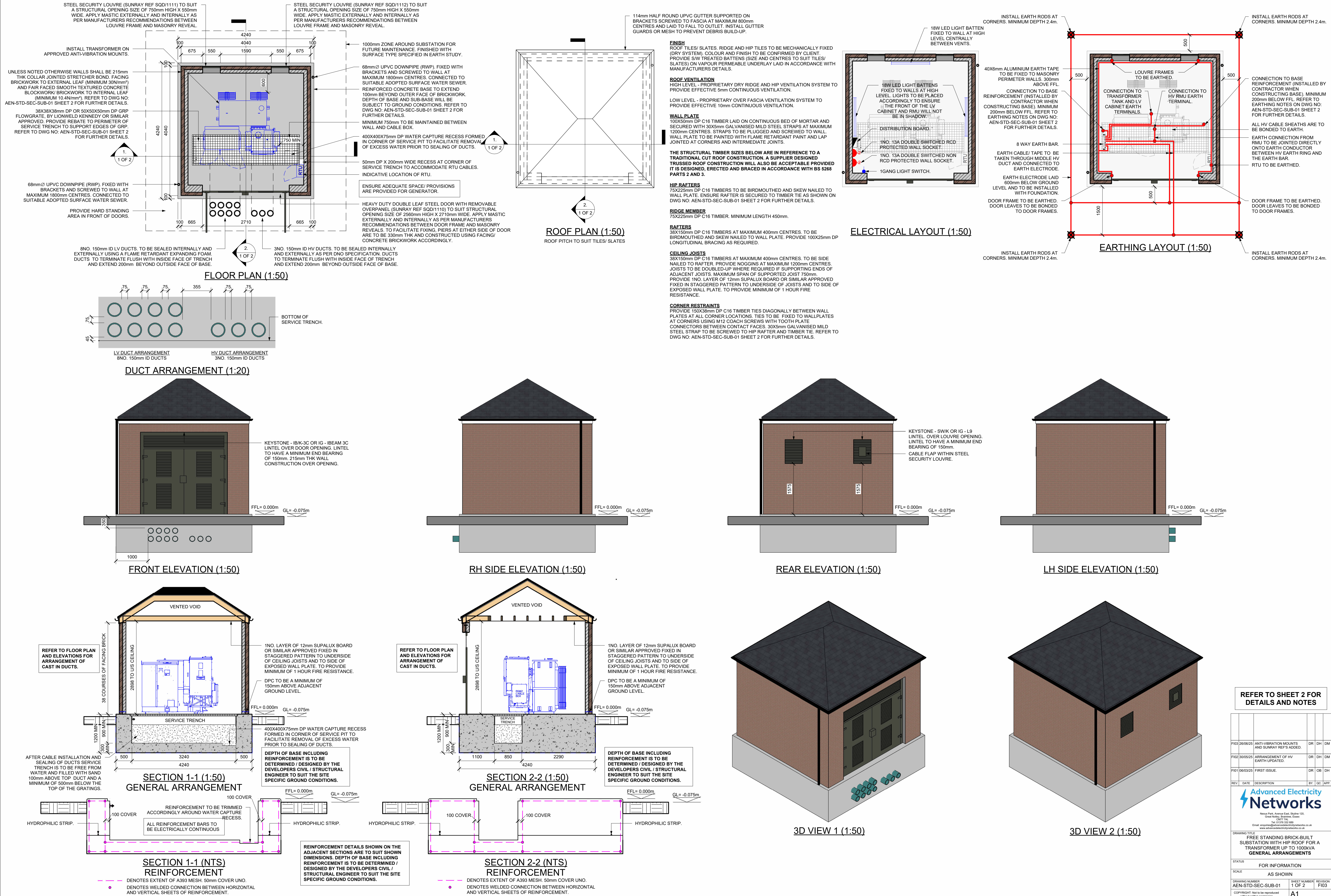




GENERAL

- DRAWINGS ARE FOR GUIDANCE PURPOSES ONLY. ADVANCED ELECTRICITY NETWORKS CANNOT BE HELD RESPONSIBLE FOR ANY LOSS, DAMAGE, EXPENSE, COSTS OR LIABILITY WHATSOEVER INCURRED.
- DO NOT SCALE FROM DRAWINGS, TAKE FIGURED DIMENSIONS ONLY.
- ALL MEASUREMENTS ARE IN MILLIMETERS.
- NO VARIATION TO THE STATED DIMENSIONS OR MATERIALS SPECIFIED WILL BE PERMITTED WITHOUT WRITTEN CONSENT FROM ADVANCED ELECTRICITY NETWORKS.
- THE FOLLOWING ABBREVIATIONS ARE USED THROUGHOUT THE STRUCTURAL DRAWINGS.

GL - FINISHED GROUND LEVEL
FFL - FINISHED FLOOR LEVEL
UNO - UNLESS NOTED OTHER WISE

- ALL WORK AND MATERIALS ARE TO COMPLY WITH THE RELEVANT BRITISH STANDARDS, EUROCODES CODES AND THE BUILDING REGULATIONS.

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERING DRAWINGS IN THIS SERIES AND ALL RELEVANT ARCHITECTS, ENGINEER'S AND SPECIALISTS' DRAWINGS.

- IT IS THE CONTRACTORS RESPONSIBILITY TO IDENTIFY ANY RISKS/HAZARDS AND TAKE MITIGATING ACTIONS WHERE NEEDED TO ENSURE THAT ALL PROPOSED WORKS CAN BE COMPLETED SAFELY. THIS INCLUDES THE DESIGN OF TEMPORARY WORKS.

- THE RUNNING OF SPRINKLER SYSTEM, HEATING, GAS, TELECOMS, WATER AND OTHER SERVICES THROUGH OR UNDER THE SUBSTATION AREA IS NOT PERMITTED.

- LOCATION OF THE SITE SHALL BE OVERLAID ON THE ORDNANCE SURVEY MAP AND ADDED ONTO THE PROJECT SPECIFIC DRAWING.

PLANNING, LOCATION AND POSITION

- POSITION AND ORIENTATION OF THE SUBSTATION SHALL BE AGREED WITH ADVANCED ELECTRICITY NETWORKS PRIOR TO THE COMMENCEMENT OF ANY BUILDING WORKS ONSITE.
- SUBSTATIONS SHALL BE LOCATED ADJACENT TO A PUBLIC HIGHWAY OR REACHED BY A PRIVATE DEDICATED ACCESS WAY WITH FULL CONTROL AND ASSOCIATED LEGAL RIGHTS.
- THE DEVELOPER IS RESPONSIBLE FOR OBTAINING ALL PLANNING CONSENTS AND BUILDING REGULATION APPROVALS.
- UNIMPEDED ACCESS FOR ADVANCED ELECTRICITY NETWORKS PERSONNEL IS REQUIRED AT ALL TIMES, 365 DAYS OF THE YEAR (24/7). ANY DOORS OR GATES ON THE ACCESS ROUTE SHALL BE LOCKED WITH THE STANDARD ADVANCED ELECTRICITY NETWORKS LOCKING SUITE.
- ACCESS VIA 24 HOUR SECURITY IS UNACCEPTABLE.
- THERE SHALL BE NO PLANTING WITHIN 1m OF THE SUBSTATION. PROPOSED SOFT LANDSCAPING ADJACENT SHALL ALLOW FOR FUTURE PLANT GROWTH WITHOUT COMPROMISING ACCESS OR VENTILATION THROUGH DOORS AND LOUVRES.

BASE

- ALL CONCRETE WORKS TO GENERALLY BE IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL STRUCTURAL CONCRETE SPECIFICATION.
- STRUCTURAL CONCRETE TO BE MINIMUM RC28/35, WHERE THE GROUND INVESTIGATION REPORT IDENTIFIES THE PRESENCE OF SULPHATE OR OTHER AGGRESSIVE CHEMICALS IN THE GROUND WATER, THE GROUND OR ANY ADJACENT MATERIAL THE DESIGN ENGINEER/ CONTRACTOR WILL BE RESPONSIBLE FOR SELECTING THE APPROPRIATE MIX TO SUIT SITE CONDITIONS.
- TOP OF CONCRETE BASE TO HAVE U2 FINISH AS DEFINED BY THE NATIONAL STRUCTURAL CONCRETE SPECIFICATION (NSCS). A FLAT, LEVEL AND SMOOTH SURFACE IS ESSENTIAL FOR INSTALLATION OF PLANT. SURFACE FLATNESS TO BE WITHIN +/-2mm OVER 2000mm.
- FORMED FINISH TO CONCRETE ABOVE GROUND LEVEL TO BE FAIR FACED PLAIN FINISH AS DEFINED BY THE NATIONAL STRUCTURAL CONCRETE SPECIFICATION (NSCS).
- 50mm MINIMUM COVER TO REINFORCEMENT.
- REINFORCING BARS TO BE ELECTRICALLY CONTINUOUS. APPROVED METHODS OF WELDING WOULD INCLUDE GAS, ARC OR CADWELD TECHNIQUES. REFER TO EARTHING NOTES FOR FURTHER DETAILS.
- ALL PERIMETER CONCRETE TOP EDGES SHALL HAVE 25mm CHAMFER INTRODUCED DURING CONCRETE PLACEMENT.
- PROVIDE HYDROPHILIC WATERSTOPS TO JOINTS/ AROUND DUCTS AS NECESSARY.
- PROVIDE 1200 GAUGE POLYETHYLENE MEMBRANE BENEATH AND AROUND SIDES OF BASE. TO AVOID DAMAGING MEMBRANE DURING CONSTRUCTION ENSURE PROTECTION BOARDS ARE INSTALLED TO HORIZONTAL AND VERTICAL FACES.

DUCTS

- 150mm INTERNAL DIAMETER (ID) TWIN WALLED HIGH DENSITY POLYETHYLENE DUCTING TO ENATS 12-24 OR BE EN 61386, LAID FLAT AND LEVEL.

INFILL TO AREA AROUND CABLES

- AFTER CABLE INSTALLATION ALL CABLE DUCTS ARE TO BE SEALED INTERNALLY AND EXTERNALLY. ADVANCED ELECTRICITY NETWORKS ARE TO BE NOTIFIED OF INTENDED SEALANT PRIOR TO INSTALLATION.
- SERVICE TRENCH SHALL BE FREE FROM WATER AND FILLED WITH SAND 100mm ABOVE TOP DUCT AND TO A MINIMUM OF 500mm BELOW THE TOP OF THE GRATINGS.

GRP GRATINGS

- 38mm OR 50mm DP GRP FLOWGRATE BY LIONWELD KENNEDY OR SIMILAR APPROVED.
- GRATINGS SHALL BE SEATED LEVEL WITH NO NOTICEABLE ROCKING OR SLIDING AND SHALL BE LEFT IN POSITION.
- GRATINGS TO BE CUT IN WHOLE "BARS" AS NOT TO LEAVE UN-EDGED "FINGERS".
- GRATINGS SHALL BE SIZED TO BE INDIVIDUALLY LIFTED WITHOUT BINDING AGAINST ADJACENT COVERS AND SHALL HAVE AN INDIVIDUAL MAXIMUM WEIGHT OF 18kg.
- CUT OFF OPENINGS FOR CABLE PENETRATIONS ENSURING THE GRATINGS CAN BE REMOVED WITH CABLES IN-SITU WHILE REMAINING STABLE.

WALLS

- UNLESS NOTED OTHERWISE WALLS SHALL BE 215mm THK COLLAR JOINTED STRETCHER BOND. FACING BRICKWORK TO EXTERNAL LEAF TO BE H.D. CATEGORY 1 MINIMUM 30mm/m² MEAN COMPRESSIVE STRENGTH AND MAX. 12% M.A. AND DURABILITY DESIGNATION F10 OR BETTER. COLOUR AND FINISH TO BE CONFIRMED BY CLIENT. INTERNAL LEAF TO BE FAIR FACED SMOOTH TEXTURED CONCRETE BLOCKWORK WITH THE EXCEPTION OF THE BOTTOM TWO COURSES AND AROUND OPENINGS (WHERE REQUIRED) WHICH ARE TO BE FAIR FACED SMOOTH TEXTURED CONCRETE BRICKWORK. MASONRY TO INNER LEAF TO HAVE A MEAN COMPRESSIVE STRENGTH OF NOT LESS THAN 10.4N/mm². CLASS II MORTAR THROUGHOUT. LEAVES TO BE TIED TOGETHER BY MEANS OF ANCON SPS CJ STAINLESS STEEL TIES LAID AT 450mm VERTICAL AND 375mm HORIZONTAL CENTRES SET BACK 38mm FORM OUTER FACE. TIES TO BE STAGGERED.
- 1200 GAUGE VISQUEEN D.P.C. TO BE INSTALLED 150mm ABOVE ADJACENT GROUND LEVEL.

ROOF

- ROOF TILES/ SLATES, RIDGE AND HIP TILES TO BE MECHANICALLY FIXED (DRY SYSTEM). COLOUR AND FINISH TO BE CONFIRMED BY CLIENT. PROVIDE S/W TREATED BATTENS (SIZE AND CENTRES TO SUIT TILES/ SLATES) ON VAPOUR PERMEABLE UNDERLAY LAID IN ACCORDANCE WITH MANUFACTURERS DETAILS.
- PROVIDE LOW AND HIGH LEVEL VENTILATION AS INDICATED.
- ALL TIMBERS TO BE KILN DRIED (KD).
- ALL STRUCTURAL TIMBERS INCLUDING ASSOCIATED BRACING/ RESTRAINTS TO BE INSTALLED AS INDICATED.
- TIMBER WALL PLATES TO BE LAID ON CONTINUOUS BED OF MORTAR AND SECURED WITH 30x5mm GALVANISED MILD STEEL STRAPS AT MAXIMUM 1200mm CENTRES. STRAPS TO BE PLUGGED AND SCREWED TO WALL. WALL PLATE TO BE PAINTED WITH FLAME RETARDANT PAINT AND LAP JOINTED AT CORNERS AND INTERMEDIATE JOINTS.
- IF APPLICABLE SUPPLIER DESIGNED TRUSSED ROOF CONSTRUCTION SHALL BE DESIGNED, ERECTED AND BRACED IN ACCORDANCE WITH BS 5288 PARTS 2 AND 3.
- PROVIDE 1NO. LAYER OF 12mm SUPALUX BOARD OR SIMILAR ACCEPTED FIXED IN STAGGERED PATTERN TO UNDERSIDE OF CEILING JOISTS AND TO SIDE OF EXPOSED WALL PLATE. TO PROVIDE MINIMUM OF 1 HOUR FIRE RESISTANCE.

DOORSET

- DOUBLE LEAF DOORSET BY SUNRAY. REF SQD/1110.
- SIZED ACCORDINGLY TO SUIT A STRUCTURAL OPENING SIZE OF 2710 WIDE X 2560mm HIGH.
- A FLEXIBLE EARTH BOND STRAP IS TO BE FITTED AND CONNECTED TO MAIN EARTHING SYSTEM.
- TO BE POLYESTER POWDER COATED GENERALLY IN JUNIPER GREEN COLOUR TO BS 12B29 OR DEVELOPER TO SPECIFY THE COLOUR TO HARMONISE WITH THE ADJACENT PREMISES AND ADVISE THE MANUFACTURER.
- MASTIC IS TO BE APPLIED EXTERNALLY AND INTERNALLY AS PER MANUFACTURERS RECOMMENDATIONS BETWEEN FRAME AND MASONRY REVEALS.
- ADVANCED ELECTRICITY NETWORKS WILL SUPPLY AN APPROPRIATE DUAL-LOCKING PADLOCK FOR ALL COMPLETED SUBSTATIONS. EURO PROFILE KEY OPERATED LOCKS WILL NOT BE ACCEPTED.

LOUVRES

- LOUVRES BY SUNRAY. REF'S SQD/1111 AND SQD/1112.
- SIZED ACCORDINGLY TO SUIT A STRUCTURAL OPENING SIZE OF 550 WIDE X 750mm HIGH.
- PROVIDE CABLE FLAP TO 1NO. LOUVER.
- A FLEXIBLE EARTH BOND STRAP IS TO BE FITTED AND CONNECTED TO MAIN EARTHING SYSTEM.
- TO BE POLYESTER POWDER COATED GENERALLY IN JUNIPER GREEN COLOUR TO BS 12B29 OR DEVELOPER TO SPECIFY THE COLOUR TO HARMONISE WITH THE ADJACENT PREMISES AND ADVISE THE MANUFACTURER.
- MASTIC IS TO BE APPLIED EXTERNALLY AND INTERNALLY AS PER MANUFACTURERS RECOMMENDATIONS BETWEEN FRAME AND MASONRY REVEALS.

ELECTRICAL

- THE SUBSTATION AUXILIARY ELECTRICAL SUPPLY FOR SMALL POWER AND LIGHTING IS TO BE TAKEN FROM THE TRANSFORMER MOUNTED FUSE CABINET AUXILIARY FUSE WAY USING 6mm² COPPER SWA PVC CABLE TO SUPPLY A SINGLE PHASE 25A STREET LIGHTING CUT OUT (TO BE MOUNTED BELOW THE SPAL CONSUMER UNIT). THIS WILL FEED A SINGLE PHASE 100A CONSUMER UNIT WITH A MINIMUM OF 4 MCB CONTROLLED WAYS (2no 16A FOR POWER AND 1no 6A FOR LIGHTING WITH A SPARE 16A WAY FOR SPECIAL REQUIREMENTS SUCH AS SCADA OR REMOTE ACTUATOR UNITS). EACH OUTGOING WAY SHALL BE LABELED TO IDENTIFY THE CIRCUITS.
- ALL INTERNAL WIRING TO BE CONTAINED WITHIN 20mm HIGH IMPACT BLACK PVC CONDUIT, WITH ALL ACCESSORIES TO BE HIGH IMPACT, NON-METALLIC, FULLY INSULATED AND WEATHERPROOF AND SOURCED FROM A QUALITY MANUFACTURER (e.g. MEM OR MK).
- LIGHTING WITHIN SUBSTATION TO BE PROVIDED BY THREE 18W LED LUMINAIRES (BATTENS) TO AT LEAST IP66 SPECIFICATION WILL BE FITTED TO THE WALLS (ONE EITHER SIDE OF DOOR AND ONE CENTRE REAR WALL, SITUATED SUCH THAT ADEQUATE LIGHTING LEVELS ARE PROVIDED AT EQUIPMENT OPERATING POSITIONS WITHIN THE SUBSTATION) AND CONTROLLED BY A NON METALLIC FULLY INSULATED LIGHTING SWITCH FITTED 1350mm ABOVE FINISHED FLOOR LEVEL ON THE WALL ADJACENT TO THE LEFT OPENING DOOR.
- TWO 13A SWITCHED SOCKET OUTLETS WITH 30mA RCD PROTECTION SHALL BE PROVIDED IN A CONVENIENT LOCATION ON THE LEFT HAND SIDE OF THE SUBSTATION. AN ADDITIONAL 13A SWITCHED SOCKET OUTLET SHALL BE PROVIDED WITHOUT RCD PROTECTION, FOR THE SUPPLY OF ELECTRICAL TEST EQUIPMENT. WHERE AN RTU (OR OTHER SUCH SCADA SYSTEMS REQUIRING AN LV AC SUPPLY) ARE INSTALLED WITHIN THE SUBSTATION, AN UNSWITCHED FUSED SPUR SHALL BE PROVIDED AT A CONVENIENT LOCATION TO SUIT THE POSITION OF THE RTU.
- THE ELECTRICAL INSTALLATION SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF BS7671 - IET WIRING REGULATIONS.
- THE SOCKETS ARE TO BE WIRED IN 2.5mm² COPPER CABLE AND THE LIGHTING WIRED IN 1.5mm² COPPER CABLE.

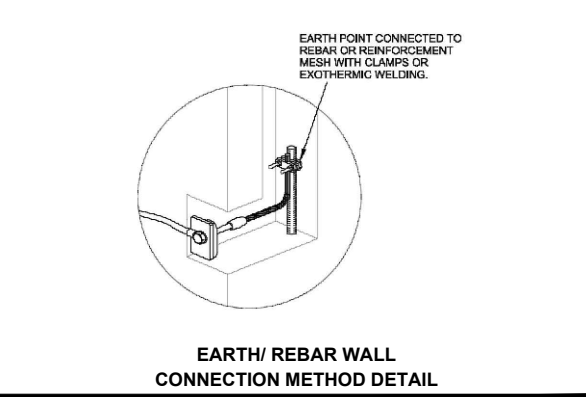
ELECTRICAL CONTINUED

- FOR SUBSTATIONS WITH SEPARATE HV AND LV EARTHING (HOT AND/OR HIGH EPR SITES):
 - CARE MUST BE TAKEN WITH LIGHTING AND SOCKET SUPPLIES TO AVOID THE POSSIBILITY OF MAKING CONTACT BETWEEN DIFFERENT EARTHING SYSTEMS. ISOLATION TRANSFORMER TO USED FOR THE LV AUXILIARY SUPPLY DERIVED FROM THE LV CABINET (SMALL POWER, LIGHTING AND RTU POWER SUPPLY) TO ENSURE THAT THE SUBSTATION SMALL POWER AND LIGHTING DOES NOT INADVERTENTLY COMPROMISE THE SEPARATION OF THE HV AND LV EARTH SYSTEMS.
 - AT HOT SITES ALL FITTINGS, SWITCHES AND CONDUIT MUST BE NON-METALLIC AND FULLY INSULATED TO THE SPECIFICATION ABOVE.
- ALL 13A SOCKETS SHALL BE DISCONNECTED OR REMOVED. SOCKET OUTLETS IN THE TRANSFORMER MOUNTED FUSE CABINET MUST BE LABELED WITH WARNING SIGN: "DO NOT USE, HOT SITE".

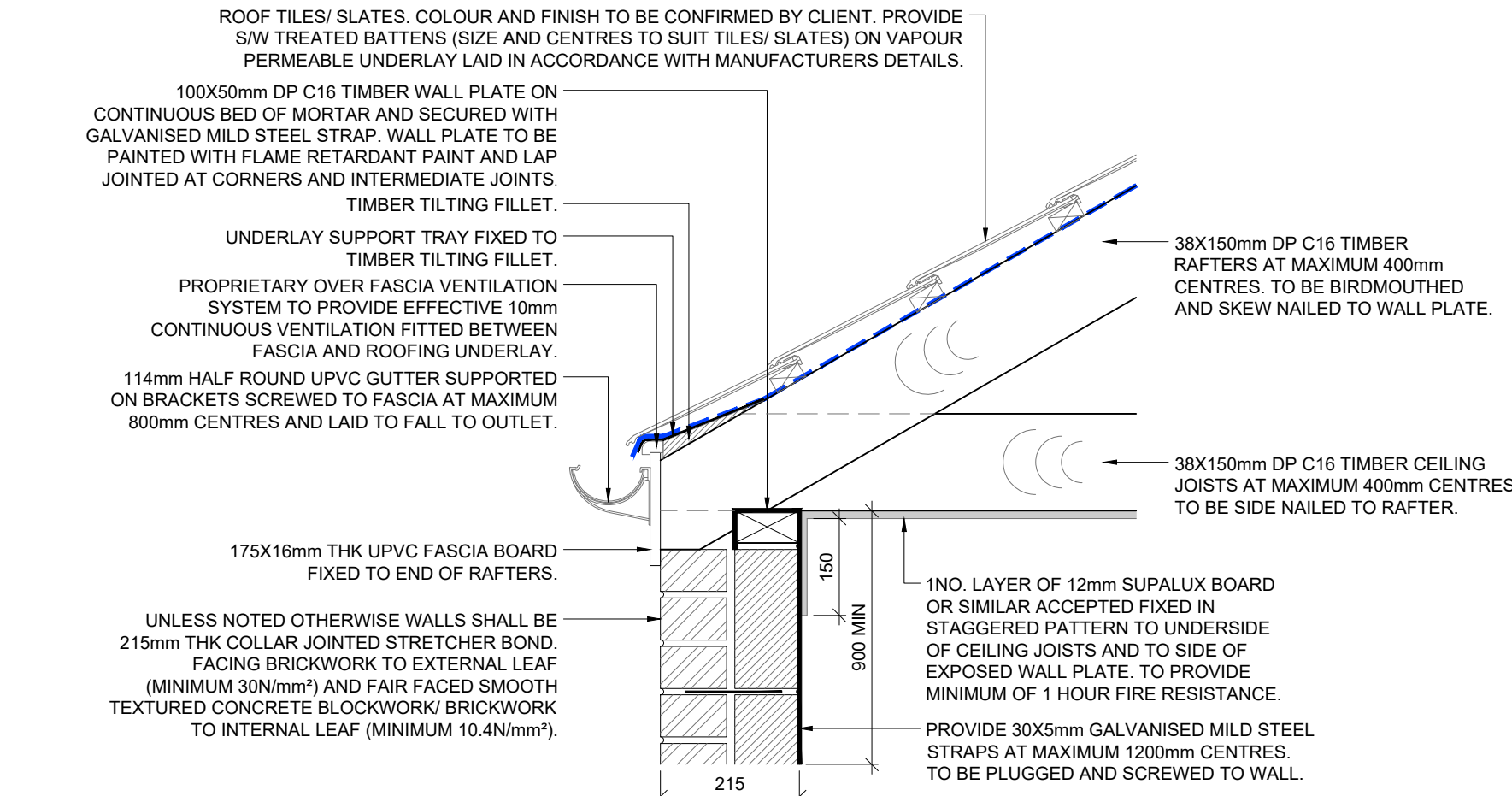
EARTHING

- THE EARTHING SYSTEM SHALL BE PROVIDED BY THE DEVELOPER/ CONTRACTOR/ ICP UNLESS STATED OTHERWISE BY ADVANCED ELECTRICITY NETWORKS.
- WHERE POSSIBLE THE EARTHING SYSTEM SHOULD BE INSTALLED IN ASSOCIATION WITH THE GROUND WORKS TO ENSURE THAT THE EARTH ELECTRODES ARE CORRECTLY POSITIONED PRIOR TO PLACEMENT OF CONCRETE.
- EARTH RODS SHALL BE COPPER CLAD WITH APPROPRIATE FITTINGS AND DRIVEN TO A MINIMUM DEPTH OF 2.4m.
- ALL EARTH CONDUCTORS AND ELECTRODES SHALL BE AS SPECIFIED IN THE APPROVED EARTHING DESIGN FOR THE SUBSTATION/PROJECT. AS A GUIDE THE FOLLOWING CONDUCTOR SIZES ARE TYPICALLY EXPECTED:
 - FOR EARTH FAULT LEVELS UP TO 8kA, 70mm² BARE STRANDED HARD DRAWN COPPER CABLE OR 25mm X 3mm COPPER TAPE.
 - FOR EARTH FAULT LEVELS UP TO 12kA, 120mm² OR 2 X 70mm² BARE STRANDED HARD DRAWN COPPER CABLE OR 25mm X 4mm COPPER TAPE.
 - FOR EARTH FAULT LEVELS UP TO 15kA, 2 X 70mm² BARE STRANDED HARD DRAWN COPPER CABLE OR 25mm X 6mm COPPER TAPE.
- THE MAXIMUM RESISTANCE OF THE STANDALONE EARTHING SYSTEM SHALL BE SPECIFIED WITHIN THE APPROVED ELECTRICAL DESIGN FOR THE PROJECT.
- WHERE THE EARTHING SYSTEM IS INSTALLED BY A DEVELOPER OR CONTRACTOR OR ICP, CERTIFICATION CONFIRMING THE RESISTANCE OF THE STANDALONE EARTHING SYSTEM (INCLUDING ANY SPECIFIED ADDITIONAL EARTHING) HAS BEEN TESTED AND IS LESS THAN THE MAXIMUM STANDALONE (BEFORE NETWORK CONNECTION) EARTH RESISTANCE SPECIFIED IN THE APPROVED ELECTRICAL DESIGN FOR THE PROJECT SHALL BE PROVIDED TO ADVANCED ELECTRICITY NETWORKS PRIOR TO EQUIPMENT INSTALLATION. FURTHER TESTING OF THE SUBSTATION EARTH RESISTANCE IS REQUIRED ONCE THE SUBSTATION IS CONNECTED TO THE HV NETWORK, TO ENSURE THAT THE EARTH RESISTANCE OF THE SUBSTATION ONCE CONNECTED TO THE NETWORK IS COMPLIANT WITH THE MAXIMUM VALUE (AFTER NETWORK CONNECTION) STATED IN THE APPROVED ELECTRICAL DESIGN FOR THE PROJECT.
- THE EARTHING SYSTEM IS INSTALLED FOR ADVANCED ELECTRICITY NETWORKS SOLE USE AND SHALL NOT BE INTERCONNECTED WITH ANOTHER EARTHING SYSTEM OR USED FOR ANY OTHER PURPOSE WITHOUT PERMISSION FROM ADVANCED ELECTRICITY NETWORKS. (FOR THE AVOIDANCE OF DOUBT, ANY DNO EQUIPMENT WITHIN THE SUBSTATION IS PERMITTED TO BE CONNECTED TO THE EARTHING SYSTEM, E.G. THE RMU, HV CABLE SHEATHS, RTU etc.)
- A 8-WAY EARTH BAR SHALL BE PROVIDED AS INDICATED AND FIXED TO THE SIDE OF THE SERVICE TRENCH 150mm BELOW FFL.
- FLEXIBLE EARTH BOND STRAP SHALL BE FITTED TO THE DOOR AND LOUVRES AND CONNECTED TO MAIN EARTHING SYSTEM.
- REINFORCING BARS WITHIN CONCRETE TO BE ELECTRICALLY CONTINUOUS.
- THE INTERNAL CONNECTIONS OF THE REINFORCEMENT WITHIN THE CONCRETE BASE SHALL USE SUITABLE CLAMPS. REFER TO DRAWING NO: AEN-STD-SEC-SUB-01 SHEET 1 FOR LOCATION OF EARTHING POINTS.
- ALL EARTH BONDING CONNECTIONS BETWEEN THE REINFORCEMENT AND THE EARTHING BAR SHALL USE A MINIMUM OF 70mm² INSULATED STRANDED HARD DRAWN COPPER CABLE OR 25mm X 3mm COPPER TAPE.
- ALL HV CABLE SHEATHS SHALL BE BONDED TO THE HV SWITCHGEAR IN A MANNER WHICH ACHIEVES A RELIABLE AND ROBUST CONNECTION OF THE HV CABLE SHEATHS TO THE SUBSTATION HV EARTH SYSTEM.
- ALL ITEMS OF ELECTRICAL PLANT (TRANSFORMER, LV CABINET ETC) EXCEPT RMU SHALL BE BONDED TO THE SUBSTATION HV EARTH BAR.
- EARTH CONNECTION FROM RMU TO BE JOINTED DIRECTLY ONTO EARTH CONDUCTOR BETWEEN HV EARTH RING AND EARTH BAR.

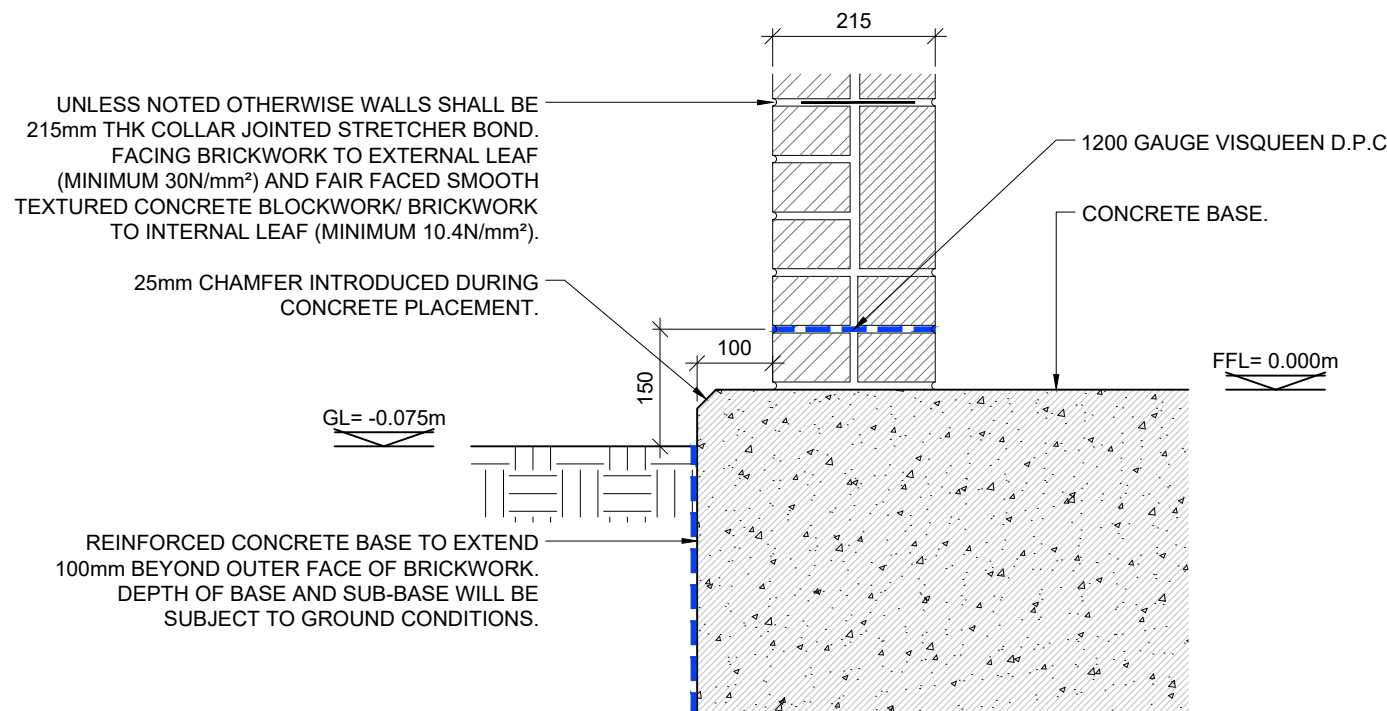
INTERNAL CONNECTION OF THE REBAR WITHIN THE CONCRETE BASE FOR ELECTRICAL CONTINUITY



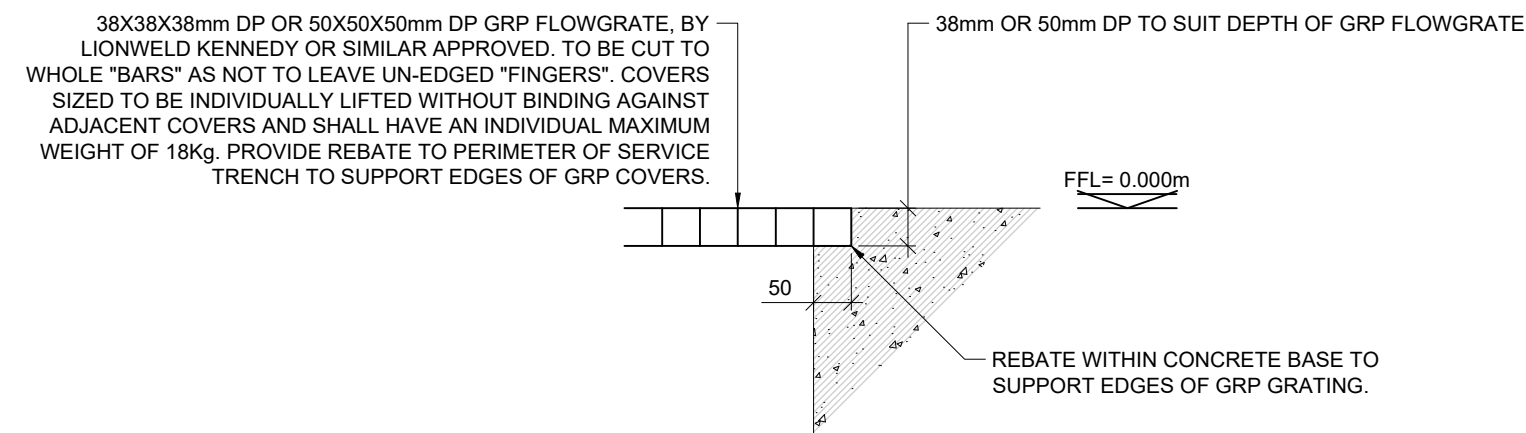
EARTH/ REBAR WALL CONNECTION METHOD DETAIL



TYPICAL EAVES DETAIL (1:10)
(TRADITIONAL CUT ROOF CONSTRUCTION)



WALL/ BASE JUNCTION DETAIL (1:10)



GRP GRATING EDGE SUPPORT DETAIL (1:10)

REFER TO SHEET 1 FOR GENERAL ARRANGEMENTS

REV	DATE	DESCRIPTION	BY	QC	APP
PROJ	26/06/25	SUNRAY REF'S ADDED TO DOORSET AND LOUVRES.	DR	DH	DM
PROJ	30/05/25	NOTE 14 AMENDED AND NOTE 15 ADDED TO EARTHING SECTION.	DR	DH	DM
PROJ	06/03/25	FIRST ISSUE.	DR	DB	DH

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DRAWING TITLE: FREE STANDING BRICK-BUILT SUBSTATION WITH HIP ROOF FOR A TRANSFORMER UP TO 1000kVA

DETAILS AND NOTES

FOR INFORMATION

AS SHOWN

DRAWING NUMBER	SHEET NUMBER	REVISION
AEN-STD-SEC-SUB-01	2 OF 2	F103

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A1