GENERAL NOTES:

G1. THE ENGINEERING DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS, AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. THE CONTRACTOR SHALL ALSO REFER TO THE REPORT ON THE GEOTECHNICAL INVESTIGATION DONE ON THE SITE AND INCLUDED IN THE TENDER DOCUMENT.

G2. THE CONTRACTOR IS TO CAREFULLY REVIEW THE CURRENT ENGINEERING DRAWINGS, ALL RELEVANT ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS PRIOR TO ANY CONSTRUCTION OR FABRICATION. ANY DISCREPANCIES ON THE DRAWINGS SHALL BE REFERRED TO THE ENGINEER FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.

G3. ANY DISCREPANCY ON THE DRAWINGS OR BETWEEN THE DRAWINGS AND/OR THE SPECIFIED STANDARDS AND/OR THE CONTRACT DOCUMENTATION SHALL BE REFERRED TO THE ENGINEER AND A WRITTEN INSTRUCTION RECEIVED PRIOR TO PROCEEDING WITH THE WORK. THE TENDERER SHALL ASSUME THE MORE ONEROUS CRITERIA IN TERMS OF COST IN THE ABSENCE OF OTHER INSTRUCTIONS.

G4. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE RELEVANT PARTS (INCLUDING ALL AMENDMENTS) OF THE CURRENT SANS 10400 (THE NATIONAL BUILDING REGULATIONS), AND THE REQUIREMENTS OF THE LOCAL STATUTORY AUTHORITIES, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS OR THE PROJECT SPECIFIC NOTES ON THE ENGINEERING DRAWINGS. WHERE CONFLICT EXIST BETWEEN THE SANS 10400 SPECIFICATIONS AND THE DRAWING NOTES, THE DRAWING NOTES SHALL TAKE PRECEDENCE.

G5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE STRUCTURE AND ANY ADJACENT STRUCTURES IN A SAFE AND STABLE CONDITION AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR IS TO DEVELOP A DETAILED SAFE WORK METHOD STATEMENT OUTLINING THE CONSTRUCTION SEQUENCE AND METHODOLOGY. THE CONTRACTOR IS TO APPOINT A QUALIFIED AND SUITABLY EXPERIENCED ECSA REGISTERED PROFESSIONAL TEMPORARY WORKS DESIGNER IN TERMS OF CLAUSE 12 OF THE CURRENT CONSTRUCTION REGULATIONS. THE TEMPORARY WORKS DESIGNER IS TO REFER TO THE NOTES ON THE ENGINEERS DRAWINGS (e.g. SLAB LOAD CARRYING CAPACITIES AND OTHER) WHERE RELIANCE IS MADE ON THE STRUCTURE TO WITHSTAND TEMPORARY LOADS (e.g. BACK-PROPPING AND SHORING). DUE ATTENTION AND CARE SHALL BE MAINTAINED BY THE CONTRACTOR REGARDING THE CARRYING OUT OF CONSTRUCTION ACTIVITIES IN AREAS CONTAINING EXISTING SERVICES. ANY STRUCTURAL DAMAGE RESULTING FROM TEMPORARY LOADING CONDITIONS SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE, TO THE DISCRETION OF THE PROJECT ENGINEER.

G6. THE LOCATION OF ALL EXISTING UNDERGROUND SERVICES IDENTIFIED ON DRAWINGS ARE INDICATIVE ONLY. ALL EXISTING SERVICES LOCATIONS SHALL BE VERIFIED ON SITE BY THE CONTRACTOR BEFORE COMMENCING WORK AND CONFIRM THAT THE LOCATION OF ALL SERVICES THAT MAY BE AFFECTED BY THE WORKS HAS BEEN CORRECTLY IDENTIFIED.

G7. WHERE PRODUCTS ARE SPECIFIED BY TRADE NAME IN THE DOCUMENTS THE CONTRACTOR MAY SUBMIT AN ALTERNATIVE PRODUCT FOR APPROVAL. A WRITTEN INSTRUCTION FOR ANY VARIATION MUST BE RECEIVED PRIOR TO PROCEEDING WITH THE WORK. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE PRODUCT MANUFACTURERS SPECIFICATION.

G8. THE CONTRACTOR IS TO REFER TO THE ARCHITECT OR PRINCIPAL AGENT FOR SETTING OUT OF THE BUILDING AND/OR BUILDING GRID SYSTEM, BOTH HORIZONTALLY AND VERTICALLY. THE CONTRACTOR SHALL CONFIRM IN WRITING TO THE ARCHITECT (OR PRINCIPAL AGENT) THAT ALL BOUNDARY PEGS AND BENCHMARKS HAVE BEEN IDENTIFIED, VERIFIED AND FOUND TO BE IN POSITION AND DELIVERY THEREOF IS ACCEPTED BY THE CONTRACTOR. THE CONTRACTOR SHALL CONFIRM THIS CHECKING OF THE MENTIONED ITEMS THROUGH A REGISTERED LAND SURVEYOR. A LAND SURVEYOR'S CERTIFICATE MUST BE ISSUED TO THE ARCHITECT (PRINCIPAL AGENT).

G9. ALL DIMENSIONS RELEVANT TO SETTING OUT AND OFF-SITE WORK SHALL BE VERIFIED BY THE CONTRACTOR BEFORE CONSTRUCTION OR FABRICATION IS COMMENCED. THE ENGINEER'S DRAWINGS SHALL NOT BE SCALED.

G10. IF ANY INSTRUCTION GIVEN IN THESE DRAWINGS AND RELEVANT SPECIFICATION CANNOT BE COMPLIED WITH, THE MATTER TO BE REFERRED TO THE ENGINEER IMMEDIATELY.

G11. ALL REINFORCEMENT MUST BE CHECKED BY THE ENGINEER BEFORE CONCRETE IS CAST. THE ENGINEER SHALL BE GIVEN AT LEAST 48 HOURS ADVANCE NOTICE OF AN INSPECTION. INSPECTION WILL ONLY BE DONE IF ALL STEEL IS PROPERLY FIXED, SPACER BLOCKS POSITIONED, SHUTTERING CLEANED OUT AND REINFORCEMENT CHECKED BY THE CONTRACTOR.

G12. a. REFER TO LOADING DIAGRAM FOR SLAB DESIGN LOAD CARRYING CAPACITIES (IMPOSED LOADS) AT 28 DAYS.
b. THE CONTRACTOR IS TO ENSURE THAT SLAB DESIGN LOAD CARRYING CAPACITIES ARE NOT EXCEEDED WHEN DETERMINING HIS SHORING/BACK-PROPPING METHODOLOGY AS WELL AS WHEN MATERIAL ARE TO BE STOCKPILED OR STORED ON SUSPENDED FLOOR SLABS OR OTHER STRUCTURES.

G13. THE CONTRACTOR RETAINS RESPONSIBILITY OF THE WORKS EVEN IF THE ENGINEER HAS INSPECTED THE WORKS DURING CONSTRUCTION.

G14. THE ANTICIPATED ERECTION SEQUENCE INDICATED ON THE DRAWINGS SHALL NOT BE VARIED WITHOUT THE APPROVAL OF THE DESIGNER OF THE PERMANENT WORKS AND ALSO THE DESIGNER OF THE TEMPORARY WORKS AND THE APPLICABLE VERIFIERS.

DRAWING NOTES:

D1. DIMENSION SHALL NOT BE OBTAINED BY SCALING FROM DRAWINGS. ONLY DIMENSIONS PROVIDED ON DRAWINGS TO BE USED. THE CONTRACTOR IS TO REQUEST FURTHER DIMENSIONS FROM THE ENGINEER IF REQUIRED.

D2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.

D3. ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.

D4. ALL DIMENSIONS ARE TO CENTERLINES / CENTERS OF MEMBERS, FROM GRIDLINES. UNLESS NOTED OTHERWISE.

D5. ALL FOUNDATIONS, COLUMNS AND WALLS ARE CENTERED ON GRIDLINES UNLESS SHOWN OTHERWISE.

D6. ALL COLUMNS AND WALLS ARE CENTRED ON PILE CAPS AND GROUND BEAMS UNLESS SHOWN OTHERWISE.

D7. BEAM SIZES ARE INDICATED AS WIDTH x HEIGHT/DEPTH, UNLESS NOTED OTHERWISE.

D8. SOME, AND NOT NECESSARILY ALL, SOFFIT STEPS MAY BE INDICATED ON THE DRAWINGS FOR CLARITY. IT IS THE RESPONSIBILITY OF THE READER OF THE DRAWING TO DETERMINE WHERE THERE IS A STEP IN THE SOFFIT USING THE LEVELS AND THICKNESSES/DEPTHS OF THE STRUCTURAL ELEMENTS INDICATED.

D9. DRAWINGS, IF PRINTED, MAY BE IN MONOCHROME (BLACK INK ONLY), UNLESS SPECIFICALLY NOTED OTHERWISE.

D10. PENETRATIONS/SLEEVES SMALLER THAN 200mm x 200mm OR 200mm DIA ARE NOT SHOWN ON THE STRUCTURAL DRAWINGS. REFER TO THE COORDINATED PENETRATION LAYOUT PRODUCED BY THE ARCHITECT AND APPROVED BY THE STRUCTURAL ENGINEER SHOWING ALL PENETRATIONS FOR SETTING OUT AND CONSTRUCTION OF PENETRATIONS.

D11. DOWNSTAND RC BEAM DEPTH IS DEFINED FROM THE T.O.C OF THE SLAB. UPSTAND RC BEAM DEPTH IS DEFINED FROM THE SOFFIT OF THE BEAM. ALL BEAM DEPTHS INCLUDE THE THICKNESS OF THE SLAB.

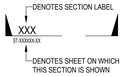
300mm x (X)mm DEEP RC BEAM — **300mm x (X)mm RC UPSTAND BEAM**

D12. THE DRAWING SYMBOLS USED ON PLAN DRAWINGS ARE AS FOLLOWS:

- 200 — DENOTES SLAB THICKNESS
- 50 / 200 — DENOTES STEP IN SLAB LEVEL
- 150 / SOFFIT STEP — DENOTES SOFFIT STEP IN SLAB LEVEL
- DENOTES EXTENT OF SETDOWN IN SLAB
- DENOTES EXTENT OF PENETRATION IN SLAB
- DENOTES EXTENT OF TEMPORARY PENETRATION IN SLAB
- DENOTES LOAD-BEARING CONCRETE COLUMN/WALL/PILE UNDER
- DENOTES LOAD-BEARING CONCRETE COLUMN/WALL/PILE OVER
- DENOTES LOAD-BEARING BRICKWORK/BLOCKWORK
- DENOTES NON LOAD-BEARING BRICKWORK/BLOCKWORK
- * — DENOTES COLUMN OR WALL THAT STARTS ON THIS LEVEL

DRAWING NOTES (CONTINUED):

D13. THE DRAWING SYMBOLS USED ON PLAN DRAWINGS ARE AS FOLLOWS:



D14. THE ABBREVIATIONS USED ARE AS FOLLOW:

GENERAL

ALT	ALTERNATING
ARCH	ARCHITECT(S)
BOS	BOTTOM OF STEEL
BLDG	BUILDING
c/c	CENTRE TO CENTRE
CJ	CONSTRUCTION JOINT
COS	CHECK ON SITE
CONC	CONCRETE
COV	COVER TO REINFORCEMENT
CVR	COVER TO REINFORCEMENT
CL	CENTRE LINE
CRS	CENTRES
CW	COMPLETE WITH
DFT	DRY FILM THICKNESS
DP	DEEP
DPC	DAMP-PROOF COURSE
DPM	DAMP-PROOF MEMBRANE
DIA	DIAMETER
ø	DIAMETER
FFL	FINISHED FLOOR LEVEL
FPBW	FULL PENETRATION BUTT WELD
FWAR	FILLET WELD ALL AROUND
GALV	GALVANISED
GL	GROUND LEVEL
HD	HOLDING DOWN (BOLT)
HDG	HOT DIP GALVANISED
HP	HYDRAULIC PIPE
ID	INSIDE DIAMETER
IL	INVERT LEVEL
LNG	LONG
MAX	MAXIMUM
MIN	MINIMUM
MS	MILD STEEL
NOM	NOMINAL
NTS	NOT TO SCALE
OD	OUTSIDE DIAMETER
O/A	OVERALL
PC	PRECAST CONCRETE
PENO	PENETRATION
PT	PRESTRESSED
RAD	RADIUS
REQ'D	REQUIRED
RC	REINFORCED CONCRETE
RL	REFERENCE LEVEL
SED	SMALL END DIAMETER
STGD	STAGGERED
SPEC	SPECIFICATION
SQ	SQUARE
SS	STAINLESS STEEL
THK	THICK
THRU	THROUGH
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL
TYP	TYPICAL
U/S	UNDERSIDE
UNO	UNLESS NOTED OTHERWISE
WP	WELD PLATE

UNITS

m^3	CUBIC METER
km	KILOGRAM
kN	KILONEWTON
kPa	KILOPASCAL
mPa	MEGAPASCAL
m	METER
mm	MILLIMETER
N	NEWTON
Pa	PASCAL
km^2	SQUARE KILOMETER
m^2	SQUARE METER
mm^2	SQUARE MILLIMETER
kg/m^3	KILOGRAMS PER SQUARE METER

REINFORCED CONCRETE

B	BOTTOM
B1	BOTTOM BARS (BOTTOM LAYER)
B2	BOTTOM BARS (SECOND LAYER FROM BOTTOM)
B3	BOTTOM BARS (THIRD LAYER FROM BOTTOM)
EW	EACH WAY
EF	EACH FACE
FF	FAR FACE
NF	NEAR FACE
REBAR	REINFORCING BAR
REINF	REINFORCEMENT
R	PLAIN ROUND REBAR OF STRENGTH 250MPa eg. R20 REFERS TO 250 Mpa PLAIN ROUND REBAR 20mm DIA
STR(S)	STIRRUP(S)
STR(S)	STARTER(S)
T	TOP
T1	TOP BARS (TOP LAYER)
T2	TOP BARS (SECOND LAYER FROM TOP)
T3	TOP BARS (THIRD LAYER FROM TOP)
Y	HIGH YIELD DEFORMED REBAR OF STRENGTH 450MPa eg. Y20 REFERS TO 450MPa DEFORMED REBAR 20mm DIA

STRUCTURAL STEEL

CHS	CIRCULAR HOLLOW SECTION
CFLC	COLD FORMED LIPPED CHANNEL
GRADE	REFERS TO GRADE S355JR
355	
LLH	LONG LEG HORIZONTAL
PFC	PARALLEL FLANGE CHANNEL
RHS	RECTANGULAR HOLLOW SECTION
SHS	SQUARE HOLLOW SECTION
TFC	TAPER FLANGE CHANNEL
TFB	TAPER FLANGE BEAM
UB	UNIVERSAL BEAM
UC	UNIVERSAL COLUMN
UA	UNEQUAL ANGLE
L	EQUAL ANGLE

DEMOLITION WORKS:

D1. DEMOLITION WORK (IF ANY) SHALL BE AS PER SANS 10400 PART E.

D2. WHERE THE PROJECT WORKS INVOLVE BREAKING BACK OF EXISTING STRUCTURAL ELEMENTS THE CONTRACTOR SHALL MAKE PROVISION FOR INSPECTION AND APPROVAL IN ACCORDANCE WITH THE CONTRACTORS QUALITY ASSURANCE SYSTEM OF THE EXSTING EXPOSED SURFACES WHICH HAVE BEEN PREPARED BUT NOT YET MODIFIED.

D3. CARE SHALL BE TAKEN TO MAINTAIN THE INTEGRITY OF EXISTING ELEMENTS BEING RETAINED/INCORPORATED INTO THE PROJECT WORKS. DAMAGED COMPONENTS SHALL BE REPORTED TO THE ENGINEER AND SHALL BE RECTIFIED TO THE SATISFACTION OF THE ENGINEER.

D4. DO NOT USE EXPLOSIVES FOR ANY DEMOLITION WORK.

D5. LEVELS AND DIMENSIONS OF EXISTING STRUCUTRE SHOWN INCLUDING THOSE EXPOSED BY EXCAVATIONS ON DRAWINGS SHALL BE CONFIRMED BY THE CONTRACTOR BY SURVEY PRIOR TO ANY DEMOLITION AND REPORT ALL DISCREPENCIES TO THE ENGINEER AND AWAIT DIRECTION BEFORE PROCEEDING.

D6. THE CONTRACTOR SHALL DEMONSTRATE THAT ALL DEMOLITION WORKS SHALL NOT CRACK OR OTHERWISE DAMAGE REMAINING STRUCTURAL COMPONENTS. METHOD STATEMENTS FOR DEMOLITION SHALL BE SUBMITTED FOR REVIEW (NOT APPROVAL) BY THE ENGINEER PRIOR TO STARTING DEMOLITION.

FORMWORK AND FALSEWORK:

FF1. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN, PROOF ENGINEER CERTIFICATION (AS REQUIRED), CONSTRUCTION, INSPECTION AND PERFORMANCE OF THE FORMWORK AND FALSEWORK.

FF2. THE FORMWORK SHALL NOT BE DESIGNED TO RELY ON RETRAINT OR SUPPORT FROM THE PERMANENT STRUCTURE WITHOUT PRIOR APPROVAL FROM THE DESIGN ENGINEER.

FF3. ALL FORMED EXPOSED EDGES AND RE-ENTRANT CORNERS SHALL BE CHAMFERED OR FILLETED 20x20mm UNLESS NOTED OTHERWISE ON THE STRUCTURAL DRAWINGS OR VARIED BY THE PROJECT REQUIREMENTS.

LOADING NOTES:

L1. THE STRUCTURAL WORKS ON THESE DRAWINGS HAVE BEEN DESIGNED FOR SUPERIMPOSED GRAVITY LOADS AND ACTIONS IN ACCORDANCE WITH SANS 10160-2 AS INDICATED ON DRAWING NO. XXXXXX-XXXXX-XXXX TO XXXXXX-XXXXX-XXXX

L2. THE STRUCTURAL WORKS ON THESE DRAWINGS HAVE BEEN DESIGNED FOR WIND LOADS AND ACTIONS IN ACCORDANCE WITH SANS 10160-3 USING THE FOLLOWING PARAMETERS:

TABLE L1: WIND LOADING PARAMETERS

BASIC WIND SPEED	36 m/s
TERRAIN CATEGORY	C

L3. THE CONTRACTOR IS TO ENSURE THAT DESIGN LOAD CARRYING CAPACITIES ARE NOT EXCEEDED WHEN DETERMINING HIS SHORING/BACK-PROPPING METHODOLOGY AS WELL AS WHEN MATERIALS ARE TO BE STOCKPILED OR STORED ON SUSPENDED FLOOR SLABS OR OTHER STRUCTURES, AS WELL AS FOR ANY OTHER TEMPORARY LOADING CONDITIONS THAT MAY OCCUR. THE CONTRACTOR IS TO TAKE COGNICANCE THAT THE LOAD CARRYING CAPACITIES AS STIPULATED ABOVE ARE ONLY REACHED WHEN THE IN-SITU CONRETE HAS REACHED ITS 28 DAY STRENGTH AND THE CONCRETE HAS BEEN PROPERLY CURED, ETC. THE CONTARRCTOR TO ALSO REFER TO THE MINIMUM SHORING AND RE-SHORING REQUIREMENTS FOR SUSPENDED SLABS AS SET OUT ELSWHERE ON THE ENGINEERING NOTES.

FOUNDATION NOTES:

F1. THE NOTES BELOW REFER TO PAD FOOTINGS, STRIP FOOTINGS AND GROUND BEAMS. FOR PILED FOUNDATIONS (IF APPLICABLE), INCLUDING LATERAL SUPPORT, REFER ELSEWHERE IN THE ENGINEERING NOTES.

F2. THE SAFE BEARING CAPACITY WITH WHICH THE FOUNDATIONS SHOWN ON THE DRAWINGS HAVE BEEN DESIGNED ARE INDICATED ON THE LAYOUT DRAWINGS. IF NOT INDICATED, A MINIMUM SAFE BEARING CAPACITY OF 100kPa FOR SURFACE BED, AND 150kPa FOR PAD, STRIP FOOTINGS AND GROUND BEAMS SHALL BE USED.

F3. THE ASSUMED FOUNDING LEVELS OF THE FOOTINGS ARE AS INDICATED ON THE DRAWINGS. BEFORE ANY REINFORCEMENT OR CONCRETE IS PLACED, THE SAFE BEARING CAPACITY OF THE GROUND IS TO BE VERIFIED BY DCP TESTS PER FOUNDATION/FOOTING EXCAVATION (NUMBER OF DCP TESTS TO BE AGREED WITH ZUTARI). EXCAVATION SHALL CONTINUE UNTIL THE REQUIRED BEARING CAPACITY IS FOUND. THE OVER-EXCAVATION SHALL BE BACK-FILLED WITH SOIL CEMENT OR MASS CONCRETE (OF COMPRESSIVE STRENGTH INDICATED BY THE ENGINEER) TO THE ASSUMED FOUNDING LEVEL OR AS DIRECTED BY THE ENGINEER.

F4. THE CONTRACTOR SHALL SUBMIT DCP TEST RESULTS TAKEN AT THE DEPTH OF REQUIRED BEARING CAPACITY TO THE ENGINEER FOR REVIEW/APPROVAL..

F5. CAST 50mm THICK 15MPa BLINDING BELOW ALL REINFORCED CONCRETE FOUNDATIONS.

F6. THE CONTRACTOR SHALL ALLOW FOR DEWATERING, SHORING, SHEET PILING, PERMANENT SHUTTERING, BATTERING OF SLOPES AND OTHER MEASURES AS REQUIRED TO CONSTRUCT LIFT TO CONSTRUCT SUMPS, PITS, FOUNDATIONS, OR ANY OTHER UNDERGROUND ELEMENTS BELOW OR NEAR THE WATER TABLE.

F7. CONCRETE SHALL NOT BE PLACED IN STANDING OR RUNNING WATER.

F8. OVER-EXCAVATION WITHIN THE INFLUENCE ZONE (45 DEGREE LINE DOWN FROM BASE OF WALL) OF ANY FOUNDATION IS NOT ALLOWED WITHOUT THE PRIOR APPROVAL OF THE EXCAVATION SEQUENCE BY THE GEOTECHNICAL ENGINEER.

F9. ANY WORKING PLATFORMS REQUIRED BY THE CONTRACTOR SHALL BE AT THEIR DISCRETION GIVEN THE GEOTECHNICAL CONDITIONS, AT THEIR COST.

F10. SHOULD THE CONTRACTOR WISH TO MAKE USE OF THE PERMANENT LAYERWORKS (AS SPECIFIED ON THE ENGINEER'S DRAWINGS) AS A WORKING PLATFORM, IT SHALL BE MAINTAINED AND REINSTATED TO THE ENGINEER'S APPROVAL PRIOR TO THE CASTING OF ANY SURFACE BEDS. THE COST OF THE ASSOCIATED WORKS IS TO BE BORNE BY THE CONTRACTOR.

F11. REFER TO GEOTECHNICAL REPORT DVH-24-59 PREPARED BY DAVEL & VAN HUYSSTEEN FOR PROJECT GEOTECHNICAL INFORMATION.

CONCRETE NOTES:

C0. (THESE CONCRETE NOTES DO NOT APPLY TO WATER-TIGHT/WATERPROOF CONCRETE OR FOR INDUSTRIAL FLOORS ON GRADE. REFER ELSEWHERE FOR THESE).

C1. ALL CONCRETE SHALL COMPLY WITH THE REQUIREMENTS OF SANS 2001-CC1 AND THE PROJECT-SPECIFIC REQUIREMENTS PROVIDED ON THESE DRAWINGS.

C2. THE CONTRACTOR IS TO TAKE FULL RESPONSIBILITY FOR THE PERFORMANCE OF ALL CONCRETE MIX DESIGNS. THE CONTRACTOR IS TO PROVIDE FOR REVIEW BY ZUTARI (BUT NOT APPROVAL) ALL CONCRETE MIX DESIGNS AND RELATED INFORMATION (AGGREGATE GRADING, CERTIFICATIONS, ADMIXTURES, OR ANY OTHER INFORMATION THAT MAY BE REQUIRED) INTENDED FOR USE ON SITE. CONFIRMATION OF REVIEW BY THE ENGINEER MUST BE OBTAINED IN WRITING PRIOR TO ANY CONSTRUCTION WORK TAKING PLACE.

C3. REINFORCEMENT FOR CONCRETE SHALL COMPLY WITH SANS 282:
• MILD STEEL (R) – YIELD STRENGTH = 250 MPa (NOMINAL)
• HIGH TENSILE STRENGTH (Y)– YIELD STRENGTH = 450 MPa (NOMINAL)
WELDING OF REINFORCEMENT IS NOT ALLOWED UNLESS IT HAS BEEN APPROVED BY THE ENGINEER IN WRITING.

C4. THE MINIMUM CONCRETE STRENGTHS, NOMINAL COARSE AGGREGATE SIZES AND STATIC MODULUS OF ELASTICITY STIFFNESSES SHALL BE AS TABULATED IN TABLE C1, UNLESS OTHERWISE SPECIFIED ON DRAWINGS OR BENDING SCHEDULES.

C5. THE STRENGTH DEVELOPMENT CURVE MUST TAKE INTO ACCOUNT THE FORMWORK STRIKING TIMES AND THE POST-TENSIONING STRESSING SCHEDULE (IF APPLICABLE) AS PER THE MAIN CONTRACTOR'S PROGRAMME.

C6. THE CONCRETE DURABILITY REQUIREMENTS AND COVER TO REINFORCEMENT AS TABULATED IN TABLE C2 AND TABLE C3 RESPECTIVELY MUST BE CONSIDERED IN THE MIX DESIGNS.

C7. THE CONCRETE MIX DESIGNER IS TO MAKE COGNISANCE OF EFFCTS SUCH AS ALKALI SILICA REACTION AND AGGREGATE BEING USED, DUSTING OF TRAFFICABLE SURFACES (SPECIFICALLY PARKING SLABS), AND ANY OTHER EFFECTS THAT MAY BE DETRIMENTAL TO THE LONG TERM PERFORMANCE OF THE CONCRETE. ALL MIX DESIGNS SHALL NEGATE THESE EFFECTS.

C8. THE MAXIMUM ALLOWED 30 YEAR FREE SHRINKAGE STRAIN (BOTH ACCELERATED SHRINKAGE TESTS (TO SANS 6085) AND ATMOSPHERE DRIED TESTS SHALL BE DONE (BY A SANAS ACCREDITED LABORATORY)) FOR ALL REINFORCED CONCRETE ELEMENTS, CONCRETE SLABS AND CONCRETE SURFACEBEDS IS 350 MICROSTRAIN.

C9. THE PROPOSED METHOD OF CURING ALL CONCRETE ELEMENTS IS TO BE SUBMITTED TO THE ENGINEER FOR REVIEW (BUT NOT APPROVAL).

C10. THE POSITION AND METHOD OF FORMING ALL CONSTRUCTION JOINTS (OTHER THAN DESIGNATED CONSTRUCTION JOINTS SHOWN ON THE DRAWINGS) SHALL BE FORMALLY SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION. SHOULD THE AGREED CONSTRUCTION JOINT POSITIONS BE REVISED DURING CONSTRUCTION, THE ENGINEER SHOULD BE NOTIFIED WELL IN ADVANCE. ALLOW ALL CONSTRUCTION JOINTS TO BE SCABBLED AND THAT LATIENCE IS FULLY REMOVED AND THE AGGREGATE PROFILE IS EXPOSED, SUCH THAT IT PROTRUDES FROM THE SURFACE OF THE JOINT.

C11. THE TOLERANCES AND FINISHES OF ALL CONCRETE ELEMENTS SHALL BE AS TABULATED IN TABLE C4.

C12. ALL BRITTLE FINISHES, RIGID PARTITIONS, SHOPFRONTS, BRICKWORK, FAÇADE, PLASTER, TILING, SHOPFITTINGS, AND INSTALLATIONS SHALL BE DESIGNED AND DETAILED TO ACCOMMODATE THE SLAB/BEAM MOVMENTS LISTED IN C13, C14 AND C15.

C13. DESIGN DEFLECTIONS (VERTICAL MOVEMENT) FOR SLABS (TOTAL LONG-TERM DEFLECTION AT MID-SPAN):
• OFFICES = SPAN/300 OR 30mm, WHICHEVER IS LESS
• PARKING, RETAIL & PLANT SLABS = SPAN/250 OR 30mm, WHICHEVER IS LESS
• MAXIMUM DIFFERENTIAL DEFLECTION BETWEEN FLOORS = 20mm

NOTE: THE BUDGET FOR SCREED THICKNESSES NEEDS TO ACCOUNT FOR THE ABOVE DEFLECTIONS OVER AND ABOVE THE ALLOWABLE TOLERANCES. FACADES, BRICKWALLS, DRYWALLS, SHOPFRONTS, TILING & OTHER FINISHES NEED TO BE DESIGNED & INSTALLED TO ACCOMODATE THE ABOVE DEFLECTIONS WITHOUT DAMAGE TO THE FINISHES/WALLING OR TO THE STRUCTURE.

C14. THE MAXIMUM ANTICIPATED HORIZONTAL MOVEMENT OF SLABS / BEAMS ARE INDICATED BELOW:
• POST-TENSIONED (PT) SLABS = 0.5mm PER METER LENGTH OF SLAB
• REINFORCED CONCRETE (RC) SLABS = 0.35mm PER METER LENGTH OF SLAB
• UNBONDED SCREEDS = 0.3mm PER METER LENGTH OF SCREED CAST
• BONDED SCREEDS = ANTICIPATED MOVEMENT IS AS PER THE SLAB TYPE SUPPORTING THE SCREED. REFER TO PT OR RC SLAB/BEAM MOVEMENTS ABOVE.

C15. SLAB CRACKS OF UP TO 0.4mm CAN BE ANTICIPATED. NOTE THAT THE SLAB MAY BE UNCRACKED WHEN TILES ARE LAID.

C16. ALL ITEMS LISTED IN C12 MUST BE DESIGNED AND DETAILED TO ACCOMMODATE MOVEMENT AT EXPANSION JOINTS. THE STRUCTURAL ENGINEER SHOULD BE CONSULTED FOR THE ANTICIPATED MOVEMENT AT EXPANSION JOINTS.

C17. **CONCRETE STRENGHT MONITORED AS INDICATED BELOW:**

CONCRETE STRENGTHS SHALL BE MONITORED ON SITE BY MEANS OF CUBE TESTING BY AN INDEPENDENT APPROVED TESTING LABORATORY. CONCRETE CUBE SAMPLES NEED TO BE TAKEN AND TESTED 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. THE FREQUENCY OF SAMPLING CAN BE SUMMARISED AS FOLLOW:

1. AT LEAST ONE SAMPLE SHALL BE TAKEN FROM EACH DAYS PLACING AND FROM AT LEAST EVERY 50m^3 OF CONCRETE OF EACH GRADE PLACED
2. ONE SAMPLE SHALL BE SUFFICIENT FOR 3 CUBES FOR EACH TESTING AGE (i.e. 6 CUBES, 3 FOR THE 7 DAY TEST AND 3 FOR THE 28 DAY TEST).
3. ALL SAMPLES ARE TO BE NUMBERED AND REFERENCED TO THE RELEVANT PORTION OF THE STRUCTURE BEING CAST AND THE INFORMATION CLEARLY COMMUNICATED TO THE ENGINEER.

CONCRETE NOTES (CONTINUED):

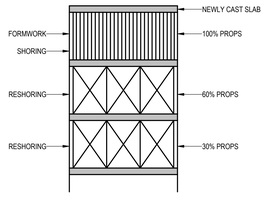
C18. ALL REINFORCEMENT MUST BE CHECKED BY THE ENGINEER BEFORE CONCRETE IS CAST. THE ENGINEER SHALL BE GIVEN AT LEAST 48 HOURS ADVANCE NOTICE OF AN INSPECTION. INSPECTION WILL ONLY BE DONE IF ALL STEEL IS PROPERLY FIXED, SPACER BLOCKS POSITIONED, SHUTTERING CLEANED OUT AND REINFORCEMENT CHECKED BY THE CONTRACTOR. NOTE THAT INSPECTIONS BY THE ENGINEERS AND ANY COMMENTS / ACCEPTANCE BY THE ENGINEER DOES NOT ABSOLVE THE CONTRACTOR OF HIS RESPONSIBILITY TO CONSTRUCT ACCORDING TO THE APPROVED DESIGN DOCUMENTATION.

C19. SLAB PANELS WITH UPSTAND BEAMS NEED TO REMAIN PROPPED UNTIL THE BEAMS HAVE REACHED THE REQUIRED STRENGTH, UNLESS OTHERWHISE AGREED WITH THE ENGINEER IN WRITING.

C20. UPSTAND OR DOWNSTAND BEAMS THROUGH COLUMNS NEED TO BE CAST AT THE SAME CONCRETE STRENGTH AS THE COLUMN FOR THE OVERLAPPING AREA, UNLESS OTHERWHISE AGREED WITH THE ENGINEER IN WRITING.

C21. SHRINKAGE / POUR STRIPS (IF APPLICABLE) IN SLABS SHALL NOT BE CAST WITHIN A MINIMUM 28 DAYS OF CASTING THE LAST SURROUNDING FLOOR SLAB. NOTE THAT THE BAY CONTAINING THE POUR STRIP IS TO REMAIN PROPPED UNTILL THE POUR STRIP CONCRETE HAS REACHED THE REQUIRED STRENGTH. ANY DEVIATIONS FROM THE ABOVE MUST BE APPROVED BY THE ENGINEER IN WRITING PRIOR TO CONSTRUCTION.

C22. STRUCTURAL FLOOR SLABS AND BEAMS MUST BE RE-SHORED FOR A MINIMUM OF 2 LEVELS BELOW THE PROPPED SLAB AS SHOWN BELOW, OR AS DICTATED THROUGH THE TEMPORARY WORKS DESIGN (SEE NOTE G5 AND L3 ELSEWHERE) WHICHEVER IS THE MORE ONEROUS.



C23. THE CONTRACTOR SHALL TAKE LEVELS OF THE FLOOR CONSTRUCTION (SUSPENDED SLABS) AS PART OF THE NORMAL QUALITY ASSURANCE PROCEDURE AT THE FOLLOWING POSITIONS AND TIME INTERVALS:

1. ON EVERY COLUMN LINE AT QUARTER AND MID-SPAN IN BOTH DIRECTIONS OF EVERY FLOOR PANEL.
2. ON THE CENTRELINES OF QUARTER AND MID-SPAN LINES IN BOTH DIRECTIONS OF EVERY FLOOR PANEL.
3. FIRST SET OF LEVELS TO BE MEASURED AFTER ALL FORMWORK IS IN ITS FINAL POSITION AND AFTER THE PLACING AND FIXING OF REINFORCEMENT BEFORE THE CASTING OF CONCRETE COMMENCES.
4. SECOND SET OF LEVELS TO BE MEASURED IMMEDIATELY AFTER THE COMPLETION OF POWER FLOATING OR OTHER FINISHING OF THE FRESH CONCRETE SURFACE.
5. THIRD SET OF LEVELS TO BE MEASURED AFTER FINAL REMOVAL OF ALL SUPPORT WORK BELOW EACH SLAB AS WELL AS ANY OTHER SUPPORTS FOR SLABS ABOVE ALL RECORDS OF LEVELS TO BE COUNTERSIGNED BY THE ENGINEER AFTER IT WAS MEASURED.

TABLE C1: CONCRETE PERFORMANCE SPECIFICATIONS

THE FOLLOWING MINIMUM CONCRETE STRENGTHS ARE TO BE USED UNLESS OTHERWISE SPECIFIED ON DRAWINGS

| ELEMENT | MINIMUM 28 DAY COMPRESSIVE STRENGTH | MINUMUM 28 - DAY MODULUS OF ELASTICITY