

Western Power's Asset Management System

Distribution Substation Plant Manual

Chapter 7 – Superseded Equipment



Original Issue: September 2019

Content Owner/Custodian: Distribution Design and Standards

This Revision: 2 – April 2025

Date for Next Review: April 2028

© Western Power
ABN 18540492861



Uncontrolled document when printed
Refer to DM for current version

EDM 50168876
Page 1

Document control

Endorsement approvals

	Name	Title	Signature & Date
Author	Samuel Liao	Senior Distribution Standards Engineer	Signature on file
Checked by	Chris Omodei	Principal Engineer	Signature on file
Endorsed by	Ken Tiong	Engineering Team Leader	Signature on file
Approved by	Pep Ngwenya	Distribution Design & Standards Manager	Signature on file

Record of revisions

Revision No.	Date	EDM version	Revised by	Description
0	September 2019	0	Gareth Chadwick	Original (MKI MPS)
1	November 2019	2	Gareth Chadwick	Type1, 2 & 3 LV Switchgear assemblies added.
Revision No.	Date	Volt version	Revised by	Description
2	April 2025	1.0	Samuel Liao	3 yearly periodic review

Key documents providing direction and influencing this document

Doc #	Title of document
DM# 40304923	Asset Management System
DM# 41965928	Safety in Design Guidelines
EDM# 50473207	DSPM Governance & Supporting Technical Documents Register

This document gives direction to and influences the following documents

Doc #	Title of document
Various DQM documents	Distribution Substation Design Projects

Stakeholders (people that were consulted when document was updated)

Position / Function / Section

Asset Management - Asset Performance

Asset Management – Safety Environment Quality and Training

Asset Management - Grid Transformation

Asset Operations – Network Operations

Asset Operations – Operational Services

Asset Operations – Network Connection Services and Emergency Management

Business and Customer Service – Customer Service

Notification list (people to be notified when document is updated)

Position / Function / Section

Asset Management - Asset Performance

Asset Management – Safety Environment Quality and Training

Asset Management - Grid Transformation

Asset Operations – Network Operations

Asset Operations – Operational Services

Asset Operations – Network Connection Services and Emergency Management

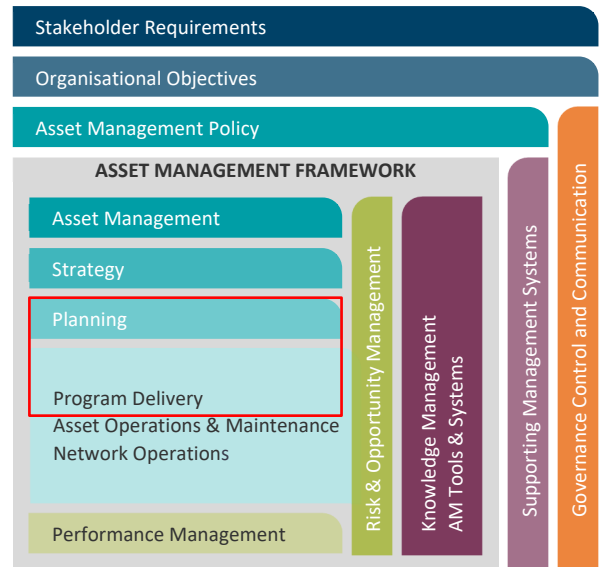
Business and Customer Service – Customer Service

This document must not be made available to personnel outside Western Power without the prior written approval of Western Power.

Document classification and hierarchy

A key requirement of the Western Power Asset Management Policy (AMP) is to develop and maintain an Asset Management System (AMS). This Distribution Substation Plant Manual is defined as an overarching / technical / governance document within the AMS document classification and structure and sits within the planning and Program Delivery component/s of the AMS.

The AMS and the interrelationships between the collection of documents, tools and systems that are used for asset management are described in the AMS document EDM# [40304923](#).



Contents

- 1. Introduction6
- 2. Disclaimer6
- 3. Compliance with this Chapter of the Manual6
- 4. Scope6
- 5. Superseded Equipment Drawings8
 - 5.1 Drawing Legend8
 - 5.2 Tyree MKI Modular Package Substation (MPS)9
 - 5.3 Type 1, 2 & 3 Low Voltage Switchgear Assemblies.....13

1. Introduction

This Chapter of the Distribution Substation Plant Manual (DSPM) only contains legacy substation plant related information and drawings showing the standard plant arrangements previously used within Western Power's distribution substations.

2. Disclaimer

The information contained within these drawings shall not be used for anything other than their intended purpose (as stated within this chapter). Other documents that refer to these drawings shall not change the intended purpose whether it is written or inferred.

This Chapter alone does not claim to demonstrate compliance with any Government Regulations or Industry Standards. These drawings are to be read in conjunction with the following Western Power documents:

- i. Western Australian Service and Installation Requirements (WASIR)
- ii. Underground Distribution Schemes Manual (UDSM)
- iii. Distribution Customer Connection Requirements (DCCR)
- iv. Distribution Overhead Line Design Standard (DOLDS) for DSM 3-24 drawing.
- v. Distribution Design Catalogue (DDC)

The drawings within this Chapter are generic in nature and may not be suitable for all substation sites. It is the designer's responsibility to make sure that these drawings are suitable for the proposed substation site prior to use.

3. Compliance with this Chapter of the Manual

This Chapter of the Distribution Substation Plant Manual contains information about legacy plant and the standard to be used for its installation. These drawings can be used as a guide when maintaining existing sites.

This information should not be used for new (green field sites). This information can be used as a reference when existing sites are being upgraded. All new green field and upgraded sites shall meet the current standards in the other Chapters of this manual.

4. Scope

This Chapter will only contain drawings for plant that has been superseded or withdrawn whilst the DSPM is in circulation. All other legacy plant is published within the standard of the day.

These standards include:

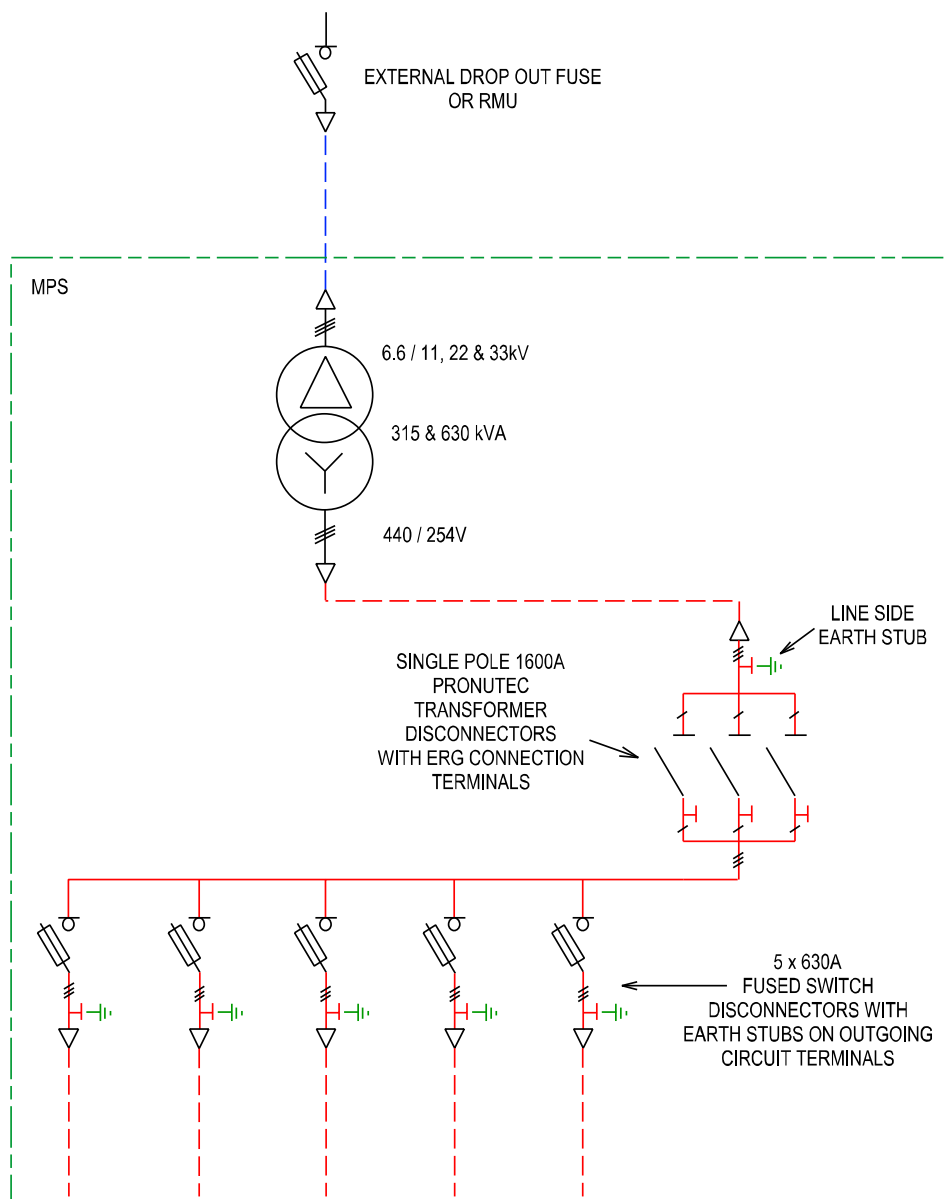
1. SECWA Distribution Substation Standards Manual 1984 (Black Book) [EDM# 23630836](#)
2. SECWA Distribution Substation Standards Manual 1993 (White Book) [EDM# 23630847](#)
3. Western Power DISTRIBUTION SUBSTATION MANUAL (DSM) 1997, 2002 and March 2007:
 - a. INTRODUCTION - ([EDM# 24016023](#))
 - b. SECTION 1 - CUSTOMER SUPPLY ARRANGEMENTS ([EDM# 25675560](#))
 - c. SECTION 2 - HV NETWORK ARRANGEMENTS ([EDM# 23580399](#))
 - d. SECTION 3 - SUBSTATION ARRANGEMENTS ([EDM# 23581570](#))
 - e. SECTION 4 - KIOSK ARRANGEMENT AND INSTALLATION GUIDE ([EDM# 23581608](#))
 - f. SECTION 5 - SUBSTATION FIRE PROTECTION REQUIREMENTS ([EDM# 23581631](#))

- g. SECTION 6 – MISCELLANEOUS ([EDM# 23935652](#))
- h. SECTION 7 - SUPERSEDED EQUIPMENT INSTALLATION GUIDE ([EDM# 23936185](#))
- i. SECTION 8 - DISTRIBUTION AUTOMATION ([EDM# 23938100](#))
- j. SECTION 9 - 33KV SUBSTATION ARRANGEMENTS ([EDM# 23938132](#))

5.1 Drawing Legend

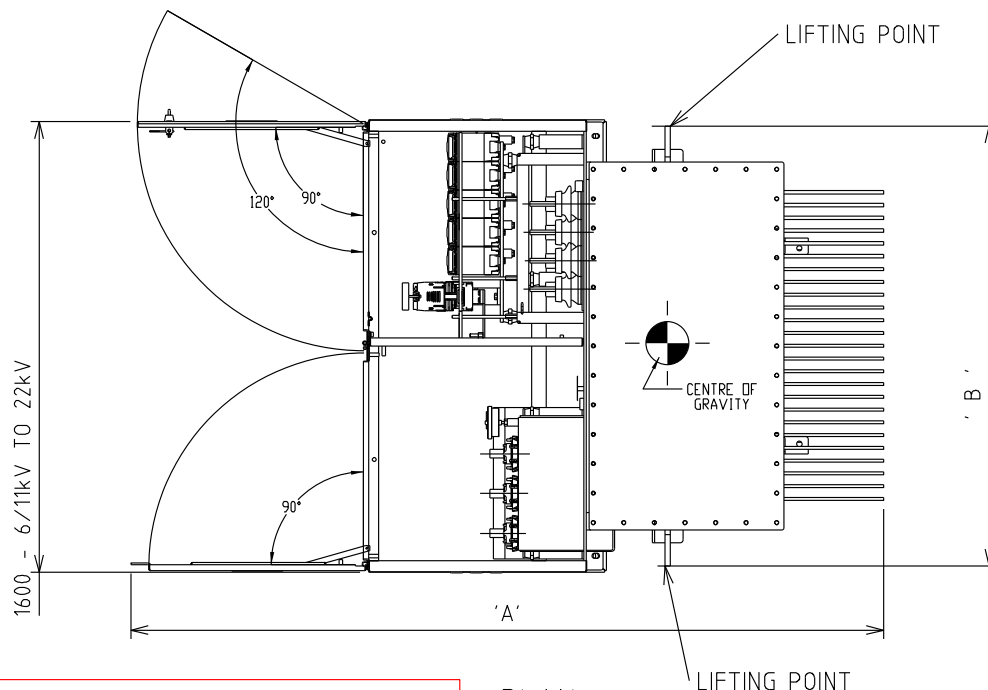


5.2 Tyree MKI Modular Package Substation (MPS)



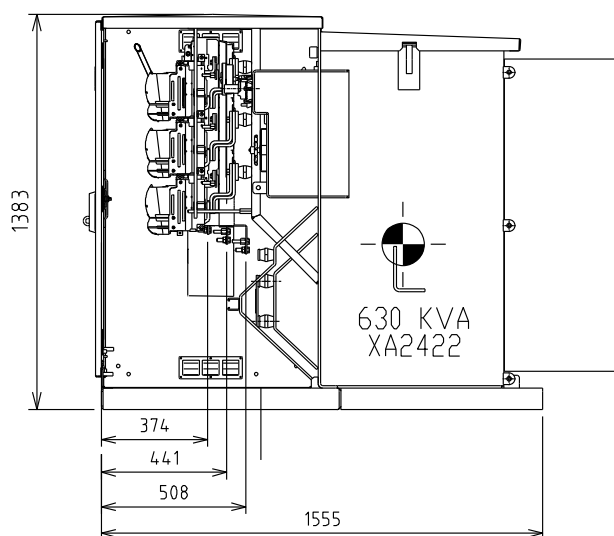
**OBSOLETE FOR
REFERENCE ONLY**

				TITLE		DISTRIBUTION SUBSTATION MANUAL		westernpower	
				TYREE 6/11, 22kV - 315 & 630kVA		DRAWN: GC		DATE: 08/2019	
				MkI MPS KIOSK		CHECKED: KG		SCALE: NTS	
				SINGLE LINE DIAGRAM		APPROVED: AS		DRG. No. DSPM7-01	
				(NOW OBSOLETE)		APPROVED: MS		REV. A	
A	08/19	ORIGINAL		KG	MS			SHT	
R. No.	DATE	DESCRIPTION		CHD.	APRD.			1	

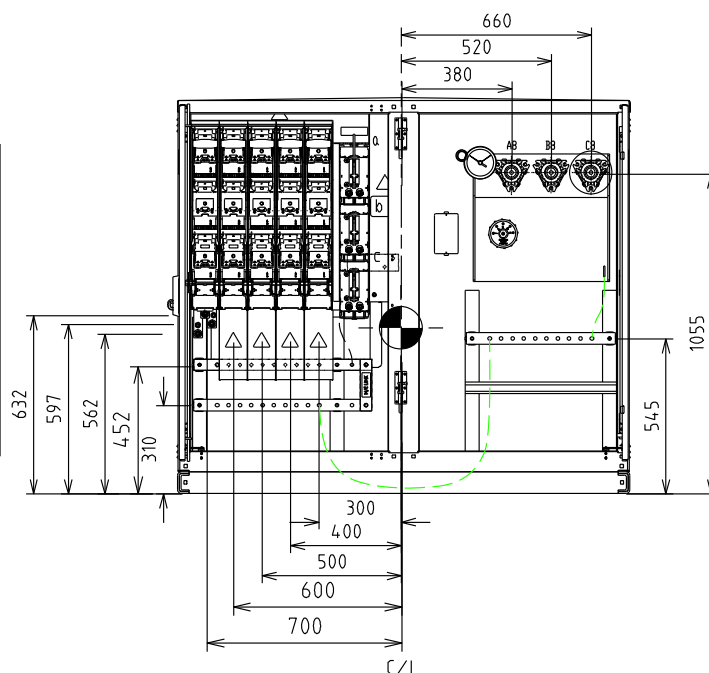


PLAN

OBSOLETE
FOR REFERENCE ONLY



SIDE ELEVATION



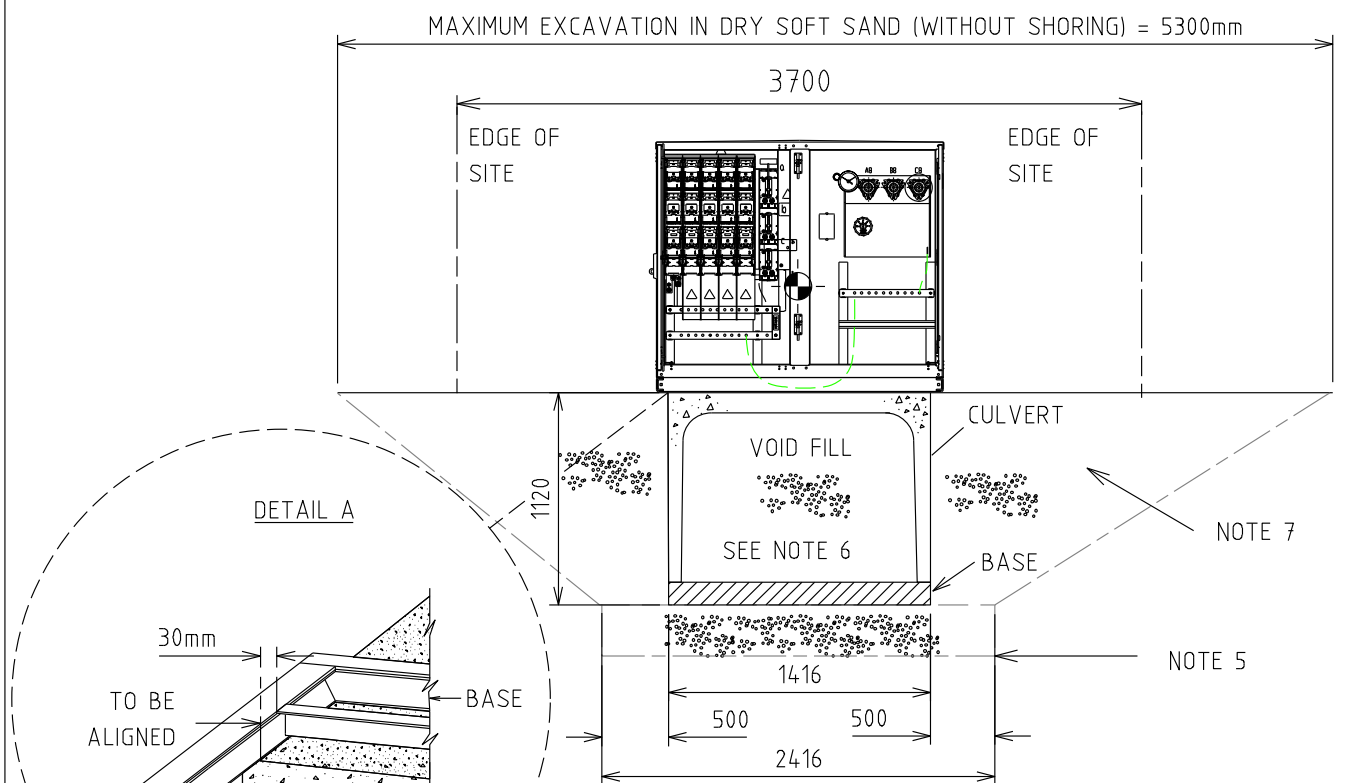
FRONT ELEVATION

TRANSFORMER SIZE (kVA)	VOLTAGE (kV)	DIMENSION 'A'	DIMENSION 'B'	OIL QTY (L)	WEIGHT (kg)	STOCK CODE	COMPATIBLE UNIT TRANSFORMER & LV CAB
315	6.6/11	2546	1478	635	2320	XA2414	HU61
315	22	2375	1463	535	2105	XA2420	HU61
630	6.6/11	2716	1756	855	3110	XA2416	HU61
630	22	2631	1551	715	2695	XA2422	HU61

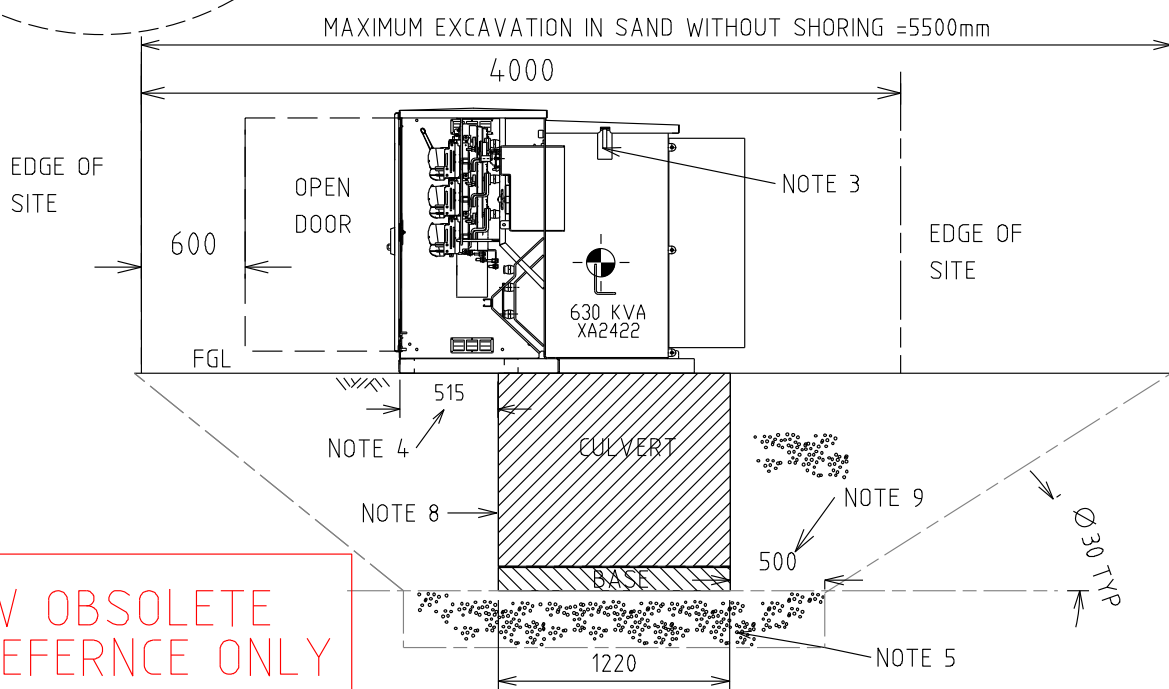
				TITLE		DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
				TYREE 6/11, 22kV - 315 & 630kVA					
				MkI MPS KIOSK					
				GENERAL ARRANGEMENT					
				(NOW OBSOLETE)					
C	05.08.18	NOW OBSOLETE, USE MkII MPS		KG	MS	DRAWN: GC		DATE: 08/2019	
B	31.01.18	OIL QTY ADDED		KG	MS	CHECKED: KG		SCALE: NTS	
A	05.10.17	TYREE TRANSFORMER ADDED		KG	MS	APPROVED: AS		REV. SHY.	
R. No.	DATE	DESCRIPTION		CHD	APRD	APPROVED: MS		C	

Uncontrolled document when printed
Refer to DM for current version

FRONT VIEW




SIDE VIEW



NOW OBSOLETE
FOR REFERENCE ONLY


THIS DRAWING TO BE READ IN CONJUNCTION WITH THE NOTES ON THE NEXT SHEET

						TITLE	DISTRIBUTION SUBSTATION PLANT MANUAL		 westernpower	
F	08/18	OBsolete USE MKII MPS	KG	MS		TYREE 6/11, 22kV - 315 & 630kVA MPS KIOSK INSTALLATION GUIDE (NOW OBSOLETE)	DRAWN: GC	DATE: 08/2019	DRG. No.	
C	31.01.18	NOTES UPDATED AND DRAFT ISSUED FOR COMMENT	KG	MS			CHECKED: KG	SCALE: NTS	DSPM7-01	
D	05.10.17	TYREE TRANSFORMERS AND SHEET 3 ADDED	KG	MS			APPROVED: AS		REV	SHT.
E	15.04.15	FORMAT CHANGED	YL	EJ			APPROVED: MS		F	3
B	22.08.13	ORIGINAL ISSUE								
R_No	DATE	DESCRIPTION	CHFD	APRD						

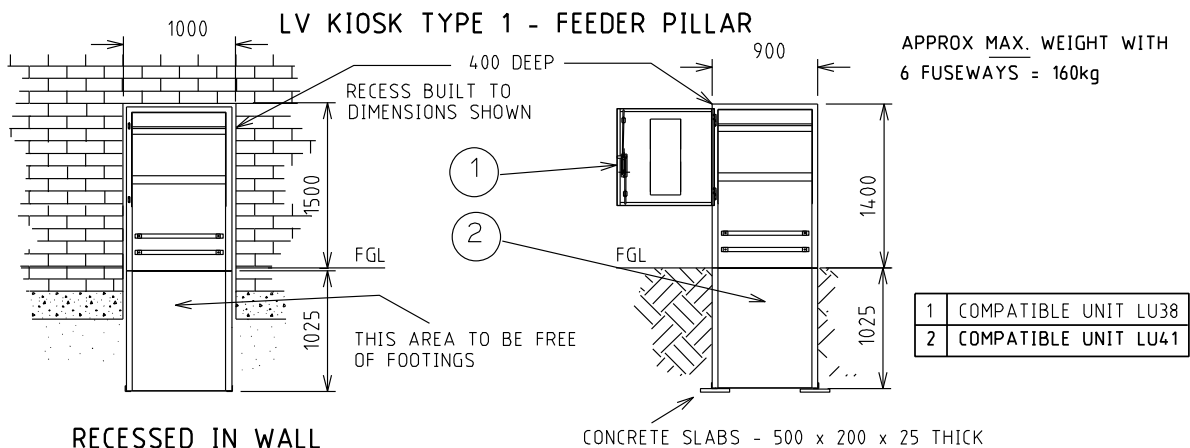
NOTES:

1. THE FOLLOWING IS TO BE READ IN CONJUNCTION WITH AS 3798 FOR EARTHWORKS, AS 4678 FOR EARTH RETAINING STRUCTURES AND AS 1597 FOR PRECAST CONCRETE CULVERTS.
2. EXCAVATION TO BE DONE IN ACCORDANCE WITH THE CODE OF PRACTICE FOR EXCAVATION.
A COMPETENT PERSON MUST BE PRESENT AT ALL TIMES DURING THE EXCAVATION, FOUNDATION PREPARATION, INSTALLATION OF CULVERT AND BACK FILL. IF DUE TO SITE CONDITIONS AND CLOSE PROXIMITY TO OTHER STRUCTURES SAFE EXCAVATION CANNOT BE CARRIED OUT THEN TRENCH SHORING SHOULD BE USED.
3. LIFTING POINT FOR "TRANSFORMER" TO BE USED FOR TRANSFORMER REPLACEMENT AND TO LIFT COMPLETE ASSEMBLED MPS UNIT. TRANSFORMER MUST LOWERED BE INTO PLACE FROM ABOVE WITHOUT ANY FORCE BEING APPLIED TO THE LV FRAME.
4. WHEN LANDING THE MPS TRANSFORMER THE EDGE OF THE CULVERT SHOULD BE LOCATED 30mm FROM THE FRONT EDGE OF MIDDLE CROSS MEMBER WITHIN THE MPS BASE. THIS IS 515mm FROM THE FRONT EDGE OF THE LV FRAME BASE. SEE DETAIL A.
5. COMPACTION OF SUBGRADE TO BE A MINIMUM MODIFIED DENSITY RATIO OF 95 % TO AS 1289.6.3.2 FOR A DEPTH OF 1000mm BELOW CULVERT BASE. IN CLEAN SAND THIS MAY BE MEASURED AS 10 BLOWS / 300mm WITH A STANDARD PENETROMETER.
6. VOID TO BE FILLED WITH SAND, HAND COMPACTION REQUIRED (NOT BY MACHINE).
7. COMPACTED BACKFILL MATERIAL IS TO BE CLEAN SAND. COMPACTION OF THE SAND IS TO BE CARRIED OUT IN LAYERS NOT EXCEEDING 300mm. COMPACTION LEVEL TO ACHIEVE A MINIMUM MODIFIED DENSITY RATIO OF 92 % TO AS 1289.6.3.2. THIS MAY BE MEASURED AS 8 BLOWS / 300mm WITH A STANDARD PENETROMETER
8. PRECAST REINFORCED BOX CULVERT AND BASE TO AS 1597 (100kN) STOCK CODE CA0002. NOMINAL (INTERNAL) SIZE OF CULVERT 1244 wide x 914 high x 1220 long. TO BE INSTALLED AS PER AS 1597.
EXTERNAL SIZE 1416 X 1022 X 1220
9. THE BASE OF THE EXCAVATION IS TO BE A MINIMUM OF 500 mm LARGER THAN THE BASE OF THE CULVERT, ON ALL SIDES. THE SIDES OF THE EXCAVATION ARE TO HAVE A SAFE SLOPE BASED ON SOIL TYPE AND MOISTURE CONTENT.
10. IN THE EVENT THAT THE SITE IS HIGHER THAN THE FINISHED LEVELS OF THE NEIGHBOURING AREAS, RETAINING WALLS, ACCESS STEPS AND DRAINAGE SHALL BE PROVIDED COMPLYING WITH AS 4678, THE REQUIREMENTS OF THE LOCAL GOVERNMENT AUTHORITY AND WESTERN POWER. THIS WORK SHALL BE CERTIFIED BY A PROFESSIONAL CIVIL ENGINEER (NPER).
11. WHERE THERE IS A RISK OF FLOODING OR WHERE GROUND WATER EXISTS, THE SUBSTATION SITE SHALL BE ELEVATED AND RETAINED SO THAT THE CULVERT BASE IS ABOVE THE PREDICTED FLOODING OR HIGHEST POSSIBLE GROUND WATER LEVEL. THE FOUNDATION DESIGN, BACK FILL AND COMPACTION IS TO BE APPROVED BY A QUALIFIED GEOTECHNICAL ENGINEER.
12. A COMPACTION CERTIFICATE IN ACCORDANCE WITH as 1289.6.3.2 IS REQUIRED BY WESTERN POWER FOR ALL SUBSTATION INSTALLATIONS.

OBSOLETE
(FOR REFERENCE ONLY)

				TITLE		DISTRIBUTION SUBSTATION			
						PLANT MANUAL			
						DRAWN: GC	DATE: 08/2019	DRG. No.	
						CHECKED: KG	SCALE: NTS	DSPM7-01	
						APPROVED: AS		REV	SHT
						APPROVED: MS		A	4
A	08/2019	NOW OBSOLETE, REFER MKII MPS		KG	MS				
R No	DATE	DESCRIPTION		CHEG	APRD				

5.3



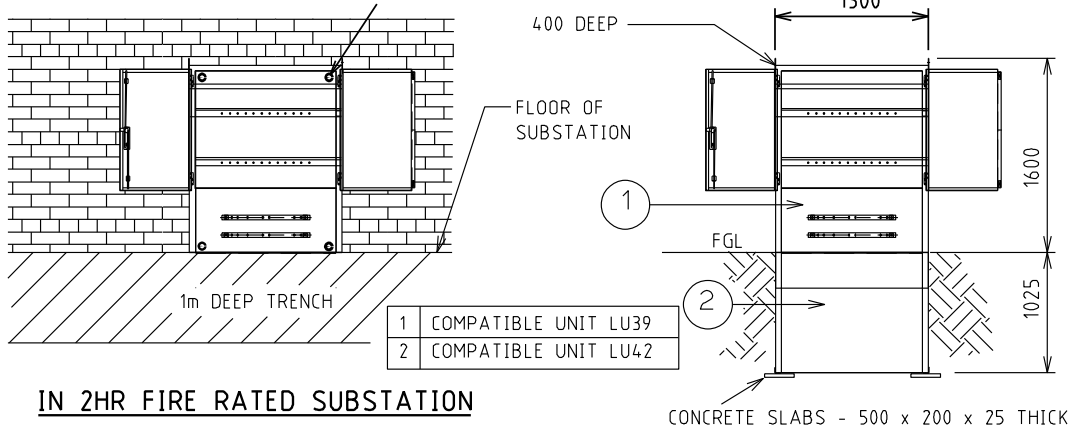
NOTE:-
THE CUSTOMER IS RESPONSIBLE FOR THE INSTALLATION OF THE
WPC SUPPLIED FEEDER PILLAR, TO BE RECESSED IN THE WALL

FREESTANDING

LV KIOSK TYPE 2 - DISTRICT SUBSTATION

DRILL 4-HOLES 12 DIA. THRU REINFORCED SECTIONS.

APPROX MAX. WEIGHT WITH 5 FUSEWAYS
& 2 DISCONNECTORS = 240kg



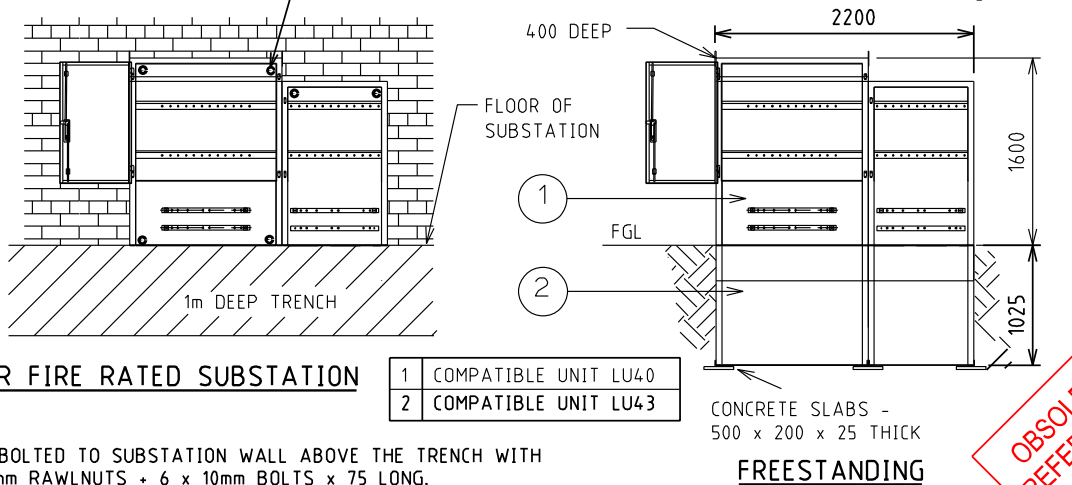
IN 2HR FIRE RATED SUBSTATION

NOTE:-
KIOSK BOLTED TO SUBSTATION WALL ABOVE THE TRENCH WITH
4 x 10mm RAWLNUTS + 4 x 10mm BOLTS x 75 LONG.

LV KIOSK TYPE 3 - DISTRICT SUBSTATION

DRILL 6-HOLES 12 DIA. THRU REINFORCED POINTS AS SHOWN.

APPROX MAX. WEIGHT WITH 5 FUSEWAYS
& 2 DISCONNECTORS = 350kg



IN 2HR FIRE RATED SUBSTATION

NOTE:-
KIOSK BOLTED TO SUBSTATION WALL ABOVE THE TRENCH WITH
6 x 10mm RAWLNUTS + 6 x 10mm BOLTS x 75 LONG.

FREESTANDING

A	11/2019	ORIGINAL ISSUE				
R No.	DATE	DESCRIPTION	ORIGD	CHEG	APRO	

TITLE

LV SWITCHGEAR KIOSK GENERAL ARRANGEMENTS

DISTRIBUTION SUBSTATION
PLANT MANUAL

DRAWN: JRR

DATE: 11/2019

DRG. No.	
----------	--

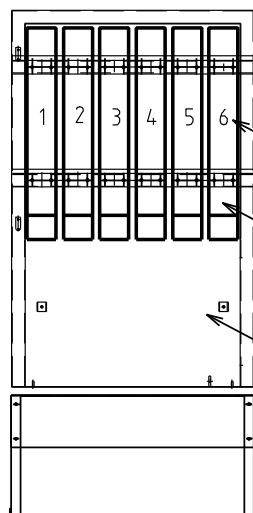
ORIGINATED: GC

SCALE.	NTS
--------	-----

DSPM-7-02

APPROVED: GRANT STAC

REV.	SHT.
A	1/2



LV KIOSK TYPE 1

COMPATIBLE UNIT LU38

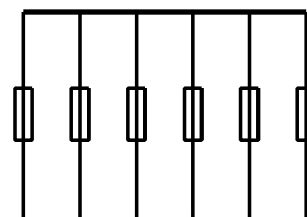
POSITION NUMBER

UP TO 6 - 400A FUSE-UNITS LU44

STANDARD FEEDER PILLAR FRAME

COMPATIBLE UNIT LU 41

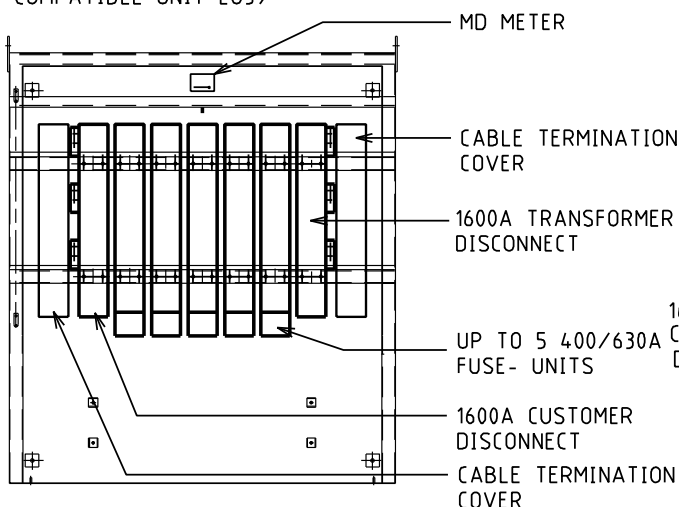
POSITION	1	2	3	4	5	6
LU44						



UP TO 6-400A FUSE UNITS

LV KIOSK TYPE 2 - 160/315/500/630/1000kVA NON MPS

COMPATIBLE UNIT LU39



MD METER

CABLE TERMINATION COVER

1600A TRANSFORMER DISCONNECT

UP TO 5 400/630A FUSE- UNITS

1600A CUSTOMER DISCONNECT

CABLE TERMINATION COVER

315/500/630/1000kVA TRANSFORMERS

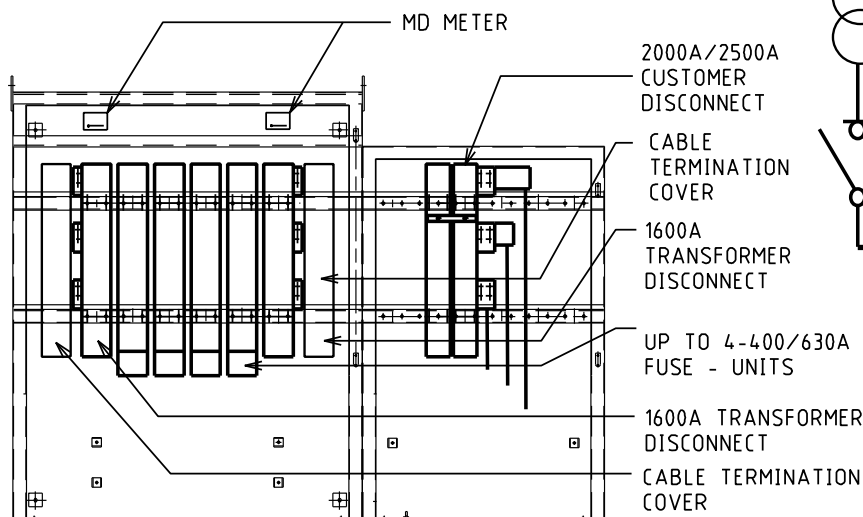
1600A TRANSFORMER DISCONNECT

1600A CUSTOMER DISCONNECT

UP TO 5-400/630A FUSE - UNITS
OR
8-400/630A FUSE - UNITS
WITHOUT 1600A CUSTOMER DISCONNECT

LV KIOSK TYPE 3 - 2000kVA NON MPS

COMPATIBLE UNIT LU40



MD METER

2000A/2500A CUSTOMER DISCONNECT

CABLE TERMINATION COVER

1600A TRANSFORMER DISCONNECT

UP TO 4-400/630A FUSE - UNITS

1600A TRANSFORMER DISCONNECT

CABLE TERMINATION COVER

2 x 1000kVA TRANSFORMERS

1600A TRANSFORMER DISCONNECT

2000/2500A CUSTOMER DISCONNECT

UP TO 4-400/630A FUSE - UNITS

OBSOLETE FOR REFERENCE ONLY

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--