

STRUCTURAL STEEL NOTES:

- S1. GENERAL NOTES**
- S1.1 THIS SPECIFICATION IS NOT EXHAUSTIVE. REFER TO ADDITIONAL NOTES ON PROJECT SPECIFIC DRAWINGS. IF THERE ARE ANY DISCREPANCIES BETWEEN THESE NOTES AND THAT OF THE PROJECT SPECIFIC DRAWINGS, THE DRAWINGS SHALL GOVERN.
- S1.2 THE SOUTH AFRICAN NATIONAL STANDARD FOR CONSTRUCTION WORKS (PUBLISHED BY THE SOUTH AFRICAN BUREAU OF STANDARDS) SHALL APPLY THROUGHOUT IN RESPECT OF THIS CONTRACT. IN ADDITION TO THE ADDITIONS AND EXCEPTIONS SET OUT BELOW.
- S1.3 A COPY OF THE SAIS SPECIFICATION SHALL BE FURNISHED BY THE CONTRACTOR AND SHALL BE KEPT ON THE SITE.
- S1.4 WHEREVER REFERENCE IS MADE IN THE CONTRACT TO SANS STANDARDS AND/OR CODE REQUIREMENTS TO BE MET BY THE GOODS AND MATERIALS TO BE FURNISHED, WORK PERFORMED OR TESTED, THE PROVISIONS OF THE LATEST EDITION OR REVISION OF THE RELEVANT SANS STANDARDS AND CODES IN EFFECT SHALL APPLY, UNLESS OTHERWISE STATED IN THE CONTRACT. WHENEVER REFERENCE IS MADE TO SANS STANDARDS AND CODES, OTHER AUTHORITY TATIVE STANDARDS AND CODES THAT ENSURE AN EQUAL OR HIGHER QUALITY THAN THE RELEVANT SANS STANDARDS AND CODES, WILL BE ACCEPTED SUBJECT TO THE PROJECT ENGINEER'S PRIOR REVIEW AND WRITTEN CONSENT. DIFFERENCES BETWEEN THE STANDARDS SPECIFIED AND THE PROPOSED ALTERNATIVE STANDARDS SHALL BE FULLY DESCRIBED IN WRITING BY THE TENDERER/ CONTRACTOR AND SUBMITTED TO THE PROJECT ENGINEER AT LEAST TWENTY EIGHT DAYS PRIOR TO THE DATE WHEN THE CONTRACTOR/TENDERER DESIRES THE PROJECT ENGINEER'S CONSENT. IN THE EVENT THAT THE PROJECT ENGINEER DETERMINES THAT SUCH DEVIATIONS ARE NOT A HIGH ENOUGH OR BETTER STANDARD, THE TENDERER/CONTRACTOR SHALL COMPLY WITH THE SPECIFIED DOCUMENT.
- S2. MATERIAL STRENGTHS**
- S2.1 HOT ROLLED STEEL SECTIONS (UNIVERSAL BEAM, UNIVERSAL COLUMN, CHANNEL SECTION etc.) SHALL BE GRADE S355JR, WITH MINIMUM ULTIMATE TENSILE STRENGTH OF 470MPa AND MINIMUM YIELD STRESS OF 355MPa.
- S2.2 COLD FORMED LIPPED CHANNEL, ANGLES AND Z SECTIONS SHALL HAVE A MINIMUM YIELD STRESS OF 270MPa UNO ON THE DRAWINGS.
- S2.3 ALL NON-STRUCTURAL STEEL (VASTRAP PLATE, GRATING, DOWNPIPE) SHALL BE COMMERCIAL QUALITY WITH MINIMUM YIELD STRENGTH OF 200MPa AND MINIMUM ULTIMATE TENSILE STRENGTH OF 355MPa.
- S3. BOLTS**
- S3.1 ALL BOLTS SHALL BE GRADE 8.8 UNLESS SPECIFIED OTHERWISE.
- S3.2 IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE ALL BOLTS ARE TORQUED PRIOR TO LOADING ANY STEEL STRUCTURES. PROVIDE BOLTS OF SUFFICIENT LENGTH AT LEAST THREE FULL THREADS ARE EXPOSED BEYOND THE NUT AFTER THE NUT HAS BEEN TIGHTENED. A MINIMUM OF ONE WASHER SHALL BE USED UNDER THE NUT IN ALL SITUATIONS.
- S3.3 THE EDGE DISTANCE BETWEEN FACE OF CONCRETE AND CENTRE OF POST INSTALLED MECHANICAL OR CHEMICAL BOLTS SHALL NOT BE LESS THAN 100mm.
- S3.4 PROVIDE BOLTS OF SUFFICIENT LENGTH THAT AT LEAST THREE FULL THREADS ARE EXPOSED BEYOND THE NUT AFTER THE NUT HAS BEEN TIGHTENED. A MINIMUM OF ONE WASHER SHALL BE USED UNDER THE NUT IN ALL SITUATIONS.
- S3.5 NO POST INSTALLED MECHANICAL OR CHEMICAL ANCHORS SHALL BE SPACED LESS THAN 100mm APART, UNLESS OTHERWISE AGREED WITH THE ENGINEER.
- S3.6 THE EMBEDMENT DEPTH OF ALL POST-INSTALLED CHEMICAL BOLTS SHALL BE AGREED WITH THE ENGINEER PRIOR TO INSTALLATION. RECOMMENDED EMBEDMENT DEPTHS ARE 120mm FOR DIA16 BOLT, 140mm FOR DIA12 BOLT, 200mm FOR DIA16 BOLT AND 250mm FOR DIA20 BOLT.
- S3.7 ALL HOLES SHALL BE THOROUGHLY CLEANED WITH AN INDUSTRIAL TYPE VACUUM CLEANER PRIOR TO THE INSTALLATION OF EPOXY GROUTING.
- S3.8 RECOMMENDED MECHANICAL BOLTS (OR SIMILAR APPROVED):  
• HILTI HS13 EXPANSION ANCHOR (ELECTROPLATED) FOR INTERNAL USE  
• HILTI HUS4 EXPANSION ANCHORS (HDG) FOR EXTERNAL USE
- S3.9 RECOMMENDED CHEMICAL ANCHORS (OR SIMILAR APPROVED):  
• HILTI HIT-HY 200 AIR EPOXY WITH HILTI HIT-C 8.8 ANCHOR RODS (HDG FOR EXTERNAL AND ELECTROPLATED FOR INSIDE)
- S3.10 DRILLED HOLES FOR BOLTED CONNECTIONS SHALL BE 2mm LARGER THAN THE BOLT DIAMETER UNO. HOLES IN STRUCTURAL BASE PLATES SHALL BE 4mm LARGER THAN THE ANCHOR BOLT DIAMETER FOR M20 BOLTS AND SMALLER, AND 6mm LARGER FOR M24 BOLTS AND LARGER.
- S3.11 HEAVY DUTY WASHERS SHALL BE PROVIDED FOR SALL OVERSIZE AND SLOTTED HOLES.
- S3.12 FRICTION GRIP BOLTS AND NUTS SHALL BE PROPERTY CLASS 10.9 HR IN ACCORDANCE TO ISO 898 PART 1 AND ISO 14399 PART 3. FRICTION GRIP BOLTS SHALL BE TIGHTENED BY THE TURN OF THE NUT METHOD IN ACCORDANCE TO SANS 10094.
- S3.13 CONTACT SURFACE AT FRICTION GRIP BOLT CONNECTIONS TO BE BLAST-CLEANED TO GRADE SA 2.3 IN ACCORDANCE TO SIS 05 09 10 WITH A SURFACE ROUGHNESS OF 40 - 80 MICRONS AND SURFACES TO BE LEFT UNCOATED AND FREE FROM ALL CONTAMINANTS AND BURRS.
- S3.14 BOLTS WHICH HAVE BEEN FULLY TENSIONED SHALL NOT BE TENSIONED A SECOND TIME. ALL BOLTS WHICH HAVE BEEN TENSIONED AND WHICH HAVE THEN BEEN UNDONE SHALL NOT BE REUSED.
- S4. WELDING**
- S4.1 EXXXW WELDING ELECTRODES SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS OF AWS AS 1 OR SUCH OTHER STANDARD AS AGREED WITH THE ENGINEER IN WRITING.
- S4.2 THE QUALITY OF THE WELDING SHALL BE SUCH THAT IT PRODUCE WELD METAL THAT, WHEN TESTED IN ACCORDANCE WITH THE APPLICABLE METHOD GIVEN IN BS 5135, HAS A MINIMUM YIELD STRESS AND MINIMUM TENSILE STRENGTH AT LEAST EQUAL TO THOSE OF THE PARENT MATERIAL.
- S4.3 THE CONTRACTOR SHALL SUBMIT WELDING PROCEDURES BY AN APPROVED WELDING AUTHORITY FOR APPROVAL AND SHALL PRODUCE EVIDENCE ACCEPTABLE TO THE ENGINEER THAT WELDING PROCEDURES AND WELDERS HAVE BEEN TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF AWS D1.1. WELDING CERTIFICATES ARE ONLY VALID FOR A PERIOD OF 12 MONTHS. THESE DOCUMENTS MUST BE SUBMITTED IN WRITING TO THE ENGINEER AND APPROVED PRIOR TO THE START OF WELDING. THE CONTRACTOR SHALL SUBMIT FOR REVIEW AN OUTLINE OF THE QUALITY CONTROL MEASURES THAT WILL BE ENFORCED BY THE CONTRACTOR TO ENSURE THAT SPECIFIED WELDING PROCEDURES ARE EMPLOYED IN ALL WELDING UNDER THIS CONTRACT.
- S4.4 NO STAGGERED OR INTERMITTENT WELDING IS PERMITTED, UNLESS SPECIFICALLY SPECIFIED BY THE ENGINEER.
- S4.5 NO WELDING ON SITE IS PERMITTED UNLESS APPROVED BY THE ENGINEER. ANY SITE WELDER AND SITE WELDING PROCEDURE WILL HAVE TO BE RE-QUALIFIED FOR SITE WELDING.
- S4.6 WELDING SHALL BE MINIMUM 6mm THICK CONTINUOUS FILLET WELDS ALL ROUND, BOTH SIDES UNLESS SPECIFIED ELSEWHERE.
- S4.7 ROOT GAPS FOR ALL BUTT WELDS ARE 3mm UNO.

STRUCTURAL STEEL NOTES (CONTINUED):

- S4.9 ALL WELDERS SHALL BE CODED WELDERS. QUALIFICATIONS OF WELDERS SHALL BE SUBMITTED TO THE ENGINEER FOR RECORD PURPOSES. WELDING CERTIFICATES ARE ONLY VALID FOR A PERIOD OF 12 MONTHS.
- S4.10 ALL WELDING AND SURFACE PREPARATION SHALL BE DISCUSSED, INSPECTED APPROVED BY THE ENGINEER IN CONJUNCTION WITH THE SANS, OR OTHER APPROVED INSPECTION AGENCY.
- S4.11 SHOP SPlicing OF MEMBERS WILL NOT BE PERMITTED WITHOUT PRIOR WRITTEN APPROVAL OF THE DESIGN ENGINEER. APPROVED SPICES SHALL HAVE A CAPACITY OF 100% OF THE SPICED MEMBER AND ACCEPTANCE SHALL BE SUBJECT TO THE RESULT OF NON-DESTRUCTIVE TEST. COST OF SPlicing AND TESTING SHALL BE BORNE BY THE FABRICATOR.
- S4.12 ALL OPEN ENDS OF HOLLOW SECTIONS SHALL BE SEALED WITH A 3mm THICK PLATE UNO.
- S4.13 BURRS AND ROUGH EDGES SHALL BE GRINDED PRIOR TO PAINTING AND WELDING OF END PLATES, CLEARS, AND BRACKETS.
- S5. TESTING OF WELDING**
- S5.1 PERFORMING NON-DESTRUCTIVE TESTING OTHER THAN VISUAL SHALL BE QUALIFIED IN ACCORDANCE WITH THE STIPULATIONS OF THE CODE.
- S5.2 FULL PENETRATION BUTT WELDS ARE TO BE RADIO GRAPHICALLY TESTED: A MINIMUM OF 50% OF FULL PENETRATION WELDS SHALL BE TESTED. IF MORE THAN 5% OF THE EXAMINED WELDS SHOW UNSATISFACTORY RESULTS, THEN ADDITIONAL EXAMINATIONS COVERING ALL WELDS SHALL BE PERFORMED.
- S5.3 MAGNETIC PARTICLE INSPECTION (MPI) SHALL BE PERFORMED ON 10% OF ALL ELEMENTS, THUS 10% OF COLUMNS, 10% OF TRUSSES, 10% OF GIRDEES, 10% OF BRACING ELEMENTS ETC.
- S5.4 VISUAL INSPECTIONS SHALL BE PERFORMED ON ALL WELDS.
- S5.5 LIQUID (DYE) PENETRANT TESTING SHALL BE PERFORM ON 10% OF ALL ELEMENTS, THUS 10% OF COLUMNS, 10% OF TRUSSES, 10% OF GIRDEES, 10% OF BRACING ELEMENTS ETC. DIFFERENT ELEMENTS SHALL BE TESTED FOR MPI TESTS.
- S6. FABRICATION OF STEELWORK**
- S6.1 ALL STEELWORK SHALL BE FABRICATED TO DEGREE OF ACCURACY II. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL DIMENSIONS AND SETTING OUT OF REINFORCED CONCRETE ELEMENTS ON SITE PRIOR TO FABRICATION OF ANY STEELWORK.
- S6.2 THE EDGES OF FLAME-CUT PLATES SHALL BE GROUND SMOOTH.
- S6.3 THE CONTRACTOR IS TO CHECK ALL DIMENSIONS ON SITE PRIOR TO FABRICATION OF STRUCTURAL STEEL COMMENCES. ANY DISCREPANCIES MUST BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY.
- S6.4 MEMBERS DISTORTED DURING FABRICATION AND/OR GALVANISING PROCESS SHALL BE STRAIGHTENED USING AN APPROVED METHOD.
- S7. ERECTION OF STEELWORK**
- S7.1 THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL SUBMIT AN ERECTION METHOD STATEMENT TO THE ENGINEER FOR REVIEW (NOT APPROVAL) PRIOR TO THE INSTALLATION OF ANY STEELWORK. THE METHOD STATEMENT SHALL EXPLAIN THE SEQUENCE OF CONSTRUCTION IN DETAIL.
- S7.2 ALL GROUTING BELOW BASE PLATES SHALL BE INSTALLED BY THE BUILDING CONTRACTOR. SIKAGROUT 212 OR SIMILAR APPROVED SHALL BE USED.
- S7.3 ALL HORIZONTAL CROSS BRACING ANGLES SHALL BE CONNECTED TO ALL INTERSECTING PURLINS, UNLESS SPECIFICALLY AGREED OTHERWISE WITH THE ENGINEER.
- S7.4 NON-METALLIC, NON-SHRINK GROUT TO BE APPROVED BY ENGINEER PRIOR TO USE. MINIMUM COMPRESSIVE STRENGTH AT 28-DAY IS 40 MPa. FOR STEEL SUPPORTING ELEMENTS SUBJECTED TO DYNAMIC LOADING (FOR e.g. CRAWL BEAMS), DYNAMIC-RESISTANT NON-SHRINK GROUT SHALL BE USED.
- S7.5 GROUTING UNDER STEEL BASE PLATES TO BE COMPLETED AT LEAST 7 DAYS PRIOR TO ERECTION OF ROOF, CLADDING AND BRIDGE.
- S7.6 BEARERS OR PUNCHES MUST BE USED UNDER POINTS OF CONSTRAINT (ROPE AND CHAIN FIXINGS) TO PREVENT BENDING OF STEEL WORK DURING TRANSPORT.
- S8. ROOF SHEETING, SIDE CLADDING AND INSULATION**
- S8.1 THE ROOF SHEETING, SIDE CLADDING AND INSULATION SHALL BE SPECIFIED BY THE ARCHITECT.
- S8.2 IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE NO STRAINING WIRES ARE OVER STRESSED (WHERE SPECIFIED BY THE ARCHITECT). THIS IS TO AVOID THE ROTATIONS OF PURLINS.
- S8.3 ROOF SHEETS AND SIDE CLADDING SHEETS SHALL BE FIXED TO BOTH PURLINS / RAILS, WHERE BACK-TO-BACK ELEMENTS ARE SPECIFIED.
- S8.4 IT IS THE CLADDING CONTRACTOR'S RESPONSIBILITY TO SIGN OFF THE ALIGNMENT OF ALL STRUCTURAL STEEL ELEMENTS IN TERMS OF ALIGNMENT, LEVELNESS AND SPACING PRIOR TO INSTALLING THE SHEETING / CLADDING.
- S8.5 ALL GROUTING SHALL BE INSTALLED PRIOR TO THE INSTALLATION OF ANY SHEETING / CLADDING.
- S8.6 ONLY CLAMPS APPROVED BY THE SHEETING MANUFACTURER AND SHEETING CONTRACTOR SHALL BE USED TO FIX PV SOLAR PANELS TO THE ROOF.
- S9. PREPARATION OF WORKSHOP DRAWINGS**
- S9.1 THE CONTRACTOR SHALL SUBMIT WORKSHOP DRAWINGS TO THE ENGINEER WITHIN THREE WEEKS OF HAVING RECEIVED THE CONSTRUCTION DOCUMENTATION. DO NOT COMMENCE FABRICATION UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED.
- S9.2 ALL WORKSHOP DRAWINGS SHALL BE SUBMITTED IN JFC AND PDF FORMATS.
- S9.3 ALL WORKSHOP MODELS SHALL BE DONE IN TEKLA OR SIMILAR APPROVED SOFTWARE.
- S9.4 IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO WORKSHOP ALL CONNECTION DETAILS WITH THE ENGINEER PRIOR TO EXPORTING FINAL WORKSHOP DETAILS TO THE CONTRACTOR'S DRAFTING OFFICE. THIS WILL MITIGATE THE RISK OF DOING ABORTIVE WORKSHOP DRAWINGS.
- S9.5 THE ENGINEER SHALL CHECK FOR CONFORMITY WITH DESIGN REQUIREMENTS AND WILL RETURN THE DRAWINGS AND/OR COMMENTS ON JFC MODEL WITH ADDITIONS AND CORRECTIONS, IF ANY, WITHIN TEN DAYS OF HAVING RECEIVED THE FINAL WORKSHOP DRAWINGS / MODEL.

STRUCTURAL STEEL NOTES (CONTINUED):

- S9.6 DETAILED CHECKING OF WORKSHOP DRAWINGS FOR DIMENSIONAL ACCURACY AND INSTALLATION FIT WILL NOT BE DONE BY THE ENGINEER.
- S9.7 ALL SETTING OUT DIMENSIONS ARE TO CENTRELINES OF ELEMENTS UNLESS SHOWN OTHERWISE. NO DIMENSIONS MAY BE SCALED.
- S9.8 HANDRAILS SHALL NOT BE SPECIFIED ON THE ENGINEER'S DRAWINGS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN THE REQUIRED INFORMATION FROM THE ARCHITECT TO MAKE ALLOWANCE FOR HOLES IN ELEMENTS TO ACCOMMODATE HANDRAILS.
- S9.9 DESIGN PHILOSOPHY - HORIZONTAL AND VERTICAL CROSS BRACING BAYS  
• ANGLES SHALL BE CONNECTED TO ALL INTERSECTING PURLINS AND SHEETING RAILS, REFER TO TYPICAL CONNECTION DETAIL.  
• NO ECCENTRICITIES SHALL BE ALLOWED BETWEEN TENSION AND COMPRESSION ELEMENTS, REFER TO TYPICAL CONNECTION DETAILS.
- S9.10 DESIGN PHILOSOPHY - ROOF TRUSSES AND GROSS TRUSSES  
• NO ECCENTRICITIES SHALL BE ALLOWED BETWEEN ANY CONNECTING ELEMENTS.  
• REFER TO DETAILED DRAWINGS WHERE PRE-CAMBERS ARE SPECIFIED.  
• ALL ELEMENTS SHALL BE WELDED ALL ROUND AND ON BOTH SIDES.
- S9.11 SETTING OUT OF ALL ERECTION BOLTS SHALL COMPLY TO THE BELOW:
- RECOMMENDED GAUGES FOR I-AND H-SECTIONS**
- | b (mm)    | g <sub>1</sub> (mm) | g <sub>2</sub> (mm) | d <sub>max</sub> (mm) |
|-----------|---------------------|---------------------|-----------------------|
| 75        | 40                  | 12                  | 38                    |
| 89        | 50                  | 12                  | 50                    |
| 100, 102  | 54                  | 16                  | 54, 55                |
| 120 - 146 | 70                  | 20                  | 60                    |
| 152 - 160 | 80                  | 20                  | 64, 65                |
| 165 - 191 | 90                  | 24                  | 70                    |
| 203 - 254 | 140*                | 24                  | 75 - 76               |
| 305       | 140*                | 24                  | 90                    |
|           |                     |                     | 95 - 110              |
- RECOMMENDED BACKMARKS FOR CHANNELS**
- | b (mm)    | g <sub>1</sub> (mm) | d <sub>max</sub> (mm) |
|-----------|---------------------|-----------------------|
| 75        | 40                  | 38                    |
| 89        | 50                  | 50                    |
| 100, 102  | 54                  | 54, 55                |
| 120 - 146 | 70                  | 60                    |
| 152 - 160 | 80                  | 64, 65                |
| 165 - 191 | 90                  | 70                    |
| 203 - 254 | 140*                | 75 - 76               |
| 305       | 140*                | 90                    |
|           |                     | 95 - 110              |
- NOTES: 1. \* ALTERNATIVELY 120.  
2. d<sub>max</sub> = MAXIMUM DIAMETER OF BOLT OR RIVET THAT CAN BE ACCOMMODATED
- RECOMMENDED BACKMARKS FOR ANGLES**
- | h or b (mm) | g <sub>1</sub> (mm) | d <sub>max</sub> (mm) | h or b (mm) | g <sub>1</sub> (mm) | g <sub>2</sub> (mm) | g <sub>3</sub> (mm) | d <sub>max</sub> (mm) |
|-------------|---------------------|-----------------------|-------------|---------------------|---------------------|---------------------|-----------------------|
| 75          | 40                  | 12                    | 90          | 50                  |                     |                     | 24                    |
| 89          | 50                  | 12                    | 100         | 50                  |                     |                     | 24                    |
| 100, 102    | 54                  | 16                    | 120         | 60                  |                     |                     | 24                    |
| 120 - 146   | 70                  | 20                    | 120         | 60                  |                     |                     | 16                    |
| 152 - 160   | 80                  | 20                    | 125         | 65                  | 50                  | 45                  | 24                    |
| 165 - 191   | 90                  | 24                    | 125         | 65                  | 50                  | 45                  | 20                    |
| 203 - 254   | 140*                | 24                    | 150         | 75                  | 50                  | 45                  | 24                    |
| 305         | 140*                | 24                    | 160         | 75                  | 55                  | 55                  | 20                    |
|             |                     |                       | 200         | 75                  | 75                  | 75                  | 24                    |
|             |                     |                       | 200         | 55                  | 55                  | 55                  | 20                    |
|             |                     |                       | 200         | 55                  | 55                  | 55                  | 20                    |
- NOTE: 1. d<sub>max</sub> = MAXIMUM DIAMETER OF BOLT OR RIVET THAT CAN BE ACCOMMODATED

MINIMUM AND RECOMMENDED EDGE DISTANCES AND SPACING FOR FASTENER HOLES

| FASTENER DIA (mm) | MINIMUM EDGE DISTANCE (mm) |                                  | RECOMMENDED END DISTANCE (mm) | RECOMMENDED PITCH (mm) |
|-------------------|----------------------------|----------------------------------|-------------------------------|------------------------|
|                   | AT SHEARED EDGES           | AT ROLLED, SAWN OR GAS-CUT EDGES |                               |                        |
| 12                | 21                         | 16                               | 30                            | 50                     |
| 16                | 28                         | 22                               | 40                            | 70                     |
| 20                | 34                         | 26                               | 40                            | 70                     |
| 24                | 42                         | 30                               | 50                            | 100                    |
| 30                | 52                         | 38                               | 60                            | 100                    |
| 36                | 64                         | 46                               | 70                            | 120                    |
| >36               | 1.75 x diameter            | 1.25 x diameter                  |                               |                        |

MINIMUM SPACING OF BOLTS: 2.7 TIMES THE BOLT DIAMETER

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

MAXIMUM END DISTANCE: 1.5 TIMES THE BOLT DIAMETER BUT NOT LESS THAN THE EDGE DISTANCE VALUES ABOVE IF THERE ARE MORE THAN TWO BOLTS IN A ROW PARALLEL TO THE DIRECTION OF LOAD

- S9.12 ALL PURLINS AND CLADDING GIRT RAILS ARE TO BE FABRICATED IN SECTIONS CONTINUOUS OVER AT LEAST 2 SPANS UNO.
- S9.13 THE STRUCTURAL DRAWINGS SHOW TYPICAL CONNECTION DETAILS ONLY. THE SHOP DRAFTER IS REQUIRED TO DEVELOP ALL CONNECTION DETAILS NOT SPECIFICALLY SHOWN. THE CONTRACTOR IS REQUIRED TO PRIOR FOR ALL ASSOCIATED ENGINEERING DESIGN AND DETAILING FOR CONNECTIONS NOT SPECIFICALLY SHOWN. ALL CONNECTIONS ARE TO DEVELOP THE FULL TENSILE CAPACITY OF MEMBERS. MINIMUM BOLT EDGE DISTANCES, END DISTANCES, BOLT SPACING AND PITCH TO BE TABULATED OR GIVEN ON DRAWINGS.

STRUCTURAL STEEL NOTES (CONTINUED):

- S10. MILD STEEL GUTTERS & RAINWATER DOWNPIPES**
- S10.1 SHEET METAL GUTTERS AND SHEET METAL RAINWATER DOWNPIPES SHALL FORM PART OF THE CLADDING CONTRACTOR'S SCOPE OF WORKS UNLESS SPECIFICALLY SPECIFIED OTHERWISE.
- S10.2 ALL MILD STEEL GUTTERS AND RAINWATER DOWNPIPES SHALL BE HOT DIPPED GALVANIZED UNLESS SPECIFIED OTHERWISE.
- S10.3 THE INSIDE OF ALL STEEL GUTTERS SHALL BE PAINTED WITH ABE RAVENOL OR SIMILAR APPROVED.
- S10.4 ALL MILD STEEL RAINWATER DOWNPIPES SHALL BE ROLLED AND SEAM WELDED. STANDARD OFF THE SHELF CIRCULAR HOLLOW SECTIONS CAN BE USED WHERE PREFERRED BY THE CONTRACTOR AND AGREED WITH THE ENGINEER, BUT ANY ADDITIONAL COSTS SHALL BE FOR THE CONTRACTOR'S ACCOUNT.
- S10.5 IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO TEST ALL GUTTERS AND RAINWATER DOWNPIPES FOR ANY LEAKS PRIOR TO HANDING OVER THE STEELWORK FOR COMPLETION.
- S11. CORROSION PROTECTION**
- S11.1 IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO READ THE ARCHITECT'S DRAWINGS IN CONJUNCTION WITH THE ENGINEER'S DRAWINGS WITH REGARDS TO PAINT SPECIFICATIONS. ANY DISCREPANCIES TO BE BROUGHT TO THE ENGINEER'S ATTENTION PRIOR TO FINALIZING THE PAINT SPECIFICATIONS.
- S11.2 PAINT SPECIFICATION SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
- S11.3 DRY FILM THICKNESS READINGS SHALL BE RECORDED WITHIN THE FIRST 7 DAYS AFTER APPLICATION OF PAINTING. ALL READINGS SHALL BE RECORDED AND SUBMITTED TO ZUTARI FOR RECORD KEEPING PURPOSES.
- S11.4 ALL STEELWORK BELOW FINISHED FLOOR LEVEL SHALL BE PAINTED WITH 2 COATS EPOXY TAR.
- S11.5 SURFACE PREPARATIONS  
• ABRASIVE BLAST CLEANING SHALL COMPLY TO SA 2.1 ACCORDING TO ISO 8501-1.  
• DEGREASED AND WIRE BRUSHING SHALL COMPLY TO ST 2 ACCORDING TO ISO 8501-1:11.6
- S11.6 CORROSION PROTECTION / PAINTING OF ALL STEEL ELEMENTS TO BE AS INDICATED ON TABLE BELOW, UNLESS OTHERWISE SPECIFIED ON DRAWINGS

| STRUCTURAL STEEL PROTECTIVE TREATMENT AND PAINTING                                                                                                                                                                                                                                                                                                                                                                                           |                           |                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| ELEMENTS                                                                                                                                                                                                                                                                                                                                                                                                                                     |                           | TREATMENT                                                                                                                                   |
| INTERNAL PURLINS, SIDE RAILS AND OTHER COLD FORMED SECTIONS (NOT EXPOSED TO WEATHER)                                                                                                                                                                                                                                                                                                                                                         |                           | Z275 PRE-GALVANIZED IN ACCORDANCE WITH SANS 4998 / ISO 4998 AS SUPPLIED                                                                     |
| EXTERNAL PURLINS, SIDE RAILS AND OTHER COLD FORMED SECTIONS (EXPOSED TO WEATHER)                                                                                                                                                                                                                                                                                                                                                             |                           | Z275 PRE-GALVANIZED IN ACCORDANCE WITH SANS 4998 / ISO 4998 AS SUPPLIED, PRIMED AND PAINTED <sup>1</sup> OR HOT-DIP GALVANIZED <sup>2</sup> |
| INTERNAL STEEL ELEMENTS <sup>1</sup> (NOT EXPOSED TO WEATHER)                                                                                                                                                                                                                                                                                                                                                                                |                           | PRIMED AND PAINTED <sup>1</sup>                                                                                                             |
| EXTERNAL STEEL ELEMENTS <sup>1</sup> (EXPOSED TO WEATHER)                                                                                                                                                                                                                                                                                                                                                                                    |                           | HOT-DIP GALVANIZED IN ACCORDANCE WITH SANS 121 / ISO 1461. SURFACE PREPARED, PRIMED AND PAINTED <sup>3</sup>                                |
| ALL STEEL BOLTS, NUTS AND WASHERS <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                               |                           | HOT-DIP GALVANIZED IN ACCORDANCE WITH SANS 121 / ISO 1461. NUTS OVERSIZE TAPPED AFTER GALVANIZING                                           |
| PROPRIETARY STEEL BOLTS, ANCHORS, FIXINGS, NUTS AND WASHERS (E.G. FISCHER, HILTY, ETC.)                                                                                                                                                                                                                                                                                                                                                      |                           | AS SPECIFIED ON RELEVANT DRAWING                                                                                                            |
| <sup>1</sup> INCLUSIVE OF ALL COLUMNS, BEAMS, TRUSSES, GIRDEES, BRACING, CONNECTION PLATES <sup>2</sup> APPLICABLE TO ALL BOLTS, THREADED ITEMS, WASHERS, NUTS AND SPACERS<br><sup>2</sup> INTUMESCENT PAINT MAY BE REQUIRED AS SPECIFIED ON RELEVANT STRUCTURAL STEEL DRAWINGS. THE CONTRACTOR SHALL SELECT SUITABLE COATING SYSTEMS IN ACCORDANCE WITH SANS 12944 / ISO 12944 COMPATIBLE WITH THE ABOVE TREATMENTS AND FOLLOWING CRITERIA: |                           |                                                                                                                                             |
| EXPOSURE CONDITION                                                                                                                                                                                                                                                                                                                                                                                                                           | DESIRED DURABILITY RANGE  | CORROSION CATEGORY                                                                                                                          |
| NOT EXPOSED TO WEATHER                                                                                                                                                                                                                                                                                                                                                                                                                       | Medium (M = 5 - 15 years) | C2 (Low)                                                                                                                                    |
| EXPOSED TO WEATHER                                                                                                                                                                                                                                                                                                                                                                                                                           | High (H = >15 years)      | C4 (High)                                                                                                                                   |

NOTE:

1. THE COATING SYSTEM INTENDED FOR USE SHALL BE SUBMITTED TO THE ENGINEER AND ARCHITECT FOR REVIEW PRIOR TO USE.

2. THE INDIVIDUAL COATING SYSTEM USED SHALL BE FROM ONE MANUFACTURER ONLY.

3. THE COATING SYSTEM SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS, INCLUDING ALL NECESSARY SURFACE PREPARATION SPECIFICATIONS AND DRYING TIME REQUIREMENTS.

4. APPLICATION MAY BE BY BRUSH, ROLLER OR SPRAYED.

5. ALL PAINT COLOURS AND FINISHES ARE TO THE ARCHITECT'S SPECIFICATIONS.

- S11.7 AFTER ASSEMBLY, AREAS OF STEEL WORK WHICH HAVE BEEN LEFT UNPAINTED, BECOME DAMAGED, OR ABRASION DURING TRANSPORT OR ERECTION SHALL BE WIRE BRUSHED, CLEANED AND BRUSH-PAINTED AS PER THE REQUIREMENTS OF S11.
- S11.8 ALL PROPRIETARY NAME PRODUCTS SHALL BE IMPLEMENTED TO THE MANUFACTURER'S SPECIFICATIONS.

STRUCTURAL STEEL NOTES (CONTINUED):

- S12. HANGING OF SERVICES FROM ROOF**
- S12.1 FIRE SPRINKLER PIPES  
• P-CLAMPS SHALL NOT BE USED WHERE Z-SECTION PURLINS ARE SPECIFIED.  
• ONLY 200A PIPES AND 300A PIPES SHALL BE FIXED TO PURLINS USING APPROVED P-CLAMPS. 200A PIPES SHALL BE FIXED TO EVERY SECOND CONNECTING PURLIN. 300A PIPES SHALL BE FIXED TO ALL INTERSECTING PURLINS.  
• NO PIPES LARGER THAN 200A SHALL BE FIXED USING P-CLAMPS.  
• DETAILS FOR HANGING LARGER PIPES FROM ROOF SPECIFIED ELSEWHERE.
- S12.2 RULES FOR FIXING OF SERVICES TO ROOF STRUCTURE (LOADS FROM TRUSSES AND GIRDEES):  
• MAIN PIPES (LARGER THAN 65mm DIAMETER) AND HEAVY ITEMS TO BE SUSPENDED FROM TRUSSES AND GIRDEES ONLY AND NOT FURTHER THAN 100mm FROM NODE POINTS (APPROVED FLANGED CLAMPS MAY BE USED).  
• MAXIMUM TOTAL ALLOWABLE LOAD FROM MIDSPAN OF TRUSS IS 200kg POINT LOAD (POSITION OF HEAVY POINT LOADS TO BE CLEARED WITH THE ENGINEER).
- S12.3 RULES FOR FIXING OF SERVICES TO ROOF STRUCTURE (LOADS FROM PURLINS):  
• SMALLER PIPES (UP TO 50mm DIAMETER) AND APPROVED LIGHT WEIGHT ITEMS CAN BE HUNG FROM THE PURLINS, BUT PURLIN CLAMPS WILL ONLY BE ALLOWED FOR A MAXIMUM LOAD OF 8kg (THUS THE EQUAL OF A MAXIMUM 32mm DIAMETER PIPE SPANNING 2m BETWEEN THE PURLINS). LARGER PIPES (40 - 50mm DIAMETERS) TO BE SUSPENDED FROM THE VERTICAL WEB (BACK) OF THE PURLIN.  
• MAXIMUM TOTAL ALLOWABLE LOAD FOR SERVICES AT MIDSPAN OF THE PURLIN TO BE 30kg OR ALTERNATIVELY 2 TIMES 30kg AT 1/3 SPANS.  
• NOTE: SERVICE PROVIDERS TO CORRELATE THEIR DRAWINGS TO ENSURE THAT THE MAXIMUM LOAD IS NOT EXCEEDED.
- S12.4 RULES FOR FIXING OF SERVICES TO ROOF STRUCTURE (GENERAL):  
• BEFORE THE CLADDING COMMENCES, IT MUST BE INSPECTED BY THE CLADDING CONTRACTOR TO SATISFY HIMSELF ON THE ALIGNMENT OF THE ROOF STRUCTURE AND THE STRUCTURAL STEEL CONTRACTOR MUST VERIFY THAT THE STRUCTURE HAS BEEN COMPLETED IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS.  
• HANGING OF SERVICES FROM THE PURLINS WILL NOT BE ALLOWED BEFORE THE CLADDING IS COMPLETED.  
• THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE UNTIL ALL ELEMENTS HAVE BEEN ERECTED AND FIXED IN POSITION.  
• NO SERVICES MAY BE FIXED TO KNEE BRACES, SAG ANGLES, BRACING ANGLES, BRACING STRUTS OR DIAGONAL MEMBERS.
- S13. SHEAR STUDS**
- S13.1 SHEAR STUDS USED IN COMPOSITE CONSTRUCTION SHALL BE THE HEADED TYPE WITH A MINIMUM YIELD STRENGTH OF 345 MPa, AND A MINIMUM ULTIMATE TENSILE STRENGTH OF 415 MPa. THE ELONGATION (ON A GAUGE LENGTH OF 5.65 x A, WHERE A IS THE AREA OF THE TEST SPECIMEN IN SQUARE MILLIMETRES) IN A TENSILE TEST SHALL BE AT LEAST 20%.
- S13.2 ALL SHEAR STUDS SHALL BE 16 mm DIAMETER UNO.
- S13.3 FUSION WELDING OF SHEAR STUDS AND THE ACCEPTANCE CRITERIA SHALL BE IN ACCORDANCE WITH ANSII/AWS D1.1D1.1M.
- S13.4 DEFECTIVE WELDS SHALL BE REPLACED OR REPAIRED IN ACCORDANCE WITH ANSII/AWS D1.1D1.1M. REPAIRED OR REPLACED WELDS SHALL BE RE-TESTED.
- S13.5 OVERSPRAY OF STEELWORK PROTECTIVE COATING TO SHEAR STUDS IS PERMITTED.

RECORD DRAWING

DISCLAIMER

IF CONSTRUCTION DRAWINGS ARE ISSUED UNDESIGNED, THE MASTER WITH THE ORIGINAL SIGNATURE OF APPROVAL WILL BE HELD AT THE ZUTARI OFFICE OF THE APPROVER

| REVISIONS |            |                         |            |
|-----------|------------|-------------------------|------------|
| NO.       | DATE       | DESCRIPTION             | APPROVED   |
| REV 1     | 2024-09-12 | RECORD DRAWING          | W. JACKSON |
| REV 2     | 2024-09-20 | ISSUED FOR CONSTRUCTION | W. JACKSON |
| REV 3     | 2024-09-23 | ISSUED FOR INFORMATION  | W. JACKSON |

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Engineer: W. JACKSON REG No: 20180351  
Signature: Date:

Client: Government Printing Works  
Signature: Date:



Client: Government Printing Works  
Signature: Date:



PROJECT: CONSTRUCTION OF NEW CARPORTS, GUARDHOUSE AND BOUNDARY WALL FOR GOVERNMENT PRINTING WORKS ADMINISTRATIVE HEADQUARTERS

PROJECT:

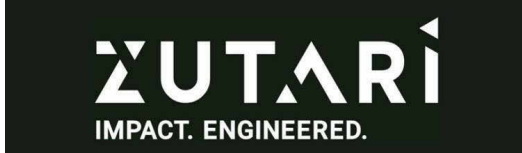
DRAWING TITLE: STRUCTURAL SERVICES GENERAL NOTES - SHEET 2

Building Classification: G1, Office  
Paper Size: A0  
Scale: AS INDICATED  
Drawn: J.P. DELPORT  
Checked: W. JACKSON  
Date: 2024-09-12

PROJECT No: CPWHG/2017/02  
Drawing No: 1002070-ZUT-DWG-1X-GF-ST-0151

REVISION: RD1

RECORD DRAWINGS



For Zutari:

For Client:

Date: 12-09-2025

Date:

As there was no full-time construction monitoring on this project, this drawing has been prepared in reliance upon information provided by the Contractor and the observations and records of the Engineer's Representative on site. The signing by Zutari of this record drawing does not guarantee or certify the accuracy and correctness of the information and detail on this drawing