON A PROPPED STRUCTURAL SLAB. THIS IS TO ENSURE THAT THE ELASTIC DEFLECTION UNDER THE OWN WEIGHT OF THE SLAB HAS TAKEN PLACE AND ALSO ALLOWS THE ELASTIC DEFLECTION UNDER SELF WEIGHT OF THE BRICKWORK TO TAKE PLACE.
- NO BRICK WALLS ARE TO BE BUILT ON FLOOR SLABS BEFORE THE SLABS HAVE REACHED THEIR 14 DAY STRENGTHS.
- BEAM DIMENSIONS ARE GIVEN AS A x B WHERE:
 - A = WIDTH OF BEAM
 - B = HEIGHT OF BEAM
 - FOR UPSTAND (UP) BEAMS, THE HEIGHT REFERS TO THE HEIGHT THAT THE BEAM EXTENDS PAST THE TOP OF THE SLAB
 - FOR DOWNSTAND (DN) BEAMS, THE HEIGHT REFERS TO THE HEIGHT THAT THE BEAM EXTENDS BELOW THE SLAB SOFFIT.

CONCRETE STRENGTH MONITORING

CONCRETE STRENGTHS SHALL BE MONITORED ON SITE BY MEANS OF CONCRETE CUBE SAMPLING AND TESTING IN ACCORDANCE WITH SANS 2001-CC1. TEST RESULTS OBTAINED FROM A READY-MIXED CONCRETE PRODUCTION PLANT - AS PART OF ITS QUALITY CONTROL SYSTEM - ARE NOT ACCEPTABLE.
CONCRETE CUBE SAMPLING IS TO BE DONE AS FOLLOWS:

- AT LEAST ONE SAMPLE SHALL BE TAKEN EVERYDAY, IF CONCRETE PLACED IS LESS THAN 50m³.
- IF MORE THAN 50m³ OF CONCRETE IS PLACED, AT LEAST ONE SAMPLE IS TO BE TAKEN FROM EVERY 50m³ OF CONCRETE PLACED OF EACH CONCRETE GRADE.
- ONE SAMPLE IS COMPRISED OF 3 CONCRETE CUBES FOR EVERY TESTING AGE (ie. THREE CUBES TESTED ON 7 DAYS PLUS THREE CUBES TESTED ON 28 DAYS)
- ALL SAMPLES SHALL BE REFERENCED TO THE RELEVANT PORTION OF THE STRUCTURE AND THIS SHALL BE CLEARLY COMMUNICATED TO THE STRUCTURAL ENGINEER.
- POURING HEIGHT OF CONCRETE MAY NOT EXCEED 3.2m UNLESS APPROVED BY ENGINEER.

TABLE 3A - CONCRETE STRENGTH		
ELEMENT	28 DAY STRENGTH (MPa)	MAX. NOMINAL AGG. SIZE (mm)
BLINDING LAYER	15	19
FOUNDATIONS	30	19
UNREINFORCED FOUNDATIONS	30	19
COLUMNS	30	19
BEAMS	30	19
WALLS	30	19
SURFACE BEDS	30	19
RETAINING WALLS	30	19
CAVITY FILLED WALLS	15	13
MASS CONCRETE	15	19

TOLERANCES AND FINISHES TO CONCRETE ELEMENTS

ELEMENTS BELOW GROUND OR IN CONTACT WITH THE GROUND (FOUNDATIONS, PILE CAPS, RAFTS, GROUND BEAMS, RETAINING WALL SOIL-SIDE FACES):

DEGREE OF ACCURACY 3 AS PER SANS 2001-CC1 SHALL APPLY UNLESS SPECIFIED OTHERWISE ON THE STRUCTURAL DRAWINGS. THE FINISHES SHALL BE ROUGH AS DEFINED IN SANS 2001-CC1.

ALL OTHER CONCRETE ELEMENTS NOT LISTED ABOVE:

THE DEGREE OF ACCURACY IS TO BE AS PER THE ARCHITECT'S SPECIFICATIONS AND DRAWINGS, BUT SHALL UNDER NO CIRCUMSTANCES BE LESS THAN DEGREE OF ACCURACY 2 AS DEFINED IN SANS 2001-CC1. THE FINISH SHALL BE AS PER THE ARCHITECT'S SPECIFICATIONS AND DRAWINGS.

OFF-SHUTTER CONCRETE RETAINING WALL FINISH:

CONCRETE CLASS 2 (SMOOTH)
DEGREE OF ACCURACY II.
PENETRON ADMIXTURE TO BE USED

CLASS B-FINE AGGREGATE

- LEVEL 3 POLISHED - IMAGE CLARITY VALUE 40-69%

ANY CONCRETE ELEMENTS REQUIRING CHAMFERS TO BE AS PER THE ARCHITECT'S SPECIFICATIONS AND DRAWINGS.

CONCRETE DURABILITY REQUIREMENTS

THE CONCRETE MIX DESIGN MUST BE SUCH THAT THE CONCRETE COMPLIES WITH THE RELEVANT CLAUSES OF SANS 2001-CC1 AND THE EXPOSURE CONDITIONS TABULATED IN TABLE 3B OF THIS DRAWING.

THE CONCRETE MIX DESIGNER IS TO TAKE INTO ACCOUNT THE POTENTIAL OF ALKALI SILICA REACTION AND THE AGGREGATE USED. DUSTING OF TRAFFICABLE SURFACES, AND ANY OTHER EFFECTS THAT MAY DETRIMENT THE LONG TERM PERFORMANCE OF THE CONCRETE, THEREFORE, THE MIX DESIGNS SHALL BE SUCH TO NEGATE THESE EFFECTS

TABLE 3B - CONCRETE DURABILITY REQUIREMENTS		
EXPOSURE DESCRIPTION		EXPOSURE CONDITION
ELEMENTS IN CONTACT WITH THE GROUND (PILE CAPS, FOUNDATIONS AND RETAINING WALLS)		SEVERE
ELEMENTS NOT IN ENCLOSED ENVIRONMENTALLY CONTROLLED SPACES OR EXPOSED TO WEATHER (BASEMENTS, WEATHER FACING ELEMENTS)		MODERATE
ELEMENTS IN ENCLOSED ENVIRONMENTALLY CONTROLLED SPACES (INTERNAL ELEMENTS)		MILD

4. REINFORCEMENT

- ALL REINFORCEMENT SHALL COMPLY WITH THE REQUIREMENTS OF SANS 2001-CC1.
- THE CONTRACTOR SHALL GIVE REASONABLE NOTICE TO THE ENGINEER FOR STEEL INSPECTIONS THAT ARE REQUIRED.
- ALL REINFORCEMENT IS TO BE CHECKED BY THE CONTRACTOR'S QUALITY CONTROL REPRESENTATIVE PRIOR TO THE STRUCTURAL ENGINEER'S REINFORCEMENT INSPECTION.
- ALL REINFORCEMENT MUST BE APPROVED BY THE ENGINEER PRIOR TO THE CONCRETE BEING CAST.
- NO HEATING, FLAME CUTTING OR WELDING OF REINFORCEMENT SHALL BE ALLOWED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER.
- REINFORCEMENT STEEL IN CONCRETE SHALL NOT BE CUT BY ANY MEANS UNLESS INSTRUCTED TO DO SO BY THE ENGINEER.
- REINFORCEMENT SYMBOLS:
 - R - PLAIN ROUND REBAR OF STRENGTH 250 MPa
 - Y - HIGH YIELD DEFORMED REBAR OF STRENGTH 450 MPa, i.e. Y20 REFERS TO 450 MPa DEFORMED REBAR WITH 20mm DIA

TABLE 4A - REINFORCEMENT ALLOWANCES	
ELEMENTS	ALLOWANCE (kg/m3)
FOUNDATIONS	80
STRIP FOOTINGS	50
COLUMNS	200
RC SURFACE BEDS	80
GROUND BEAMS	150
STAIRS	80
SLABS	100
BEAMS	150
RETAINING WALLS	120
RETAINING WALL FOOTING	100

TABLE 4B - CONCRETE COVERS			
ELEMENTS	BOTTOM (mm)	TOP (mm)	SIDES (mm)
FOUNDATIONS	50	50	50
GROUND BEAMS	50	50	50
COLUMNS	-	-	30
BEAMS	30	30	30
WALLS	-	-	30
SLABS	-	30	30
RETAINING WALLS	-	-	SOIL SIDE = 30 OTHER SIDE = 50

5. STRUCTURAL STEELWORK

- ALL STRUCTURAL STEELWORK SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH SABS 1200H OR SANS 2001-CS1.
- ALL STRUCTURAL STEELWORK SHALL BE GRADE S355JR AND COLD FORMED SECTIONS SHALL HAVE A YIELD STRENGTH OF 200 MPa UNLESS NOTED OTHERWISE (U.N.O.).
- MEMBERS DENOTED "HIGH YIELD" ARE TO BE 450 MPa.
- ALL DIMENSIONS SHALL BE CHECKED ON SITE PRIOR TO THE GENERATION OF SHOP DRAWINGS.
- ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
- BEFORE TO THE COMMENCEMENT OF ANY STEEL FABRICATION, THE STEELWORK CONTRACTOR IS TO SUBMIT A QUALITY ASSURANCE SYSTEM (IN ACCORDANCE WITH SANS 1921-3:2018) TO THE ENGINEER FOR APPROVAL.
- ALL BOLTS ARE TO BE GRADE 8.8.
 - a. ALL BOLTS ARE TO RECEIVE WASHERS.
 - WASHER MATERIAL SHALL MATCH THAT OF ITS ACCOMPANYING NUT AND BOLT, i.e. HOT-DIPPED GALVANISED NUTS AND BOLTS ARE TO RECEIVE HOT-DIPPED GALVANISED WASHERS.
 - THE DIRECT CONTACT OF DISSIMILAR METALS AND ALLOYS IS TO BE AVOIDED, AS FAR AS REASONABLY POSSIBLE, TO AVOID GALVANIC CORROSION FROM OCCURRING.
 - ELECTRO-PLATED FASTENERS ARE NOT TO BE MIXED WITH HOT-DIP FASTENERS.
- ALL CHEMICAL ANCHORS ARE TO BE HOT-DIP GALVANISED TO SANS 121 UNLESS NOTED OTHERWISE.
 - a. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE THE ENGINEER WITH THE SPECIFICATIONS OF ANCHORS USED AND TO ENSURE THAT THESE ANCHORS ARE HOT-DIP GALVANISED.
- MINIMUM EMBEDMENT DEPTHS FOR CHEMICAL ANCHORS:
 - M12 = 160mm
 - M16 = 200mm
 - M20 = 240mm

THESE PRESCRIBED EMBEDMENT DEPTHS MAY ONLY BE WAIVED UPON THE EXPLICIT INSTRUCTION FROM THE ENGINEER, IN THE CASE OF, FOR INSTANCE, SUPPLIER SPECIFICATIONS DIFFERING FROM THE ABOVE.
- WELDING TO BE IN ACCORDANCE WITH SANS 2001-CS1:2017 IN PARTICULAR TO THE FOLLOWING:
 - a. ALL WELDS ARE TO BE VISUALLY INSPECTED OVER THE FULL LENGTH OF THE WELD, IN ACCORDANCE WITH SANS 2001-CS1:2005. AT LEAST 20% OF ALL FILLET WELDS ARE TO BE TESTED USING A NON-DESTRUCTIVE METHOD WHICH IS TO INCLUDE THE ULTRASONIC TEST.
 - b. THE SELECTED WELD TESTING COMPANY SHALL HOLD A CURRENT CERTIFICATE OF COMPETENCE FROM A NATIONALLY RECOGNISED INDEPENDENT AUTHORITY.
 - c. THE INDEPENDENT TESTING COMPANY IS TO SUBMIT A REPORT SUMMARISING THE RESULTS OF SUCH TESTS TO THE ENGINEER FOR THEIR COMMENTS/APPROVAL.
 - d. WELDING OPERATORS SHALL BE QUALIFIED BY A FABRICATOR ON AN INDEPENDENT TESTING AGENCY, IN ACCORDANCE WITH SANS 2001-CS1:2017. QUALIFICATION CERTIFICATES SHALL BE PROVIDED TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
 - e. THE METAL ARC PROCESS - IN ACCORDANCE WITH SANS 2001-CS1:2017 - SHALL BE USED FOR ALL WELDING.
- A WRITTEN WELDING PROCEDURE SPECIFICATION (WPS) SHALL BE PREPARED AND PROVIDED TO THE ENGINEER BEFORE WELDING.
- THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A CERTIFICATE - ATTAINED FROM THE STRUCTURAL STEEL SUPPLIER - FOR ALL SECTIONS USED.
THIS CERTIFICATE SHOULD CERTIFY THAT ALL FOREMENTIONED SECTIONS CONFORM TO THE SPECIFIED STRENGTH CLASS AND APPLICABLE CODES.
- THIS CERTIFICATE IS TO BE APPROVED BY THE ENGINEER PRIOR TO THE COMMENCEMENT OF ANY WORK.
- A COMPLETE SET OF SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER, FOR APPROVAL, PRIOR TO THE COMMENCEMENT OF ANY FABRICATION. THE CONTRACTOR SHALL ALLOW THE ENGINEER 2 WEEKS FOR REVIEWING AND APPROVAL AND SHALL ALSO ALLOW FOR ANY POSSIBLE CHANGES TO SHOP DRAWINGS.
- THE CONTRACTOR SHALL DESIGN ALL WELDS AND, WHERE NECESSARY, GUSSETS OF SUFFICIENT STRENGTH SHALL BE PROVIDED TO OBTAIN THE REQUIRED WELD LENGTH.
- CENTROIDS OF ALL MEMBERS TO INTERSECT AND SETTING-OUT POINTS (S.O.P'S) AT MEMBER CENTROIDS SHALL CONFORM TO THOSE SHOWN ON GENERAL ARRANGEMENT DRAWINGS. NO ECCENTRICITIES, EXCEPT THOSE SHOWN ON THE ENGINEER'S DRAWINGS, SHALL BE ALLOWED.
- ALL CONNECTIONS, GUSSET PLATES AND COMPRESSION/TENSION SPLICES ARE TO BE DESIGNED FOR FULL STRENGTH CAPACITY OF THE CONSTITUENT MEMBERS BY THE FABRICATOR AND CONTRACTOR.
- ONLY TYPICAL CONNECTIONS ARE SHOWN ON THE ENGINEER'S DRAWINGS. THE SHOP DRAWER IS TO DEVELOP ALL CONNECTION DETAILS NOT SPECIFICALLY SHOWN. THE CONTRACTOR IS TO PRICE FOR ALL ASSOCIATED ENGINEERING DESIGN AND SUCH DETAILING OF CONNECTIONS.
- ALL GUSSET / END PLATES TO HAVE A MINIMUM THICKNESS OF 8mm U.N.O.
- THE PROPOSED METHOD AND SEQUENCE OF ERECTION OF THE STRUCTURE SHALL BE SUBMITTED TO THE ENGINEER FOR WRITTEN APPROVAL. SUCH SUBMISSION IS TO TAKE PLACE AT THE TIME OF SHOPDRAWING SUBMITTAL. THE CONTRACTOR SHALL INDICATE THE PROPOSED METHOD FOR THE ERECTION OF THE STRUCTURE DURING ERECTION. SUCH STABILITY DURING ERECTION REMAINS THE CONTRACTOR'S RESPONSIBILITY. WHERE TEMPORARY BRACING OR PROPPING IS NECESSARY, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN, ERECTION, MAINTENANCE AND REMOVAL (WHERE NECESSARY) OF SUCH SUPPORTS. PROPOSAL OF SUCH BRACING OR PROPPING SHALL BE SUBMITTED TO THE ENGINEER AT AN EARLY STAGE FOR WRITTEN APPROVAL.
- WHERE APPLICABLE, A 40 MPa NON-SHRINK GROUT SHALL BE PROVIDED UNDER BASE PLATES BEFORE ANY PRIMARY LOADS ARE APPLIED TO THE STRUCTURE.

CORROSION PROTECTION

- SITE WELDING IS ONLY TO ALLOWED UPON EXPLICIT WRITTEN APPROVAL BY THE ENGINEER.
- WHERE SITE REPAIRS TO GALVANISING ARE REQUIRED, A TWO PACK ZINC-RICH EPOXY (GALVPATCH OR ZINCPX) SHALL BE USED IN ACCORDANCE WITH SANS 121. THE MINIMUM DFT SHALL BE 100 µm.
- THE "COLD" GALVANISING PRODUCT INTENDED TO BE USED BY THE CONTRACTOR IS TO BE APPROVED BY THE ENGINEER PRIOR TO ANY SITE WELDING OCCURRING, AND PRIOR TO ANY GALVANISING BEING COMPROMISED.
- STRUCTURAL TREATMENT AND CORROSION PROTECTION OF STEELWORK SHALL BE AS BELOW:

TABLE 5B - STRUCTURAL STEEL PROTECTION TREATMENT AND PAINTING	
ELEMENT	TREATMENT
INTERNAL PURLINS, GIRTS AND OTHER COLD FORMED SECTIONS (NOT EXPOSED TO WEATHER)	Z275 PRE-GALVANISED IN ACCORDANCE WITH SANS 4998 / ISO 4998 AS SUPPLIED
EXTERNAL PURLINS, GIRTS AND OTHER COLD FORMED SECTIONS (EXPOSED TO WEATHER)	Z275 PRE-GALVANISED IN ACCORDANCE WITH SANS 4998 / ISO 4998 AS SUPPLIED & PRIMED AND PAINTED ***
INTERNAL STEEL ELEMENTS (NOT EXPOSED TO WAETHER) *	PRIMED AND PAINTED **
EXTERNAL STEEL ELEMENTS (EXPOSED TO WEATHER) **	HOT DIPPED GALVANISED IN ACCORDANCE WITH SANS 121 / ISO 1461, SURFACE PREPARED, PRIMED AND PAINTED ***
ALL STEEL BOLTS, NUTS AND WASHERS **	HOT DIPPED GALVANISED IN ACCORDANCE WITH SANS 121 / ISO 1461, NUTS OVERSIZE TAPPED AFTER GALVANISED
PROPRIETARY STEEL BOLTS, ANCHORS, NUTS AND WASHERS (i.e. HILTI, FISCHER, ETC.)	AS SPECIFIED ON RELEVANT DRAWING

- * INCLUDING ALL BEAMS, COLUMNS, GIRDERS, TRUSSES, BRACING AND CONNECTIONS.
- ** APPLIES TO ALL BOLTS, THREADED MEMBERS, WASHERS, NUTS & SPACERS.
- *** THE CONTRACTOR IS TO SELECT SUITABLE COATING SYSTEMS, IN ACCORDANCE WITH SANS 12944 / ISO 12944, COMPATIBLE WITH THE STEEL PROTECTIVE TREATMENTS (TABLE 5B) AND EXPOSURE AND CORROSIONITY DETAILS (TABLE 5C).

NOTES:

- THE INTENDED COATING SYSTEM SHALL BE SUBMITTED TO THE ENGINEER AND ARCHITECT, FOR REVIEW AND APPROVAL, PRIOR TO APPLICATION.
- INDIVIDUAL COATING SYSTEMS SHALL BE FROM ONE MANUFACTURER.
- APPLICATION OF THE COATING SYSTEM, AS WELL AS SURFACE PREPARATIONS AND DRYING TIME REQUIREMENTS SHALL BE STRICTLY ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.
- ALL PAINT COLORS AND FINISHES ARE TO BE AS PER THE ARCHITECTS SPECIFICATIONS.

TABLE 5C - CORROSIONITY CATEGORY		
EXPOSURE CONDITION	DESIRED DURABILITY RANGE	CORROSIONITY CATEGORY
NOT EXPOSED TO WEATHER	MEDIUM (M = 5 - 15 YEARS)	C1 (very low)
EXPOSED TO WEATHER	MEDIUM (M = 5 - 15 YEARS)	C5 (high)

BOLT EDGE DISTANCE REQUIREMENTS AND SPACING

THE FOLLOWING MINIMUM END DISTANCES, EDGE DISTANCES AND SPACINGS SHALL BE APPLICABLE TO STEEL CONNECTIONS UNLESS NOTED OTHERWISE.

MIN SPACING OF BOLTS: 2.7 TIMES THE BOLT DIAMETER.

MAX EDGE DISTANCE: 12 TIMES THE THICKNESS OF THE OUTER CONNECTED PART BUT NOT MORE THAN 150mm.

MIN END DISTANCE: 1.5 TIMES THE BOLT DIAMETER BUT NOT LESS THAN THE EDGE DISTANCE VALUES TABULATED IN TABLE 5A OF THIS DRAWING, IF THERE ARE TWO OR MORE BOLTS IN A ROW PARALLEL TO THE DIRECTION OF LOAD.

TABLE 5A - MINIMUM BOLT EDGE DISTANCE AND SPACING			
BOLT SIZE	AT SHEARED EDGES (mm)	AT ROLLED, SAWN OR GAS-CUT EDGES (mm)	RECOMMENDED END DISTANCE (mm)
M12	21	16	50
M16	28	22	70
M20	36	28	90
M24	42	30	100
M30	52	38	100
M36	64	46	120

D	2025.03.20	FOR TENDER
C	2024.12.06	FOR TENDER
B	2024.11.11	FOR TENDER
A	2024.10.25	FOR TENDER
DATE	REV	DATE
		COMMENT