

## 1. GENERAL

THE CONSUMER SHALL SUPPLY TO PWC THREE (3) COPIES OF THE FINAL BUILDING DRAWINGS OF THE SUBSTATION FOR INSPECTION AND COMMENT BEFORE STARTING CONSTRUCTION. PWC WILL INSPECT THE DRAWINGS AND PROVIDE COMMENTS IN ORDER TO ASSIST THE CONSUMER IN PROVIDING ACCOMMODATION TO MEET THE REQUIREMENTS OF PWC. THE INSPECTION OF THE CONSUMERS' DRAWINGS AND THE COMMENTS THEREON IN NO WAY RELIEVES THE CONSUMER FROM THE RESPONSIBILITY OF PROVIDING THE SUBSTATION ACCOMMODATION REQUIRED AND SHOWN ON THE CONSTRUCTION DRAWINGS.

THE BUILDING DRAWINGS PREPARED BY THE CONSUMERS' CONSULTANT AND SUBMITTED TO PWC FOR CONSIDERATION SHOULD SHOW ALL THE DETAILS WHICH ARE RELEVANT TO THE CONSTRUCTION OF THE SUBSTATION. IN ADDITION DETAILS OF CONSTRUCTION ADJACENT TO THE SUBSTATION MAY BE REQUIRED WHERE CONSIDERED NECESSARY.

THE SITING OF THE SUBSTATION AND ANY OTHER BUILDING (FIRE SOURCE FEATURE) MUST COMPLY WITH THE REQUIREMENTS OF THE BUILDING CODE OF AUSTRALIA.

THE PWC SUBSTATION CONSTRUCTION DRAWINGS ARE INTENDED ONLY AS A GUIDE TO MEET BASIC ACCOMMODATION REQUIREMENTS.

A PROFESSIONALLY QUALIFIED STRUCTURAL ENGINEER MUST CERTIFY THAT THE SUBSTATION FLOOR, WALLS, CEILING AND/OR ROOF SLAB TOGETHER WITH ANY EXTERNAL LOADS TRANSFERRED TO THE SUBSTATION BUILDING ELEMENTS HAVE BEEN DESIGNED TO WITHSTAND ALL IMPOSED LOADS TO ALL RELEVANT AUSTRALIAN STANDARDS. IT IS EMPHASISED THAT REQUIREMENTS OF THE STATUTORY BODIES MUST BE MET. ADDITIONALLY, PRIOR TO HANDOVER OF THE SUBSTATION CHAMBER TO PWC, A QUALIFIED BUILDING CERTIFIER MUST CHECK THE SUBSTATION CHAMBER AND CERTIFY IN WRITING THAT PWC REQUIREMENTS HAVE BEEN MET.

REFERENCE IS MADE TO THE REQUIREMENTS OF ALL OTHER STATUTORY BODIES, THE SUBSTATION SHALL WITH REGARD TO ACCESS AND EGRESS REQUIREMENTS BE THE RESPONSIBILITY OF THE CONSUMER, NOT PWC.

## 2. CONSTRUCTION

THE WHOLE OF THE SUBSTATION CHAMBER SHALL BE OF FIRE RESISTANCE LEVEL (FRL) 240/240/240 CONSTRUCTION. COMPLETE ISOLATION FROM THE REMAINDER OF THE CONSUMERS' PREMISES BY A MINIMUM OF 200mm SUITABLY REINFORCED CONCRETE FILLED CEMENT BLOCKS OR EQUIVALENT. THE FLOORS AND CEILINGS BEING OF REINFORCED CONCRETE NOT LESS THAN 170mm THICK.

THE SUBSTATION AND ASSOCIATED CHAMBERS SHALL BE MADE PROOF AGAINST THE ENTRY OF BIRDS AND RATS. ALL NECESSARY HORIZONTAL AND VERTICAL DAMP COURSES SHALL BE PROVIDED AND THE CHAMBERS SHALL BE WATERTIGHT AND DRY BEFORE ACCEPTANCE FOR EQUIPPING. WHERE WALLS RETAIN EARTH OR BACK-FILLING, PARTICULAR ATTENTION MUST BE PAID TO THE STRUCTURAL ADEQUACY AND WATERPROOFING OF SUCH WALLS. REFER SECTION 3.

THE WATERPROOFING OF THE SUBSTATION CHAMBER SHALL BE SUCH THAT ITS EFFECTIVENESS SHALL NOT BE IMPAIRED BY THE DRILLING FOR THE FIXING OF EXPANSION BOLTS FOR THE ATTACHMENT OF EQUIPMENT TO EITHER WALLS, FLOOR OR CEILING.

NO SERVICES, INCLUDING BUT NOT LIMITED TO DRAINS, DUCTS, DOWNPIPES, ELECTRICAL CABLES, HIGH OR LOW PRESSURE SUPPLY PIPES, FIRE SERVICES OR ALARM SYSTEMS, ELECTRICAL AND TELEPHONE CABLES, OR CONDUITS ETC. OTHER THAN THOSE REQUIRED BY PWC, MAY OCCUR WITHIN THE SUBSTATION AND ASSOCIATED CHAMBERS. THIS PROVISION WILL BE RIGIDLY ENFORCED.

## 3. WALLS

ALL SUBSTATION WALLS BELOW GROUND LEVEL AND BUILT AGAINST NATURAL EXCAVATION ARE TO BE SEPARATED BY A DRAINED CAVITY AT LEAST 50mm WIDE. WHERE A RETAINING WALL IS USED TO RETAIN NATURAL GROUND THERE SHOULD BE A DRAINED CAVITY AT LEAST 50mm WIDE BETWEEN THE RETAINING WALL AND THE EXTERNAL FACE OF THE SUBSTATION CHAMBER WALL. RELIANCE ON THE EFFECTIVENESS OF A WATERPROOF MEMBRANE ONLY IN THESE SITUATIONS IS NOT ACCEPTABLE.

THE WALLS OF THE SUBSTATION CHAMBER SHALL BE OF MINIMUM 200mm SUITABLY REINFORCED CONCRETE FILLED CEMENT BLOCKS OR EQUIVALENT, TO ACHIEVE A FRL OF 240/240/240.

ALTERNATIVE WALL CONSTRUCTION WILL BE CONSIDERED, PROVIDING AN EQUIVALENT FRL IS ACHIEVED.

ALL CONCRETE WALLS AND MORTAR JOINTS OF WALL SURFACES SHALL BE CLASS 3 FINISH AS PER AS3610.

## 4. FLOORS

THE LANDING AREA IN WHICH THE TRANSFORMERS WILL BE PLACED BEFORE BEING INSTALLED IN THE SUBSTATION MUST BE CAPABLE OF SUPPORTING THE MASS OF THE TRANSFORMERS AS GIVEN ON THE CONSTRUCTION DETAIL DRAWINGS. THE POSSIBILITY MUST BE ALLOWED FOR THE TOTAL NUMBER OF TRANSFORMERS WHICH ARE TO BE INSTALLED IN THE SUBSTATION, BEING POSITIONED ON THE LANDING AREA AT ANY ONE TIME. THIS CONDITION WILL APPLY TO ANY OTHER AREA ON THE CUSTOMERS PREMISES WHERE TRANSFORMERS ARE LIKELY TO BE TRANSPORTED AND HELD PRIOR TO INSTALLATION IN THE SUBSTATION.

THE SLAB ON GROUND SHALL BE A MINIMUM THICKNESS OF 170mm CONSTRUCTED WITH 32MPa CONCRETE. THE SLAB IS TO BE REINFORCED WITH AT LEAST ONE LAYER OF F92 FABRIC HAVING A COVER OF 55mm FROM THE TOP SURFACE. THE FLOORS OF THE SUBSTATION CHAMBER SHALL BE EVEN, LEVEL AND FINISHED TO A FINE SURFACE FINISH, PREFERABLY IN ONE OPERATION.

IF THE SUBSTATION FLOOR SLAB IS SUSPENDED THEN THE SUSPENDED STRUCTURAL FLOOR AND THE TOPPING SLAB SHALL BE DESIGNED BY A PROFESSIONALLY QUALIFIED STRUCTURAL ENGINEER. THE SLAB SHALL BE CAPABLE OF CARRYING ALL OF THE SUPERIMPOSED LOADS OF PWC EQUIPMENT TOGETHER WITH ANY OTHER LIKELY LOADS ASSOCIATED WITH THE BUILDING, AND DESIGNED FOR FIRE RESISTANCE TO ALL RELEVANT AUSTRALIAN STANDARDS.

THRESHOLDS OF ALL DOORS AND EXTERNAL STEPS MUST BE FINISHED WITH A 40 X 6mm GALV EQUAL ANGLE WITH 100 X 25 X 3mm FISH TAIL LUG WELDED AT 300mm SPACING AND SET IN THE CONCRETE FOR ITS FULL LENGTH.

ANY PENETRATIONS IN THE FLOOR MUST BE MADE WATERTIGHT.

A MINIMUM CLEARANCE OF 150mm BETWEEN EQUIPMENT AND FLOOR SHALL BE MAINTAINED WHEN LIFTING EQUIPMENT WITHIN THE SUBSTATION CHAMBER.


ALL FLOOR SURFACES SHALL BE A CLASS 3 FINISH AS PER AS3610.

## 5. ROOF

IF THE SUBSTATION IS FREE STANDING AND EXISTS AS A STRUCTURE ON ITS OWN, THE ROOF MAY BE OF AN INHERENT FRL 60/60/60 CONSTRUCTION. HOWEVER, IF THE SUBSTATION IS INCORPORATED IN AND FORMS A PORTION OF A LARGER STRUCTURE, THEN THE SUBSTATION ROOF MUST BE OF AN INHERENT FRL 240/240/240 CONSTRUCTION.

THE SUBSTATION ROOF MUST BE ADEQUATELY DESIGNED TO WITHSTAND ANY LOADS WHICH MAY BE APPLIED EXTERNALLY.

THE CONSTRUCTION OF THE ROOF SLAB TO THE SUBSTATION MUST BE SUCH THAT THE INGRESS OF MOISTURE IS PREVENTED.

DRG NO	DESCRIPTION	NO	DESCRIPTION	DRN	DATE	CKD	APPD	POWER STANDARD DRAWING					
S02-2-7-00	SHEET 2	3	SHEET 2 AMENDED	C.C.	OCT'18	B.V.	B.V.	DES	B.CHEUNG	INDOOR SUBSTATION SURFACE CHAMBER CONSTRUCTION NOTES SHEET 1 OF 2			
		2	SHEET 2 AMENDED	A.T.	JAN'17	I.B.	B.C.	DRN	A.TAYLOR	A3			DRAWING NUMBER S02-2-7-00_1 CAD PRODUCT - DO NOT AMEND MANUALLY AMDT
		1	SHEET 2 AMENDED	K.T.	JUN'16	I.B.	B.C.	CKD	B.CHEUNG				
		0	COMPILED FROM S02-2-7-22 AND S02-2-7-23	A.T.	JAN'14	B.C.	B.C.	APPD	B.CHEUNG				
								SCALE	N.T.S.				
								ISSUED	JANUARY 2014				
								ALL DIM. IN mm					
								DRAFTING STANDARD TO A.S.1100					

## 6. EARTHING

THE BUILDER MUST GIVE FOURTEEN (14) DAYS NOTICE AS TO WHEN CLEAR ACCESS IS AVAILABLE TO INSTALL EARTH RODS. FOR LOCATIONS WHERE IT IS NECESSARY TO LIFT THE EARTHING EQUIPMENT IN AND OUT OF POSITION, SUCH LIFTING SHALL BE DONE BY THE BUILDER IN THE EVENT OF THE EQUIPMENT BEING DAMAGED AS A RESULT OF LIFTING OPERATIONS, THE BUILDER SHALL BE LIABLE TO PWC FOR THE DAMAGE.

AFTER PWC HAS INSTALLED THE EARTH RODS AND PRIOR TO THE POURING OF THE FLOOR SLAB PWC WILL LAY AND CONNECT THE EARTH CABLES. THESE CABLES WILL BE BROUGHT UP AGAINST A WALL IN A POSITION NOMINATED BY PWC. TO ENABLE THIS TO BE ARRANGED THE BUILDER IS REQUIRED TO GIVE PWC FOURTEEN (14) DAYS NOTICE OF INTENTION TO POUR THE FLOOR SLAB.

IF THE CONCRETE FLOOR SLAB OF THE SUBSTATION IS OF SUSPENDED CONSTRUCTION, THE EARTH RODS WILL BE LOCATED IN THE LOWEST LEVEL OF THE EXCAVATED AREA DIRECTLY UNDER THE SUBSTATION. THE MOST SUITABLE POSITIONS FOR THE EARTH RODS WILL BE DETERMINED ON SITE BY PWC. THE EARTH RODS ARE TO BE INSTALLED BY THE BUILDER TESTED BY PWC.

FROM THE POSITION OF THE TERMINATED EARTH CABLES MENTIONED ABOVE, THE TWO (2) EARTH CABLES MUST BE CARRIED UP THROUGH THE STRUCTURE TO THE LEVEL OF THE SUBSTATION FLOOR. TO ACHIEVE THIS THE BUILDER MUST PROVIDE AND INSTALL TWO (2) 38mm GALVANIZED WATER PIPES. THESE PIPES MUST BE SURFACE RUN FOR THE FULL EXTENT OF THE RUN UP TO SUBSTATION FLOOR LEVEL. IF THESE PIPES CHANGE DIRECTION A SUITABLE GALVANIZED STEEL DRAW-IN BOX IS TO BE INSTALLED IN A POSITION WHICH IS ACCESSIBLE TO PWC STAFF AT ALL TIMES. THE BUILDER SHALL INSTALL ITS EARTH CABLES IN THESE PIPES AND ATTACH TO THE EARTH RODS.

AT ALL TIMES THE BUILDER MUST PROTECT THE EARTH RODS AND CONNECTING CABLES FROM DAMAGE BY OTHER ACTIVITIES ON SITE. IF THE EARTH RODS AND/OR CABLES ARE DAMAGED BY THE BUILDER THEN THE BUILDER IS RESPONSIBLE FOR THEIR SUBSEQUENT REPAIR OR REINSTATEMENT.

## 7. CONDUITS

THE BUILDER SHALL PROVIDE AND INSTALL ALL ELECTRICAL UP V.C. CONDUITS AS SHOWN ON THE CONSTRUCTION DETAIL DRAWINGS. THESE CONDUITS SHALL BE OF THE DIAMETERS NOMINATED ON THE CONDUIT SCHEDULE OF THE CONSTRUCTION DETAIL DRAWING AND BE HEAVY DUTY ORANGE COLOURED RIGID PIPE CONFORMING TO AS2053. JOINTS SHALL BE SPIGOT AND SOCKETED SUITABLE FOR SOLVENT WELDING. ALL CONDUITS ENTERING THE CABLE PITS AND WALLS SHALL FINISH FLUSH WITH THE INTERNAL WALL. ALL FLOOR CONDUITS TO TERMINATE 125mm ABOVE SUBSTATION FLOOR LEVEL AND BE PROTECTED FROM ACCIDENTAL DAMAGE BY A CEMENT COLLAR. COLLAR DETAILS ARE SHOWN ON DRG S02-2-7-48. ALL CONDUITS SHALL TERMINATE WITH A BELL MOUTH FITTING. CONDUITS IN RAISED FLOOR AREA ARE TO FINISH FLUSH WITH SOCKET END.

HV CONDUITS AND LV CONDUITS RUNNING TO AND FROM THE SUBSTATION SHALL PROJECT 150mm PAST THE EXTERNAL FACE OF THE SUBSTATION AT THE BOUNDARY AND SHALL BE SOCKET ENDED. THEY SHALL BE SEALED AGAINST THE INGRESS OF MOISTURE BY MEANS OF A PWC APPROVED SEALING METHOD SIMILAR TO HAUFF-TECHNIK P-CABLE BASIC SG SYSTEM.

WHERE THE SUBSTATION IS SET BACK FROM THE BOUNDARY LINE, BOTH THE HV AND LV CONDUIT RUNS SHALL BE EXTENDED FROM THE SUBSTATION AND PROJECT 150mm PAST THE BOUNDARY AND SHALL BE SOCKET ENDED. THE HV AND LV CONDUITS MUST BE AT THE DEPTHS BELOW FINISHED FOOTPATH LEVEL SHOWN ON THE CONSTRUCTION DETAIL DRAWING. HOWEVER IF THIS IS NOT ACHIEVABLE ACCEPTABLE DEPTHS WILL BE DETERMINED BY PWC. THE BUILDER/ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR SEALING ALL OF THE CONSUMER MAINS CONDUITS FROM WITHIN THE SUBSTATION UPON INSTALLATION OF THE CONSUMERS MAINS (INCLUDING SPARE CONDUITS NOT USED) WITH A SUITABLE FIRESTOP, eg EXPANDING FIRE FOAM OR FIRE PILLOWS, TO FORM AN APPROPRIATE FIRE BARRIER.

## 8. PERSONNEL DOORS

ALL PERSONNEL DOORS SHALL BE 2400mm HIGH X 1200mm WIDE SOLID CORE EXTERIOR DOORS WITH FRL (-/120/120).

ALL PERSONNEL DOORS SHALL BE VERIFIED AND TAGGED BY A CERTIFIED AUDITOR.

THRESHOLDS OF ALL DOORS AND EXTERNAL STEPS MUST BE FINISHED WITH A 40 X 6mm GALV EQUAL ANGLE WITH 100 X 25 X 3mm FISH TAIL LUG WELDED AT 300mm SPACING AND SET IN THE CONCRETE FOR ITS FULL LENGTH.

ALL DOORS ARE TO BE HUNG ON THEIR FRAMES USING THREE (3) 100mm STAINLESS STEEL HEAVY DUTY HINGES PER LEAF.

ALL DOORS ARE TO BE HUNG SO THAT THE CENTER LINE OF DOOR IS DIRECTLY OVER THE THRESHOLD. ALL DOORS SHALL HAVE A STORM WATER DOOR SEAL FITTED, SIMILAR TO RAVEN RP4.

## 8. PERSONNEL DOORS (CONT.)

HARDWARE

EACH PERSONNEL DOOR IS TO BE FITTED WITH A LOCKWOOD 570X CAM (SELF LOCKING) PWC CYLINDER WITH 60mm BACKSET OPERATION BY KEY FROM THE OUTSIDE. EXTERNAL FACE SHALL BE FITTED WITH A LOCKWOOD 184SC DOUBLE BEND PULL HANDLE AND 1900SC SQUARE END PLATE WITH CYLINDER HOLE ALONG WITH A LATCH GUARD PLATE. THE LATCH SHALL BE FITTED SO THAT THERE IS NOT LESS THAN 10mm ENGAGEMENT OF THE LATCH BOLT INTO STRIKER PLATE WHEN THE DOOR IS IN THE CLOSED POSITION. INTERNAL FACE SHALL BE FITTED WITH LOCKWOOD FLUID SERIES PANIC BAR FE112/ØMSIL.

ALL DOORS SHALL BE FITTED WITH A LOCKWOOD 7242SIL HYDRAULIC DOOR CLOSER. ALL PERSONNEL DOORS ARE TO BE PRIME COATED, UNDERCOATED AND THEN FINISHED WITH TWO (2) COATS OF ENAMEL PAINT. THE FINAL COLOUR IS TO SUIT THE CONSUMERS REQUIREMENTS. THE EXTERIOR OF ALL PERSONNEL DOORWAYS SHALL BE FITTED WITH A 75mm WEATHER SHEILD FITTED ABOVE THE DOORWAY.

## 9. LOUVRED TRANSFORMER DOORS

THE CLEAR OPENING IN THE SUBSTATION CHAMBER WALL FOR THE TRANSFORMER LOUVRE DOORS SHOULD BE AS SHOWN ON THE APPROPRIATE SUBSTATION CHAMBER CONSTRUCTION DRAWING. THE TRANSFORMER LOUVRE PANEL DOOR OPENING HEIGHT SHOULD PREFERABLY BE TO THE SUBSTATION CEILING. HOWEVER, IF THIS IS NOT POSSIBLE DUE TO STRUCTURAL DIFFICULTIES, A MINIMUM OPENING HEIGHT TO SUIT THE TRANSFORMER AND REQUIRED LIFTING EQUIPMENT IS ACCEPTABLE.

THE CONSTRUCTION OF LOUVRED TRANSFORMER DOORS SHALL COMPLY IN ALL RESPECTS WITH THE DETAILS SHOWN ON DRAWINGS S02-2-7-02 & S02-2-7-03.

THRESHOLDS OF ALL DOORS MUST BE FINISHED WITH A 40 X 6mm EQUAL ANGLE WITH 100 X 25X3mm FISH TAIL LUG WELDED AT 300mm SPACING AND SET IN THE CONCRETE FOR ITS FULL LENGTH.

THE AREA ADJACENT TO THE TRANSFORMER DOORS AND LEAST ONE OF THE TWO PERSONNEL DOORS SHALL NOT FORM ANY PART OF THE EMERGENCY EVACUATION ROUTE FOR THE BUILDING COMPLEX. THE ACCESS WAY SHALL HAVE CLEAR UNHINDERED ACCESS FOR PWC AND NT FIRE SERVICES AND STORAGE OF ANY MATERIAL IN THIS ACCESS WAY IS STRICTLY PROHIBITED.

## 10. PAINTING

THE INTERNAL SUBSTATION CEILING AND WALLS NEED NOT BE PAINTED. EXTERNAL WALLS MAY BE PAINTED TO CONSUMER DETAIL AS REQUIRED.

## 11. SUBSTATION LIGHTING AND POWER

THE SUBSTATION CHAMBER WILL HAVE LIGHTING AND A GENERAL PURPOSE OUTLET INSTALLED, AS SHOWN ON THE APPROPRIATE SUBSTATION CHAMBER OPTIONS MISCELLANEOUS DETAILS DRAWING. CONNECTION TO SUPPLY IS BY PWC.

## 12. SUBSTATION CHAMBER INTERNAL DIMENSIONS

THE SUBSTATION CHAMBER DIMENSIONS WILL VARY DEPENDING ON THE LOCATION IN WHICH EQUIPMENT IS INSTALLED. THROUGHOUT THE SUBSTATION CHAMBER A MINIMUM OF 1000mm CLEAR OPENING SHALL BE PROVIDED FROM ANY STRUCTURE TO EQUIPMENT AND A MINIMUM OF 900mm BETWEEN EQUIPMENT.

DRG NO	DESCRIPTION	NO	DESCRIPTION	DRN	DATE	CKD	APPD	POWER STANDARD DRAWING								
S02-2-7-00	SHEET 1	3	UPDATE DOOR, FIRE RATING & PANIC BAR	C.C.	OCT'18	B.V.	B.V.	DES	B.CHEUNG	INDOOR SUBSTATION SURFACE CHAMBER CONSTRUCTION NOTES SHEET 2 OF 2						
		2	NOTE 8 AMENDED	A.T.	JAN'17	I.B.	B.C.	DRN	A.TAYLOR							
		1	PERSONAL/TRANSFORMER DOORS UPDATED	C.C.	JUN'16	I.B.	B.C.	CKD	B.CHEUNG							
		0	COMPILED FROM S02-2-7-22 AND S02-2-7-23	A.T.	JAN'14	B.C.	B.C.	APPD	B.CHEUNG							
								SCALE	N.T.S.							
ASSOCIATED DRAWINGS								AMENDMENTS			ISSUED	JANUARY 2014	A3	DRAWING NUMBER	S02-2-7-00_2	AMDT
											ALL DIM. IN mm					

