भारत सरकार
रेल मंत्रालय
(रेलवे बोर्ड)

भारतीय रेल
सिगनल इंजीनियरी नियमावली

परिशिष्ट – II
(मार्गदर्शन के लिए रेखा-चित्र)

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
(RAILWAY BOARD)

INDIAN RAILWAYS
SIGNAL ENGINEERING MANUAL

APPENDIX - II
(DRAWINGS FOR GUIDANCE)

जून JUNE 2021

APPENDIX II

(DRAWINGS FOR GUIDANCE)

OF
INDIAN RAILWAYS
SIGNAL ENGINEERING MANUAL
(IRSEM)

June 2021

Published by:
Indian Railways Institute of Signal Engineering and Telecommunications, Secunderabad

For Government of India, Ministry of Railways (Railway Board), New Delhi

PREFACE
TO APPENDIX II OF IRSEM (Version 3.0)

1. This Booklet Contains of Drawings for Guidance. These may be suitably customised as per site conditions, Type and size of equipments to be installed or as per Zonal Railways practices, duly keeping in view Railway Board/RDSO`s Drawings/Schemes, Reliability, Availability, Maintainability & Safety and Industry`s Best Practices.

2. **Numbering Convention:** Drawings are given numbers such as Drg no: 19-D3, where 19 stands for Chapter Number and 3 stands for third drawing in this chapter.

3. These Drawings shall be read in conjunction with relevant Provisions in concerned Chapter of SEM.

Disclaimer:- *Any example/Drawing given in Appendix II showing any particular equipment or usage of any acronym is only for guidance/information of Signal Engineers & Technicians and does not endorse any particular make/Brand/Equipment.*

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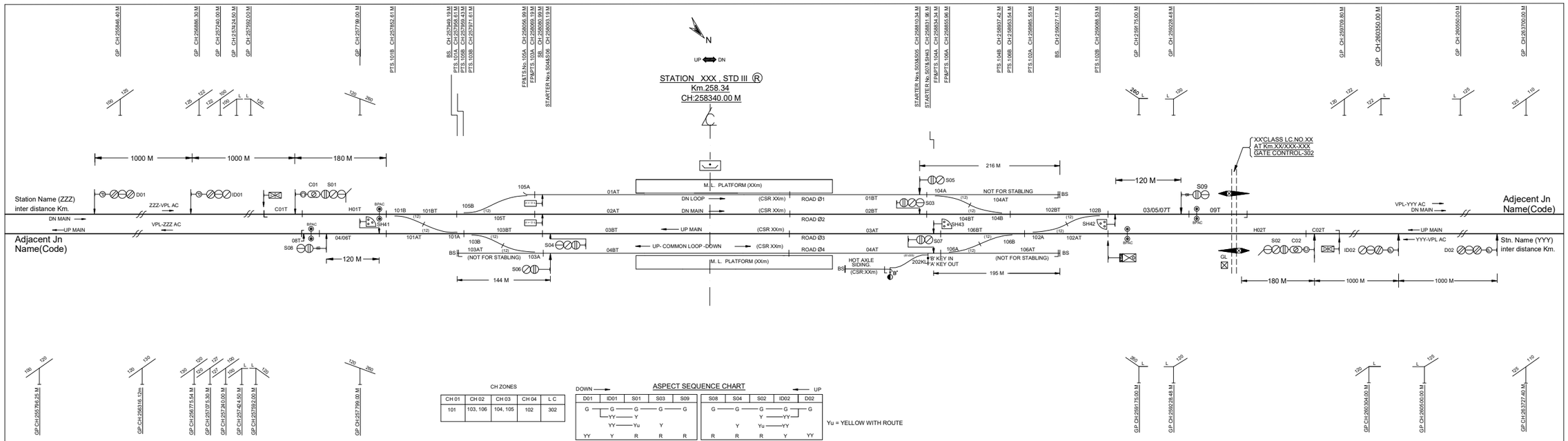
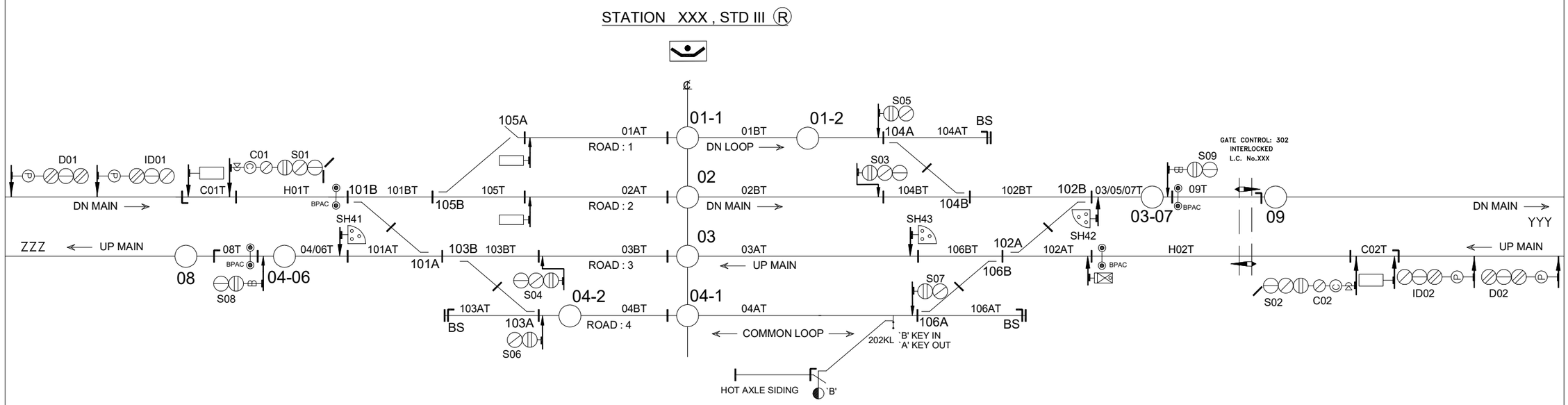
SIGNALLING INTERLOCKING PLAN FOR DOUBLE LINE STATION



(PRINT IN A2 SIZE)

CONTROL TABLE FOR DOUBLE LINE STATION

4 ROAD STATION ON DOUBLE LINE



CH ZONES

CH 01	CH 02	CH 03	CH 04	L C
101	103, 106	104, 105	102	302

PRODUCTION & CHECKER BLOCK					
COMPANY		RAILWAYS		INTERLOCKING CONTROL TABLE	STATION LAYOUT
DRAWN		DRAWN	(SSE/D)*	ICT.SCR.GTL.VPL.Ø2	SHEET No: / VERSION
CHECKED	(SD)†	CHECKED	(ASTE)*		
	(DV)†		(SSTE)*		
APPROVED	(CRE)†	APPROVED	(Dy.CSTE)*	4 RD STATION	ØØ1 / Ø1
CRE: CONTRACTOR'S RESPONSIBLE ENGINEER *SIGNATURE WITH DATE, † SIGNATURE WITH DATE AND LICENSE No					

(PRINT IN A3 SIZE)

SNo.	SIGNAL No.	TO DESTINATION	SELECT ROUTE		IN ROUTE			OVERLAP			ISOLATION POINT		CRANK HANDLE NORMAL	FOULING TRACK CIRCUITS	APPROACH LOCK BY TRACK CIRCUITS	BACK LOCK BY TRACK CIRCUITS	SIGNAL REPLACED BY TRACK CIRCUITS	OVERLAP RELEASES AFTER 120 SEC BY		SLOTTED BY GATE	RELEASED BY OTHER CONTROLS &SIDING POINT DETECTION	LOCKS ROUTES	SIGNAL ASPECT CONTROLLED BY				TCAS/TPWS FITTED	RFID	REMARKS
			SIGNAL BUTTON	ROUTE BUTTON	POINT NORMAL	POINT REVERSE	TRACK CIRCUIT	POINT NORMAL	POINT REVERSE	TRACK CIRCUIT	NORMAL	REVERSE						OCCUPIED BY TRACK CIRCUITS	CLEARENCE OF TRACK CIRCUIT				YELLOW WITH ROUTE	YELLOW	DOUBLE YELLOW	GREEN			
1.	D01	ID01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ID01 HHG/ DG			DG CONTROLLED BY ID01 DG/HHG WITH POINTS No. 101N. 105N
2.	ID01	S01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	S01 HG	S01 DG			DG CONTROLLED BY S01 DG HHG CONTROLLED BY S01 HG
3.	S01	DN MAIN	S01	02	101. 105	—	H01T. 101BT. 105T. 02AT. 02BT	104. 102	—	104BT. 102BT. 03/05/07T	—	—	CH01. CH03. CH04	—	DEAD APPROACH	H01T. 101BT.105T	H 01T	02AT. 02BT	105T	—	—	C01-02. SH42-02	—	S03 RG/ HG/ DG	—	S03 DG			TIME RELEASE 120 SEC
4.	S01	DN LOOP SET TO BS	S01	01-1	101	105	H01T. 101BT. 105T. 01AT. 01BT	104	—	104AT	—	—	CH01. CH03	—	DEAD APPROACH	H01T. 101BT.105T	H 01T	01AT. 01BT	105T	—	—	C01-01-1. SH42-02	S05 RG	—	—	—			TIME RELEASE 120 SEC.
5.	S01	DN LOOP SET TO MAIN	S01	01-2	101	105	H01T. 101BT. 105T. 01AT. 01BT	102	104	104AT. 104BT. 102BT. 03/05/07T	—	—	CH01. CH03. CH04	—	DEAD APPROACH	H01T. 101BT. 105T	H 01T	01AT. 01BT	105T	—	—	C01-01-1. SH42-01-1	S05 RG/ HG	—	—	—			TIME RELEASE 120 SEC.
6.	S01	COMMON LOOP SET TO BS	S01	04-1	—	101. 103	H01T.101BT. 101AT.103BT. 103AT.04BT. 04AT	106	—	106AT	105	—	CH01. CH02. CH03	—	DEAD APPROACH	H01T.101BT. 101AT.103BT. 103AT	H 01T	04BT. 04AT	103AT	—	—	C01-04-1. C02-03. SH42-02. SH42-03	S07 RG	—	—	—			TIME RELEASE 120 SEC. 202 KL-`A' KEY IN.
7.	S01	COMMON LOOP SET TO MAIN	S01	04-2	—	101. 103	H01T.101BT. 101AT.103BT. 103AT.04BT. 04AT	—	106. 102	106AT. 106BT. 102AT. 102BT. 03/05/07T	105	—	CH01. CH02. CH04. CH03	—	DEAD APPROACH	H01T.101BT. 101AT. 103BT. 103AT	H 01T	04BT. 04AT	103AT	—	—	C01-04-1. SH42-04-1	S07 RG/ HG	—	—	—			TIME RELEASE 120 SEC. 202 KL-`A' KEY IN.
8.	C01	DN MAIN	C01	02	101. 105	—	C01T OCCUPIED.	—	—	—	—	—	CH01. CH03	—	DEAD APPROACH	H01T. 101BT.105T	—	—	—	—	—	S01-02. S03-03-07. S05-03-07. S07-03-07. SH42-01-1. SH42-02. SH42-03. SH42-04-1. SH43-03-07	—	—	—	—			TIME RELEASE 120 SEC. HG CLEARS AFTER 60 SEC.
9.	C01	DN LOOP	C01	01-1	101	105	C01T OCCUPIED.	—	—	—	(104W SH42-03 SH42-04-1 SH43-03-07)	—	CH01. CH03	—	DEAD APPROACH	H01T. 101BT. 105T	—	—	—	—	—	S01-01-01.S01-01-2. S05-03-07. SH42-01-1. SH42-02.	—	—	—	—			TIME RELEASE 120 SEC. HG CLEARS AFTER 60 SEC.
10.	C01	COMMON LOOP	C01	04-1	—	101. 103	C01T OCCUPIED.	—	—	—	105	—	CH01. CH02. CH03.	—	DEAD APPROACH	H01T. 101BT. 101AT. 103BT. 103AT	—	—	—	—	—	C02-03. C02-04-1.S01-04-1. S01-04-2. S07-03-07. SH42-02. SH42-03. SH42-04-1.	—	—	—	—			TIME RELEASE 120 SEC. HG CLEARS AFTER 60 SEC. 202 KL`A' KEY IN.

PRODUCTION & CHECKER BLOCK			
COMPANY		RAILWAYS	
DRAWN		DRAWN	(SSE/D)*
CHECKED	(SD)†	CHECKED	(ASTE)*
	(DV)†		(SSTE)*
APPROVED	(CRE)†	APPROVED	(Dy.CSTE)*
CRE: CONTRACTOR'S RESPONSIBLE ENGINEER *SIGNATURE WITH DATE, † SIGNATURE WITH DATE AND LICENSE No			

INTERLOCKING CONTROL TABLE	PART I	
ICT.SCR.GTL.VPL.Ø2	SHEET No:	VERSION
4 RD STATION	ØØ2	Ø1

(PRINT IN A3 SIZE)

SNo.	SIGNAL No.	TO DESTINATION	SELECT ROUTE		IN ROUTE			OVERLAP			ISOLATION		CRANK HANDLE NORMAL	FOULING TRACK CIRCUITS	APPROACK LOCK BY TRACK CIRCUITS	BACK LOCK BY TRACK CIRCUITS	SIGNAL REPLACED BY TRACK CIRCUITS	OVERLAP RELEASES AFTER 120 SEC BY		SLOTTED BY GATE	RELEASED BY OTHER CONTROLS &SIDING POINT DETECTION	LOCKS ROUTES	SIGNAL ASPECT CONTROLLED BY				TCAS/TPWS FITTED	RFID	REMARKS
			SIGNAL BUTTON	ROUTE BUTTON	POINT		TRACK CIRCUIT	POINT		TRACK CIRCUIT	POINT							OCCUPIED BY TRACK CIRCUITS	CLEARENCE OF TRACK CIRCUIT				YELLOW WITH ROUTE	YELLOW	DOUBLE YELLOW	GREEN			
					NORMAL	REVERSE		NORMAL	REVERSE		NORMAL	REVERSE																	
11.	D02	ID02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	ID02 HHG/ DG			DG CONTROLLED BY ID02 DG/HHG WITH POINTS No. 106N
12.	ID02	S02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	S02 HG	S02 DG			DG CONTROLLED BY S02 DG
13.	S02	UP MAIN	S02	03	102. 106	—	H02T.102AT. 106BT. 03AT. 03BT	103. 101	—	103BT. 101AT. 04/06T	—	—	CH04. CH02. CH01	—	DEAD APPROACH	H02T. 102AT. 106BT	H 02T	03AT. 03BT	106BT	302	—	C02-03. SH41-03	—	S04 RG/ HG/ DG	—	S04 DG			TIME RELEASE 120 SEC
14.	S02	COMMON LOOP SET TO BS	S02	04-1	102	106	H02T.102AT. 106BT. 106AT. 04AT. 04BT	103	—	103AT	—	—	CH04. CH02	—	DEAD APPROACH	H02T. 102AT. 106BT. 106AT	H 02T	04AT. 04BT	106AT	302	202N	C02-04-1. SH41-03	S06 RG	—	—	—			TIME RELEASE 120 SEC. 202 KL-`A' KEY IN.
15.	S02	COMMON LOOP SET TO MAIN	S02	04-2	102	106	H02T.102AT. 106BT. 106AT. 04AT. 04BT	101	103	103AT.103BT. 101AT. 04/06T	—	—	CH04. CH02. CH01	—	DEAD APPROACH	H02T. 102AT. 106BT. 106AT	H 02T	04AT. 04BT	106AT	302	202N	C02-04-1. SH41-04-1	S06 RG/ HG	—	—	—			TIME RELEASE 120 SEC. 202 KL-`A' KEY IN.
16.	C02	DN MAIN	C02	03	102. 106	—	C02T OCCUPIED.	—	—	—	—	—	CH04. CH02	—	DEAD APPROACH	H02T. 102AT. 106BT	—	—	—	302	—	S01-04-1.CO1-04-1. S02-03.S04-04-06. S06-04-06.SH41-03. SH41-04-1	—	—	—	—			TIME RELEASE 120 SEC. HG CLEARS AFTER 60 SEC.
17.	C02	COMMON LOOP	C02	04-1	102	106	C02T OCCUPIED.	—	—	—	—	—	CH04. CH02	—	DEAD APPROACH	H02T. 102AT. 106BT. 106AT	—	—	—	302	202N	C01-04-1. S02-04-2.S02-04-1. S06-04-06. SH41-03.SH41-04-1	—	—	—	—			TIME RELEASE 120 SEC. HG CLEARS AFTER 60 SEC. 202 KL-`A' KEY IN.
18.	S03	DN MAIN	S03	03-07	104. 102	—	104BT. 102BT. 03/05/07T	—	—	—	—	—	CH03. CH04	—	02AT. 02BT, S01-02	104BT. 102BT	104BT	—	—	—	—	C01-02. SH42-02	—	S09 RG/ DG	—	S09 DG			TIME RELEASE 120 SEC
19.	S04	UP MAIN	S04	04-06	103. 101	—	103BT. 101AT. 04/06T	—	—	—	—	—	CH02. CH01	—	03AT. 03BT, S02-03	103BT. 101AT	103BT	—	—	—	—	C02-03. SH41-03. SH42-03.	—	S08 RG/ DG	—	S08 DG			TIME RELEASE 120 SEC
20.	S05	DN MAIN	S05	03-07	102	104	104AT. 104BT. 102BT. 03/05/07T	—	—	—	—	—	CH03. CH04	—	01AT. 01BT	104AT. 104BT. 102BT	104AT	—	—	—	—	C01-01-1. C01-02. SH42-01-1	—	S09 RG/ DG	—	—			TIME RELEASE 120 SEC

PRODUCTION & CHECKER BLOCK			
COMPANY		RAILWAYS	
DRAWN		DRAWN	(SSE/D)*
CHECKED	(SD)†	CHECKED	(ASTE)*
	(DV)†		(SSTE)*
APPROVED	(CRE)†	APPROVED	(Dy.CSTE)*
CRE: CONTRACTOR'S RESPONSIBLE ENGINEER *SIGNATURE WITH DATE, † SIGNATURE WITH DATE AND LICENSE No			

INTERLOCKING CONTROL TABLE	PART II	
ICT.SCR.GTL.VPL.Ø2	SHEET No:	VERSION
4 RD STATION	ØØ3	Ø1

(PRINT IN A3 SIZE)

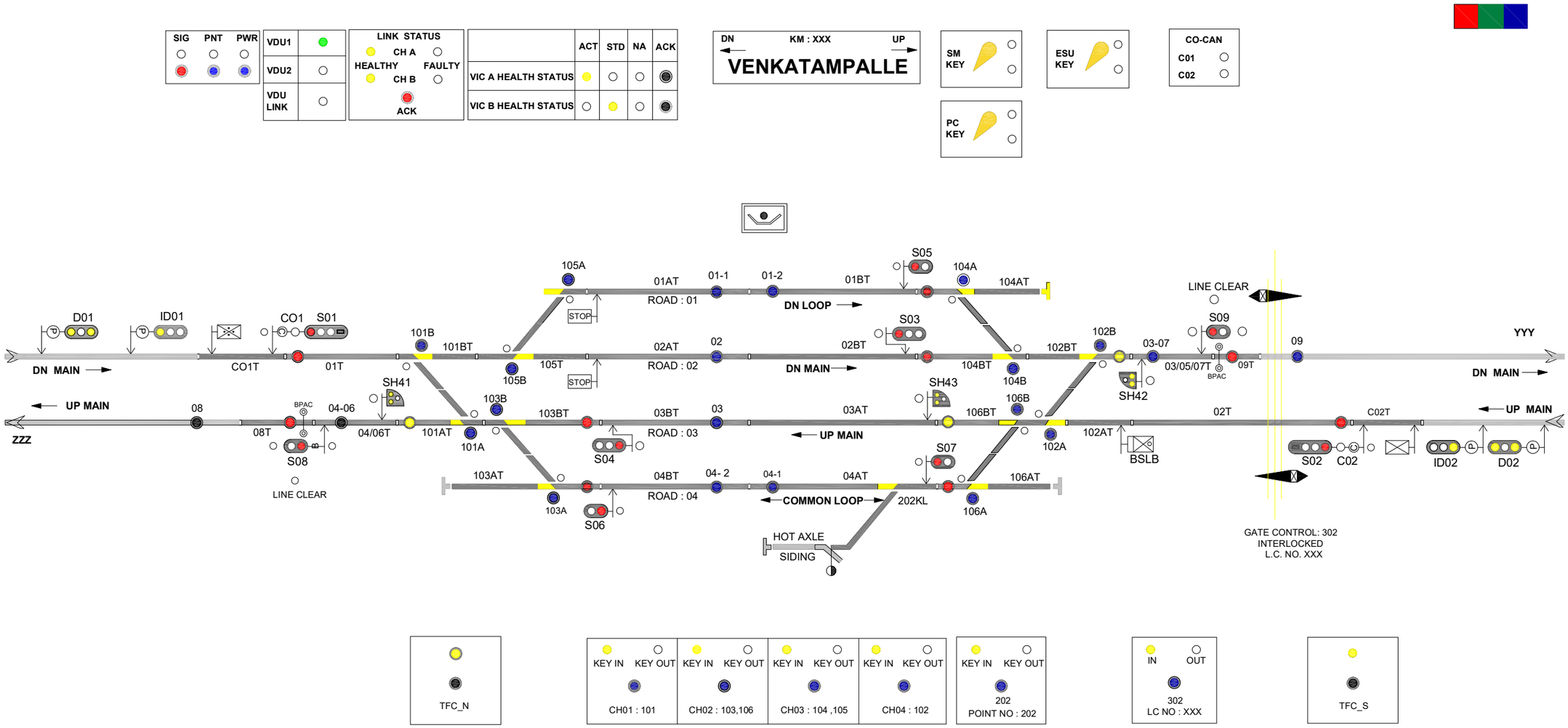
SNo.	SIGNAL No.	TO DESTINATION	SELECT ROUTE		IN ROUTE			OVERLAP			ISOLATION		CRANK HANDLE NORMAL	FOULING TRACK CIRCUITS	APPROACK LOCK BY TRACK CIRCUITS	BACK LOCK BY TRACK CIRCUITS	SIGNAL REPLACED BY TRACK CIRCUITS	OVERLAP RELEASES AFTER 120 SEC BY		SLOTTED BY GATE	RELEASED BY OTHER CONTROLS &SIDING POINT DETECTION	LOCKS ROUTES	SIGNAL ASPECT CONTROLLED BY				TCAS/TPWS FITTED	RFID	REMARKS
					POINT			POINT			POINT							OCCUPIED BY TRACK CIRCUITS	CLEARENCE OF TRACK CIRCUIT				YELLOW WITH ROUTE	YELLOW	DOUBLE YELLOW	GREEN			
			SIGNAL BUTTON	ROUTE BUTTON	NORMAL	REVERSE	TRACK CIRCUIT	NORMAL	REVERSE	TRACK CIRCUIT	NORMAL	REVERSE																	
21.	S06	UP MAIN	S06	04-06	101	103	103AT. 103BT. 101AT. 04/06T	—	—	—	—	—	CH02. CH01	—	04BT. 04AT	103AT. 103BT. 101AT	103AT	—	—	—	202N	C02-03. C02-04-1. SH42-03. SH42-04-1. SH41-04-1	—	S08 RG/ DG	—	—			TIME RELEASE 120 SEC. 202 KL-`A' KEY IN.
22.	S07	DN MAIN	S07	03-07	—	106. 102	106AT. 106BT. 102AT. 102BT. 03/05/07T	—	—	—	104	—	CH02. CH04. CH03	—	04BT. 04AT	106AT. 106BT. 102AT. 102BT	106AT	—	—	—	—	C01-02. C01-04-1. SH42-04-1. SH41-03. SH41-04-1.	—	S09 RG/ DG	—	—			TIME RELEASE 120 SEC. 202 KL-`A' KEY IN.
23.	S08	UP MAIN	S08	08	101	—	08T	—	—	—	—	—	CH01	—	—	—	08T	—	—	—	—	SH41-03. SH41-04-1	—	—	—	—			CONTROLLED BY UP LINE BLOCK INSTRUMENT `LINE CLEAR' CONDITION. UP LINE BPAC CLEAR.
24.	S09	DN MAIN	S09	09	—	—	09T	—	—	—	—	—	—	—	—	—	09T	—	—	302	—	SH42-01-1. SH42-02. SH42-03. SH42-04-1. SH43-03-07	—	—	—	—			CONTROLLED BY DN LINE BLOCK INSTRUMENT `LINE CLEAR' CONDITION. DN LINE BPAC CLEAR.
25.	SH41	UP MAIN	SH41	03	101. 103	—	101AT. 103BT	—	—	—	—	—	CH01. CH02	—	04/06T	101AT. 103BT	101AT	—	—	—	—	S02-03. S02-04-1. C02-03. C02-04-1. S04-04-06. S07-03-07. S08-08. SH42-03	—	—	—	—			TIME RELEASE 120 SEC
26.	SH41	COMMON LOOP	SH41	04-1	101	103	101AT. 103BT. 103AT	—	—	—	—	—	CH01. CH02	—	04/06T	101AT. 103BT. 103AT	101AT	—	—	—	—	S02-04-2. C02-03. C02-04-1. S06-04-06. S07-03-07. S08-08. SH42-04-1	—	—	—	—			TIME RELEASE 120 SEC
27.	SH42	DN LOOP	SH42	01-1	102	104	102BT. 104BT. 104AT	—	—	—	—	—	CH04. CH03	—	03/05/07T	102BT. 104BT. 104AT	102BT	—	—	—	—	S01-01-2. C01-01-1.C01-02. S05-03-07.S09-09	—	—	—	—			TIME RELEASE 120 SEC
28.	SH42	DN MAIN	SH42	02	102. 104	—	102BT. 104BT	—	—	—	—	—	CH04. CH03	—	03/05/07T	102BT. 104BT	102BT	—	—	—	—	S01-01-1. S01-02. S01-04-1. C01-01-1. C01-02. C01-04-1. S03-03-07. S09-09	—	—	—	—			TIME RELEASE 120 SEC
29.	SH42	UP MAIN	SH42	03	106	102	102BT. 102AT. 106BT	—	—	—	104 W C01-01-1	—	CH04. CH02.	—	03/05/07T	102BT. 102AT. 106BT	102BT	—	—	—	—	S01-04-1. C01-02. C01-04-1. S04-04-06. S06-04-06. S09-09. SH41-03. SH43-03-07.	—	—	—	—			TIME RELEASE 120 SEC
30.	SH42	COMMON LOOP	SH42	04-1	—	102. 106	102BT. 102AT. 106BT. 106AT	—	—	—	104 W C01-01-1	—	CH04. CH02.	—	03/05/07T	102BT. 102AT. 106BT. 106AT	102BT	—	—	—	202N	S01-04-2. C01-02. C01-04-1. S06-04-06. S07-03-07. S09-09. SH41-04-1	—	—	—	—			TIME RELEASE 120 SEC. 202 KL-`A' KEY IN.
31.	SH43	DN MAIN	SH43	03-07	106	102	106BT. 102AT. 102BT	—	—	—	104 W C01-01-1	—	CH02. CH04.	—	03BT. 03AT	106BT. 102AT. 102BT	106BT	—	—	—	—	C01-02. S09-09. SH42-03	—	—	—	—			TIME RELEASE 120 SEC

PRODUCTION & CHECKER BLOCK			
COMPANY		RAILWAYS	
DRAWN		DRAWN	(SSE/D)*
CHECKED	(SD)†	CHECKED	(ASTE)*
	(DV)†		(SSTE)*
APPROVED	(CRE)†	APPROVED	(Dy.CSTE)*
CRE: CONTRACTOR'S RESPONSIBLE ENGINEER *SIGNATURE WITH DATE, † SIGNATURE WITH DATE AND LICENSE No			

INTERLOCKING CONTROL TABLE	PART III	
ICT.SCR.GTL.VPL.Ø2	SHEET No:	VERSION
4 RD STATION	ØØ4	Ø1

(PRINT IN A3 SIZE)

VDU LAYOUT PLAN FOR ELECTRONIC INTERLOCKING (EI)



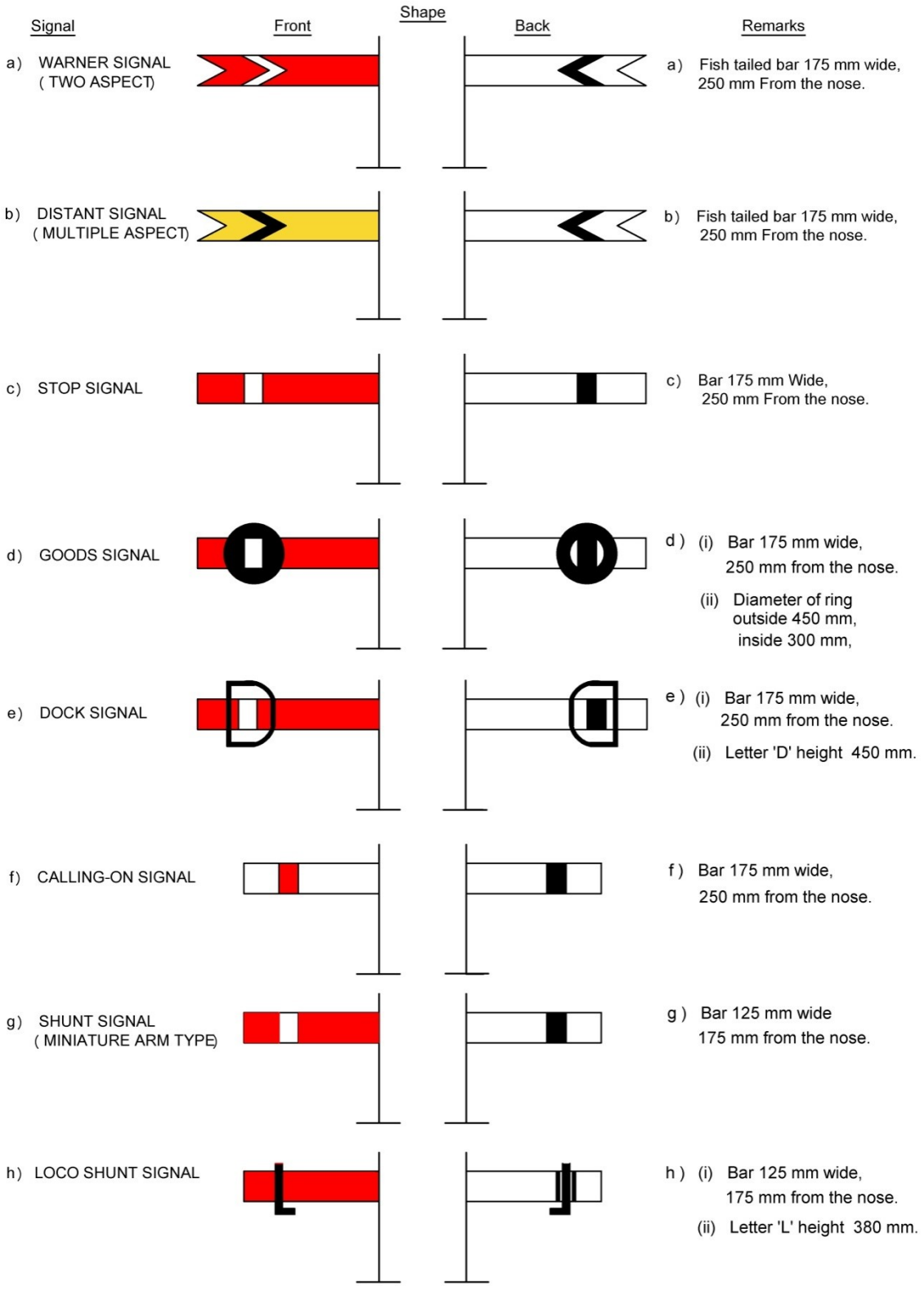
PRODUCTION & CHECKER BLOCK			
COMPANY		RAILWAYS	
DRAWN		DRAWN	(SSE/D)*
CHECKED	(SD)†	CHECKED	(ASTE)*
	(DV)†		(SSTE)*
APPROVED	(CRE)†	APPROVED	(Dy.CSTE)*
CRE: CONTRACTOR'S RESPONSIBLE ENGINEER *SIGNATURE WITH DATE, † SIGNATURE WITH DATE AND LICENSE No			

VDU LAYOUT	VDU LAYOUT	
FPD.SCR.GTL.VPL.Ø1	SHEET No:	VERSION
VENKATAMPALLE	ØØ1	Ø1

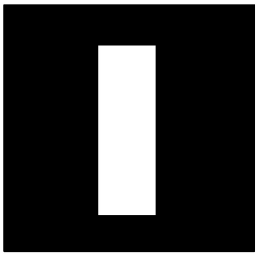
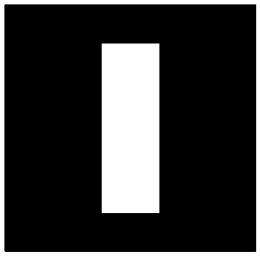
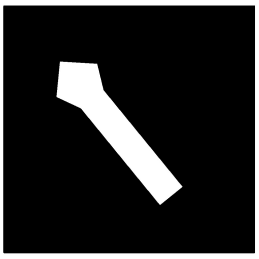
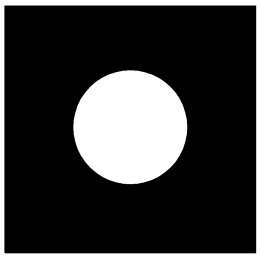
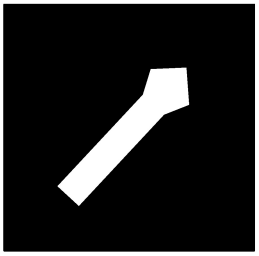
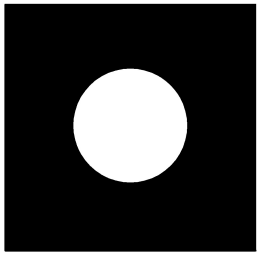
PRINT IN COLOUR (A3 SIZE)

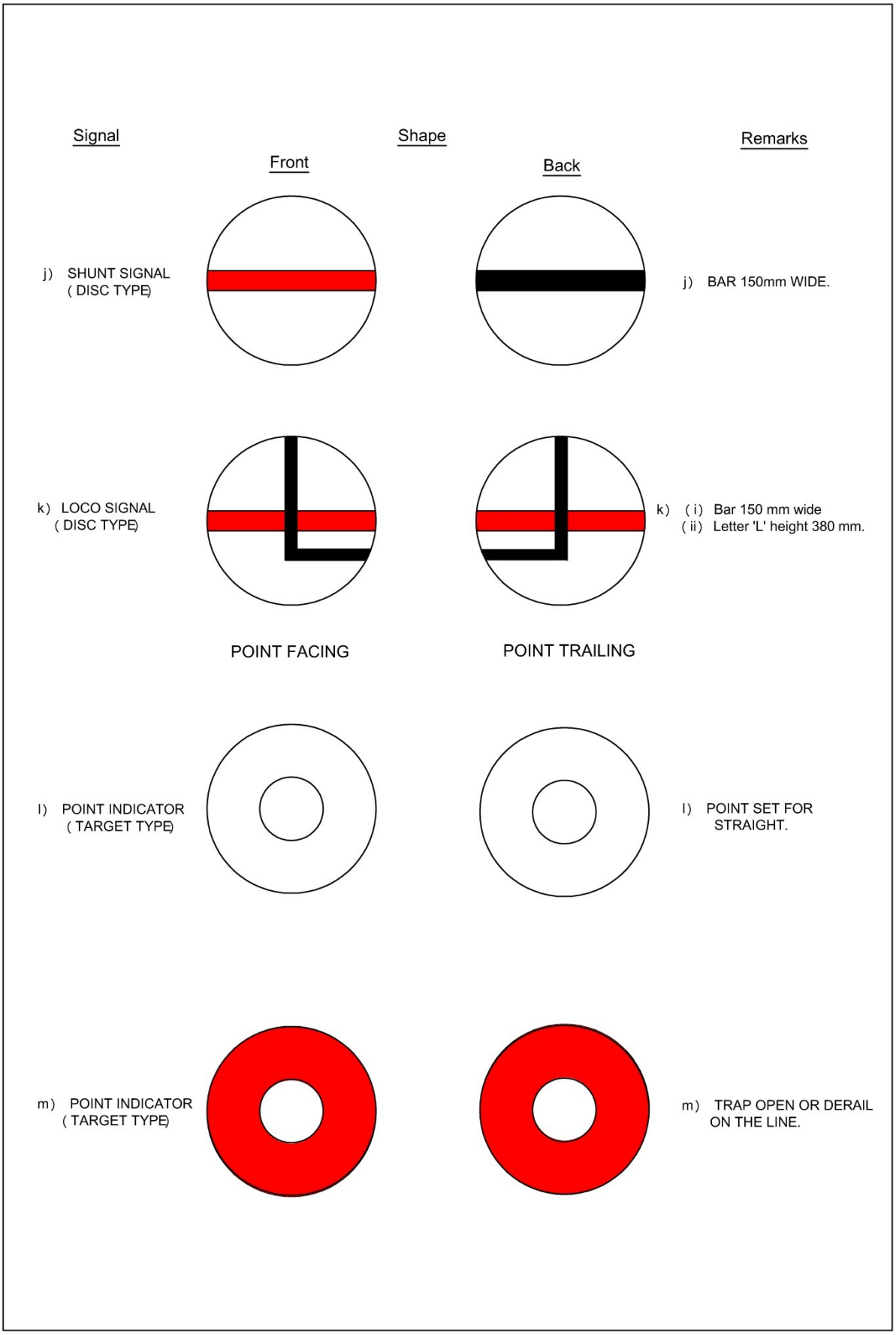
MECHANICAL SIGNALLING GEARS - COLOURING SCHEME

SEMAPHORE SIGNAL ARMS, POINT INDICATORS, BOARDS & MARKERS

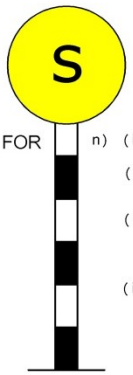
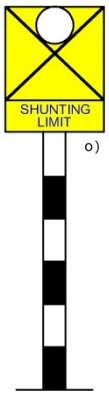
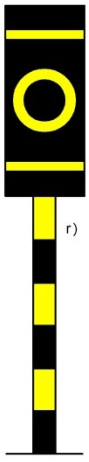


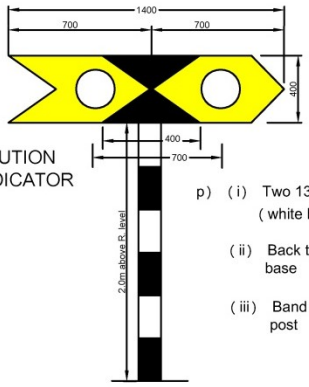
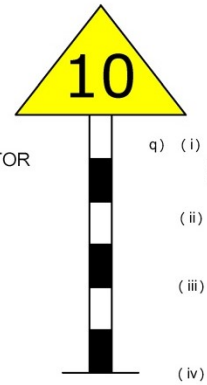
PRINT IN COLOUR

Signal	Shape		Remarks
	Point Facing	Point Trailing	
			i) (i) Points set for straight.
i) POINT INDICATOR (DIRECTIONAL TYPE)			(ii) Points set for left hand turnout.
			(iii) Points set for right hand turnout.



PRINT IN COLOUR

Signal	Shape	Remark
n) `S' MARKER FOR OUTLYING SIDINGS		n) (i) Disc diameter : 1 metre. (ii) Letter 'S' height : 300 mm. : 40 mm thick (iii) Height of centre of disc from rail level : 2000 mm (iv) Bands on the post : 300 mm wide, Black & White bands alternately
o) SHUNTING LIMIT BOARD		o) (i) Rectangular board : 600 mm x 1 metre (ii) Height from rail level to the underside of the board containinng the cross : 2000 mm (iii) Bands on the post : 300 mm wide Black & White bands alternately
r) GOODS WARNING BOARD		r) (i) Rectangular board : 535 x 1800 mm (ii) Yellow band & circle as shown : 140 mm (iii) Plastic reflector as shown (iv) Band on the post : 300 mm wide, Black & Yellow bands alternately.

Signal	Shape	Remark
p) CAUTION INDICATOR		p) (i) Two 130mm. Yellow lights (white back lights) (ii) Back triangle base : 400 mm (iii) Band on the post : 300 mm wide, Black & White bands alternately
q) SPEED INDICATOR		q) (i) Equilateral traingular board-side : 1 metre (ii) letters indicating speed-hight : 300 mm, 40 mm thick (iii) Height from rail level to bottom of the board : 2000 mm (iv) Band on the post : 300 mm wide Black & White bands alternately

(Ref.-Annexure 8/4-para 807 & 808 of P-Way Manual)

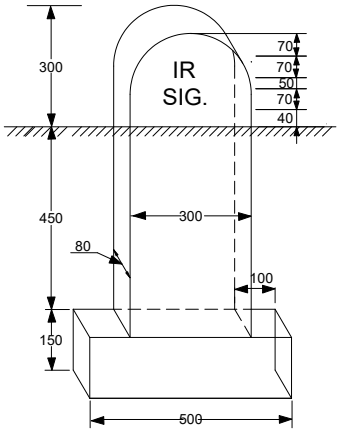
(Ref.-Annexure 8/4-para 807 & 808 of P-Way Manual)

PRINT IN COLOUR

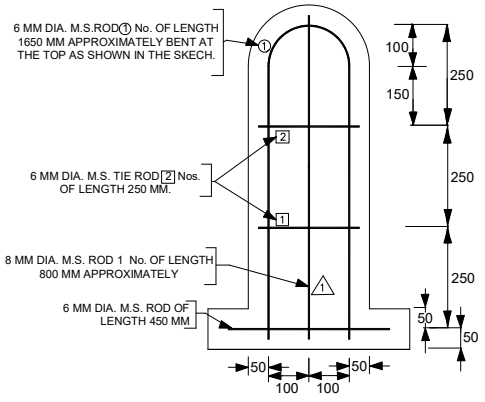
COLOURING SCHEME		
S.No.	**EQUIPMENT**	**COLOUR**
1	Signal arms, point indicators, boards & markers	As per shape &colour as shown in figures.
2	**Signal Post & Signal Fitting** **(a) Signal Post** (i) Up to a height of 2 meters above rail level (ii) Balance of the post (b)Signal spectacle & other fittings on the post (c) Shunt Signal counter weight, side facing cabin man	 Black White Black White
3	**Interlocking Frames, their Levers and Fittings** : Levers above quadrants shall be painted with enamels in colours as under :- (a) Warner Lever (b) (i) Distant Signal lever 45 degree aspect (ii) -do- 90 degree aspect (c) Other Signal levers (d) (i) Slot lever mechanical (ii) Slot lever electrical (e) Point lever	 Green Yellow Green Red Same colour as of the lever slotted with a 150 mm wide blue band in the middle. Same colour as of the lever slotted with a 150 mm wide yellow band in the middle. Black

S. No.	EQUIPMENT	COLOUR
	(f) Facing point lock lever	Blue
	(g) Economical Facing point lock lever	Upper Half-Black
		Lower Half-Blue
	(h) Station Master's Control lever	Upper Half-White
		Lower Half-Black
	(i) Level crossing Gate control lever	Chocolate
	(j) Release Lock Lever	Black with a 150mm wide Blue band in the middle.
	(k) Detector (Double Wire)	Red and Blue bands 150mm wide alternately.
	(l) Route lever	Upper half-Red Lower half – Black
	(m) Siding key control lever	Black
	(n) King lever	Red & White bands 150 mm wide alternately.
	(o) Spare lever	White
4	**Interlocking Frame parts and Fittings except levers above quadrants.**	
	(a) Interlocking frame supports, Quadrants, Levers below Quadrants, locking troughs, Drop Block, Catch Handle connections, Indicator plates.	Black
	(b) Down rods between lever tail and pedestal crank	Black
5	**Ground and Miscellaneous**- Cranks, compensators, wheels, stakes facing point locks, lock bars detectors, cabin wire adjusters, interlocking key boxes and foot. Rests.	Black

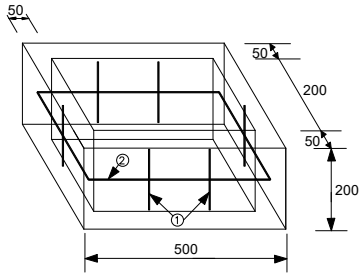
DRAWING FOR RCC CABLE MARKER



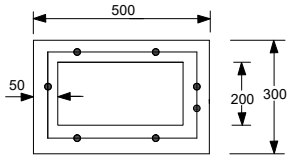
REINFORCEMENT DETAILS FOR RCC CABLE MARKER



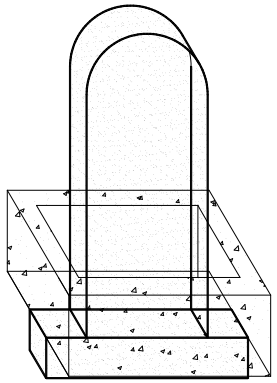
3D VIEW



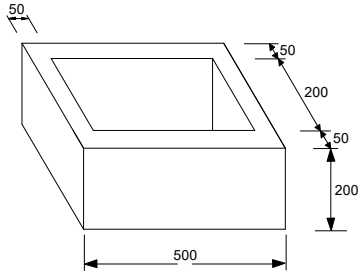
TOP VIEW



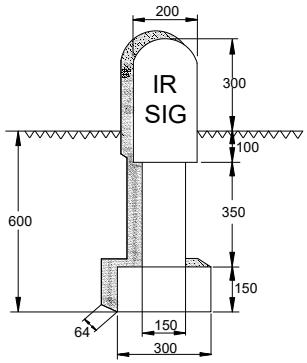
① VERTICAL MS RODS OF 8 MM Dia., 150 MM HEIGHT : 08 NUMBERS
② HORIZONTAL MS RINGS (350 x 350) OF 8 MM Dia. : 01 NUMBERS



CONCRETE SKIRTING FOR PLACING ON CABLE MARKER

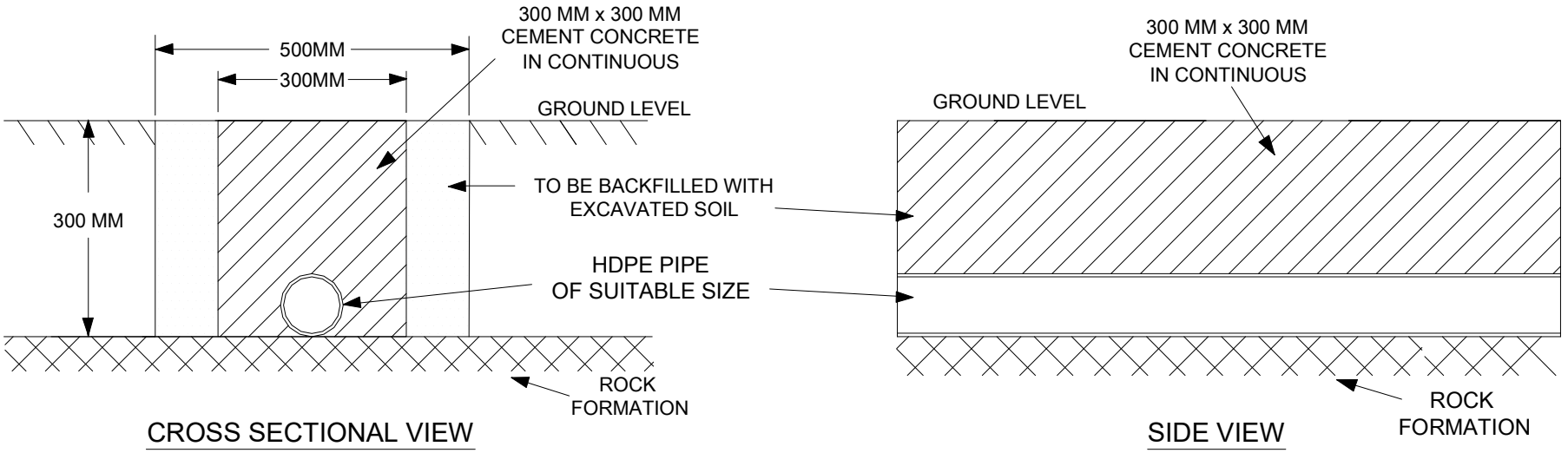


NOTE:-
1. ALL DIMENSIONS ARE IN MM.
2. CABLE MARKER SHALL BE ENGRAVED WITH IR SIG / IR QUAD / IR OFC AS THE CASE MAY BE OF 2.8" (70 MM) HEIGHT.
3. CABLE MARKERS SHALL BE PAINTED IN RED COLOR PAINT FOR SIGNALLING CABLES ENGRAVED LETTERS SHALL BE PAINTED IN WHITE COLOR CEMENT PAINT.
4. AFTER PLACING PRECAST RCC SKIRTING ON THE PRECAST RCC MARKER AS SHOWN, GAP BETWEEN THE CABLE MARKER AND SKIRTING SHALL BE FILLED WITH RICH MORTAR.
5. THE PROPORTION FOR CEMENT, SAND & JELLY SHALL BE 1:2:4 WITH 6 MM TO 10 MM GRANITE METAL.
6. FOR MILD STEEL THE SPECIFICATION IS IS:432.
7. CABLE MARKERS SHALL BE PLACED AT AN INTERVAL OF 20 M WITH IN STATION SECTION AND 50 M IN BLOCK SECTION FOR GUIDANCE ONLY.



NOTE:-
1. ALL DIMENSIONS ARE IN MILLI METER.
2. PAINTED WHITE LETTERS ON RED BACK GROUND
3. FOUNDATION CONCRETE OF 300 MM FROM THE BASE OF THE MARKER SHALL BE DONE AT SITE AT ALL PLACES WITH MIX 1:3:5.
4. COMPONENT CONCRETE SHALL BE OF M25 MIX AND WIRE MESH OF 1.5 MM THICK MESS SHALL BE USED.
5. THE ENGRAVING OF "RLY" & "SIG" SHALL BE DONE ON BOTH SIDES OF THE MARKER AND ENGRAVED SIDE SHALL BE PLACED PARALLEL TO THE LENGTH OF CABLE ROUTE.

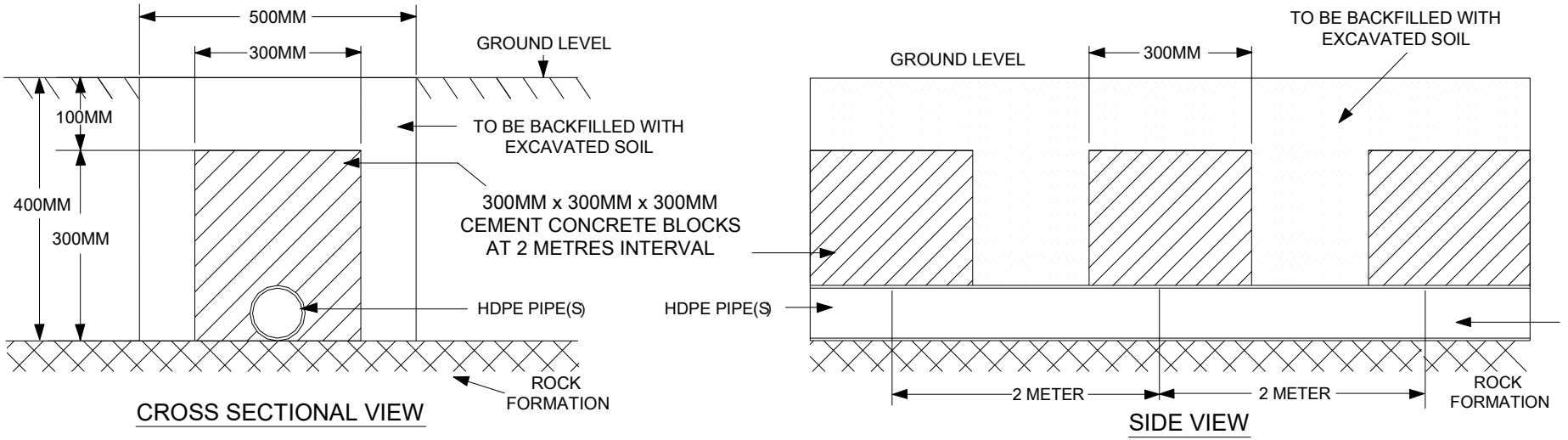
DRAWING FOR CABLE LAYING WHEN ROCK FACED AT 300 MM DEPTH FROM GROUND LEVEL



NOTE :

1) ALL DIMENSIONS ARE IN MILLIMETER.
2) CEMENT CONCRETING OF 300 MM x 300 MM SHALL BE PROVIDED IN CONTINUOUS.
3) CONCRETING WITH MIXTURE OF CEMENT RIVER SAND/ M-SAND. AND JELLY CHIPS OF SIZE 20 MM WITH RATIO 1:3:6.
4) HDPE PIPE AS PER IS-4984 TO BE USED.
5) REFILLED SOIL SHALL BE RAMMED TO THE EARTH LEVEL.

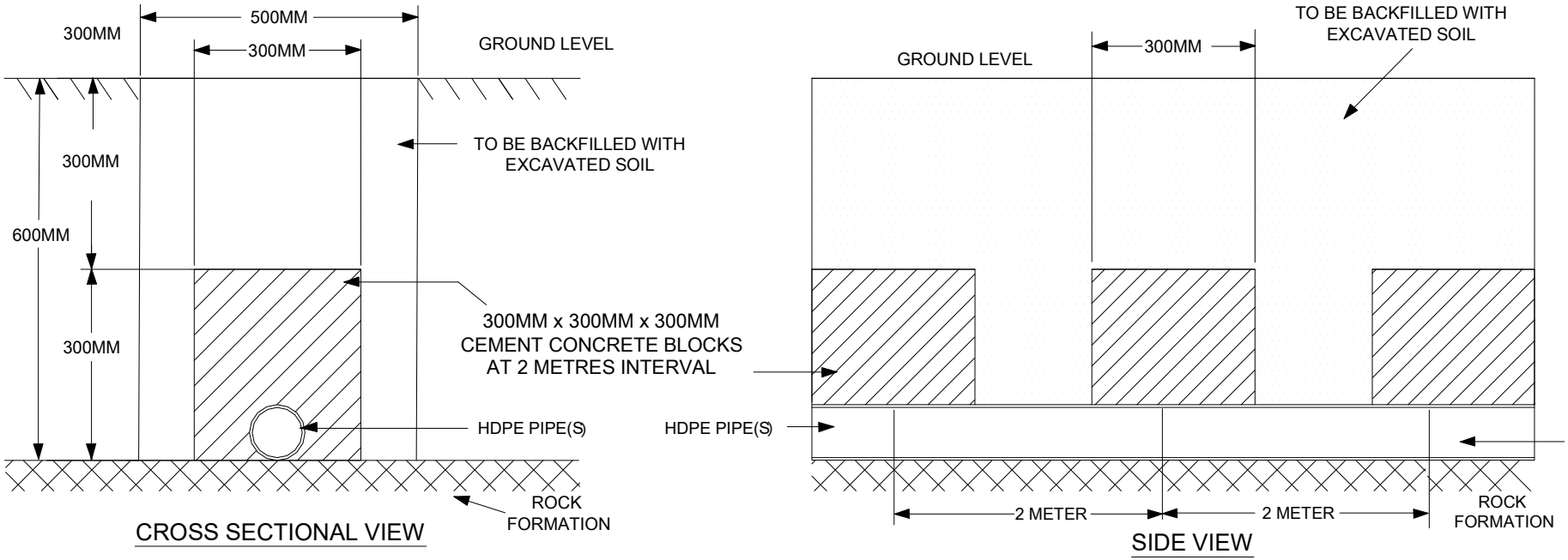
DRAWING FOR CABLE LAYING WHEN ROCK FACED AT 400 MM DEPTH FROM GROUND LEVEL



NOTE :

1) ALL DIMENSIONS ARE IN MILLIMETER.
2) CEMENT CONCRETING BLOCKS OF 300MM X 300MM SHALL BE PROVIDED AT 2 METRES INTERVAL.
3) CONCRETING WITH MIXTURE OF CEMENT RIVER SAND/ AN JELLY CHIPS OF SIZE 20 MM WITH RATIO 1:3:6.
4) HDPE PIPE AS PER IS-4984 TO BE USED.
5) REFILLED SOIL SHALL BE RAMMED TO THE EARTH LEVEL.

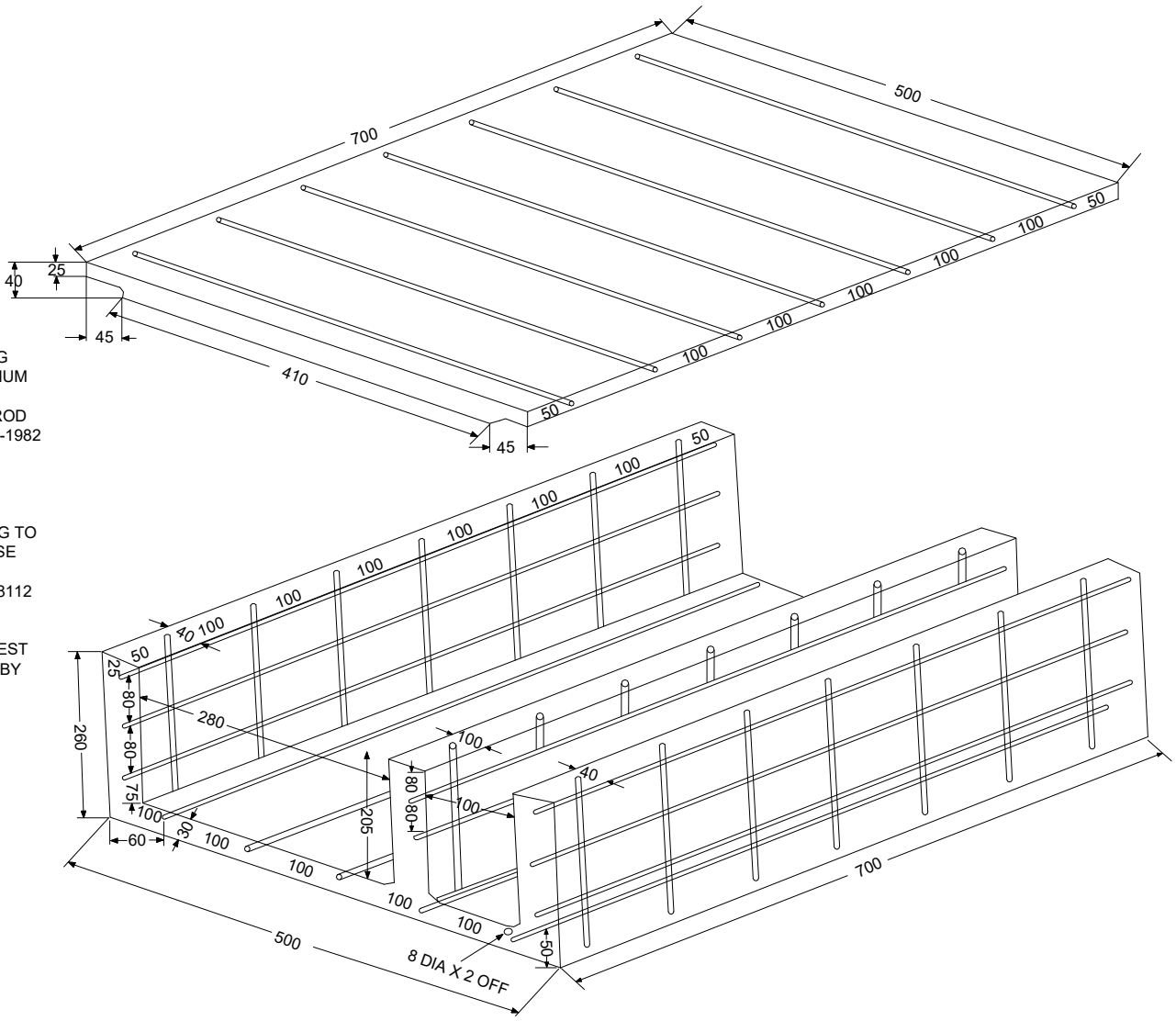
DRAWING FOR CABLE LAYING WHEN ROCK FACED AT 600 MM DEPTH FROM GROUND LEVEL



NOTE :

1) ALL DIMENSIONS ARE IN MILLIMETER.
2) CEMENT CONCRETING BLOCKS OF 300MM X 300MM SHALL BE PROVIDED AT 2 METRES INTERVAL.
3) CONCRETING WITH MIXTURE OF CEMENT RIVER SAND/ AN JELLY CHIPS OF SIZE 20 MM WITH RATIO 1:3:6.
4) HDPE PIPE AS PER IS-4984 TO BE USED.
5) REFILLED SOIL SHALL BE RAMMED TO THE EARTH LEVEL.

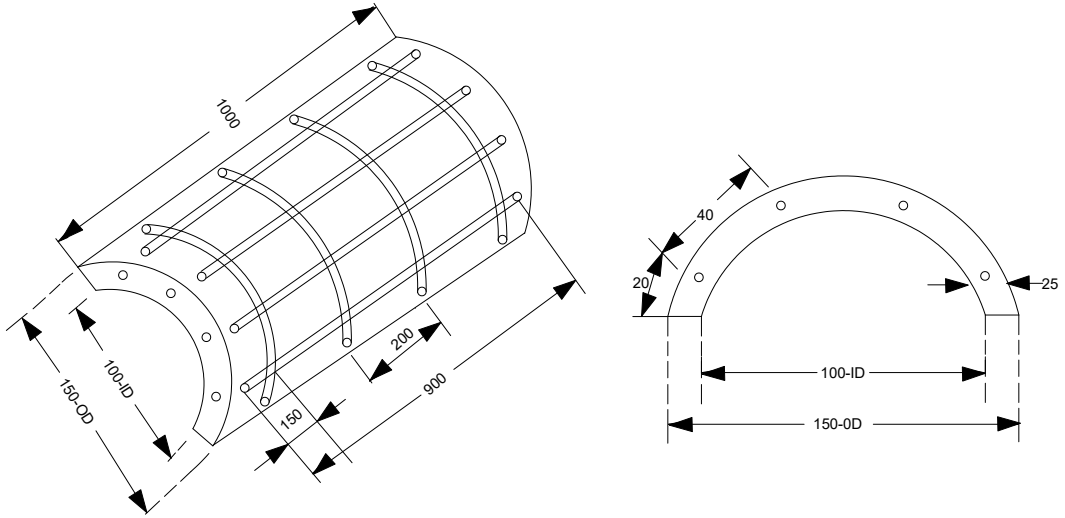
DRAWING FOR RCC DUCT 500 MM



Note : -

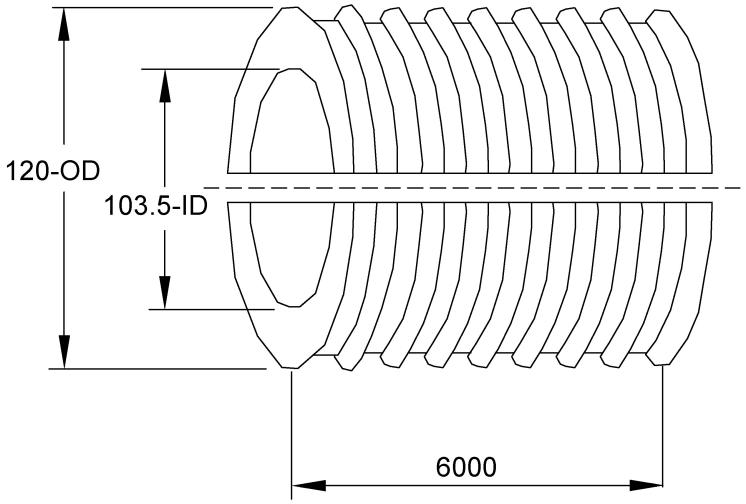
1. TRUNKING AND CAPPING ARE SUITABLE FOR BURYING ADJACENT TO THE TRACKS IN TRENCHES WITH MINIMUM DEPTH OF 600 MM.
2. THE TRUNKING TO BE ALLIGNED BY PUTTING AN MS ROD OF 8 MM DIA. x 100 MM LONG AS PER IS : 432 PART (1) -1982 IN THE TWO HOLES PROVIDED.
3. 6.0 MM DIA. HIGH STRENGTH DEFORMED STEEL BARS CONFORMING TO IS : 11786 TO BE USED FOR REINFORCEMENT.
4. M-25 GRADE OF CONCRETE TO BE USED CONFORMING TO IS : 10262 -1982 AND IS : 456 - 2000 - 10 MM SIZE COURSE AGGREGATE TO BE USED .
5. OPC OF 43 GRADE TO BE USED CONFORMING TO IS : 8112 - 1989.
6. THE ACCEPTANCE TEST SHALL BE CONDUCTED IN A RECOGNISED LABORATORY AND THE COST OF THE TEST AS CHARGED BY THE LABORATORY SHALLBE BORNE BY THE CONTRACTOR.
7. CURING SHALL BE DONE AS PER THE IS : 456 - 2000.
8. DUCT MAY BE IN SITU OR FACTORY MADE.
9. ALL DIMENSIONS ARE IN MILLIMETER.

DRAWING OF RCC SPLIT PIPE (100 MM DIA.)

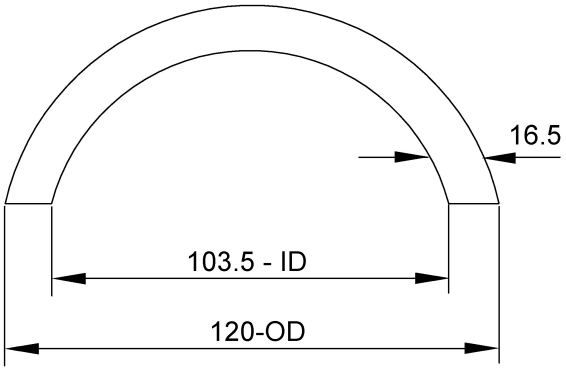


1. RCC SPLIT PIPE SIMILAR TO NP2 PIPES CONSISTING REINFORCED CONCRETE AND ARE SUITABLE FOR BURYING ADJACENT TO THE TRACKS IN TRENCHES WITH MINIMUM DEPTH OF 600 MM.
2. 8 SWG GI MILD STEEL WIRE CONFORMING TO IS:280-2006 TO BE USED FOR REINFORCEMENT.
3. M-25 GRADE OF CONCRETE TO BE USED CONFORMING TO IS:10262-1982 AND IS:456-2000 WITH MAXIMUM 6 MM SIZE COURSE AGGREGATE.
4. OPC OF 43 GRADE TO BE USED CONFORMING TO IS:8112-1989.
5. THE CUBE TEST SHALL BE CONDUCTED IN A RECOGNISED LABORATORY AND THE COST OF THE TEST AS CHARGED BY THE LABORATORY SHALL BE BORNE BY THE CONTRACTOR.
6. CURING SHALL BE DONE AS PER THE IS:456-2000.
7. PIPE SHALL BE FACTORY MADE.
8. ALL DIMENSIONS ARE IN MILLIMETER.

DRAWING OF DWC SPLIT PIPE (120 MM DIA.)



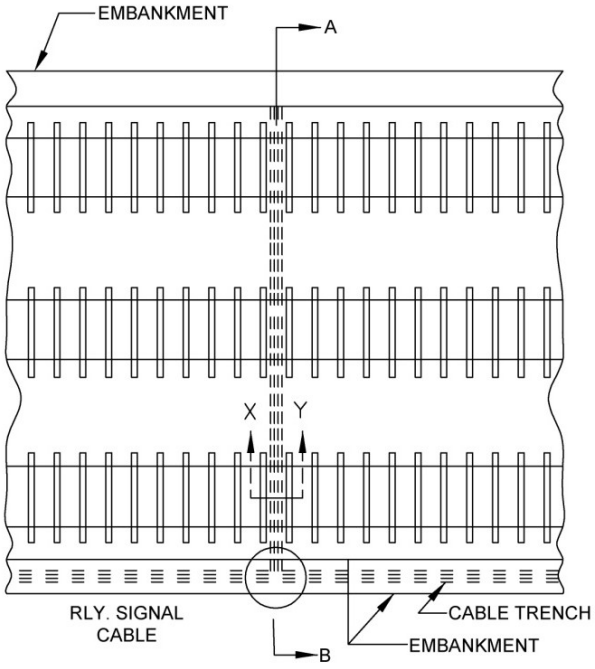
SIDE VIEW



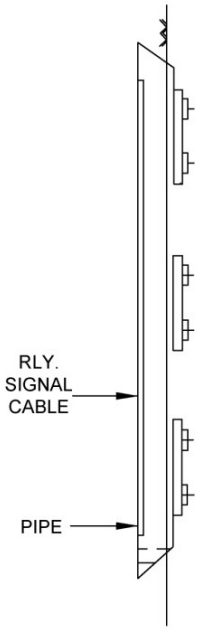
CROSS SECTIONAL VIEW

1. DWC SPLIT PIPE OF ID 103.5 MM DIA. AND OD 120 MM DIA. OF STANDARD LENTH OF 6 Mtrs.
   WITH COUPLERS SHALL BE PROVIDED SUITABLE FOR BURYING ADJACENT TO THE TRACKS.
2. PIPE SHALL BE FACTORY MADE AS PER IS SPEC.NO.14830(PART-2):2001.
3. ALL DIMENSIONS ARE IN MILLI METER.

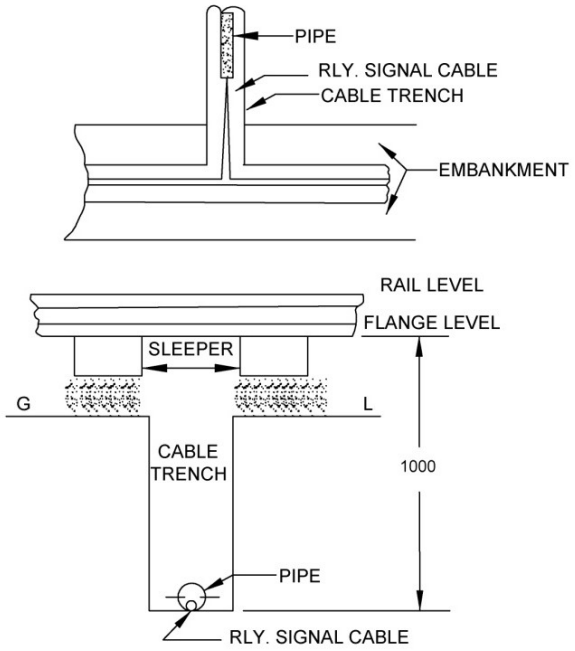
DRAWING FOR ROAD / TRACK CROSSING



PLAN

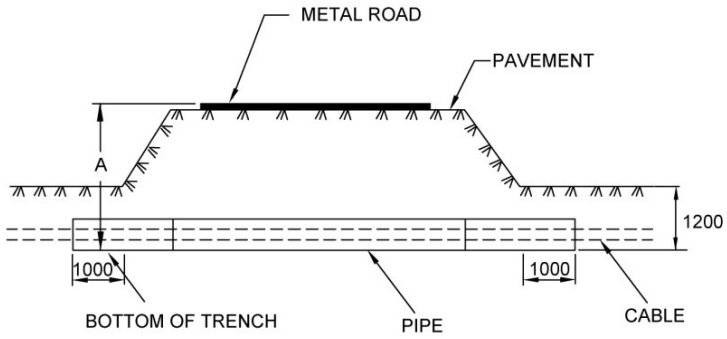


SECTION ON AB



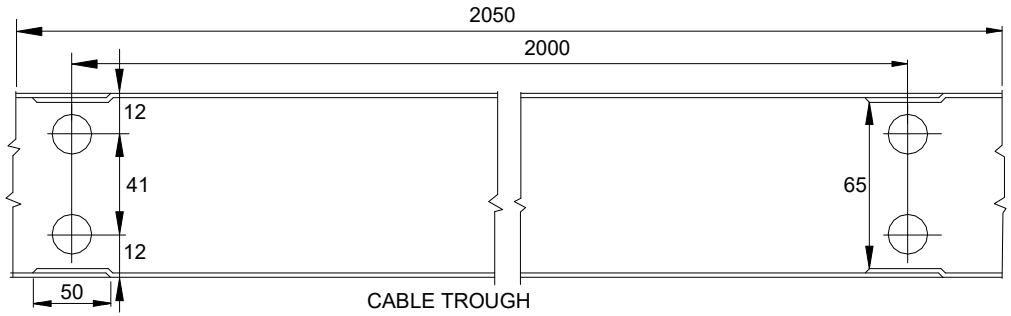
ENLARGED SECTIONAL VIEW AT XY

NOTE: ALL DIMENSIONS ARE IN MILLIMETER.

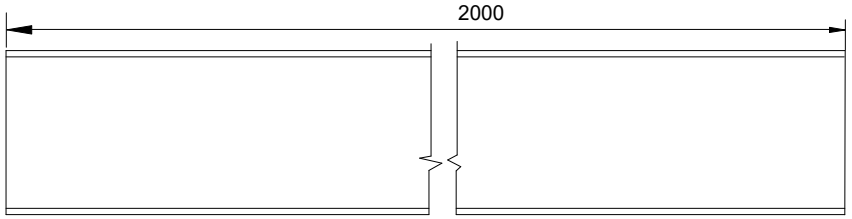


Drg.No.15-D6

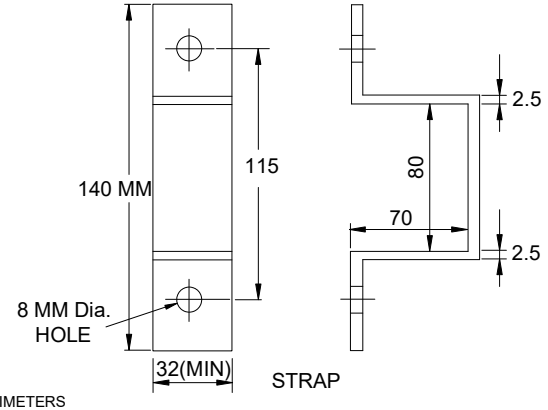
DRAWING FOR CABLE TROUGH FOR METALLIC BRIDGE



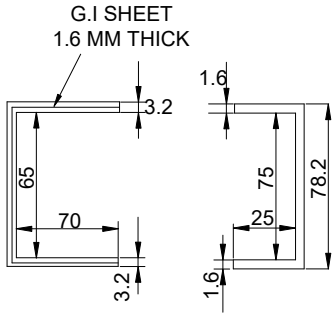
CABLE TROUGH

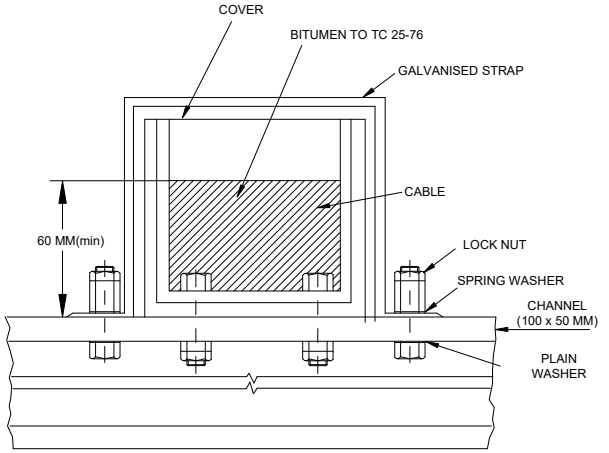


COVER



STRAP





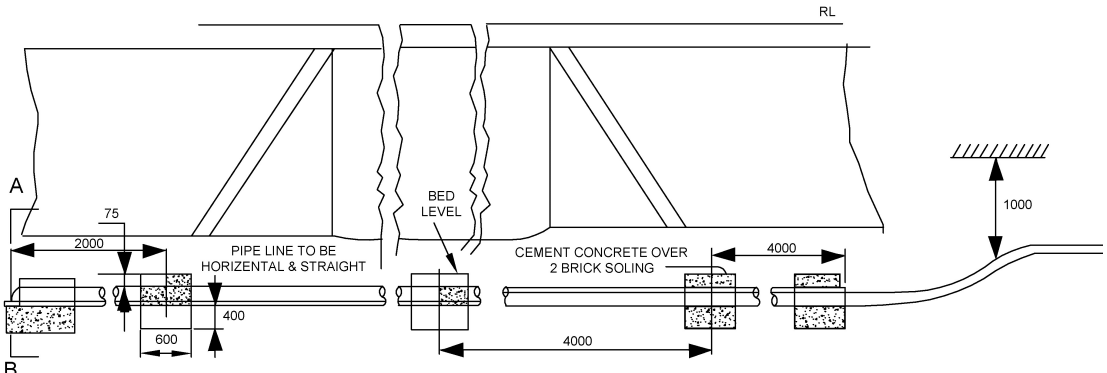
NOTE:-

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. TROUGH TO BE FABRICATED OUT OF GALVANISED STEEL SHEET TO IS:277-1985 WITH FOLLOWING STIPULATIONS THICKNESS : MINIMUM 1.6 MM GRADE OF ZINC COATING : 200
3. NO WELDING SHALL BE DONE ON ANY COMPONENT FOR FABRICATIONS.
4. CABLE TROUGH TO BE FITTED TELESCOPICCALLY.
5. AFTER TIGHTENING NUTS FOR FIXING STRAP THE THREAD OF THE BOLT MAY BE BURRED TO PREVENT THEFT.

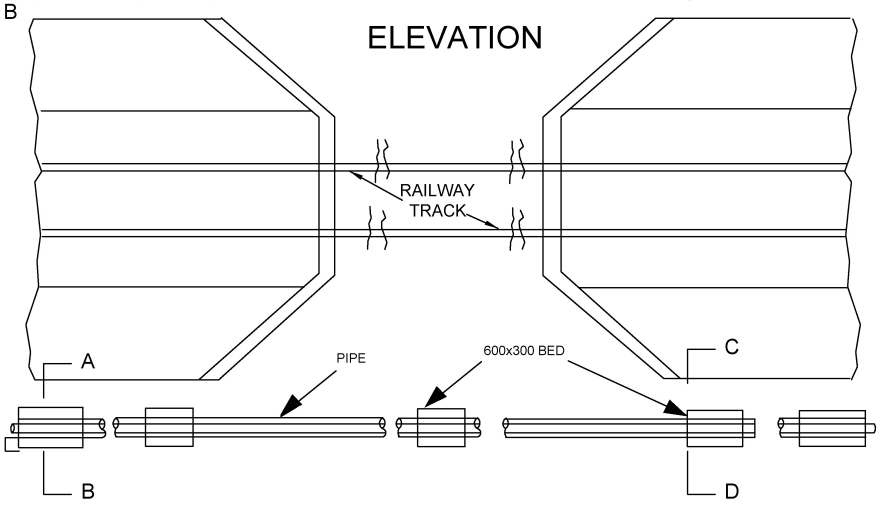
SCHEDULE OF MATERIALS		
SL.No.	DESCRIPTION	NO.REQD.
1.	TROUGH 2.05 METRES LONG.	1
2.	COVER 2.0 METRES LONG	1
3.	STRAP	2
4.	BOLT HEX. HEAD 6 MM Dia. x 32 MM.	4
5.	NUT FOR ABOVE	4
6.	LUCK NUT FOR SL 4	4
7.	DISH WASHER FOR SL 5	4
8.	PLAIN WASHER FOR SL 5	4

Drg.No.15-D7

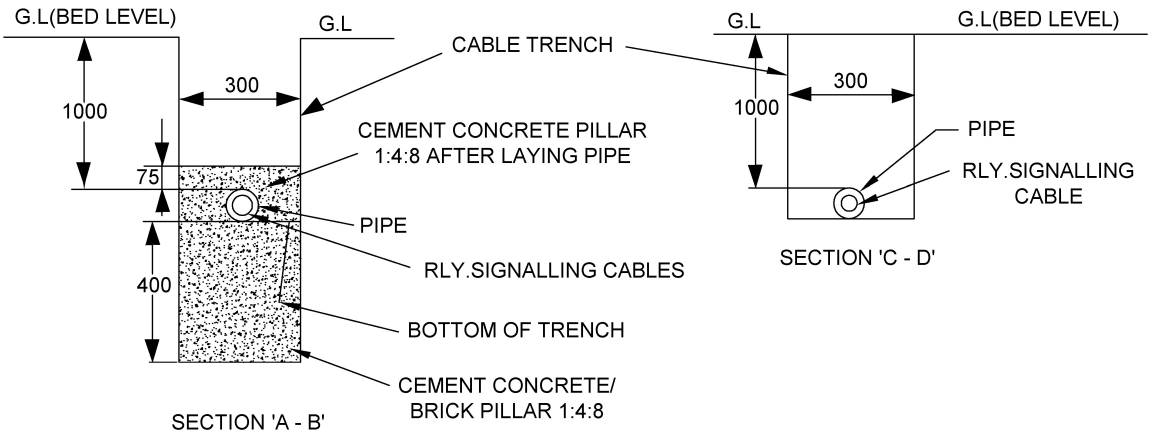
DRAWING FOR CABLE LAYING ON CULVERTS



ELEVATION



PLAN

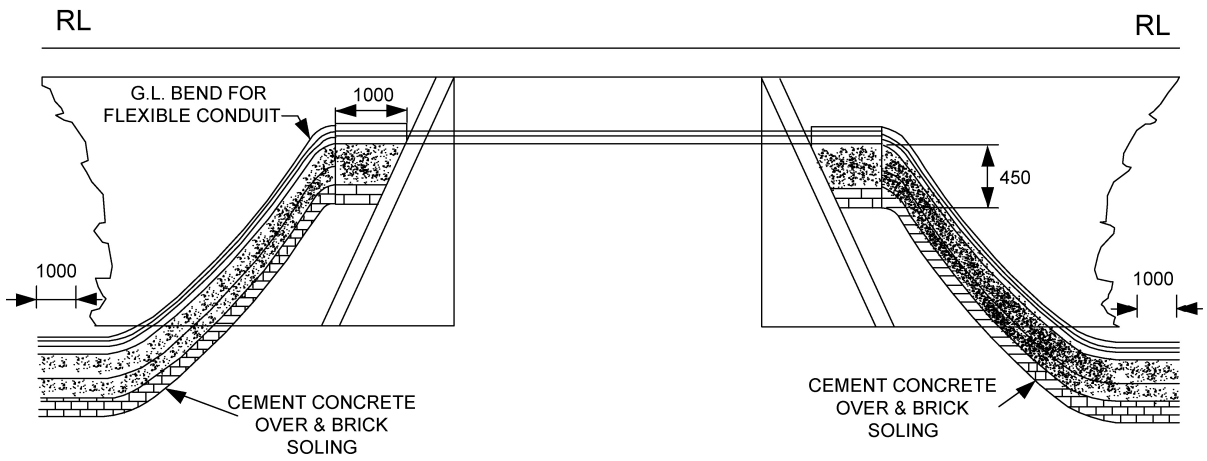


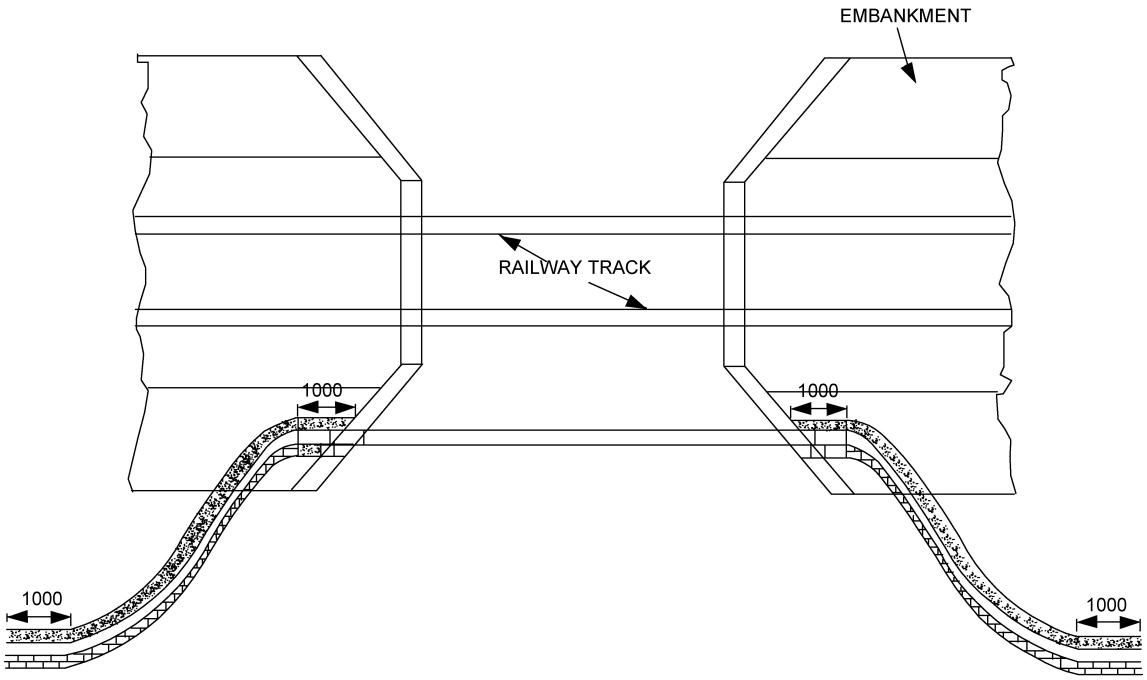
NOTE:-

1. ALL DIMENSIONS ARE IN MILLIMETER.

Drg.No.15-D8

DRAWING FOR CABLE LAYING ON CULVERTS WITH HIGH FLOOD LEVEL



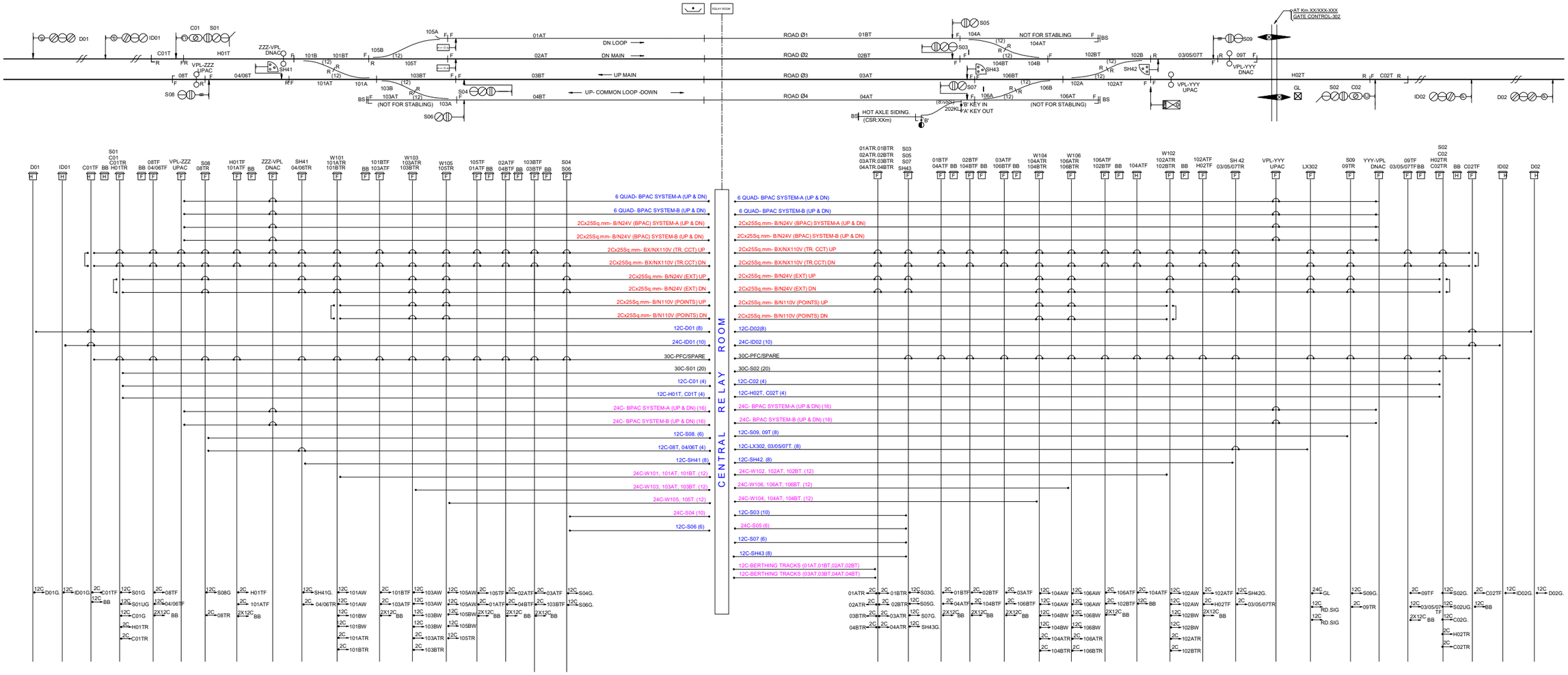


NOTE:-
1. ALL DIMENSIONS ARE IN MILLIMETER.

CABLE CORE PLAN FOR A 4-ROAD STATION WITH PI

CABLES	APPROX. QTY.
30C X 1.5 Sq mm.	06 KMS
24C X 1.5 Sq mm.	24 KMS
12C X 1.5 Sq mm.	24 KMS
2C X 25 Sq mm.	18 KMS
2C X 2.5 Sq mm.	06 KMS
6 QUAD	05 KMS
TOTAL CABLES	83 KMS

NOTE:
1. Adequate spare conductors to a minimum of 20% of the total conductors used shall be provided in each main cable up to the farthest point zone and beyond which there should be a minimum of 10% spare conductors of the total conductors used. No spare conductors are required if the total number of conductors used is 3 or less. The spare conductors shall be provided on the outermost layer. (SEM Pt-II Para-15.3.2).
2. The signalling cables of 6, 12, 24 & 30 core x 1.5 sq.mm copper conductors are catered.
3. Spare 30-core cable is provided from home signal to home signal and terminated in-between locations for quick transfer of circuits (in case of cable cuts/failures/testing). Only two conductors of this cable are used for connecting potential-free contacts of TFBCs to check the intactness of this spare cable.
4. It is desirable to use 12-core signalling cable for extending power supply instead of 2C X 25 Sq.mm Aluminium power cable, if the same is available.
5. Individual power cables are catered for Up & Down gears on each side. If any one cable goes defective, other cable may be looped in the end apparatus case as ring protection, till the defective cable is attended.



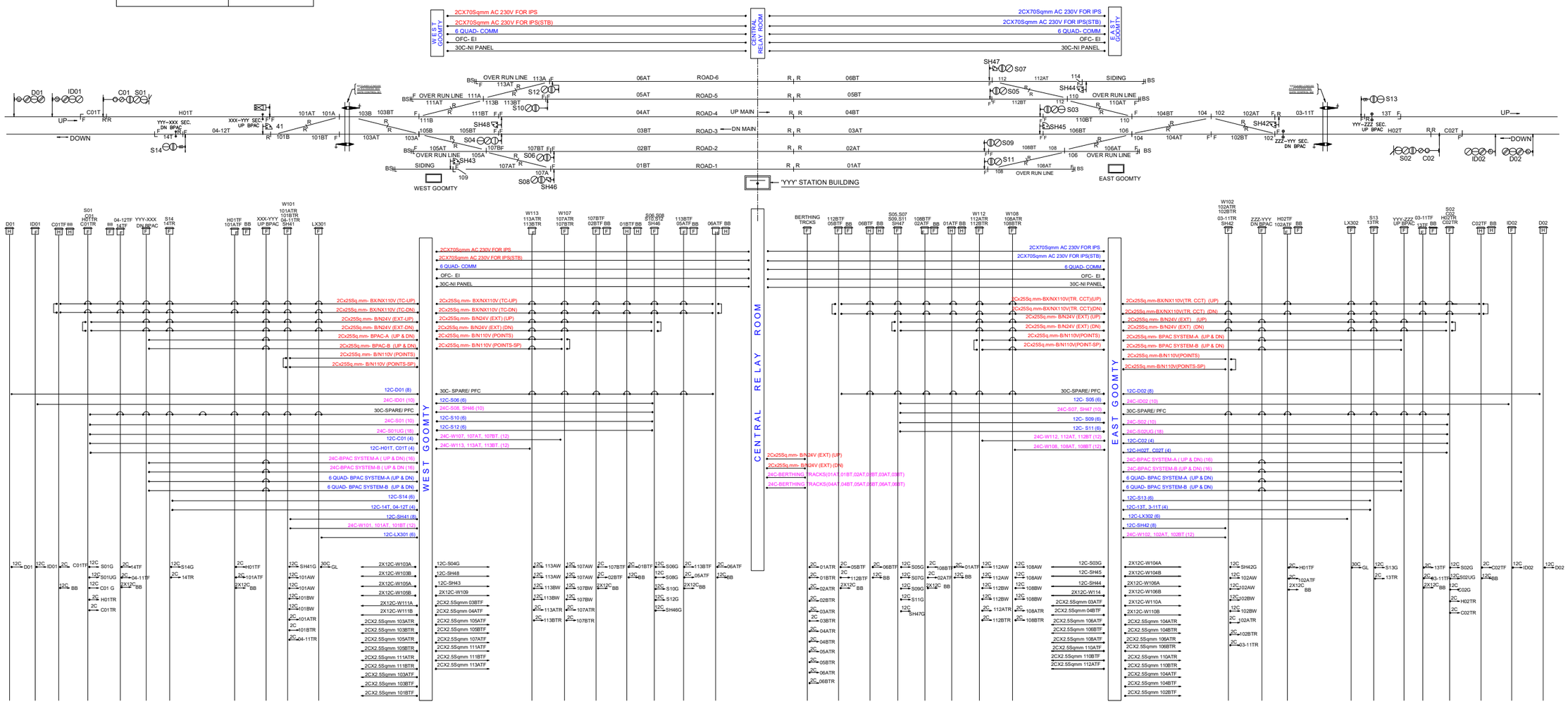
PRINT IN COLOUR (A2 SIZE)

CABLE CORE PLAN FOR A 6-ROAD STATION WITH DISTRIBUTED EI

TYPE OF CABLE	APPROX. QTY.
30C X 1.5 Sq mm.	06 KMS
24C X 1.5 Sq mm.	12 KMS
12C X 1.5 Sq mm.	26 KMS
2C X 2.5 Sq mm.	12 KMS
2C X 25 Sq mm.	12 KMS
2C X 70 Sq mm.	07 KMS
6 QUAD	05 KMS
OFC	04 KMS
TOTAL CABLES	84 KMS

NOTE :

1. Number of apparatus cases to be kept at minimum. Where too many apparatus cases are coming in a close proximity, Goomties to be used (instead of apparatus cases) for ease of maintenance.
2. Adequate spare conductors to a minimum of 20% of the total conductors used shall be provided in each main cable up to the farthest point zone and beyond which there should be a minimum of 10% spare conductors of the total conductors used. No spare conductors are required if the total number of conductors used is 3 or less. The spare conductors shall be provided on the outermost layer. (SEM Pt-II Para-15.3.2).
3. The signalling cables of 6, 12, 24 & 30 core x 1.5 sq.mm copper conductors are catered.
4. From Central location to Goomties, cables are provided in redundant path with path diversity on either side of tracks.
5. Spare 30-core cable is provided from home signal to home signal and terminated in-between locations for quick transfer of circuits (in case of cable cuts/failures/testing). Only two conductors of this cable are used for connecting potential-free contacts of TFBCs to check the intactness of this spare cable.
6. From Goomties/Apparatus cases, direct feeding over tail cables is considered maximum up to 200 Mtrs.
7. It is desirable to use 12-core signalling cable for extending power supply instead of 2C X 25 Sq.mm Aluminium power cable, if the same is available.
8. 6-core signalling cable may be used in place of 2-core x 2.5 Sq.mm for Track circuit tail cables, if the same is available.
9. Individual power cables are catered for Up & Down gears on each side. If any one cable goes defective, other cable may be looped in the end apparatus case as ring protection, till the defective cable is attended.



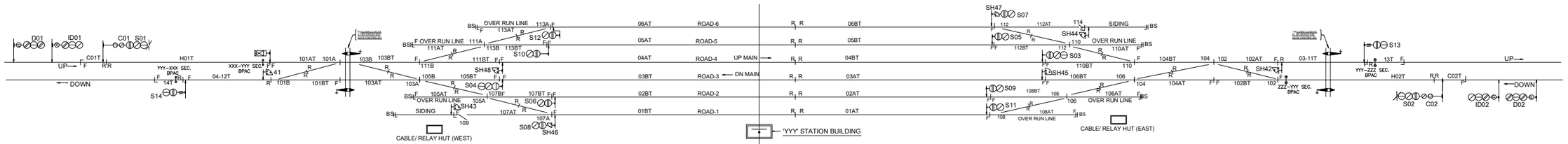
PRINT IN COLOUR (A2 SIZE)

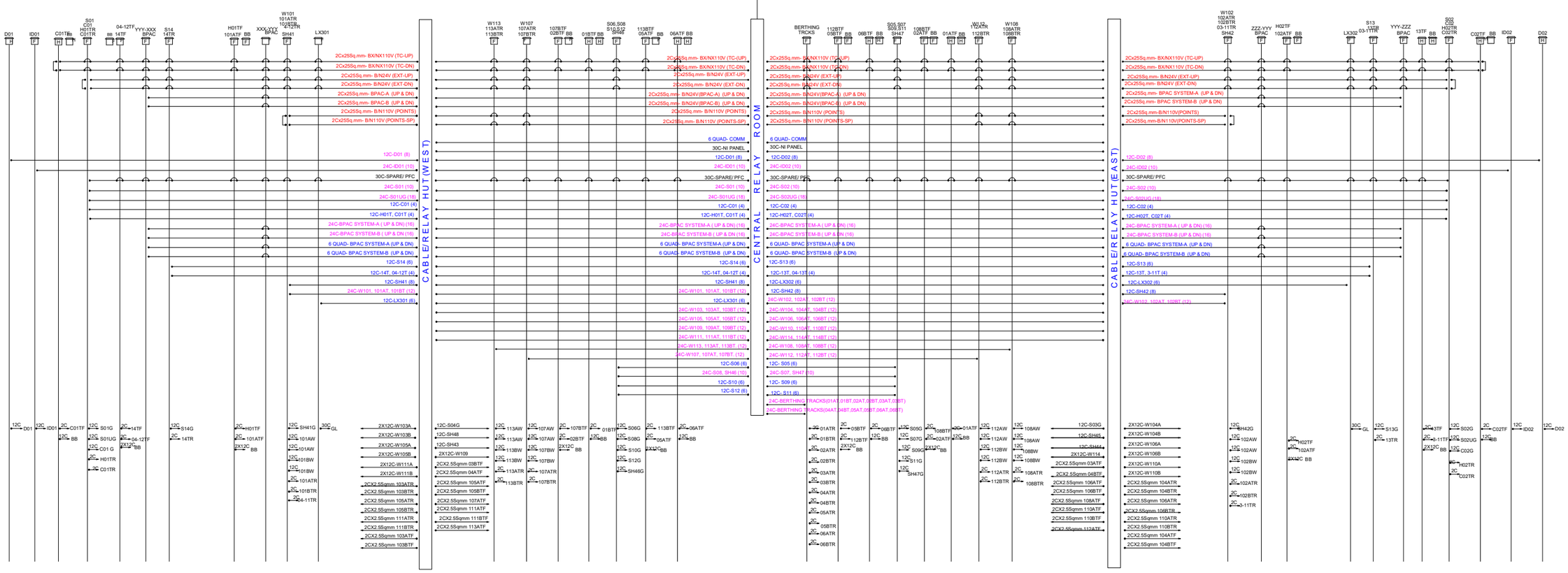
CABLE CORE PLAN FOR A 6-ROAD STATION WITH PI WITH EITHER SIDE CABLE HUNTS

TYPE OF CABLE	APPROX. QTY.
30C X 1.5 Sq mm.	06 KMS
24C X 1.5 Sq mm.	35 KMS
12C X 1.5 Sq mm.	33 KMS
2C X 2.5 Sq mm.	12 KMS
2C X 25 Sq mm.	22 KMS
6 QUAD	07 KMS
TOTAL CABLES	115 KMS

NOTE :

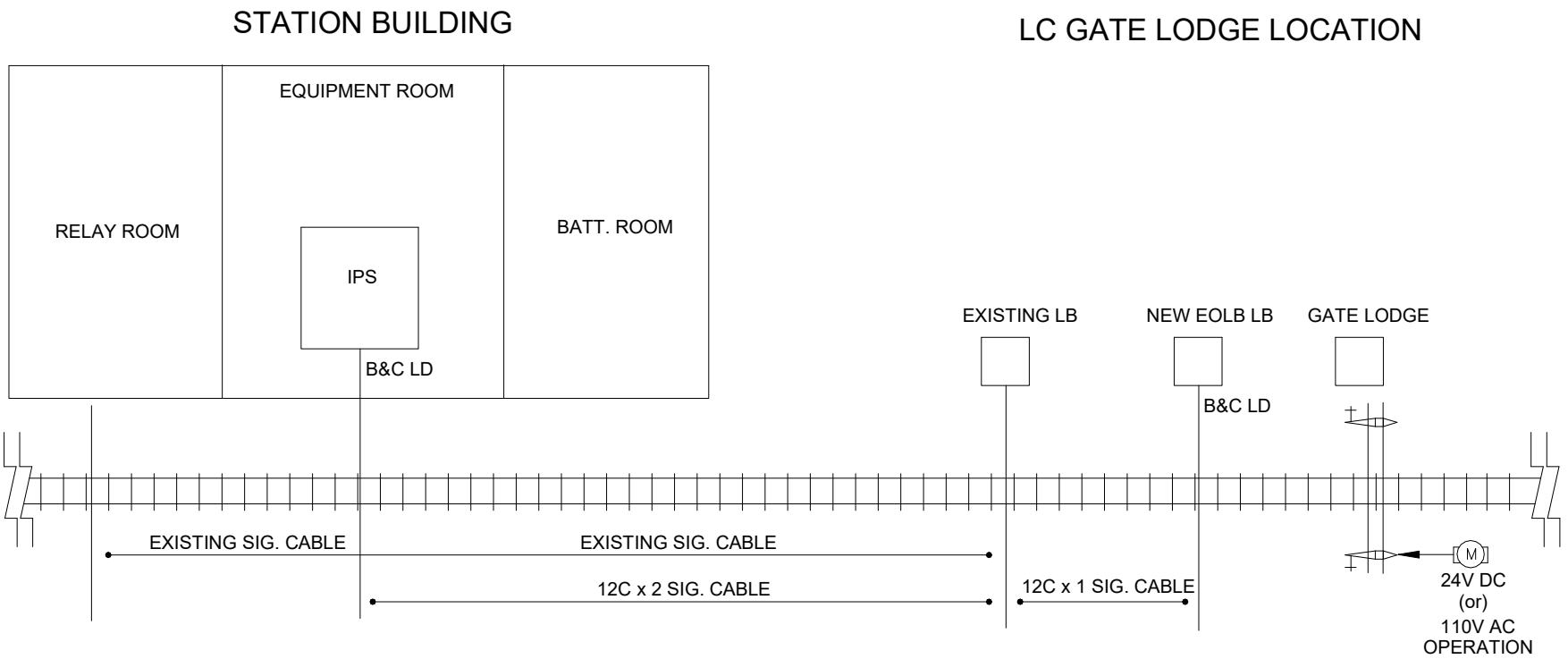
1. Number of apparatus cases to be kept at minimum. Where too many apparatus cases are coming in a close proximity, Goomties to be used (instead of apparatus cases) for ease of maintenance.
2. Adequate spare conductors to a minimum of 20% of the total conductors used shall be provided in each main cable up to the farthest point zone and beyond which there should be a minimum of 10% spare conductors of the total conductors used. No spare conductors are required if the total number of conductors used is 3 or less. The spare conductors shall be provided on the outermost layer. (SEM Pt-II Para-15.3.2).
3. The signalling cables of 6, 12, 24 & 30 core x 1.5 sq.mm copper conductors are catered.
4. Spare 30-core cable is provided from home signal to home signal and terminated in-between locations for quick transfer of circuits (in case of cable cuts/failures/testing). Only two conductors of this cable are used for connecting potential-free contacts of TFBCs to check the intactness of this spare cable.
5. From Goomties/Apparatus cases, direct feeding over tail cables is considered maximum up to 200 Mtrs.
6. It is desirable to use 12-core signalling cable for extending power supply instead of 2C X 25 Sq.mm Aluminium power cable, if the same is available.
7. 6-core signalling cable may be used in place of 2-core x 2.5 Sq.mm for Track circuit tail cables, if the same is available.
8. Individual power cables are catered for Up & Down gears on each side. If any one cable goes defective, other cable may be looped in the end apparatus case as ring protection, till the defective cable is attended.





PRINT IN COLOUR (A2 SIZE)

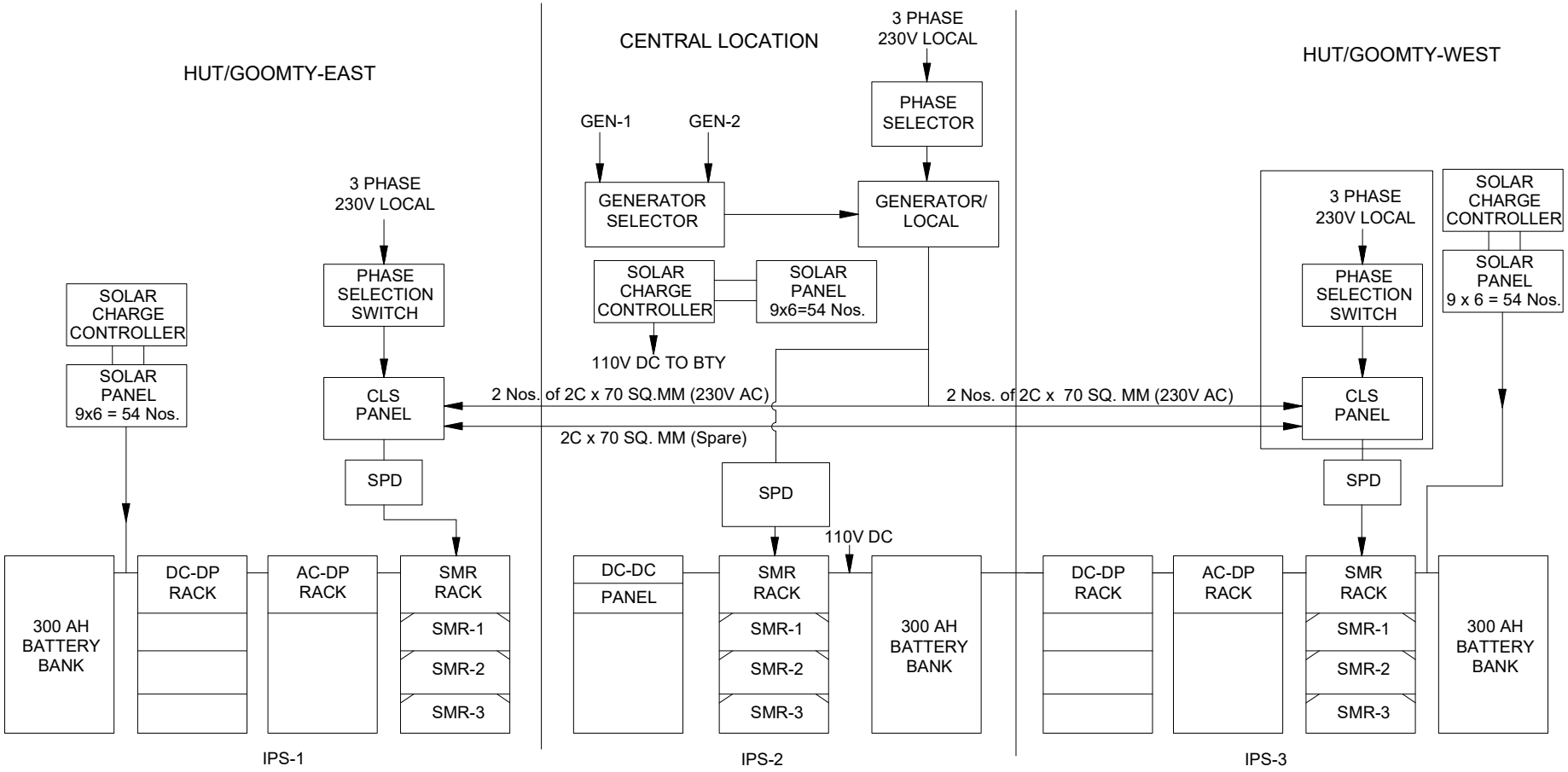
CABLE PLAN FOR ELECTRIC LIFTING BARRIER (ELB) AT STATION



NOTE:

1. 2 Nos. OF 2 x 25 Sq.MM (Al) CABLE FOR 24V DC/12C SIGNALLING CABLE FOR 110V AC TO BE LAID FROM STATION (IPS) TO LC GATE LOCATION,
2. 2 Nos. OF ADDITIONAL DC-DC CONVERTORS (24-32V/5A) TO BE PROVIDED IN EXISTING IPS.
3. B&C TYPE LIGHTENING DISCHARGE AT IPS AND LB OF EOLB TO BE PROVIDED.

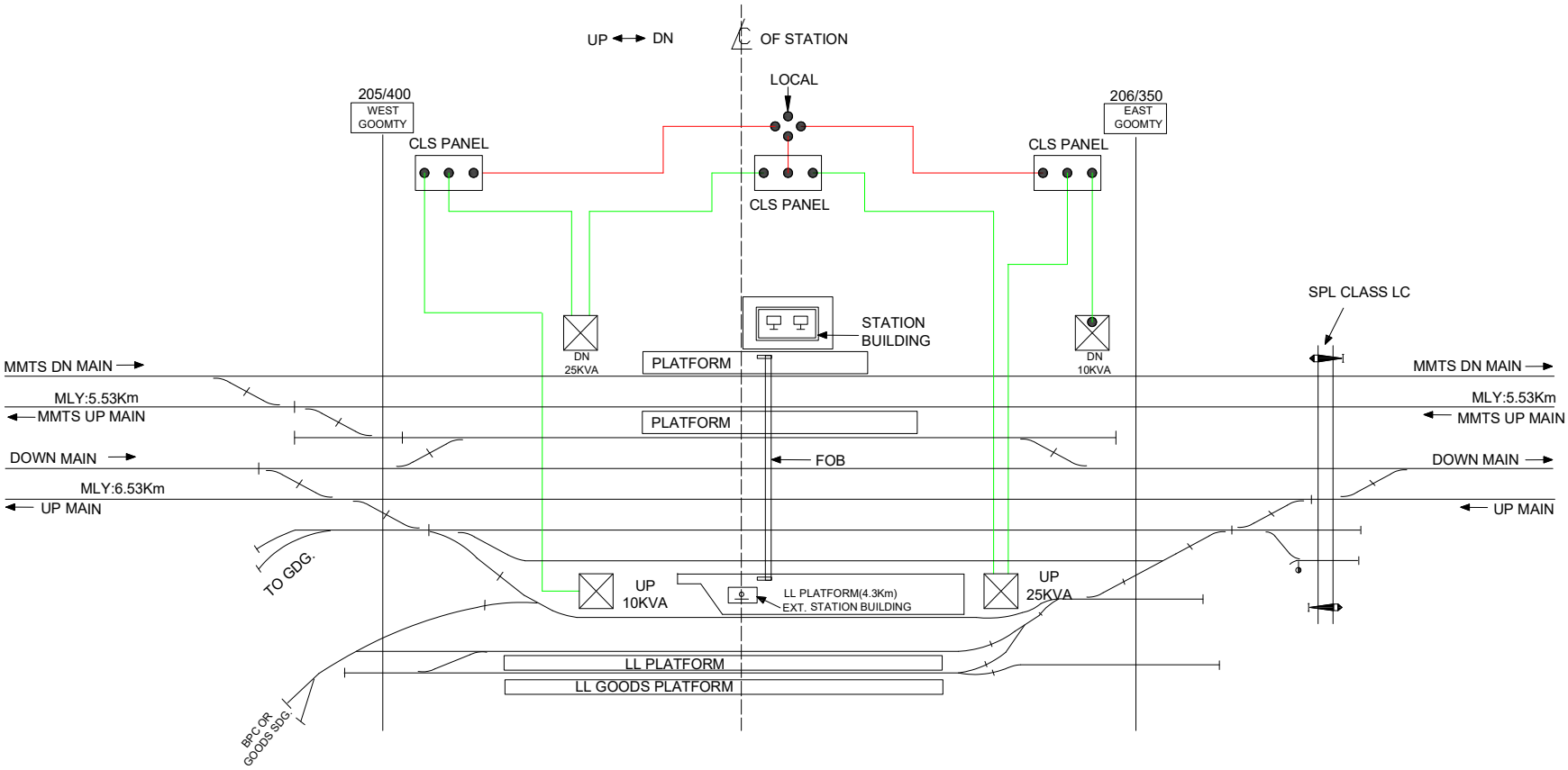
SCHEME OF POWER SUPPLY ARRANGEMENT FOR DISTRIBUTED EI WITH TWO END GOOMTIES (NON-RE)



NOTE:-

1. GOOMTY IPS INDICATION TO BE REPEATED TO ASM EITHER THROUGH QUAD CABLE OR DATA LOGGER.
2. 110V DC BUS BAR TO BE EXTENDED TO EI
3. THE ABOVE 2C x 25 SQ.MM CABLE CAN BE REPLACED BY 2C x 50 SQ.MM.
4. WHEN 2C x 25 SQ.MM CABLE IS NOT AVAILABLE THEN 12C SIGG CABLE CAN BE USED.

SCHEME OF POWER SUPPLY ARRANGEMENT FOR DISTRIBUTED EI WITH TWO END GOOMTIES (RE)

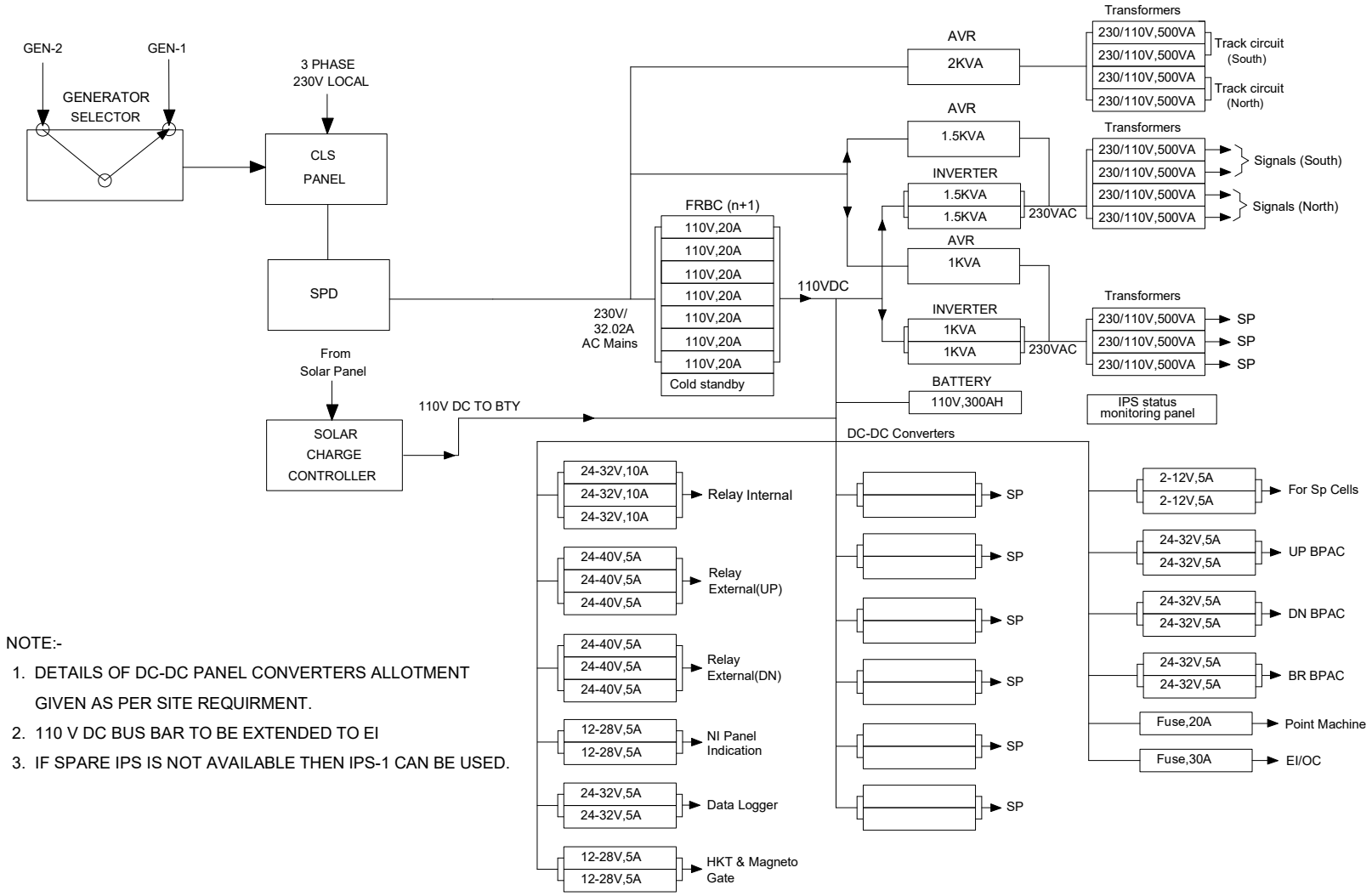


NOTE : 1. AT TRANSFORMER ARE PLACING AT THE END OF PLATFORMS OF THE STATION's
2. LOCAL POWER SUPPLY TO BE EXTENDED FOR STATION THROUGH CABLES.
3. STATION REQUIRES 25 KVA AT DUE TO S&T,PA SYSTEM,OFC LOADS etc.

RED DENOTES CONVENTIONAL SCHEME .
GREEN DENOTES CABLE WIRE IS MORE THAN 50 SQ.MM POWER CABLE.

PRINT IN COLOUR

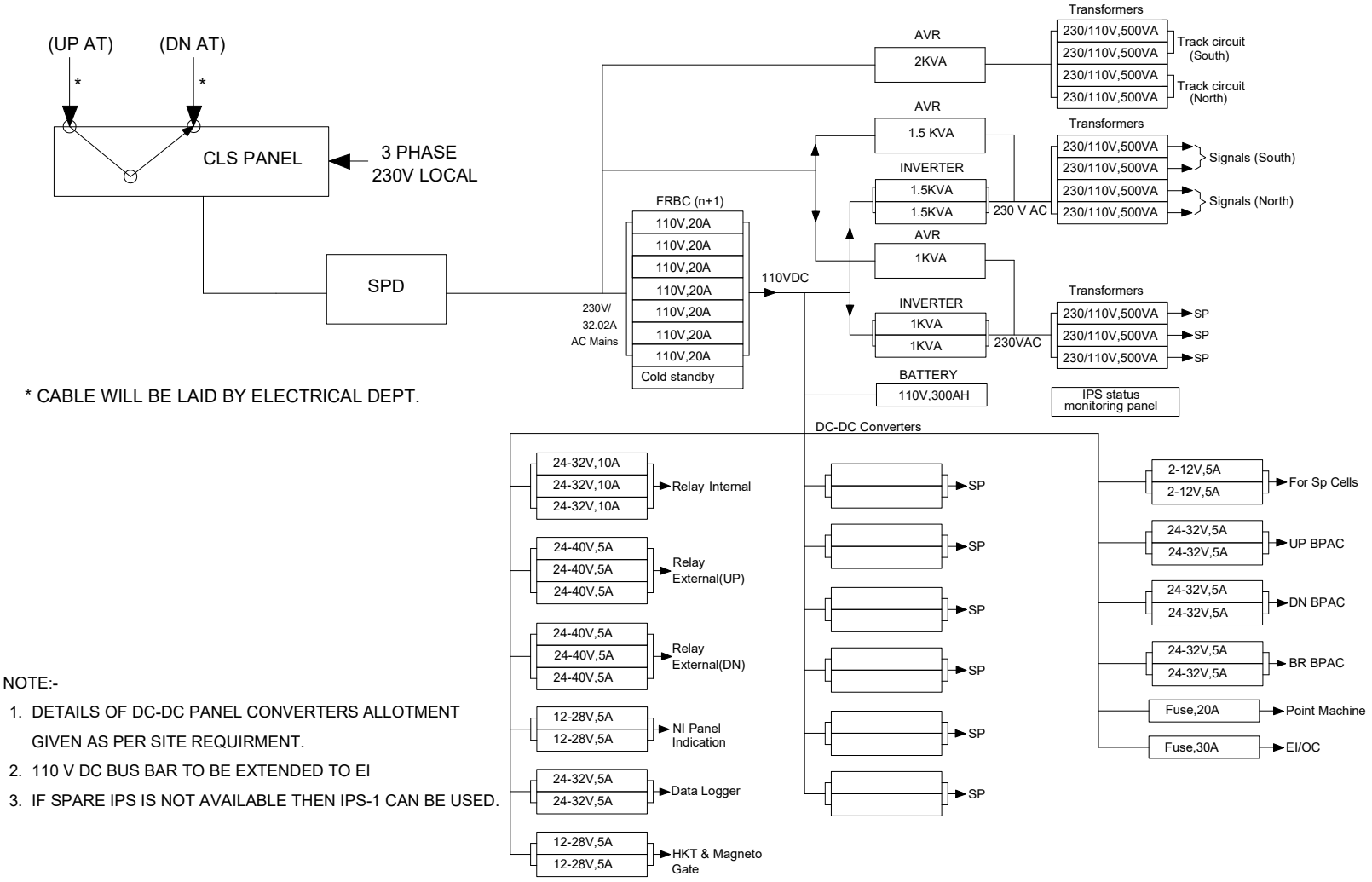
POWER SUPPLY ARRANGEMENT FOR DISTRIBUTED EI (NON-RE) FOR A 6 ROAD JUNCTION STATION



NOTE:-

1. DETAILS OF DC-DC PANEL CONVERTERS ALLOTMENT GIVEN AS PER SITE REQUIRMENT.
2. 110 V DC BUS BAR TO BE EXTENDED TO EI
3. IF SPARE IPS IS NOT AVAILABLE THEN IPS-1 CAN BE USED.

POWER SUPPLY ARRANGEMENT FOR DISTRIBUTED EI (RE) FOR A 6 ROAD JUNCTION STATION

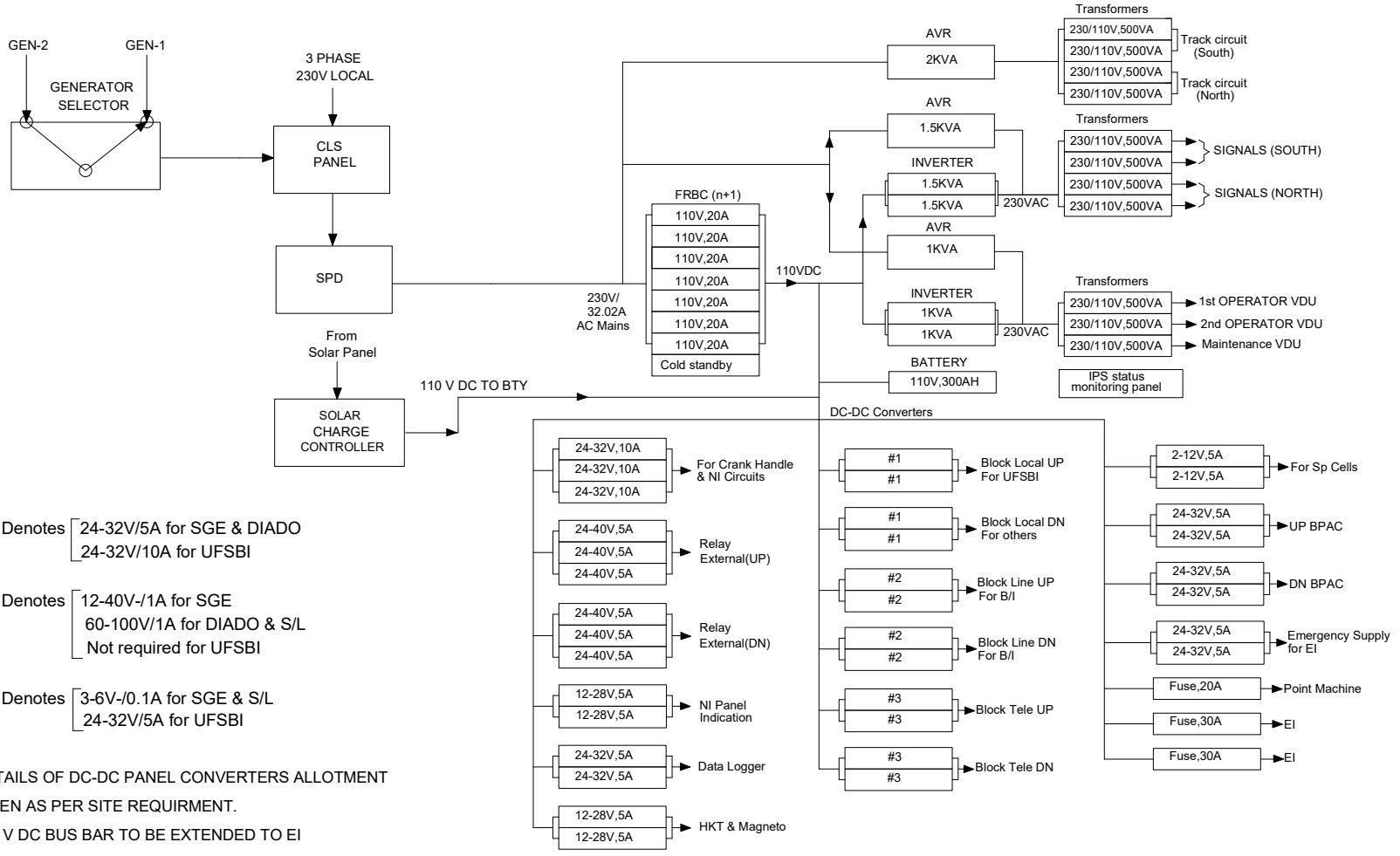


* CABLE WILL BE LAID BY ELECTRICAL DEPT.

NOTE:-

1. DETAILS OF DC-DC PANEL CONVERTERS ALLOTMENT GIVEN AS PER SITE REQUIRMENT.
2. 110 V DC BUS BAR TO BE EXTENDED TO EI
3. IF SPARE IPS IS NOT AVAILABLE THEN IPS-1 CAN BE USED.

POWER SUPPLY ARRANGEMENT FOR CENTRAL EI (NON-RE) FOR A 4 ROAD JUNCTION STATION



#1 Denotes
- 24-32V/5A for SGE & DIADO
- 24-32V/10A for UFSBI

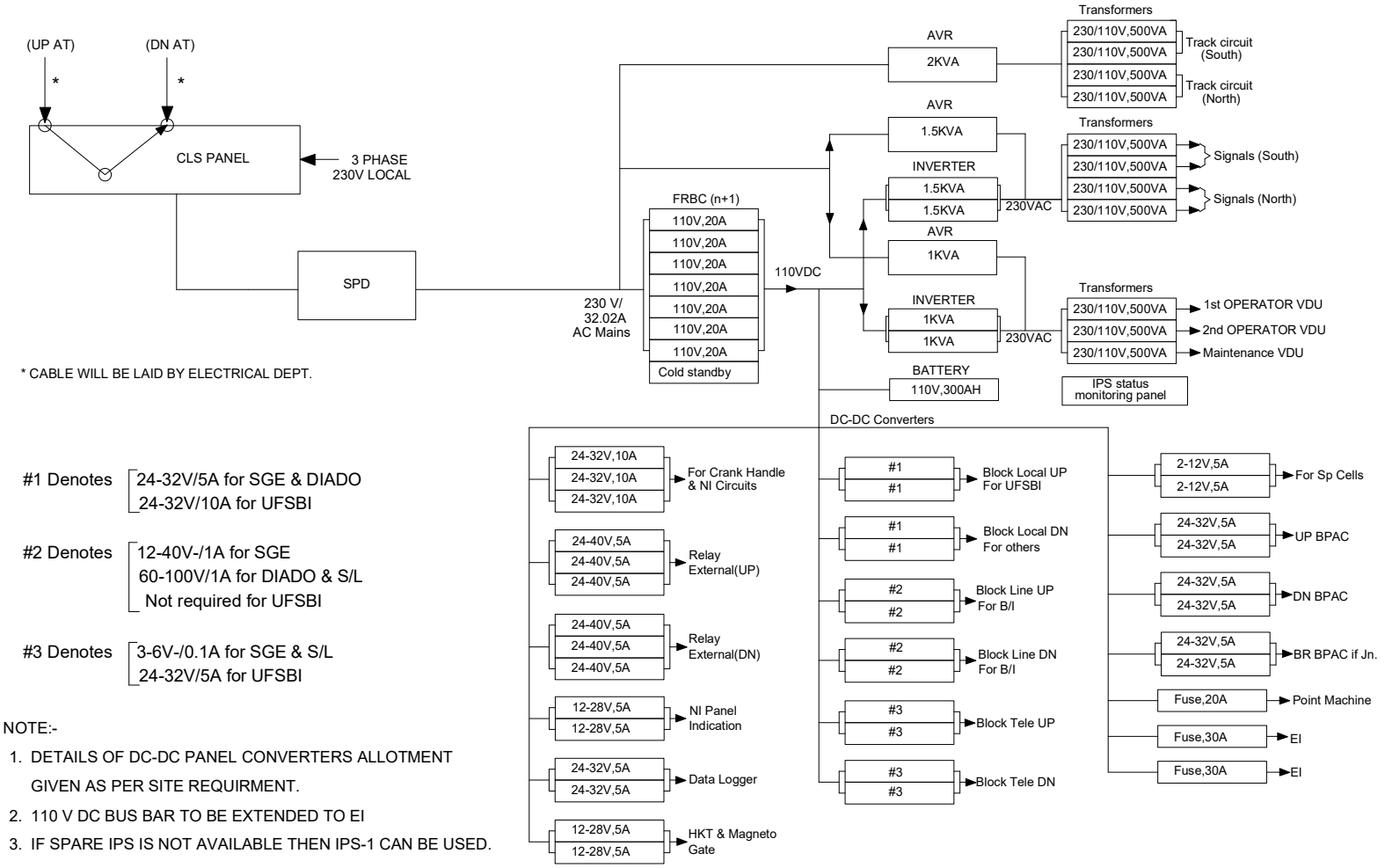
#2 Denotes
- 12-40V-/1A for SGE
- 60-100V/1A for DIADO & S/L
- Not required for UFSBI

#3 Denotes
- 3-6V-/0.1A for SGE & S/L
- 24-32V/5A for UFSBI

NOTE:-

1. DETAILS OF DC-DC PANEL CONVERTERS ALLOTMENT GIVEN AS PER SITE REQUIRMENT.
2. 110 V DC BUS BAR TO BE EXTENDED TO EI
3. IF SPARE IPS IS NOT AVAILABLE THEN IPS-1 CAN BE USED.

POWER SUPPLY ARRANGEMENT FOR CENTRAL EI (RE) FOR A 4 ROAD JUNCTION STATION



* CABLE WILL BE LAID BY ELECTRICAL DEPT.

#1 Denotes
- 24-32V/5A for SGE & DIADO
- 24-32V/10A for UFSBI

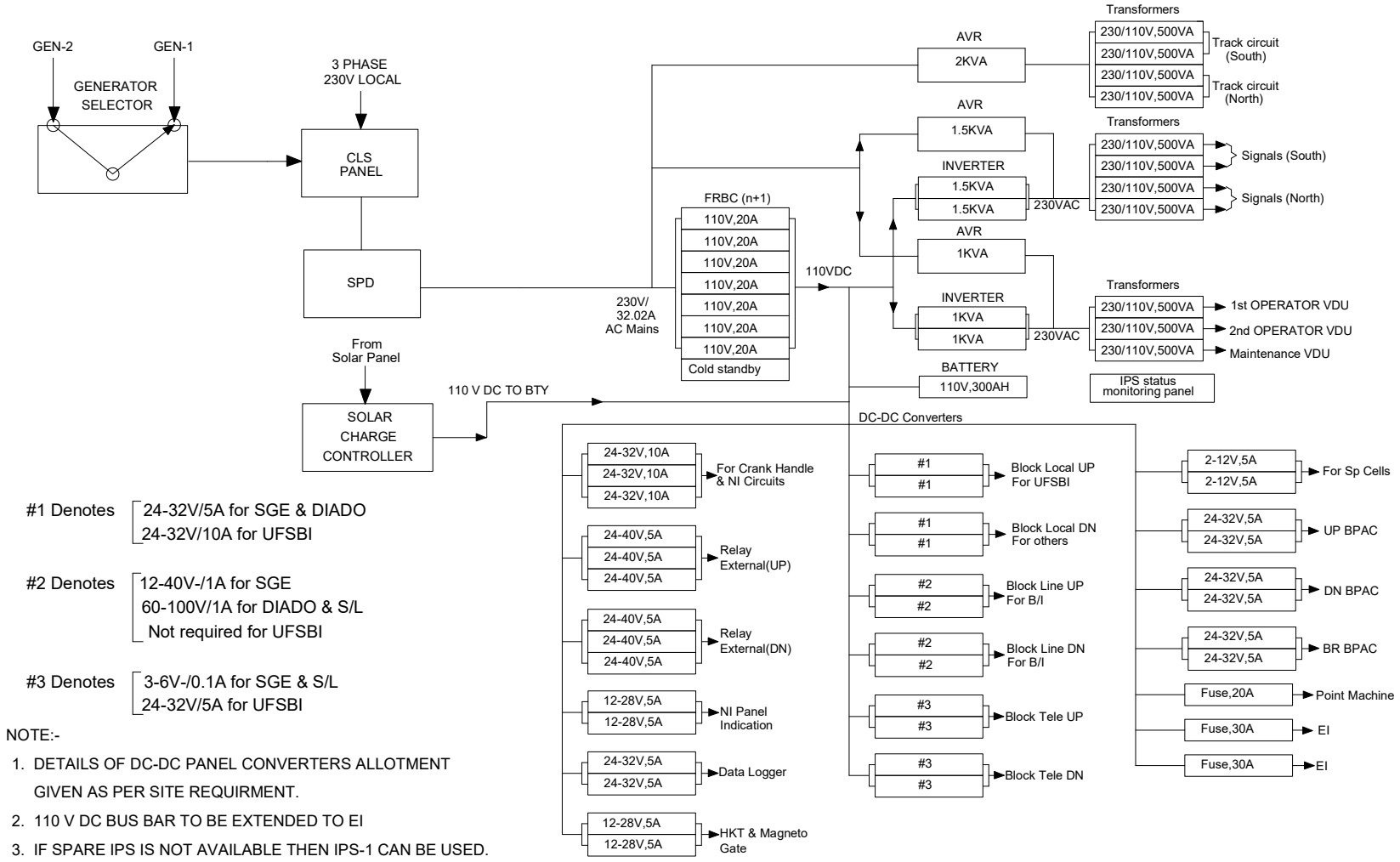
#2 Denotes
- 12-40V-/1A for SGE
- 60-100V/1A for DIADO & S/L
- Not required for UFSBI

#3 Denotes
- 3-6V-/0.1A for SGE & S/L
- 24-32V/5A for UFSBI

NOTE:-

1. DETAILS OF DC-DC PANEL CONVERTERS ALLOTMENT GIVEN AS PER SITE REQUIRMENT.
2. 110 V DC BUS BAR TO BE EXTENDED TO EI
3. IF SPARE IPS IS NOT AVAILABLE THEN IPS-1 CAN BE USED.

POWER SUPPLY ARRANGEMENT FOR CENTRAL EI (NON-RE) FOR A 6 ROAD JUNCTION STATION



#1 Denotes
- 24-32V/5A for SGE & DIADO
- 24-32V/10A for UFSBI

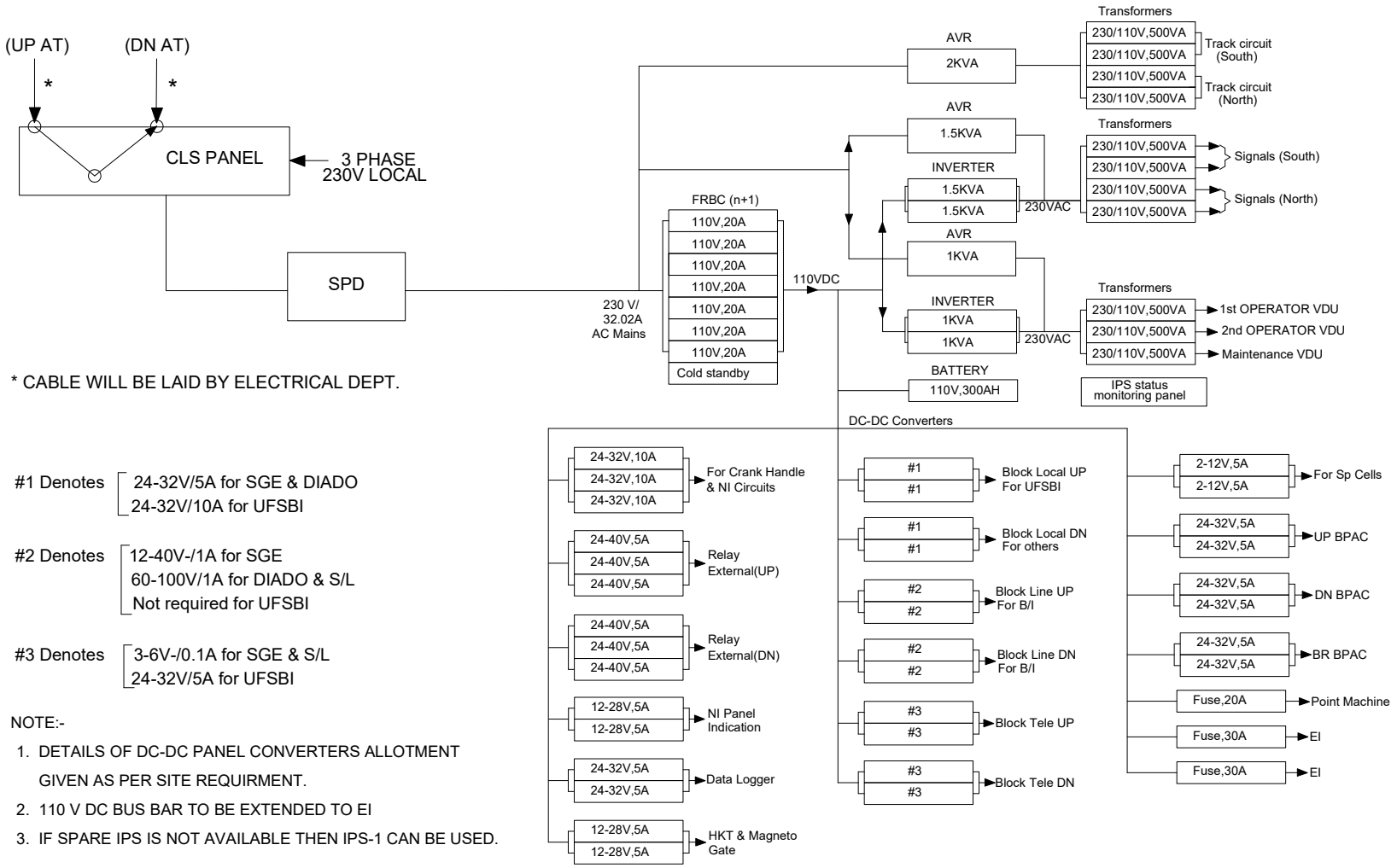
#2 Denotes
- 12-40V-/1A for SGE
- 60-100V/1A for DIADO & S/L
- Not required for UFSBI

#3 Denotes
- 3-6V-/0.1A for SGE & S/L
- 24-32V/5A for UFSBI

NOTE:-

1. DETAILS OF DC-DC PANEL CONVERTERS ALLOTMENT GIVEN AS PER SITE REQUIRMENT.
2. 110 V DC BUS BAR TO BE EXTENDED TO EI
3. IF SPARE IPS IS NOT AVAILABLE THEN IPS-1 CAN BE USED.

POWER SUPPLY ARRANGEMENT FOR DISTRIBUTED EI (RE) FOR A 6 ROAD JUNCTION STATION



* CABLE WILL BE LAID BY ELECTRICAL DEPT.

#1 Denotes
- 24-32V/5A for SGE & DIADO
- 24-32V/10A for UFSBI

#2 Denotes
- 12-40V-/1A for SGE
- 60-100V/1A for DIADO & S/L
- Not required for UFSBI

#3 Denotes
- 3-6V-/0.1A for SGE & S/L
- 24-32V/5A for UFSBI

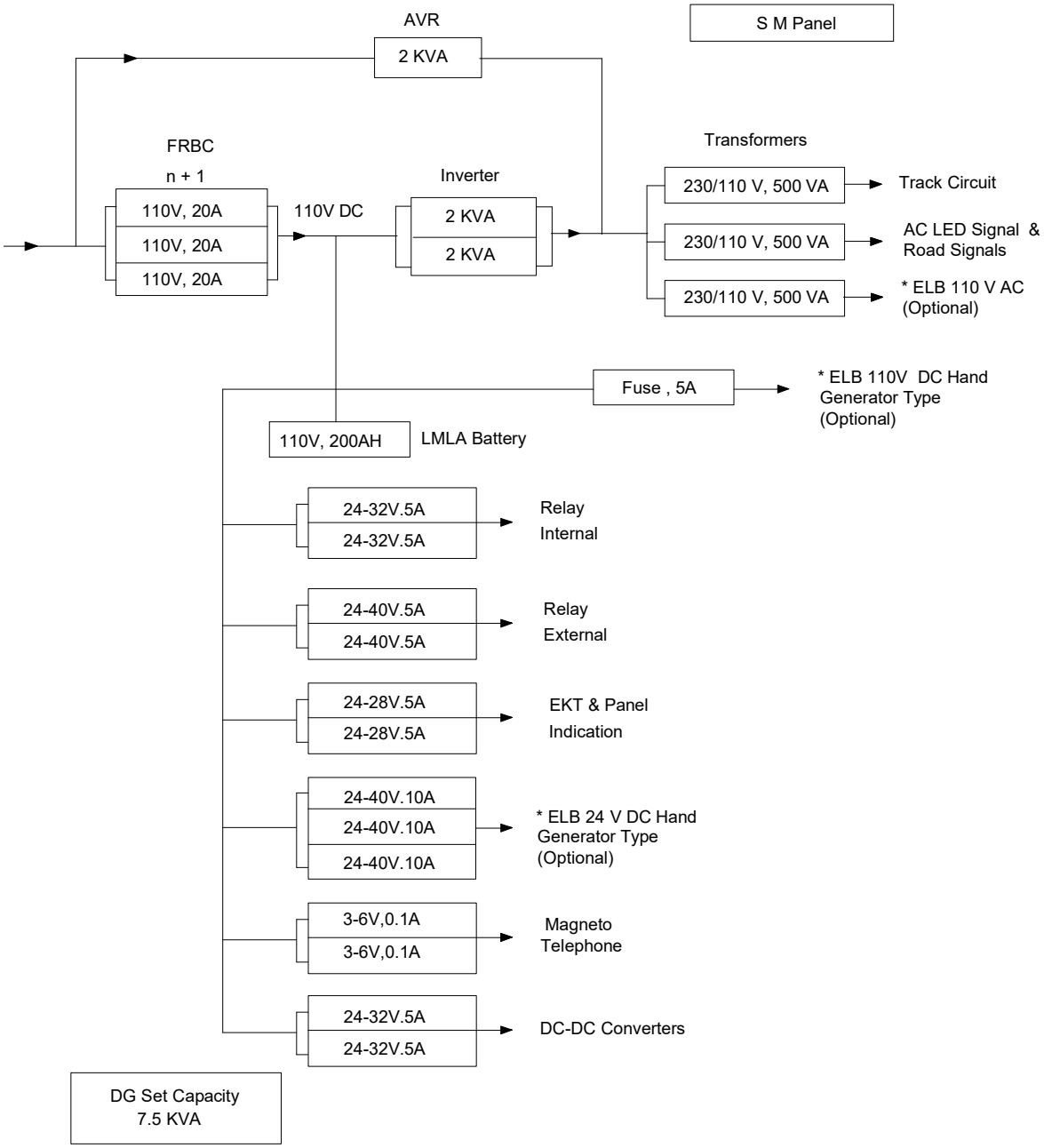
NOTE:-

1. DETAILS OF DC-DC PANEL CONVERTERS ALLOTMENT GIVEN AS PER SITE REQUIRMENT.
2. 110 V DC BUS BAR TO BE EXTENDED TO EI
3. IF SPARE IPS IS NOT AVAILABLE THEN IPS-1 CAN BE USED.

IPS ARRANGEMENT FOR INTERLOCKED LC GATE & IBS

IPS Configuration for LC GATE in RE/Non RE AREA

(Ref : RDSO Specification No 165/2012 Dt : 10-02-2012)



NOTE : 1. POWER SOURCES IN NON-RE AREA : SEB, DG SET 1 & 2

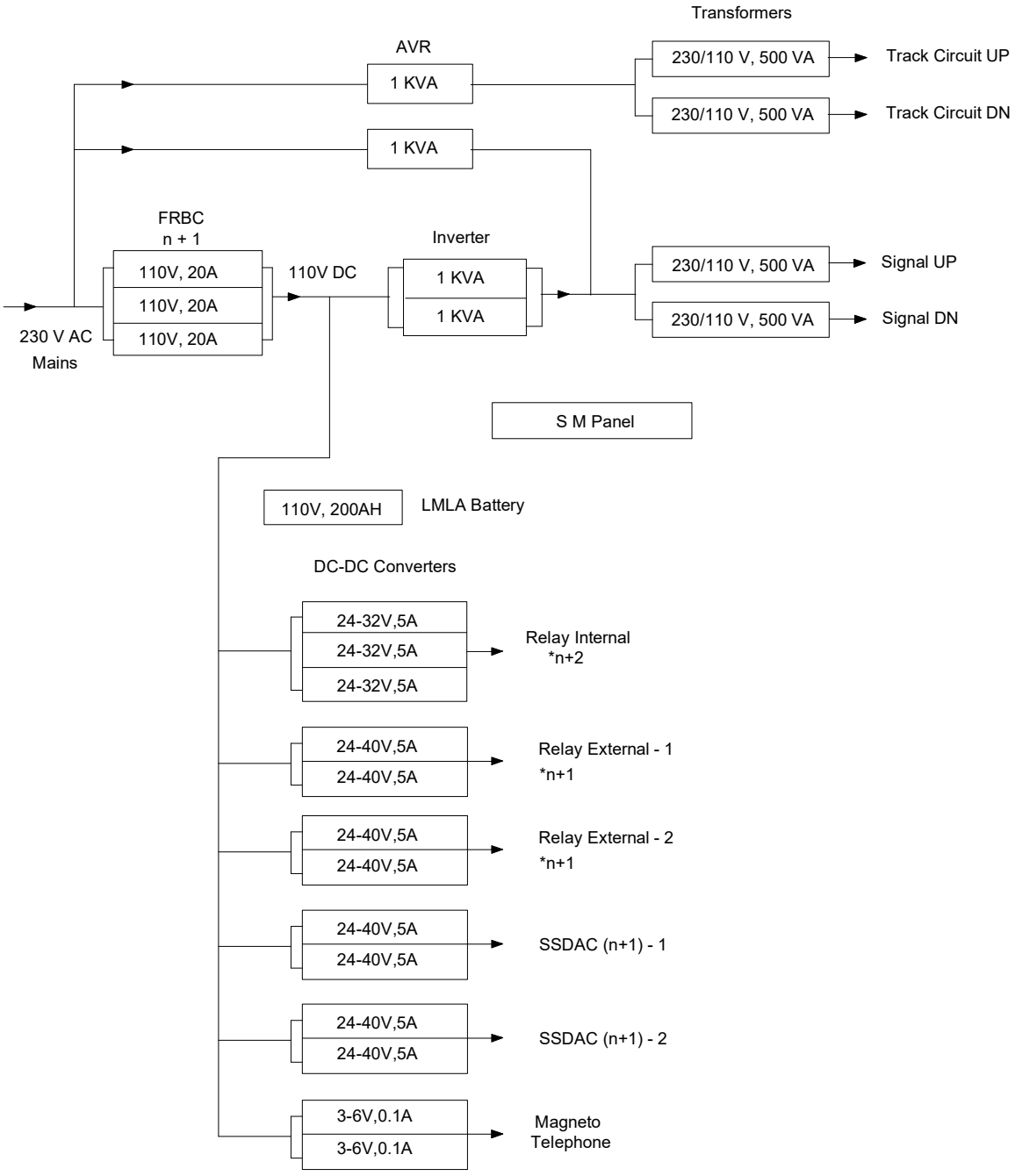
2. POWER SUPPLY SOURCES IN RE AREA : AT SUPPLY, SEB (D/L)
: AT, SEB, DG SET (S/L)

3. * ONLY ONE TYPE OF ELB (24 V DC/110 V DC /110 V AC) SHALL BE USed.

IPS ARRANGEMENT FOR INTERLOCKED LC GATE & IBS

IPS Configuration for IBS in RE/Non RE Area.

(Ref : RDSO Specification No 165/2012 Dt : 10-02-2012)



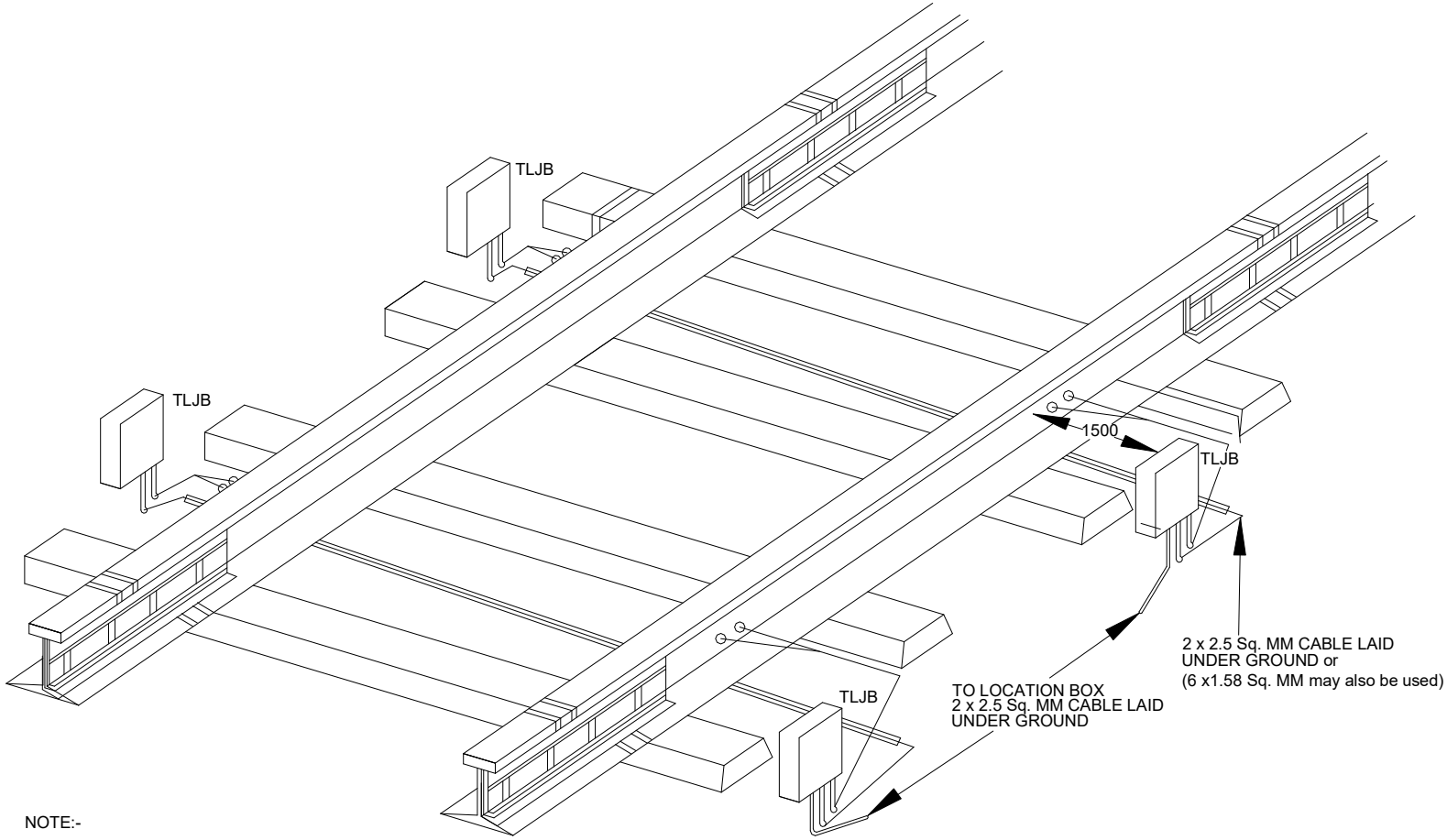
NOTE : 1. POWER SOURCES IN NON-RE AREA : SEB, DG SET 1 & 2

2. POWER SUPPLY SOURCES IN RE AREA : UP AT, DN AT, SEB (D/L)
: AT, SEB, DG SET (S/L)

3. * WHEREEVER REQUIRED 60-66 V/5A DC-DC CONVERTER MODULES MAY BE USED INSTEAD OF 24-32 V/5A DEPENDING UPON RELAY TYPE.

Drg.No.17-D1

DRAWING FOR TRACK LEAD CABLE CONNECTIONS

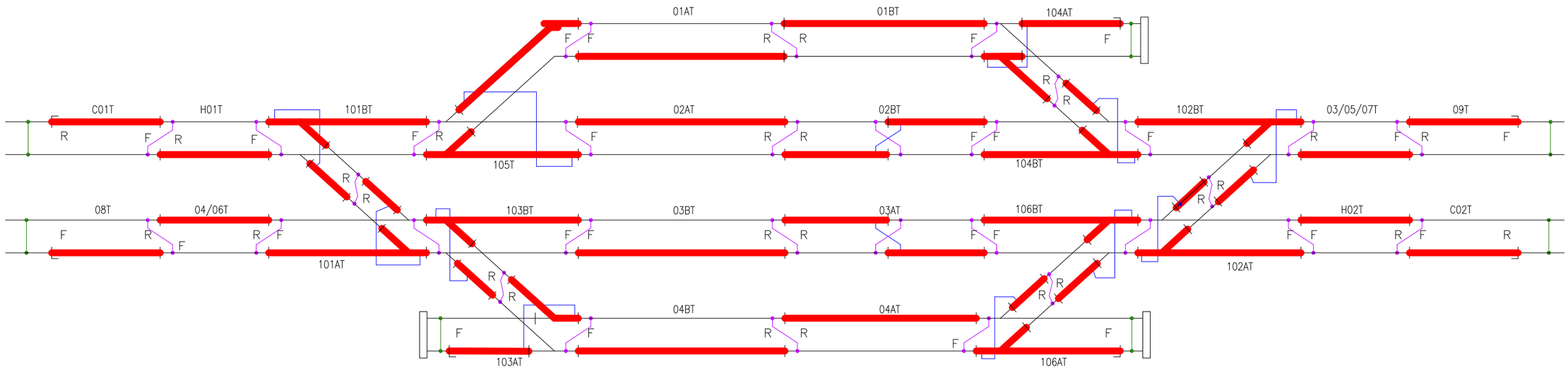


NOTE:-

1. ALL DIMENSIONS ARE IN MM.
2. TRACK LEAD CABLE SHALL BE LAID AT A DEPTH OF 1 Mtr FROM THE GROUND LEVEL.
3. CONNECTORS FROM TLJB TO TRACK SHALL BE MADE FIRMLY THROUGH 2 x 2.5 Sq. MM CABLE ALONG WITH ARMOUR AT BOTH ENDS.

TRACK CIRCUIT BONDING DIAGRAM FOR A 4-ROAD STATION (DOUBLE LINE)

TRACK CIRCUIT BONDING DIAGRAM



LEGEND :

- POSITIVE RAIL
- NEGATIVE RAIL
- BLOCK JOINT
- F FEED END
- R RELAY END
- TRANSVERSE BOND
- CROSS BOND
- JUMPER CABLE

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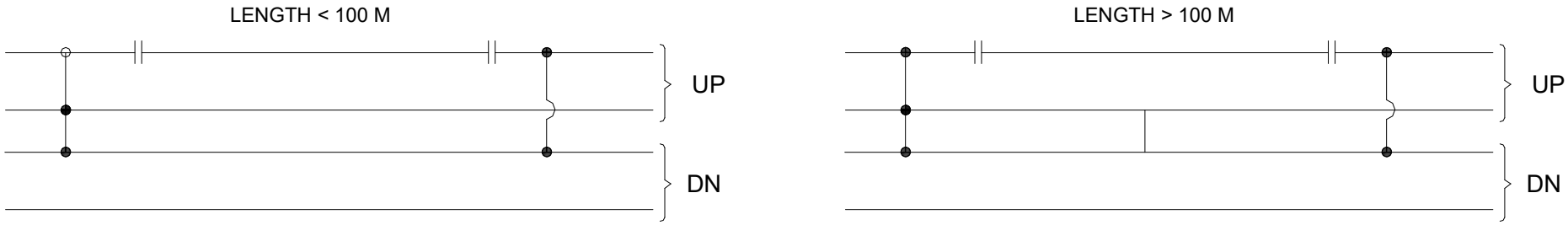
CROSS BONDING IN DOUBLE LINE AND SINGLE LINE TRACK CICUITS, EARTH WIRE IN SINGLE LINE

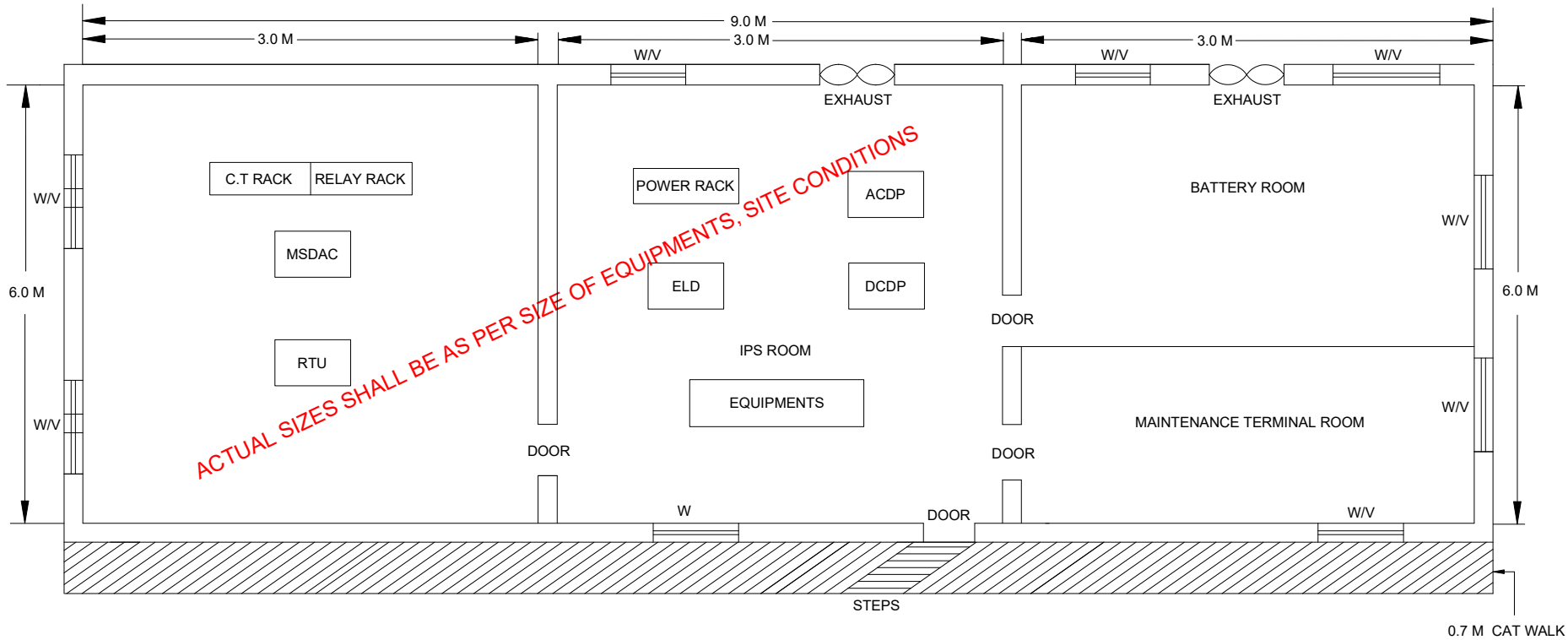
CROSS BONDING FOR DOUBLE TRACK



CROSS BONDING FOR SINGLE TRACK

Drg.No.18-D1

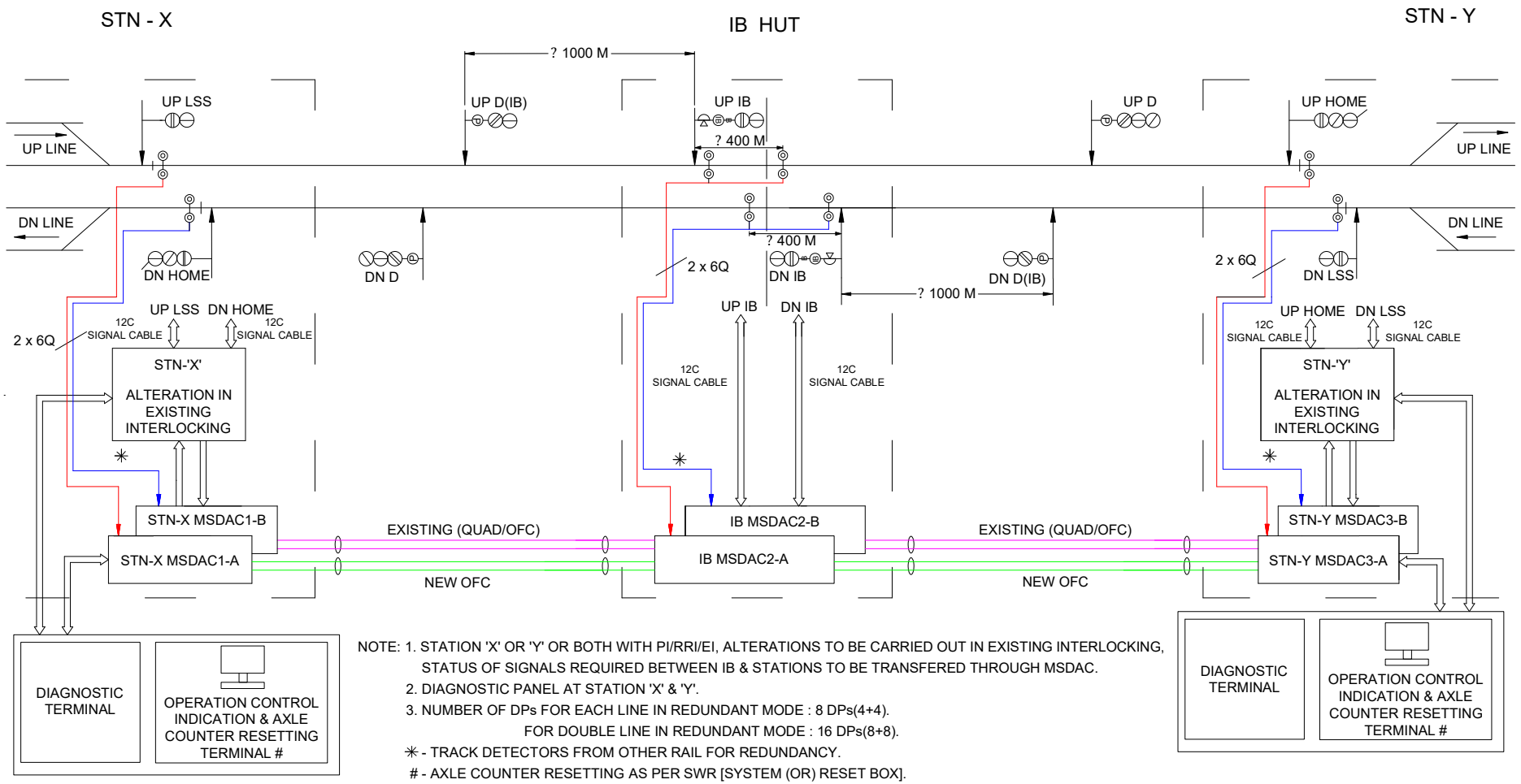
IB HUT LAYOUT PLAN (DOUBLE LINE)



NOTE: 1. ALL DIMENSIONS ARE IN METER.

2. THE DOOR SHOULD BE FLUSH TYPE AND OPENED INSIDE.
3. FLOORING AND WALLS INSIDE GOOMTY SHOULD BE PROVIDED WITH VITREOUS ENAMEL TILES OF COLOUR APPROVED BY S&T TO AVOID ACCUMULATION OF DUST.
4. CABLE DUCT FOR LAYING OF CABLE TO BE PROVIDED IN CONSULTATION WITH ASTE/DSTE.
5. OPENING OF REQUIRED SIZE FOR CABLE ENTRY TO BE PROVIDED AT THE BASEMENT LEVEL IN CONSULTATION WITH ASTE/DSTE.
6. FLOOR LEVEL SHOULD BE AT THE HEIGHT OF 1.0 M FROM RAIL LEVEL.
7. ARRANGEMENT FOR FIXING EXHAUST FAN IN BATTERY & EQUIPMENT ROOMS TO BE MADE AS SHOWN.
8. ALL THE WINDOWS AND VENTILATORS SHALL BE PROVIDED WITH DUST PROOF WIRE MESH.
9. RDSO TYPE VENTILATORS TO BE PROVIDED
10. HEIGHT OF WINDOWS SHOULD BE 0.91 M ABOVE FLOOR LEVEL.
11. TWO TIER BATTERY STAND SHALL BE PROVIDED IN BATTERY ROOM WITH ACID PROOF TILES.
12. ROOF SHALL BE SLANTING TO PREVENT WATER ACCUMULATION.
13. HAND RAILING AROUND CAT WALK UP TO 0.7 M HEIGHT SHALL BE PROVIDED.
14. ANTI THEFT MEASURES TO BE TAKEN.

IB SIGNALLING WITH MSDAC & OFC (DOUBLE LINE)



NOTE: 1. STATION 'X' OR 'Y' OR BOTH WITH PI/RRI/EI, ALTERATIONS TO BE CARRIED OUT IN EXISTING INTERLOCKING, STATUS OF SIGNALS REQUIRED BETWEEN IB & STATIONS TO BE TRANSFERED THROUGH MSDAC.

2. DIAGNOSTIC PANEL AT STATION 'X' & 'Y'.

3. NUMBER OF DPs FOR EACH LINE IN REDUNDANT MODE : 8 DPs(4+4).
FOR DOUBLE LINE IN REDUNDANT MODE : 16 DPs(8+8).

✳ - TRACK DETECTORS FROM OTHER RAIL FOR REDUNDANCY.

- AXLE COUNTER RESETTING AS PER SWR [SYSTEM (OR) RESET BOX].

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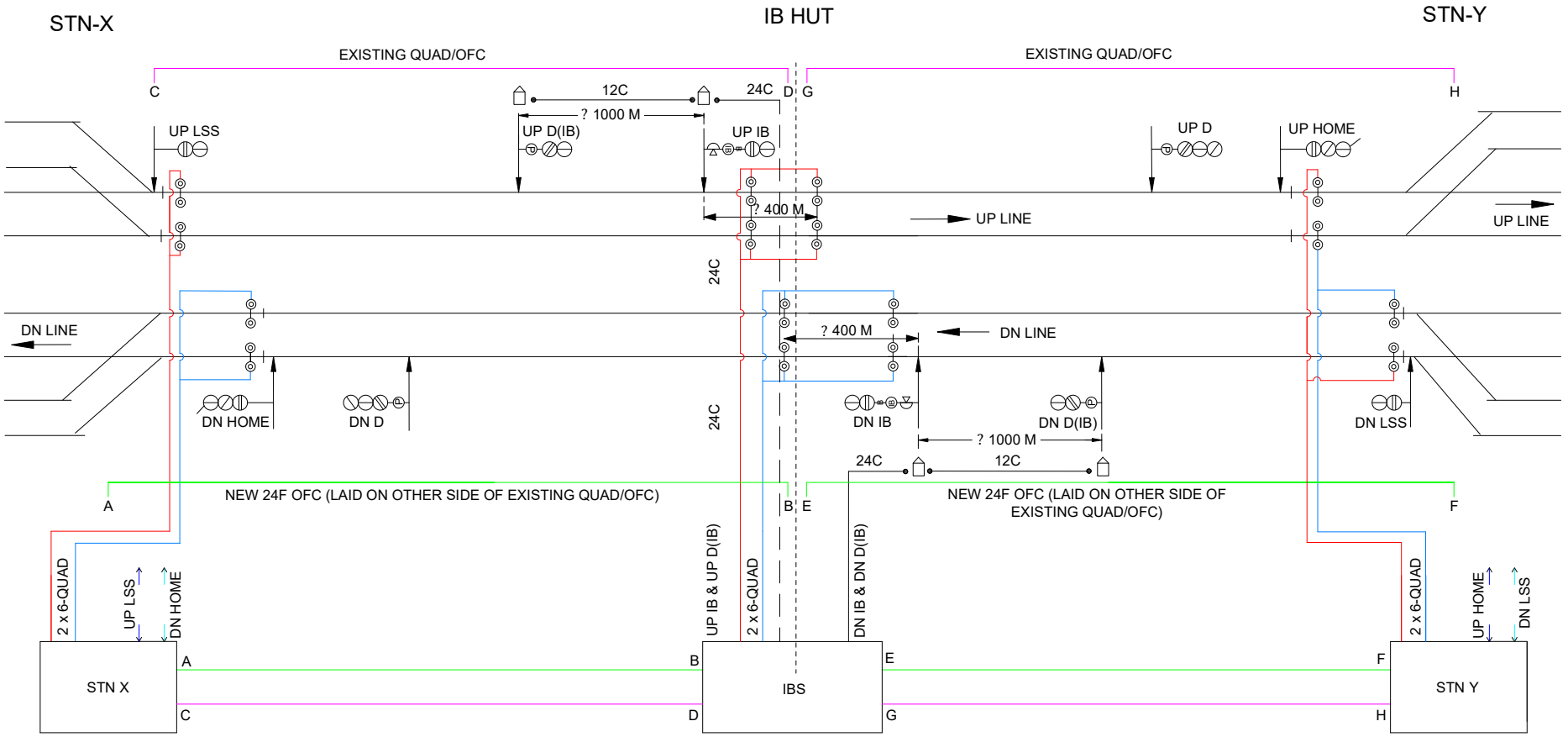
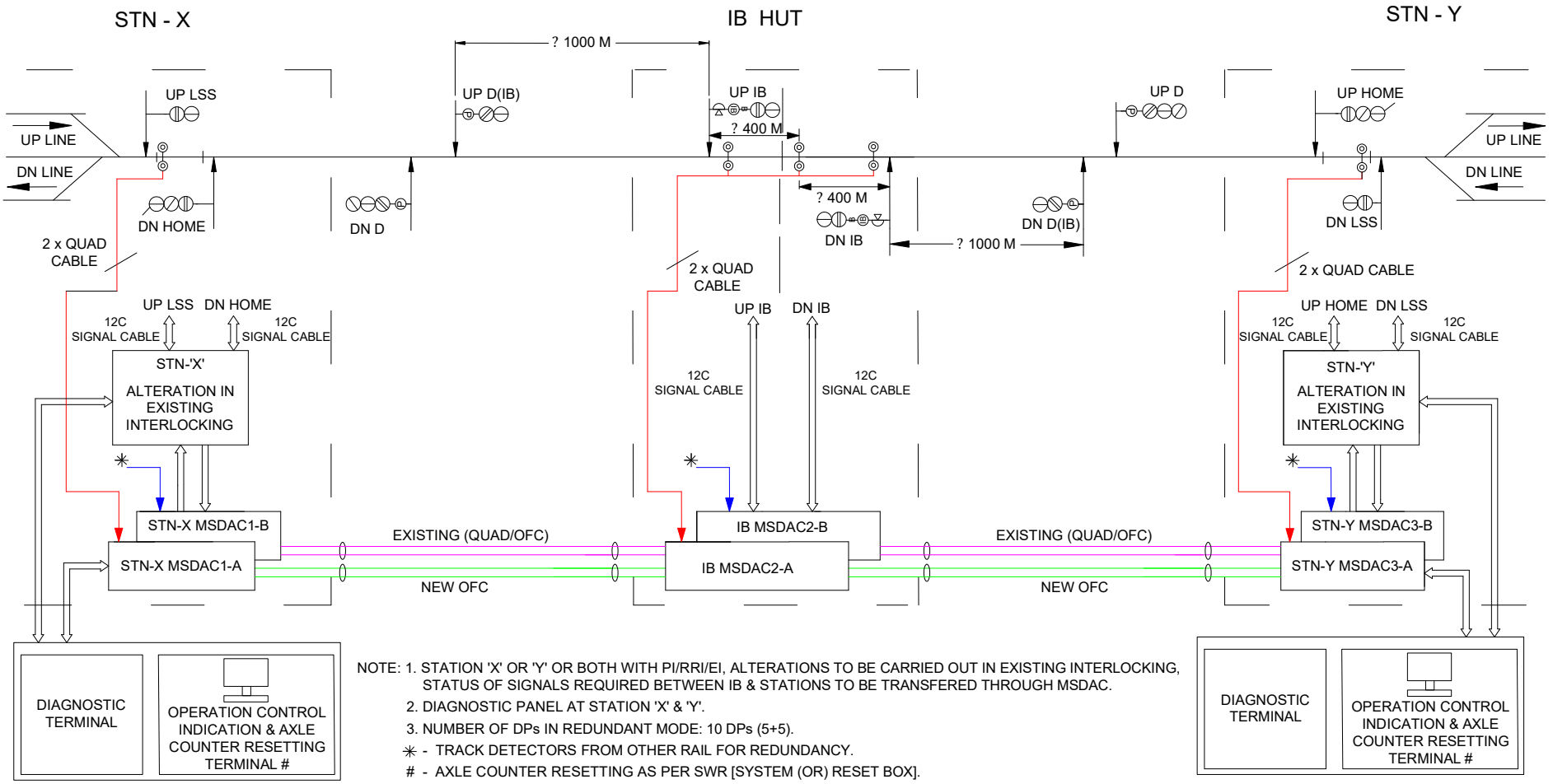
IB CABLE PLAN (DOUBLE LINE)



NOTE: 1. ONE QUAD TO BE USED FOR JUNGLE SIDE RAILS TX/RX DETECTOR.
2. SECOND QUAD TO BE USED FOR INNER SIDE RAILS TX/RX DETECTOR.
3. UP SIGNAL CABLE - UP TRENCH, DOWN SIGNAL CABLE - DOWN TRENCH.
4. NEW OFC (24 FIBRE) TO BE LAID ON THE OTHER SIDE OF EXISTING QUAD/OFC.
5. IB PHONE TO BE CONNECTED ON RESPECTIVE 6-QUAD CABLE.
6. IB SIGNAL & IB DISTANT TO BE CONNECTED ON 12C INDIVIDUALLY.

PRINT IN COLOUR

IB SIGNALLING WITH MSDAC & OFC (SINGLE LINE)



NOTE: 1. STATION 'X' OR 'Y' OR BOTH WITH PI/RRI/EI, ALTERATIONS TO BE CARRIED OUT IN EXISTING INTERLOCKING, STATUS OF SIGNALS REQUIRED BETWEEN IB & STATIONS TO BE TRANSFERED THROUGH MSDAC.

2. DIAGNOSTIC PANEL AT STATION 'X' & 'Y'.

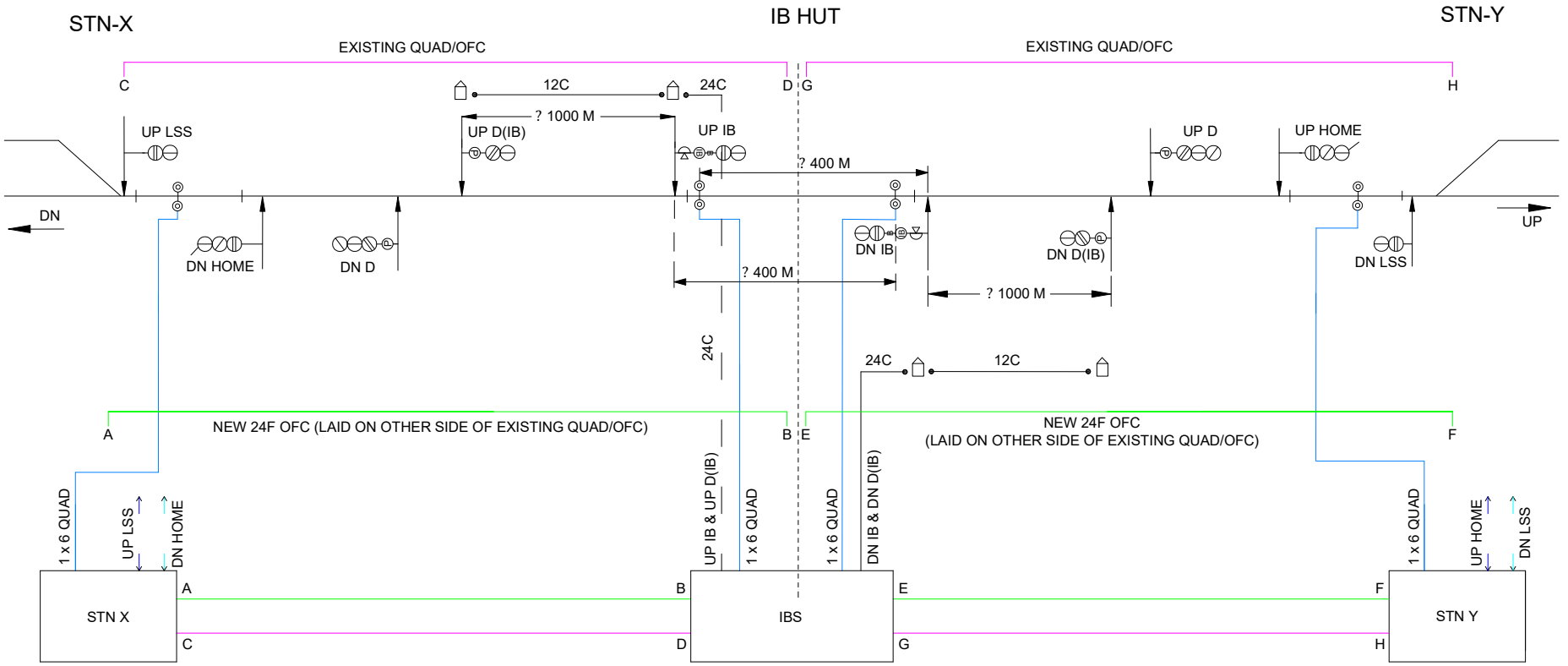
3. NUMBER OF DPs IN REDUNDANT MODE: 10 DPs (5+5).

✳ - TRACK DETECTORS FROM OTHER RAIL FOR REDUNDANCY.

\# - AXLE COUNTER RESETTING AS PER SWR [SYSTEM (OR) RESET BOX].

PRINT IN COLOUR

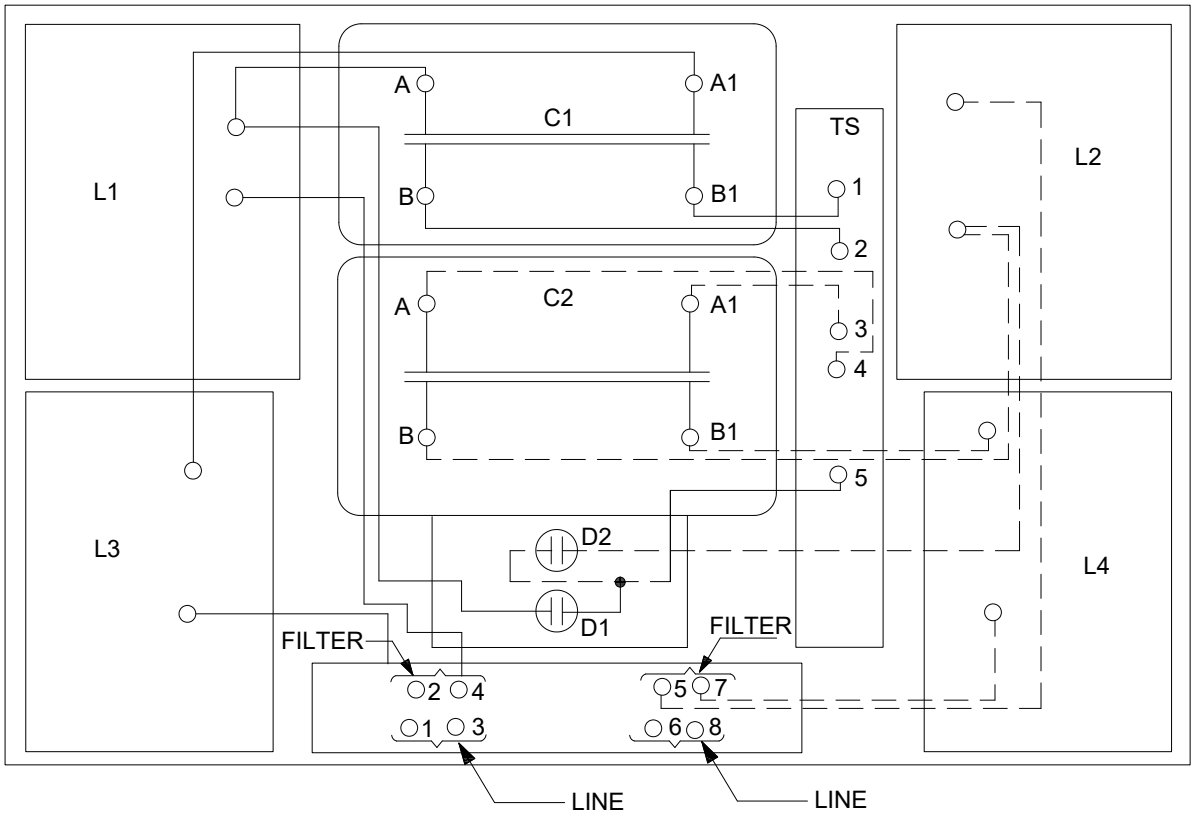
IB CABLE PLAN (SINGLE LINE)



NOTE: 1. ONE QUAD TO BE USED FOR UP LHS SIDE RAILS TX/RX DETECTOR.
2. SECOND QUAD TO BE USED FOR DN LHS SIDE RAILS TX/RX DETECTOR.
3. UP SIGNAL CABLE - UP TRENCH, DOWN SIGNAL CABLE - DOWN TRENCH.
4. NEW OFC (24 FIBRE) TO BE LAID ON THE OTHER SIDE OF EXISTING QUAD/OFC.
5. IB PHONEs TO BE CONNECTED ON QUAD CABLE UP TO IB HUT AND ON OFC FROM IB HUT TO STATION IN REAR

PRINT IN COLOUR

FILTER UNIT FOR BLOCK CIRCUITS

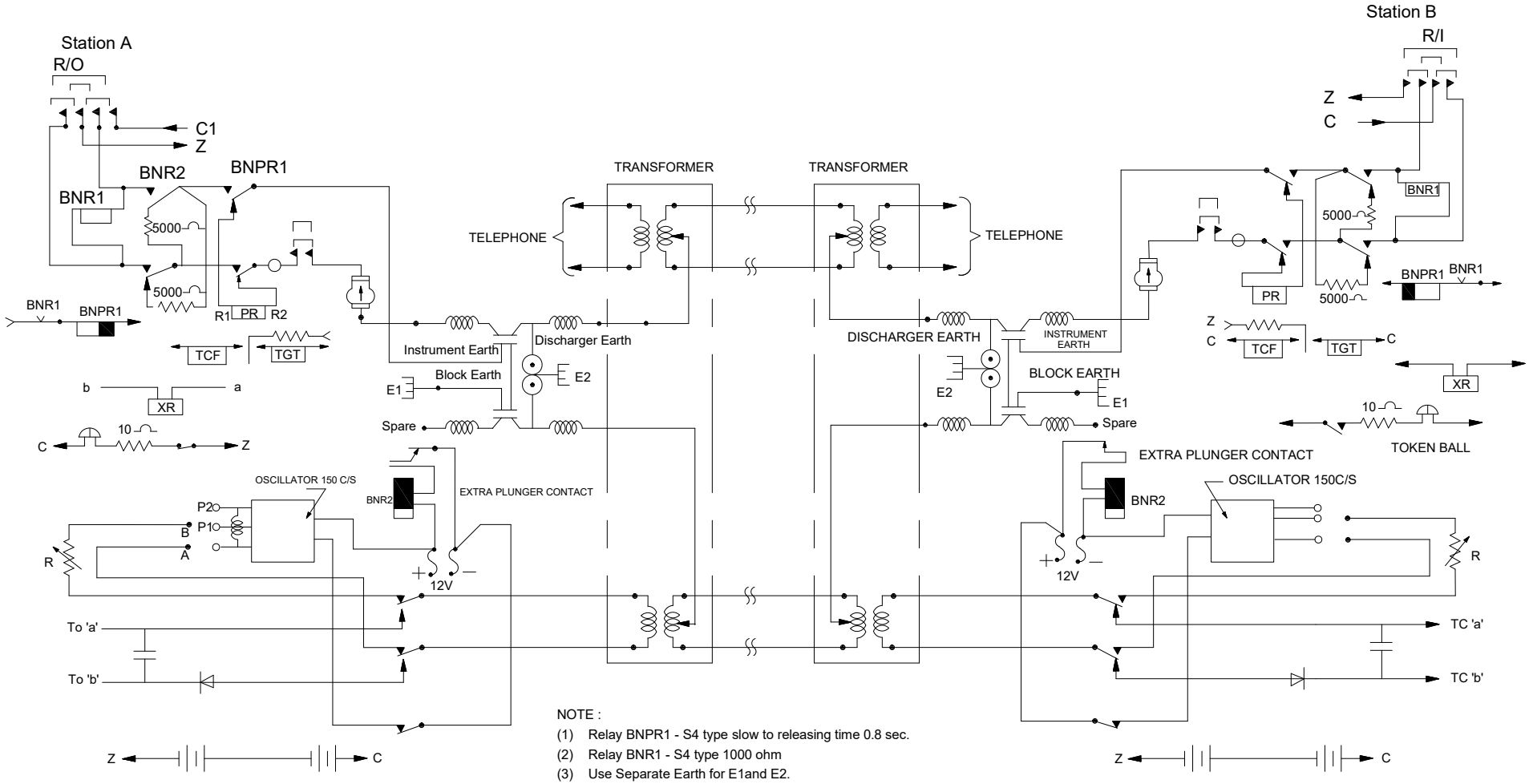


NOTE : (1) Terminals 1 and 2, 3 and 4, 5 and 6, 7 and 8 are linked when covers placed over the filter.

(2) Wiring shown thus for UP block section -- -- -- -- --

(3) Wiring shown thus for DOWN block section ————

PROTECTIVE DEVICES FOR AC ELECTRIFIED AREA OF NEALE's Á' TYPE TOKEN INSTRUMENT – EARTH RETURN



NOTE :

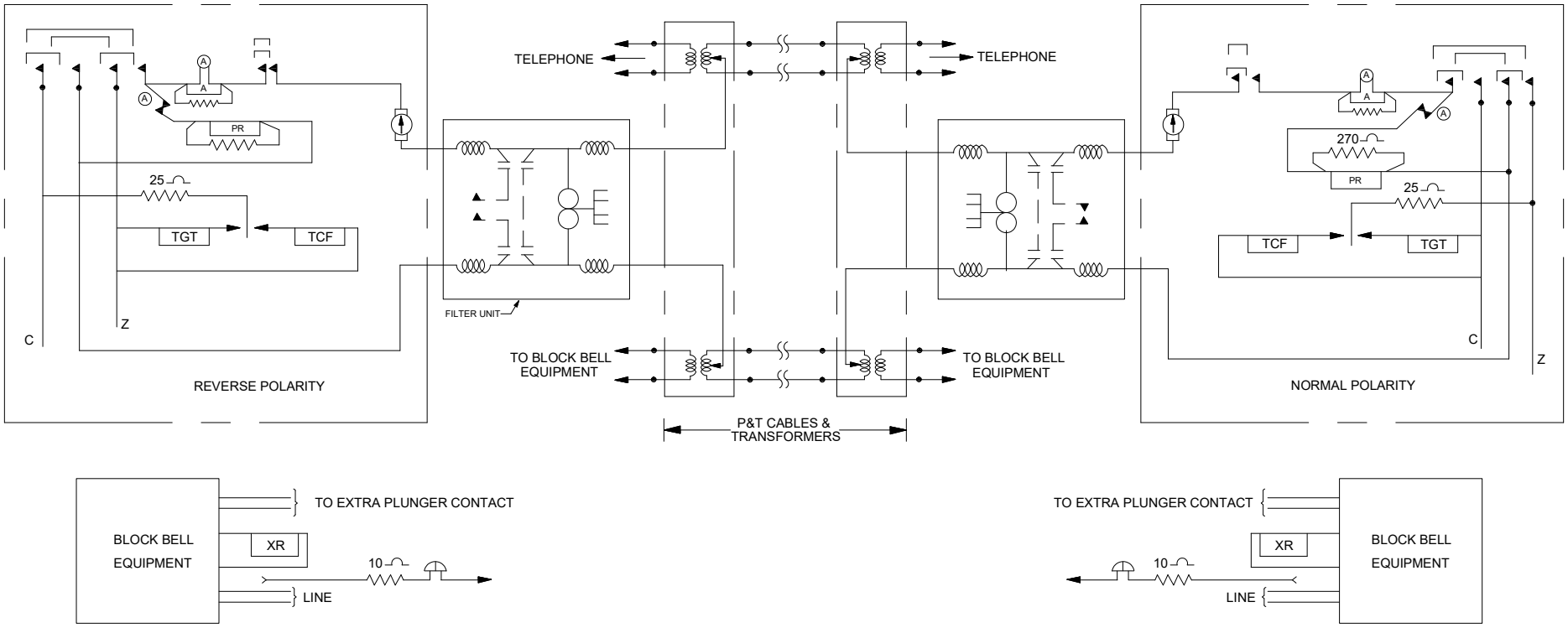
(1) Relay BNPR1 - S4 type slow to releasing time 0.8 sec.

(2) Relay BNR1 - S4 type 1000 ohm

(3) Use Separate Earth for E1and E2.

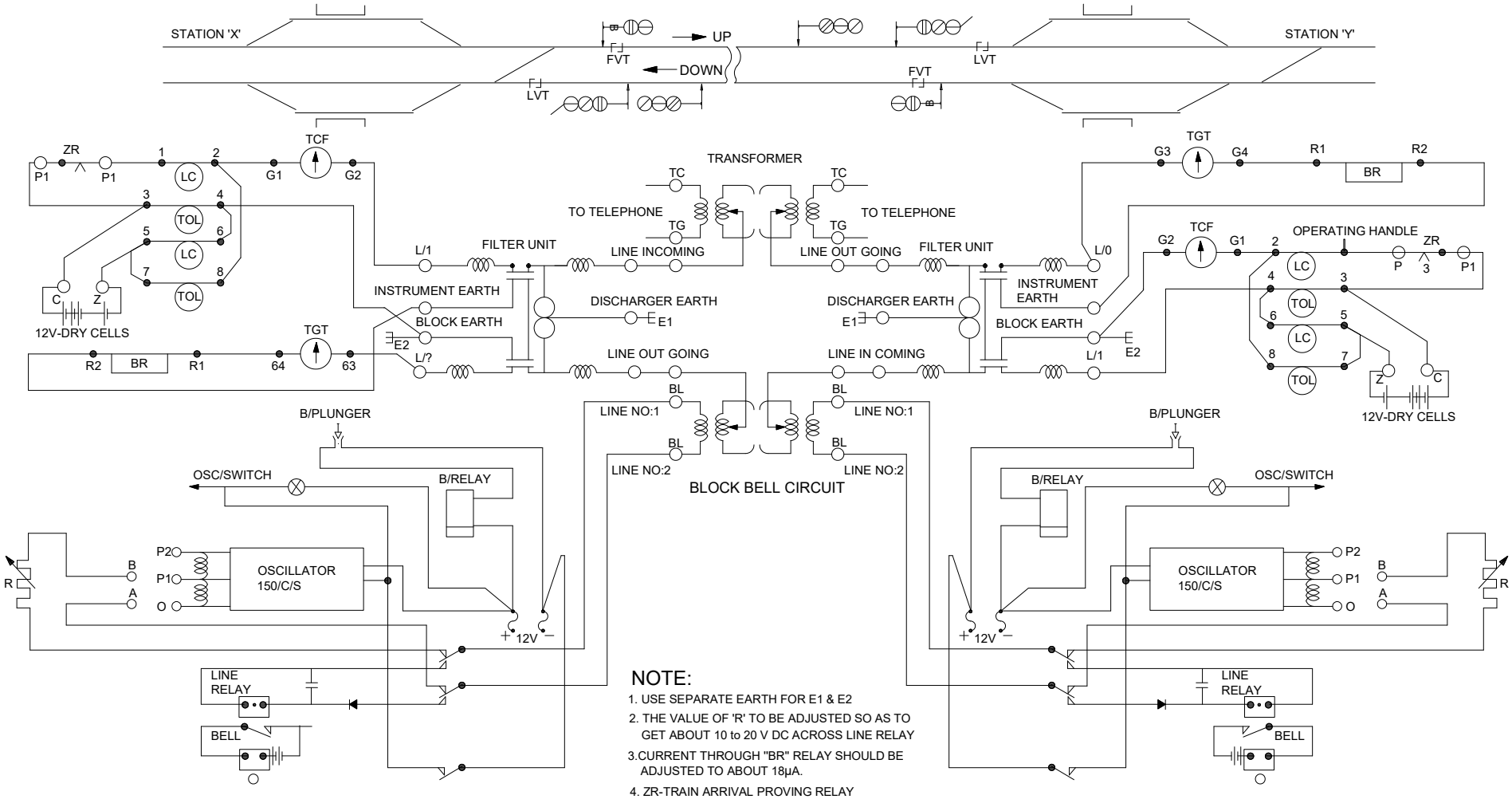
(4) The value of R to be adjusted so as to get about 10 to 12 V DC across Relay XR.

PROTECTIVE DEVICES FOR AC ELECTRIFIED AREA OF NEALE's Á' TYPE TOKEN INSTRUMENT – METALLIC RETURN



Note : Condensers in filter units to be disconnected and removed

DOUBLE LINE BLOCK WORKING WITH PROTECTIVE DEVICE FOR AC ELECTRIFIED AREA

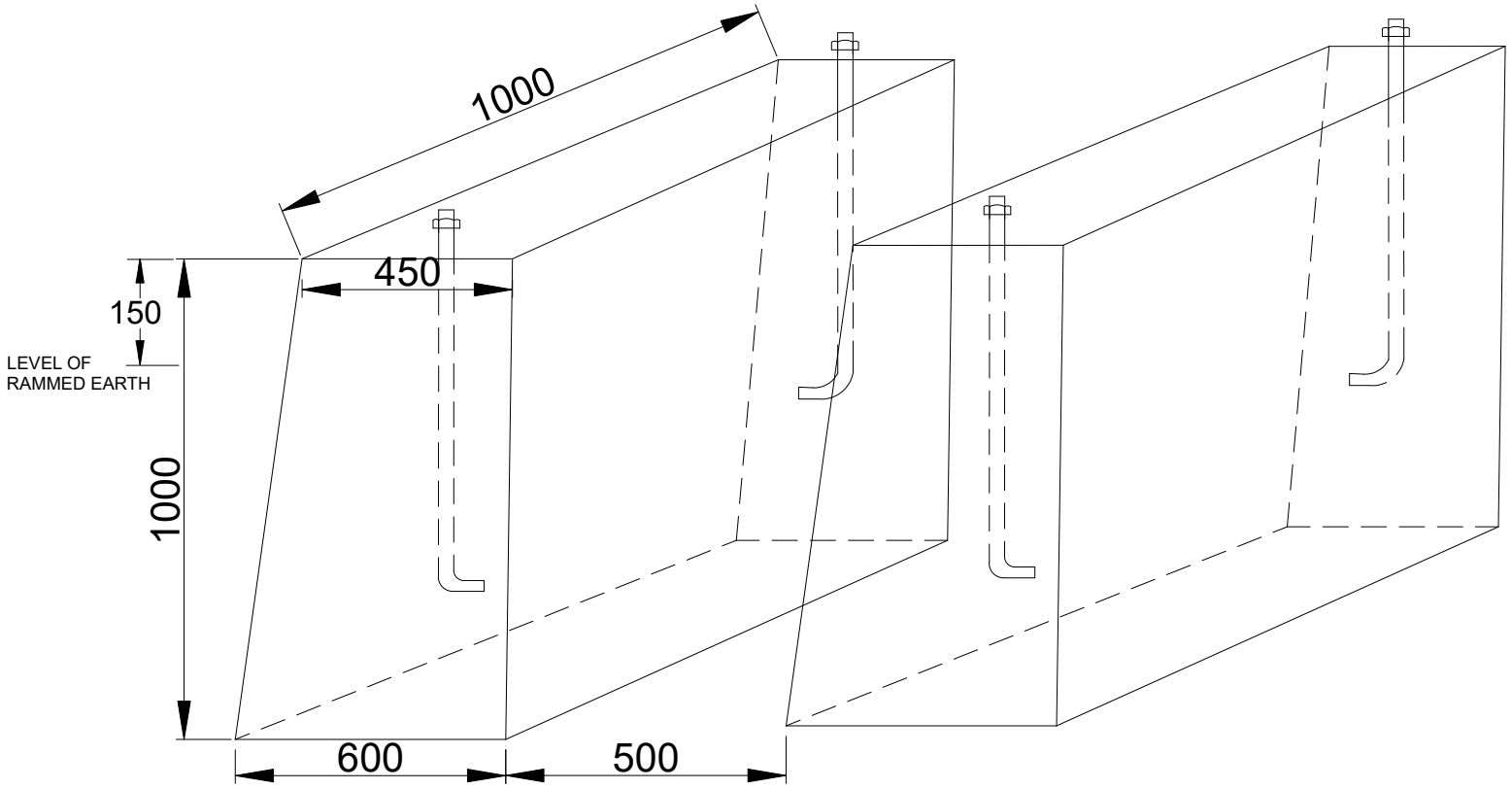


NOTE:

1. USE SEPARATE EARTH FOR E1 & E2
2. THE VALUE OF 'R' TO BE ADJUSTED SO AS TO GET ABOUT 10 to 20 V DC ACROSS LINE RELAY
3. CURRENT THROUGH "BR" RELAY SHOULD BE ADJUSTED TO ABOUT 18μA.
4. ZR-TRAIN ARRIVAL PROVING RELAY

Drg.No. 19-D1

APPARATUS CASE FULL SIZE FOUNDATION



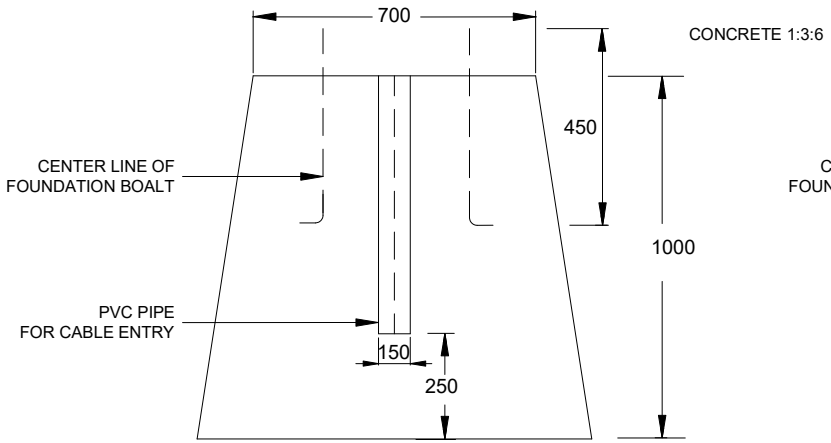
CONCRETE 1:3:6

NOTE:-

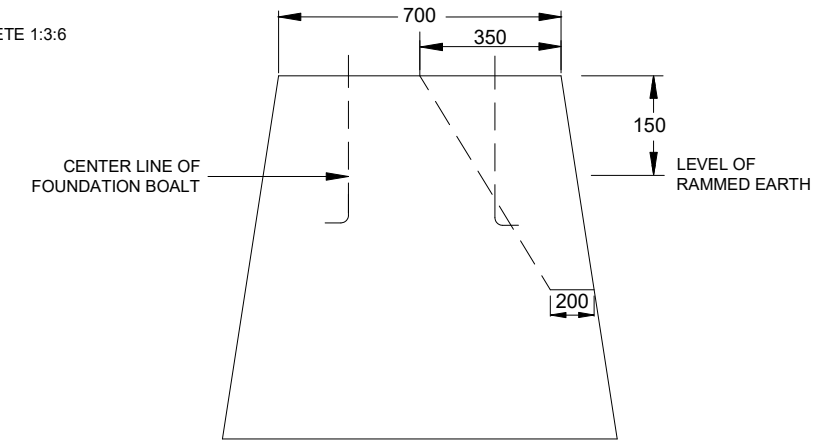
1. ALL DIMENSIONS ARE IN MM.
2. CONCRETE FOUNDATION WITH MIXTURE OF CEMENT, SAND AND JELLY CHIPS, SIZE:20, WITH RATIO 1:3:6.
3. OUTER SURFACE SHOULD BE PLASTERED WITH 1:4 CEMENT AND SAND.
4. ON ALL SIDES OF THE EARTH SHOULD BE RAMMED INTO THE LEVEL AS SHOWN IN THE SKETCH.
5. FOUNDATION BOLT OF SIZE 22 MM DIA., 450 MM LONG WITH 2 FLAT SPRING WASHERS & ONE NUT IS TO BE USED.

Drg.No. 19-D2

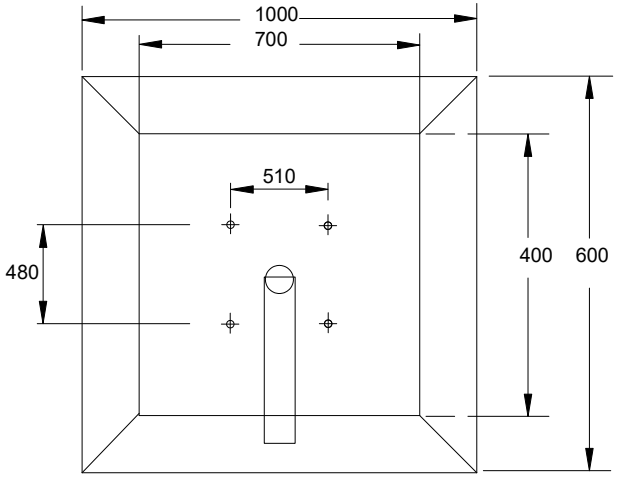
APPARATUS CASE HALF/QUARTER SIZE FOUNDATION



SECTION VIEW



SIDE VIEW

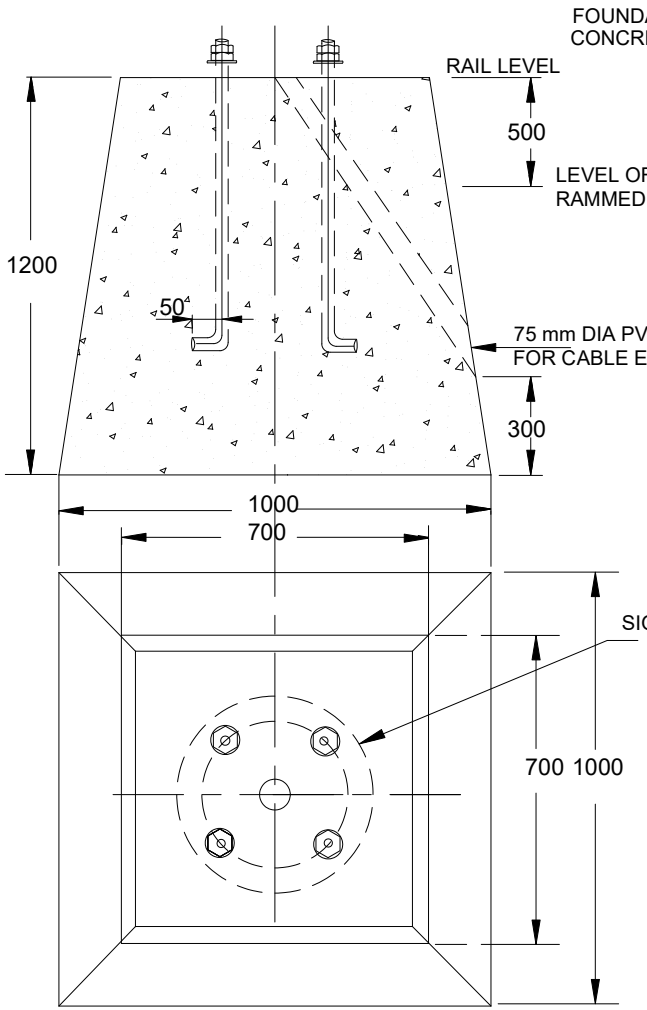


PLAN

NOTE:-

1. ALL DIMENSIONS ARE IN MM.
2. CONCRETE FOUNDATION WITH MIXTURE OF CEMENT, SAND AND JELLY CHIPS, SIZE:20, WITH RATIO 1:3:6.
3. OUTER SURFACE SHOULD BE PLASTERED WITH 1:4 CEMENT AND SAND.
4. ON ALL SIDES OF THE EARTH SHOULD BE RAMMED INTO THE LEVEL AS SHOWN IN THE SKETCH.
5. FOUNDATION BOLT OF SIZE 22 MM DIA., 450 MM LONG WITH 2 FLAT SPRING WASHERS & ONE NUT IS TO BE USED.

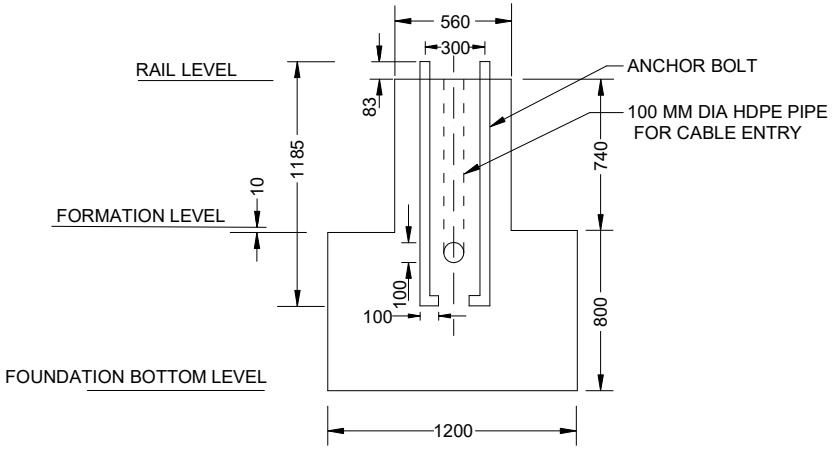
MAIN SIGNAL POST FOUNDATION



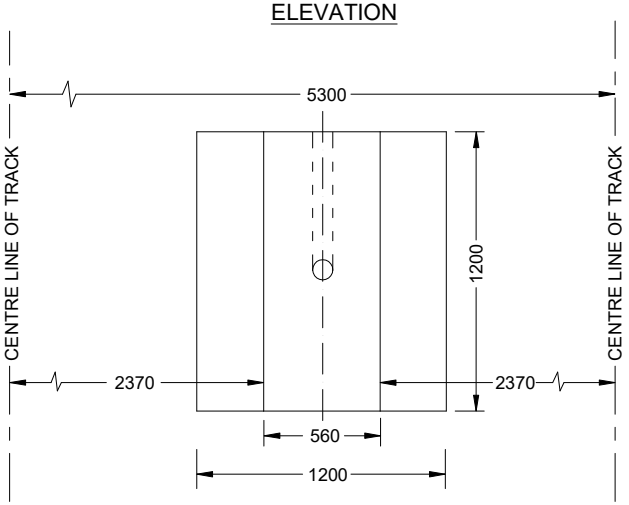
NOTE:-

1. ALL DIMENSIONS ARE IN MM.
2. COSTING OF BOLTS TO BE DONE IN THE CONCRETE BASE DULY TAKING HE MEASUREMENTS OF THE SURFACE BASE AND CIRCLE ALSO ALIGNING THE FOUR HOLES OF THE SURFACE BASE WITH THE BOLT LOCATION 1, 2, 3 & 4 BY PROVIDING TEMPLATE.
3. ENTIRE FOUNDATION SHOULD BE CAST IN ONE STRETCH AND WITH BOLT ONLY.
4. 75 MM DIA. PVC PIPE TO BE EMBEDDED DURING CASTING ITSELF (AND NOT LATER ON).
5. AFTER COSTING OF BASE AND CURING OF THE SAME IS OVER THE FOUR SIDES OF THE BASE TO BE CLEARED OF ALL LEFT OVER CONCRETE AND SIDES DULY RAMMED WITH EARTH UPTO 500 BELOW THE TOP OF THE BASE.
6. WHERE REQUIRED PITCHING ON THE RELEVANT SIDES OF THE RAMMED SURFACE WITH 225 TO 300 SIZE BOULDERS SHALL BE DONE AND FILLING THE CREVICES WITH 10:6:12 CONCRETE WITH FINE 20 STONE CHIPS. PITCHING WILL BE TO THE FULL HEIGHT OF THE RAMMED EARTH.
7. OUTER SURFACE SHOULD BE PLASTERED FROM TOP OF FOUNDATION WITH 1:2 CEMENT AND SAND UPTO A LEVEL OF 500 MM.
8. FOUNDATION BOLT OF SIZE 30 MM DIA 750 MM LONG WITH 2 FLAT SPRING WASHERS & 2 NUTS ARE TO BE USED.
9. CONCRETE FOUNDATION WITH RATIO 1:3:6.

MAIN SIGNAL POST FOUNDATION
(WHERE TRACK CENTRE IS LESS THAN 5.3M)
(Based on RDSO No: RDSO/M-0011/R4



ELEVATION



PLAN

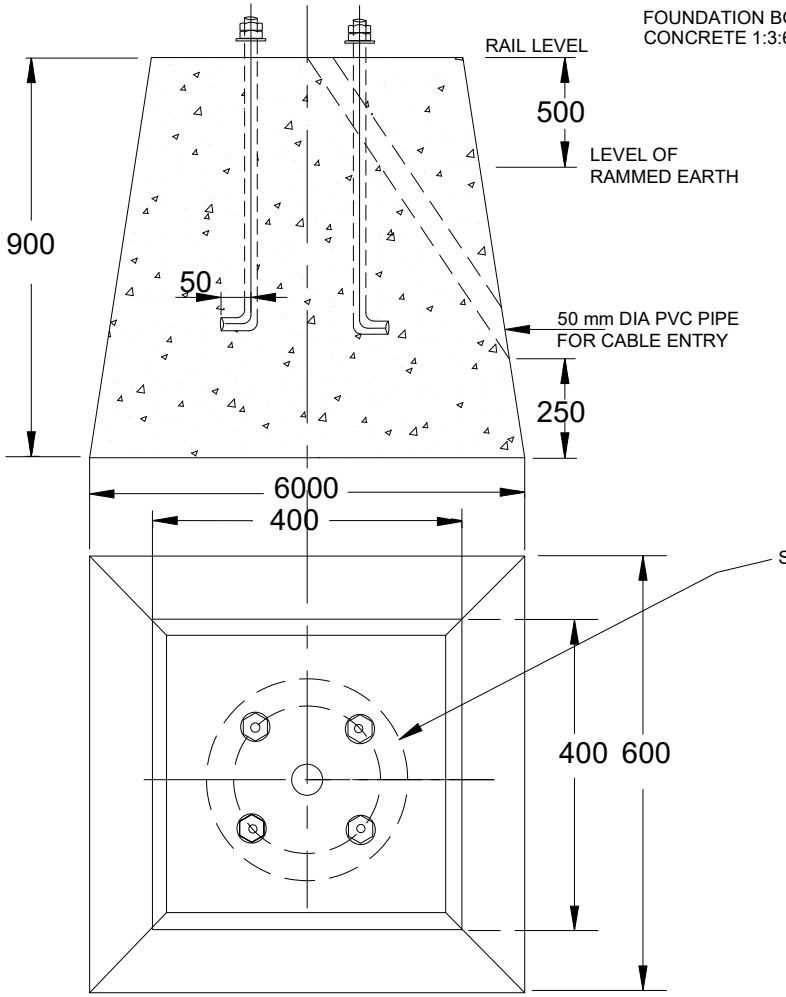
NOTE:-

1. CASTING OF BOLTS TO BE DONE IN THE CONCRETE BASE DULY TAKING THE MEASUREMENTS OF THE SURFACE BASE AND CIRCLE ALSO ALIGNING THE FOUR HOLES OF THE SURFACE BASE WITH BOLT LOCATIONS BY PROVING TEMPLATE.
2. 100 MM DIA HDPE PIPE TO BE EMBEDDED DURING CASTING ITSELF.
3. AFTER CASTING OF BASE AND CURING OF THE SAME IS OVER THE FOUR SIDES OF THE BASE TO BE CLEARED OF ALL LEFT OVER CONCRETE AND SIDES TO BE FILLED WITH SUITABLE SOIL AND DULY COMPACTED IN LAYERS UPTO FORMATION LEVEL.
4. WHERE REQUIRED PITCHING ON THE RELEVANT SIDES OF THE RAMMED SURFACE WITH 225 TO 300 MM SIZE BOULDERS SHALL BE DONE & FILLING THE CREICES WITH 1: 6: 12 CONCRETE WITH FINE 20 MM STONE CHIPS PITCHING WILL BE UPTO THE FULL HEIGHT OF THE RAMMED EARTH.
5. CABLE GROOVE IS TO BE FILLED UP WITH SAND & COVERED FLUSH WITH SIDE OF THE FOUNDATION BY A LAYER OF 25 MM THICK CEMENT PLASTER AFTER LAYING OF CABLE AND ERRECTION OF SIGNAL POST.
6. THIS DRAWING OF MASS CONCRETE FOOTING IS SIUTABLE FOR SUPPORTING MAIN LINE SIGNAL POST AS PER SIGNAL DIRECTORATE/RDSO's TENTATIVE DRAWING NO SDO/S&T/SIGNAL POST/002 AND FURTHER REQUIREMENTS PROVIDED VIDE NOTE NO STG/SOD/VOL-III DATED 29-11-17 & 05-11-2018.
7. THE DESIGN IS SUITABLE FOR OVERALL HEIGHT OF MAIN LINE SIGNAL POST UPTO 5.6M ABOVE BOTTOM OF SIGNAL BASE WITH ROUTE INDICATOR HAVING SIX ARMS DIAMETER OF SIGNAL POST HAS BEEN TAKEN AS 0.14 M IN THE DESIGN LOADS HAVE BEEN TAKEN AS PER S&T NOTE NO STO/SOD/VOL-II DATED 29-11-2017 OF SIGNAL DIRECTORATE.
8. UNIT WEIGHT OF CONCRETE HAS BEEN TAKEN AS 24 KN/M^3 AS PER CLAUSE S 2 OF IRS BRIDGE SUBSTRUCTURES & FOUNDATION CODE.
9. CONCRETE GRADE OF MCC FOR FOOTING HAS BEEN TAKEN M-20 FOR SEVERE ENVIRONMENT EXPOSURE CONDITION AS SPECIFIED IN CLAUSE 5.4.4 OF IRS CONCRETE BRIDGE CODE.
10. MINIMUM SAFE BEARING CAPACITY OF SOIL HAS BEEN TAKEN AS 150KN/M2.
11. THE FOUNDATION IS SUITABLE FOR BASIC WIND SPEED UPTO 47 m/s.
12. IT HAS BEEN ASSUMED THAT NO OTHER HORIZONTAL FORCE IS BEING APPLIED EXCEPT WIND FORCE.
13. THIS DRAWING HAS BEEN PREPARED IN CONSULTATION WITH SIGNAL DIRECTORATE /RDSO AND AS PER REQUIREMENTS OF SIGNAL DIRECTORATE IN REFERENCE TO ED/Sig-1/RAILWAY BOARD LETTER NO 2011/Sig/SOD/1 NEW DELHI DATED 17-11-2016.
14. THIS DRAWING SUPERSEDES EARLIER DRAWING NO RDSO/M-0011/RB/1,2 AND 3 DATED 06-12-2011.
15. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.

TENTATIVE
TO BE USED IN EXCEPTIONAL CASES ONLY

Drg.No. 19-D4

SHUNT SIGNAL FOUNDATION



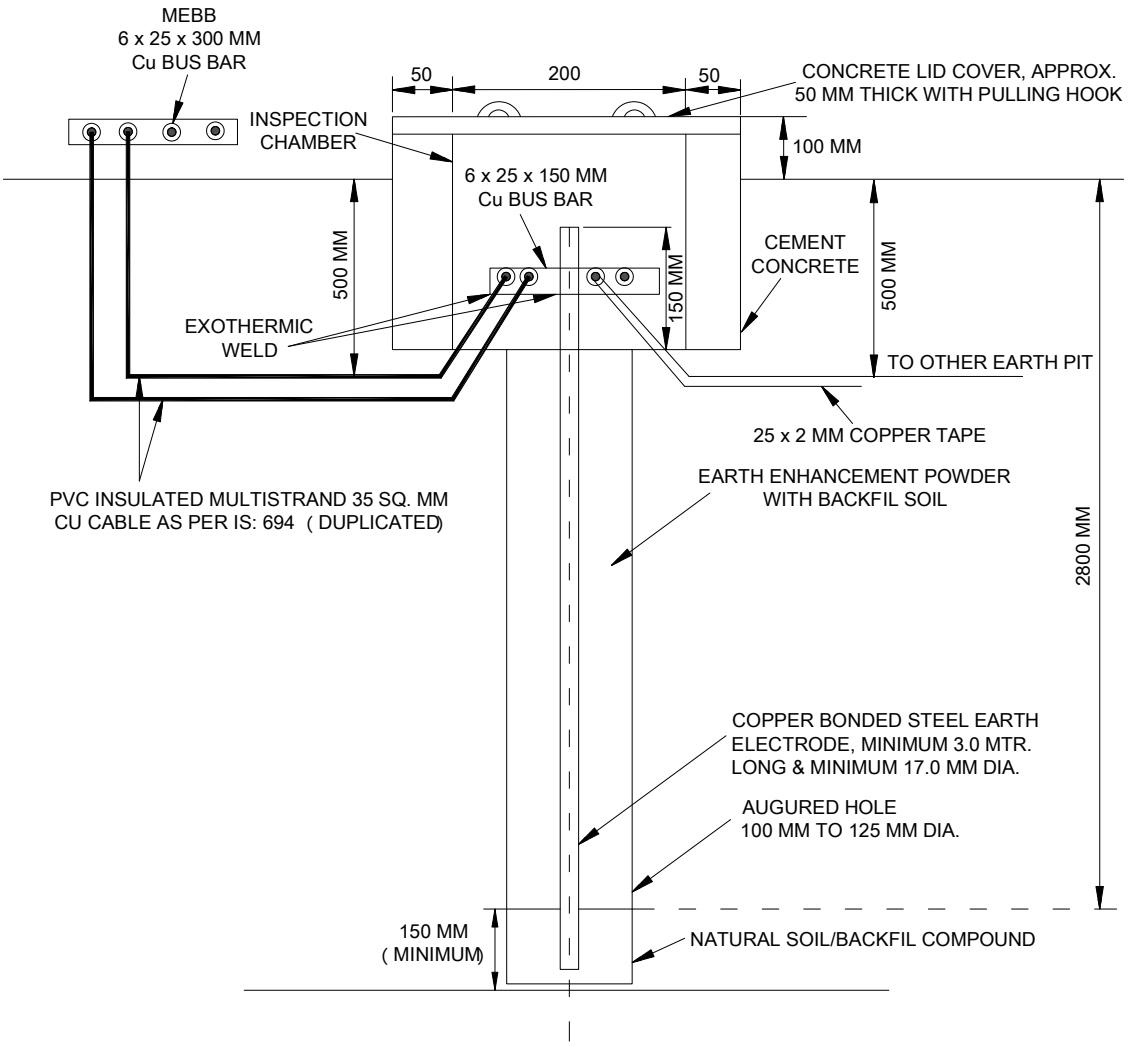
NOTE:-

1. ALL DIMENSIONS ARE IN MM.
2. COSTING OF BOLTS TO BE DONE IN THE CONCRETE BASE DULY TAKING HE MEASUREMENTS OF THE SURFACE BASE AND CIRCLE ALSO ALIGNING THE FOUR HOLES OF THE SURFACE BASE WITH THE BOLT LOCATION 1, 2, 3 & 4 BY PROVIDING TEMPLATE.
3. ENTIRE FOUNDATIONSHOULD BE CAST IN ONE STRETCH AND WITH BOLT ONLY.
4. 50 MM DIA. PVC PIPE TO BE EMBEDDED DURING CASTING ITSELF (AND NOT LATER ON).
5. AFTER COSTING OF BASE AND CURING OF THE SAME IS OVER THE FOUR SIDES OF THE BASE TO BE CLEARED OF ALL LEFT OVER CONCRETE AND SIDES DULY RAMMED WITH EARTH UPTO 500 BELOW THE TOP OF THE BASE.
6. WHERE REQUIRED PITCHING ON THE RELEVANT SIDES OF THE RAMMED SURFACE WITH 225 TO 300 SIZE BOULDERS SHALL BE DONE AND FILLING THE CREVICES WITH 10:6:12 CONCRETE WITH FINE 20 STONE CHIPS. PITCHING WILL BE TO THE FULL HEIGHT OF THE RAMMED EARTH.
7. OUTER SURFACE SHOULD BE PLASTERED FROM TOP OF FOUNDATION WITH 1:2 CEMENT AND SAND UPTO A LEVEL OF 500 MM.
8. FOUNDATION BOLT OF SIZE 22 MM DIA 450 MM LONG WITH 2 FLAT SPRING WASHERS & 2 NUTS ARE TO BE USED.
9. CONCRETE FOUNDATION WITH RATIO 1:3:6.
10. SAME DRAWING CAN BE ADOPTED FOR GWB, BSLB, CALLING-ON LEGEND BOARD OR ANY OTHER BOARDS OF SPECIFIED IN SIP.

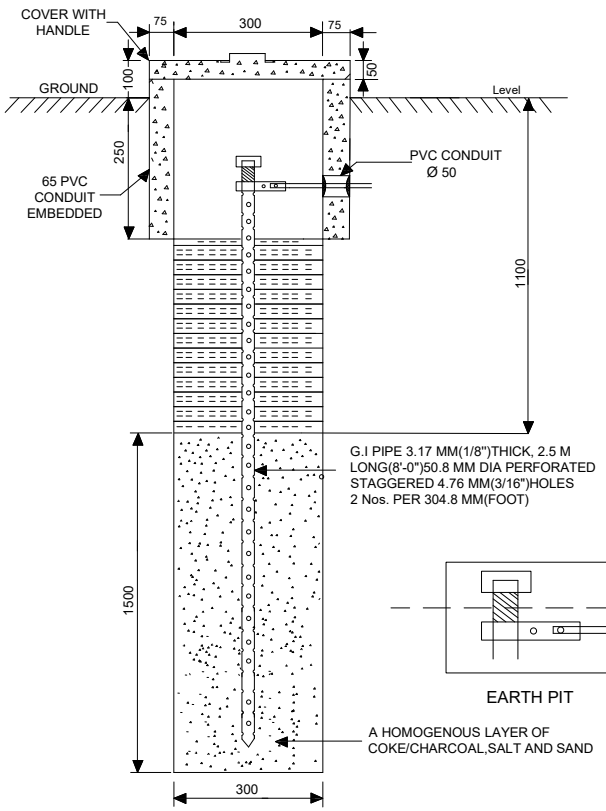
Drg.No. 19-D5

DRAWING OF EARTHING ELECTRODE FOR S&T INSTALLATION

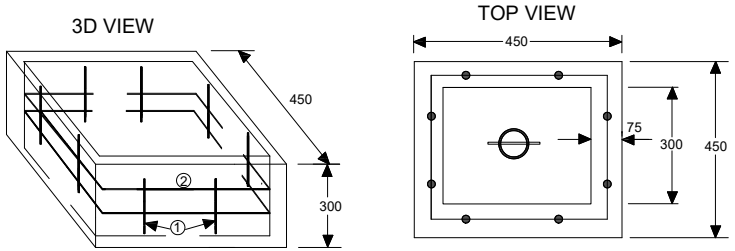
(RDSO/SPN/197/2008)



EARTHING ARRANGEMENT FOR SIGNALS, LOCATION BOXES



REINFORCEMENT DETAILS FOR CONCRETE CHAMBER



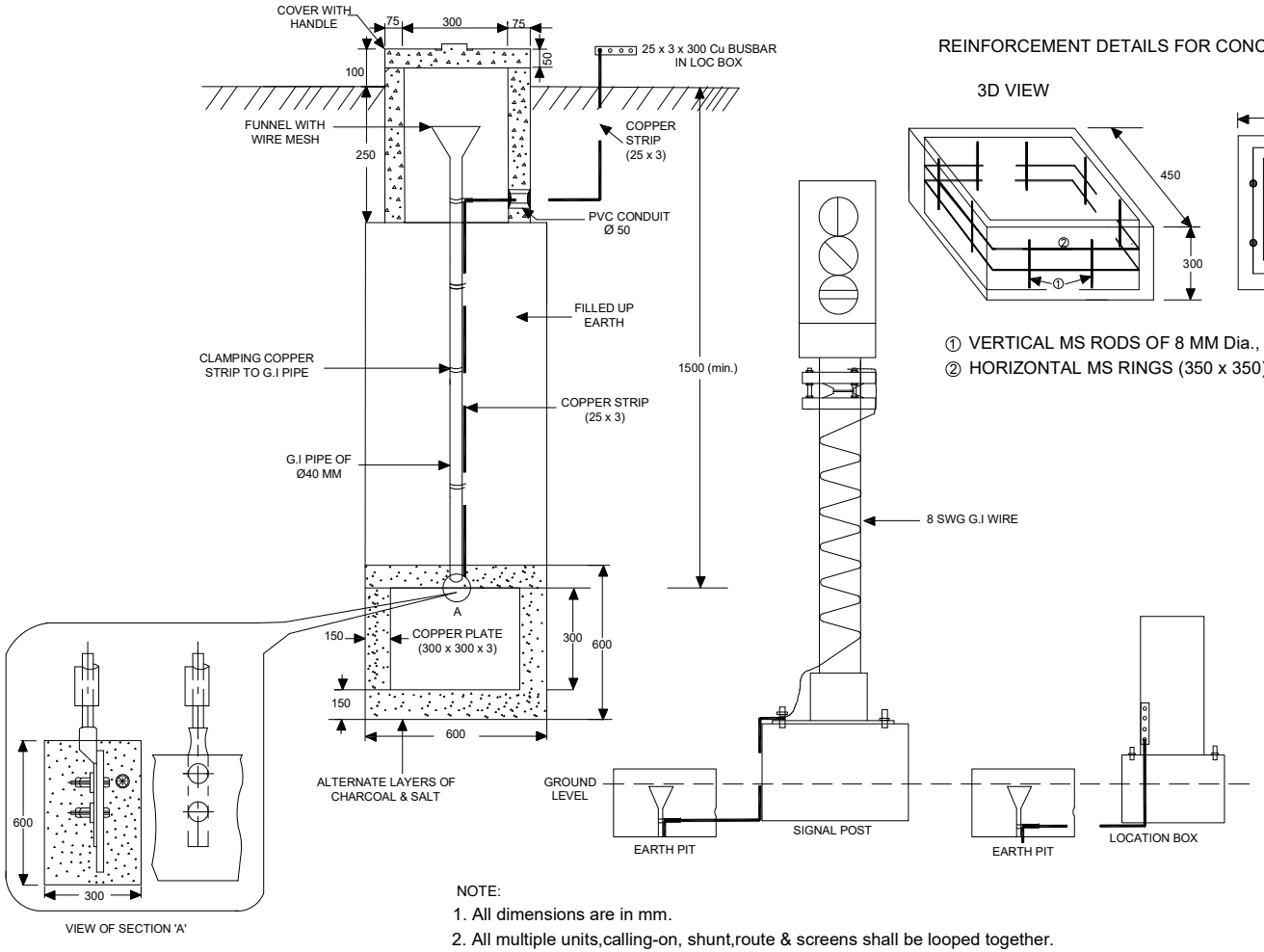
① VERTICAL MS RODS OF 8 MM Dia., 250 MM HEIGHT : 08 NUMBERS

② HORIZONTAL MS RINGS (350 x 350) OF 8 MM Dia. : 02 NUMBERS

NOTE:

1. ALL DIMENSIONS ARE IN MM.
2. ALL MULTIPLE UNITS,CALLING-ON, SHUNT,ROUTE & SCREENS SHALL BE LOOPED TOGETHER.
3. CODE OF PRACTICE FOR EARTHING AS PER IS:3043
4. CONCRETE OF M25 GRADE 1:2:4 WITH MAXIMUM SIZE OF STONE CHIPS OF 10 MM.

COPPER PLATE EARTHING ARRANGEMENT



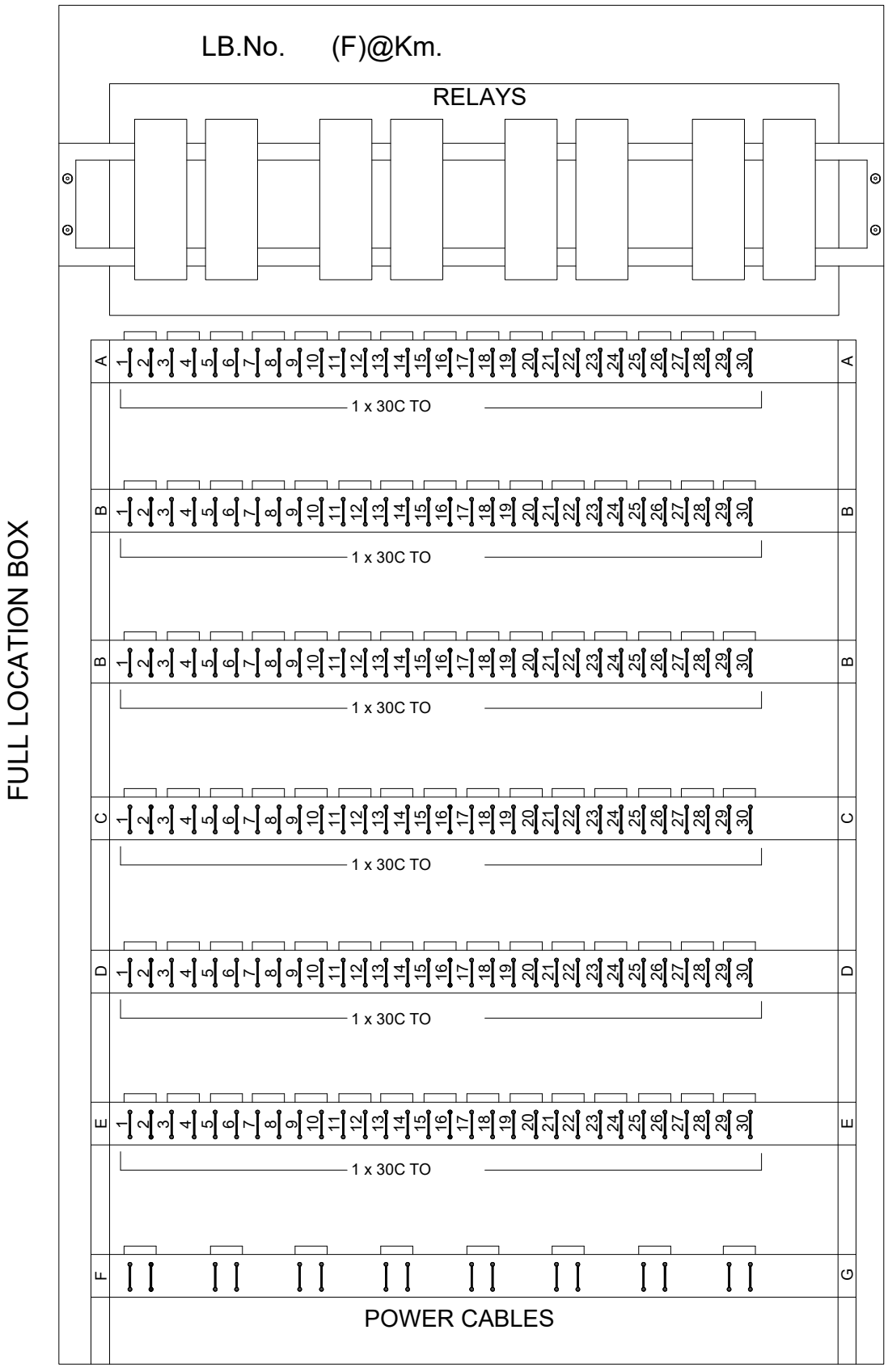
REINFORCEMENT DETAILS FOR CONCRETE CHAMBER

① VERTICAL MS RODS OF 8 MM Dia., 250 MM HEIGHT : 08 NUMBERS
② HORIZONTAL MS RINGS (350 x 350) OF 8 MM Dia. : 02 NUMBERS

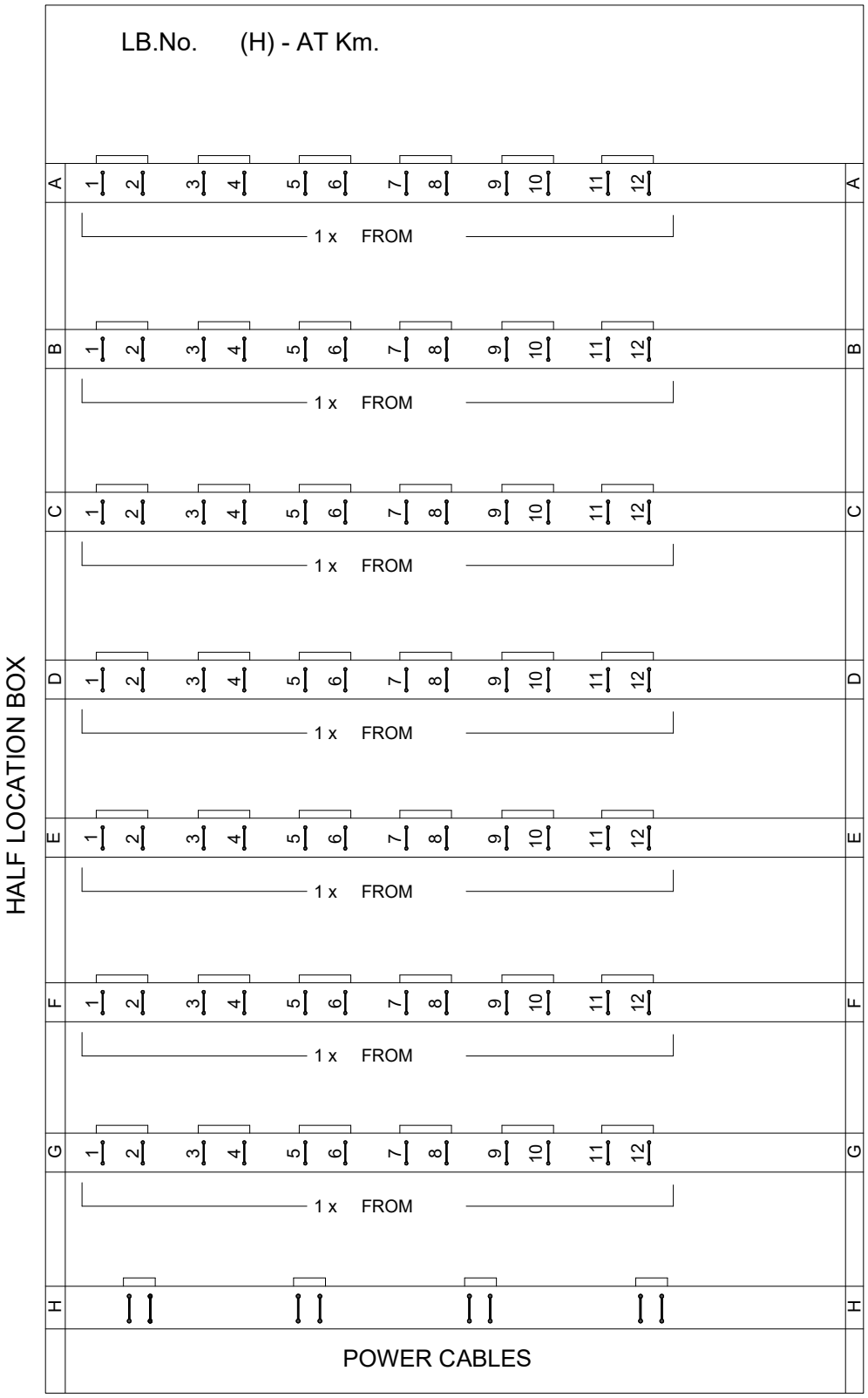
NOTE:

1. All dimensions are in mm.
2. All multiple units,calling-on, shunt,route & screens shall be looped together.
3. Code of practice for earthing as per IS:3043
4. Ⓚ Copper nut & bolt (Hexoganal head) to be provided for fixing copper strip to copper plate.
5. Concrete of M25 grade 1:2:4 with maximum size of stone chips of 10mm.

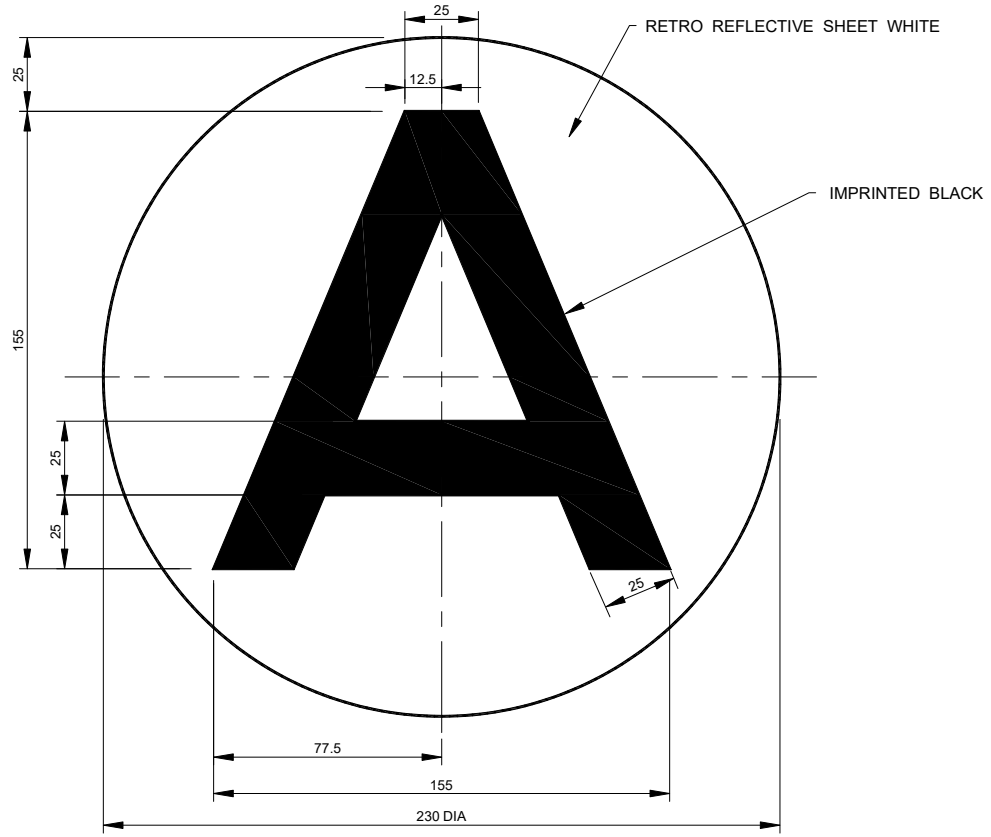
FULL LOCATION WIRING FORMAT



HALF LOCATION WIRING FORMAT



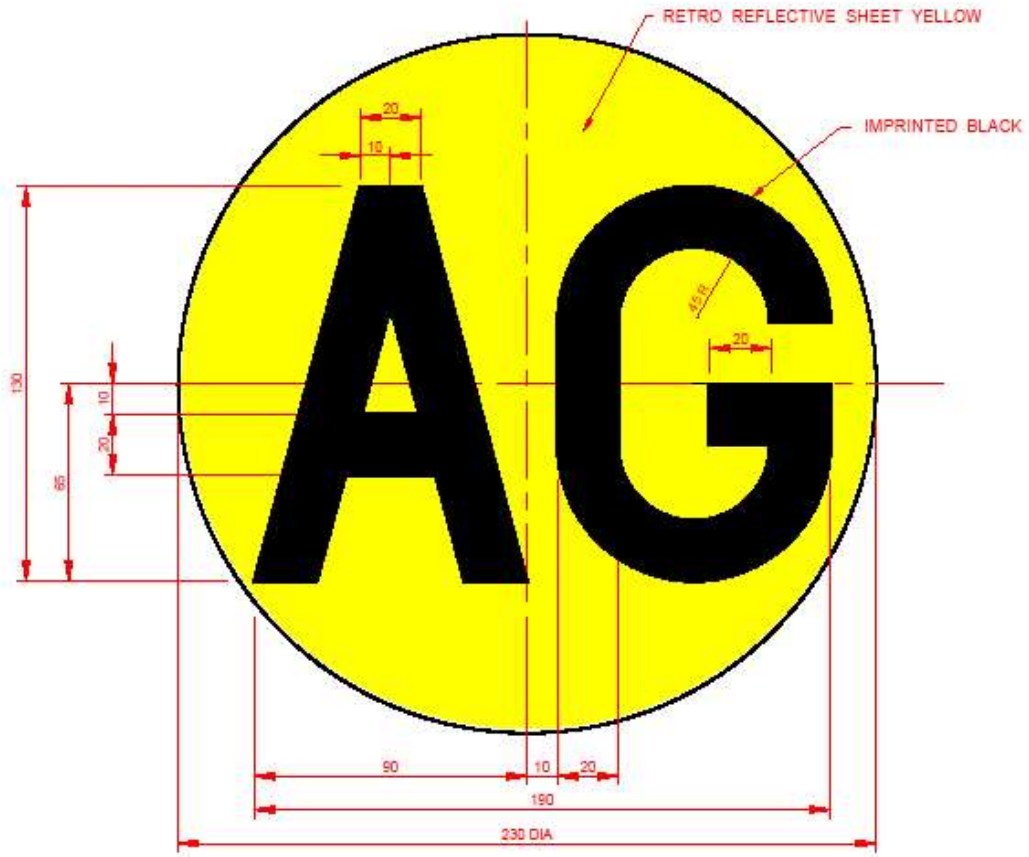
“A” MARKER RETRO REFLECTIVE SHEET



MATERIAL :-

RETRO REFLECTIVE SHEET HIGH INTENSITY GRADE WHITE WITH IMPRINTED ' A ' IN BLACK
WITH FILM THICKNESS 0.3 mm
TOLERANCE AS PER APPLICABLE
NOTE :- ALL DIMENSIONS ARE IN mm

“AG” MARKER RETRO REFLECTIVE SHEET

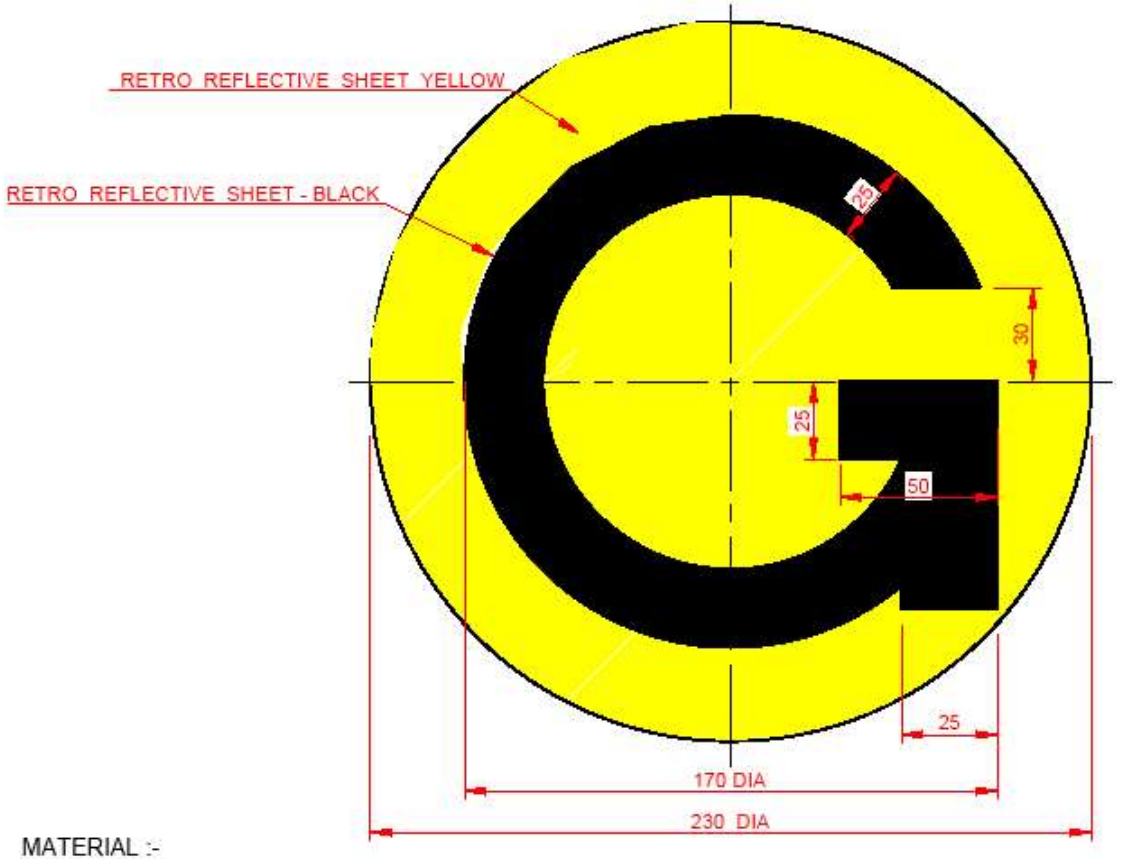


MATERIAL :-

RETRO REFLECTIVE SHEET HIGH INTENSITY GRADE YELLOW WITH IMPRINTED 'AG' IN BLACK
WITH FILM THICKNESS 0.3 mm
TOLERANCE AS PER APPLICABLE
NOTE :- ALL DIMENSIONS ARE IN mm

PRINT IN COLOUR

“G” MARKER RETRO REFLECTIVE SHEET

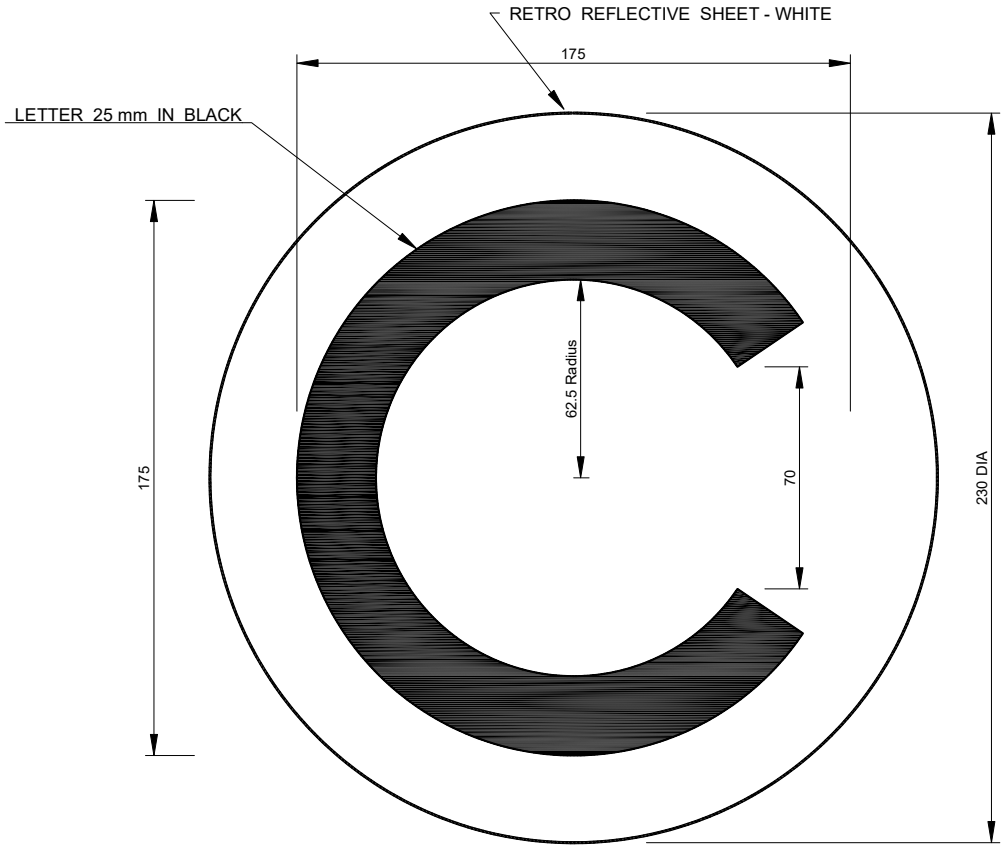


MATERIAL :-

RETRO REFLECTIVE SHEET HIGH INTENSITY GRADE YELLOW WITH IMPRINTED ‘G’ IN BLACK
WITH FILM THICKNESS 0.3 mm
TOLERANCE AS PER APPLICABLE
NOTE :- ALL DIMENSIONS ARE IN mm

PRINT IN COLOUR

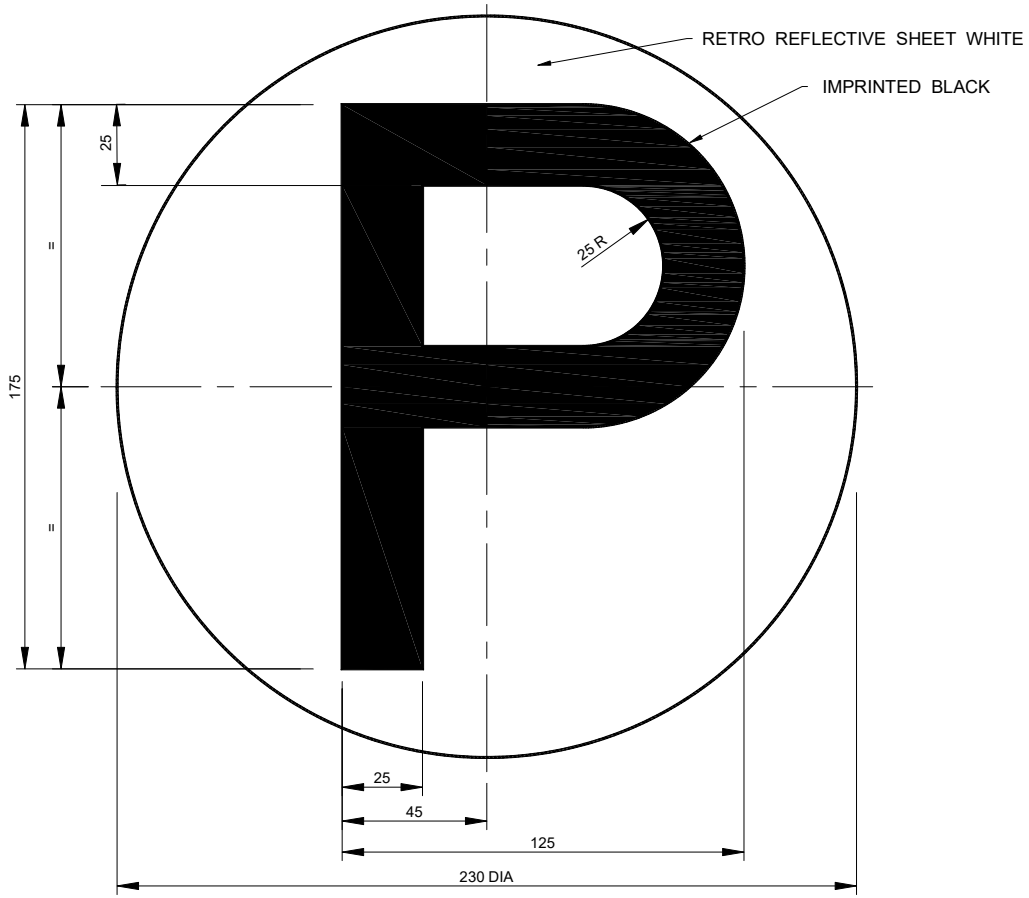
“C” MARKER RETRO REFLECTIVE SHEET



MATERIAL :-

RETRO REFLECTIVE SHEET HIGH INTENSITY GRADE WHITE WITH IMPRINTED 'C' IN BLACK
WITH FILM THICKNESS 0.3 mm
TOLERANCE AS PER APPLICABLE
NOTE :- ALL DIMENSIONS ARE IN mm

“P” MARKER RETRO REFLECTIVE SHEET



MATERIAL :-

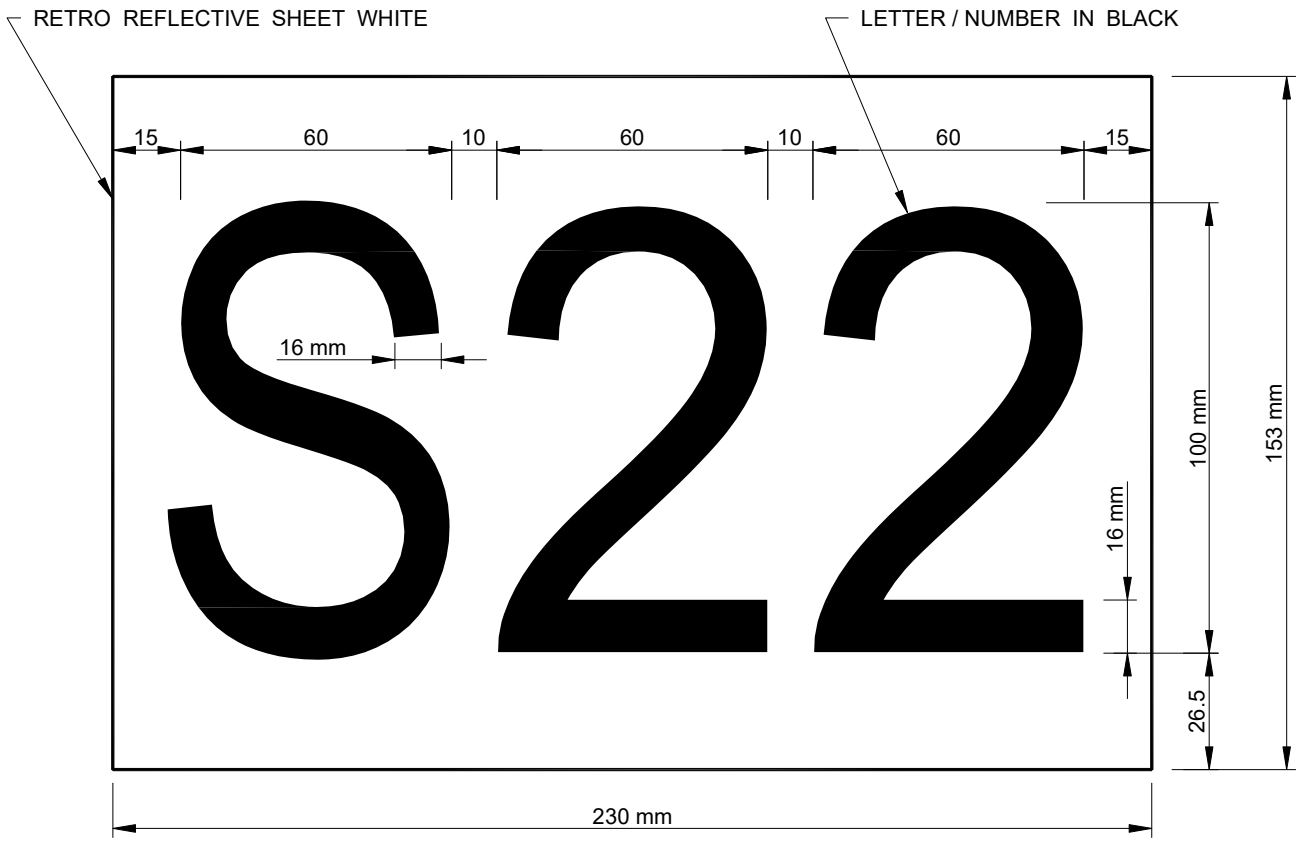
RETRO REFLECTIVE SHEET HIGH INTENSITY GRADE WHITE WITH IMPRINTED ' P ' IN BLACK

WITH FILM THICKNESS 0.3 mm

TOLERANCE AS PER APPLICABLE

NOTE :- ALL DIMENSIONS ARE IN mm

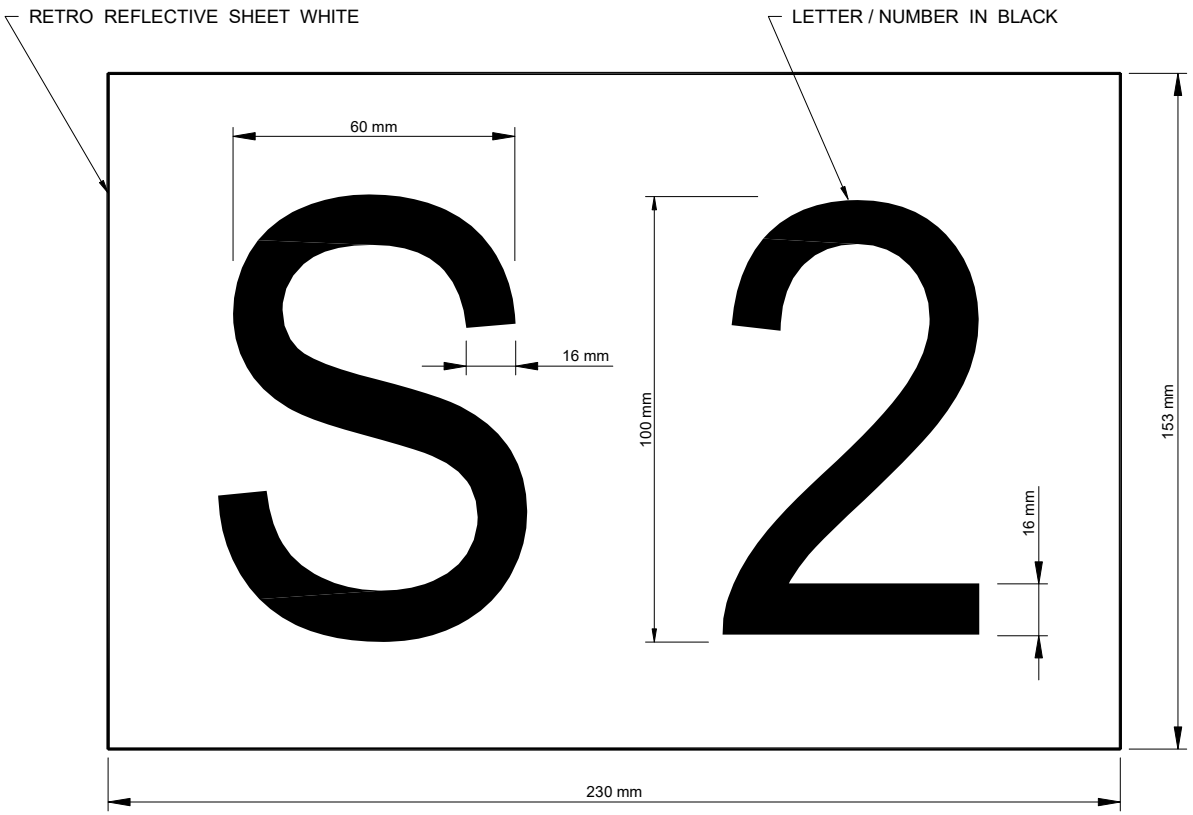
SIGNAL NUMBER PLATE (DOUBLE DIGIT) RETRO REFLECTIVE SHEET



MATERIAL :-

PRESSURE SENSITIVE TYPE RETRO REFLECTIVE SHEET HIGH INTENSITY
GRADE WHITE WITH IMPRINTED NUMBER / ALPHABET IN BLACK
WITH FILM THICKNESS 0.3 mm
TOLERANCE AS PER APPLICABLE
NOTE :- ALL DIMENSIONS ARE IN mm

SIGNAL NUMBER PLATE RETRO REFLECTIVE SHEET

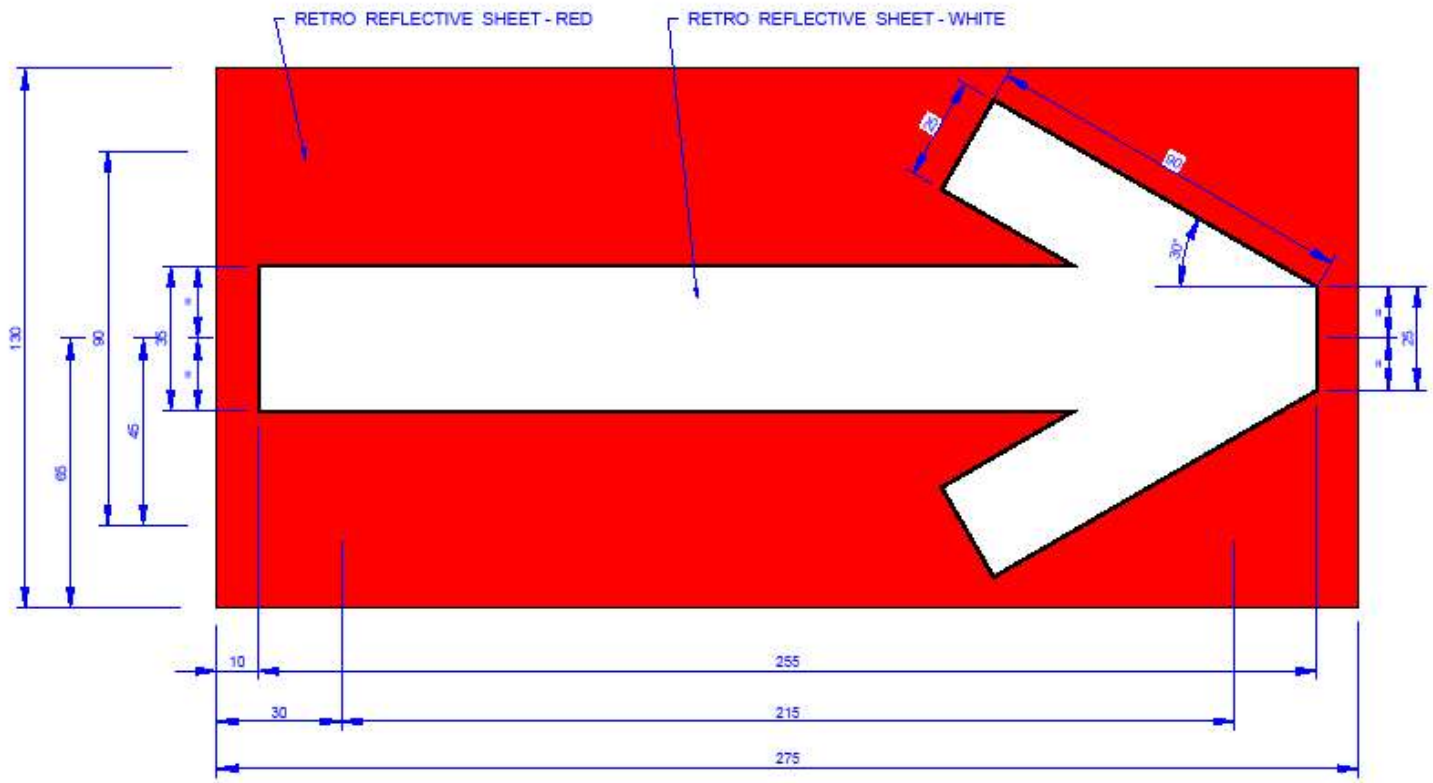


MATERIAL :-

PRESSURE SENSITIVE TYPE RETRO REFLECTIVE SHEET HIGH INTENSITY GRADE WHITE WITH IMPRINTED NUMBER / ALPHABET IN BLACK WITH FILM THICKNESS 0.3 mm
TOLERANCE AS PER APPLICABLE

NOTE :- ALL DIMENSIONS ARE IN mm

ARROW MARKER RETRO REFLECTIVE SHEET

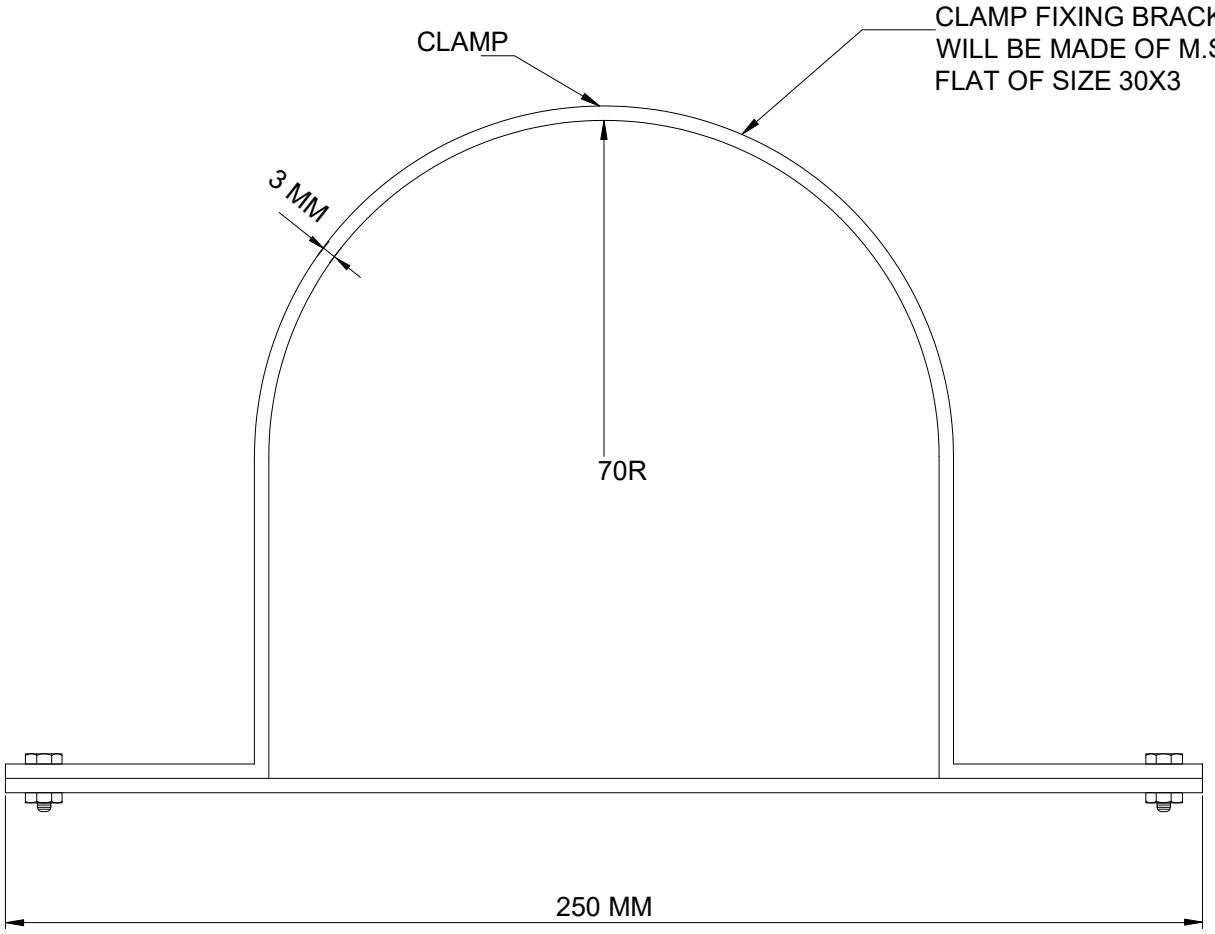


MATERIAL :-

RETRO REFLECTIVE SHEET HIGH INTENSITY GRADE RED WITH IMPRINTED " ARROW " IN WHITE
WITH FILM THICKNESS 0.3 mm
TOLERANCE AS PER APPLICABLE
NOTE :- ALL DIMENSIONS ARE IN mm

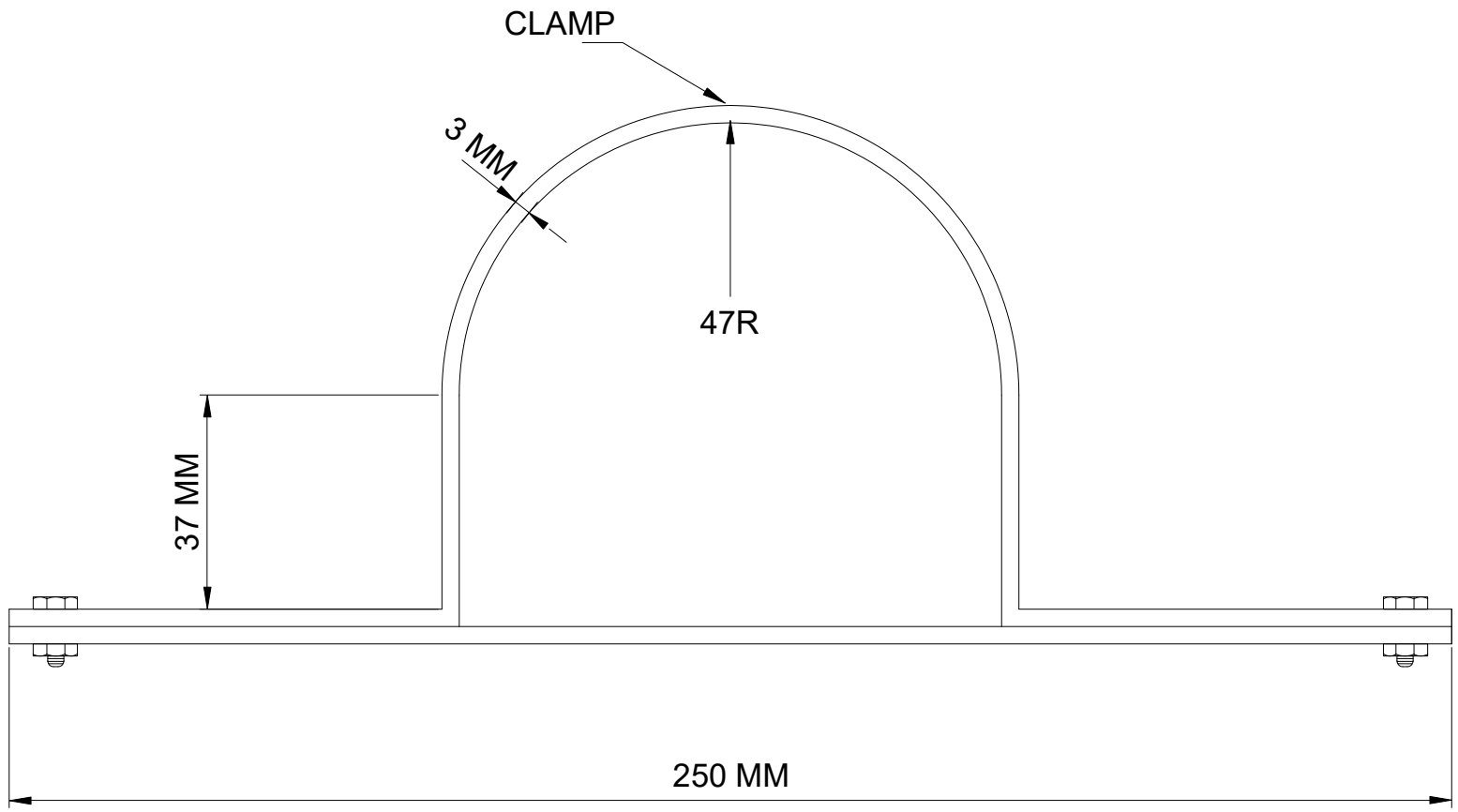
PRINT IN COLOUR

CLAMP FOR MAIN SIGNAL



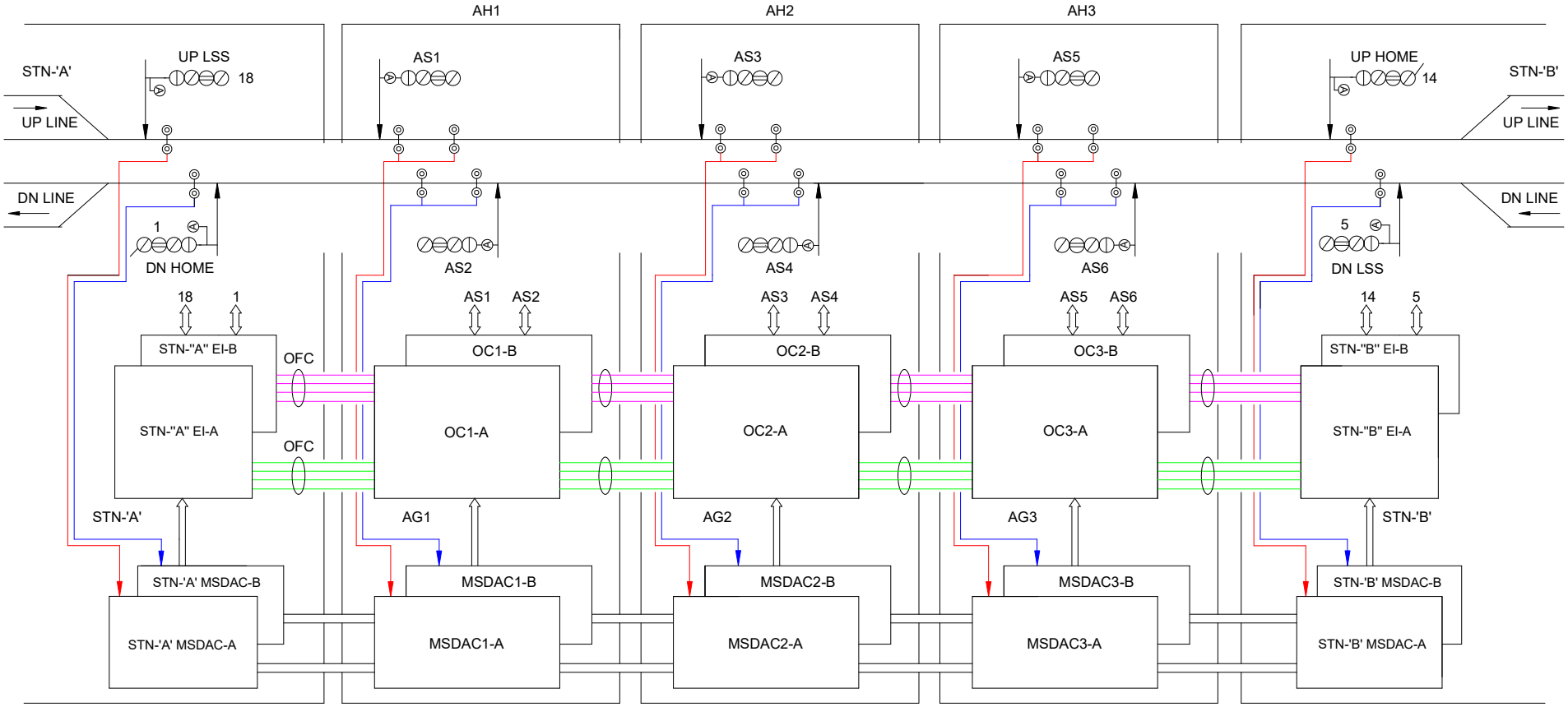
All dimensions are in mm

CLAMP FOR SHUNT SIGNAL



All dimensions are in mm

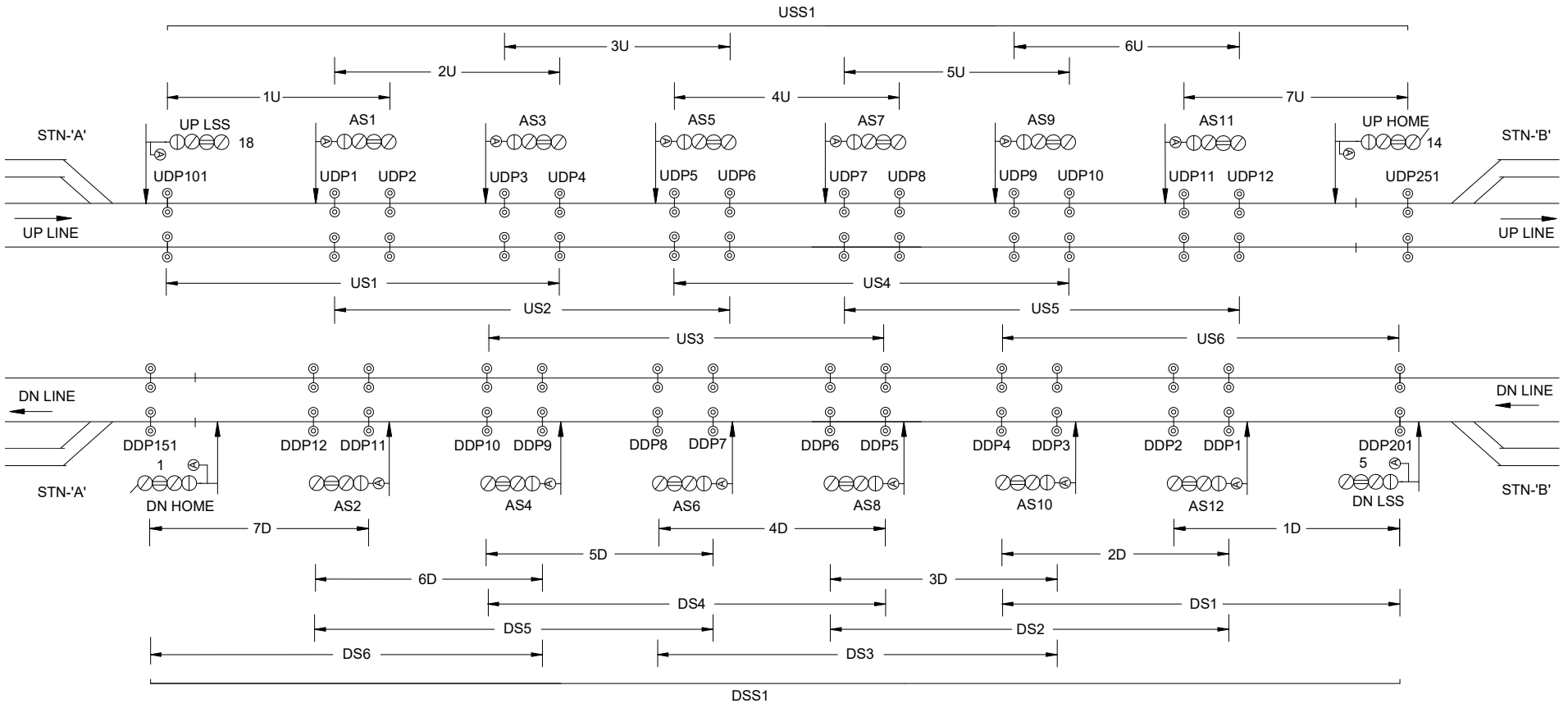
AUTOMATIC SIGNALLING SCHEME WITH OFC, MSDAC & OC



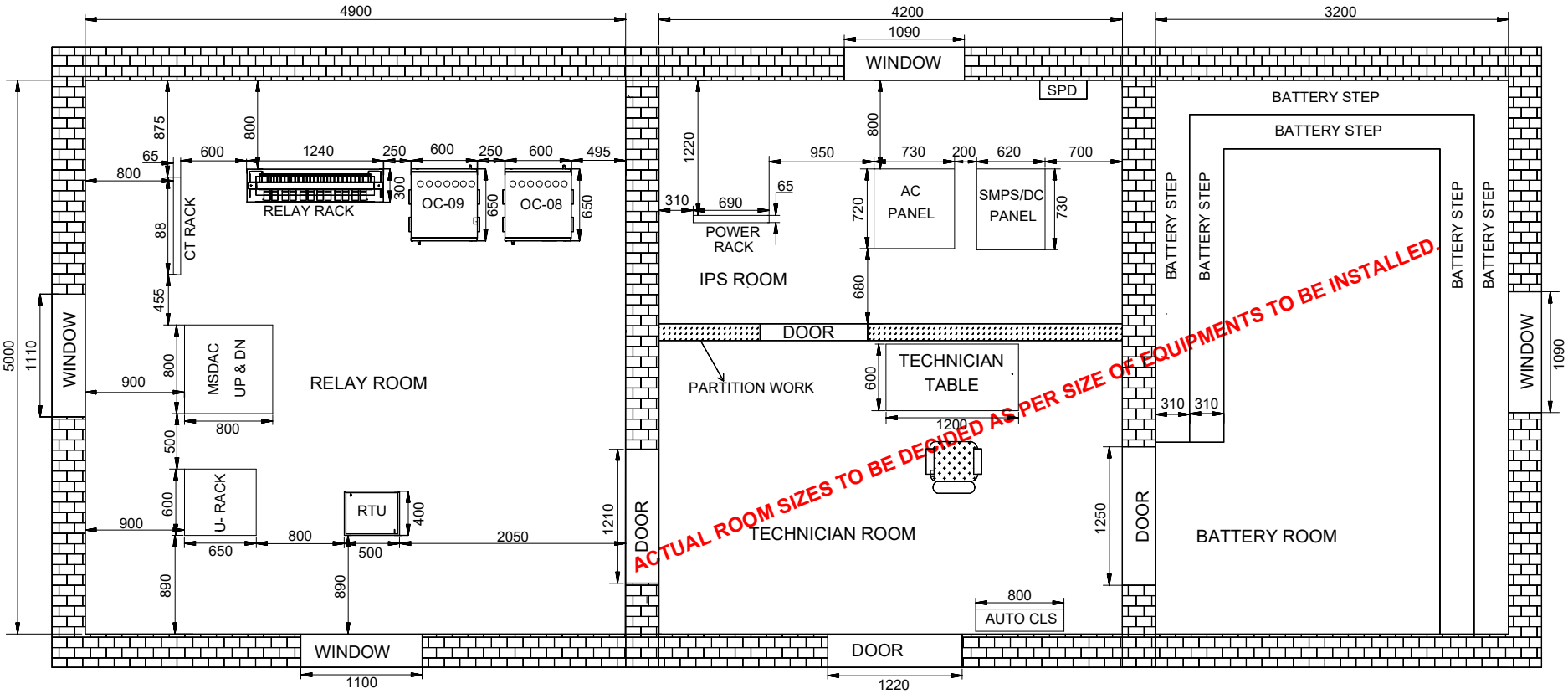
NOTE: 1. OC - OBJECT CONTROLLER.
2. EI - ELECTRONIC INTERLOCKING.

PRINT IN COLOUR

PLACEMENT OF DP'S & TRACK SECTIONS BETWEEN TWO CROSSING STATIONS



TYPICAL FLOOR PLAN OF AUTO SECTION HUT

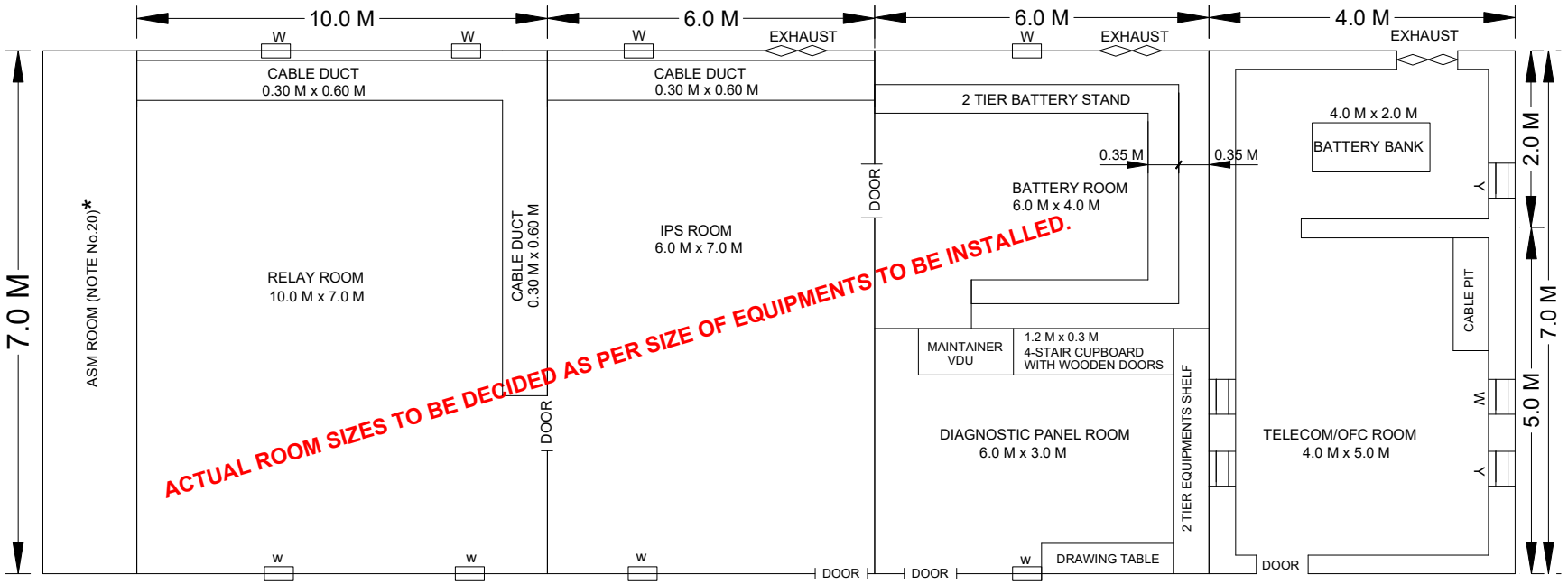


ACTUAL ROOM SIZES TO BE DECIDED AS PER SIZE OF EQUIPMENTS TO BE INSTALLED.

ALL DIMENSIONS ARE IN MM

Drg.No. 21-D1

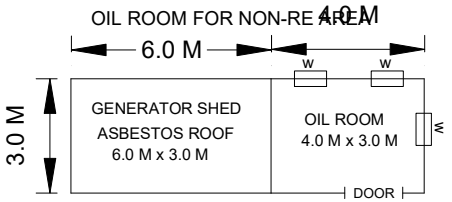
S&T BUILDING PLAN UPTO 4 ROAD STATIONS



NOTE:

1. ALL DIMENSIONS ARE IN METERS.
2. THE DOOR SHOULD BE FLUSH TYPE AND OPENED INSIDE.
3. THE DOOR OF RELAY ROOM SHOULD BE PROVIDED WITH DOUBLE LOCK ARRANGEMENT TO BE OPENED BY TWO KEYS INDEPEDENT.
4. FLOORING AND WALLS IN RELAY ROOM SHOULD BE PROVIDED WITH VITREOUS ENAMEL TILES OF COLOURS APPROVED BY S&T TO AVOID ACCUMULATION OF DUST.
5. CABLE DUCT FOR LAYING OF CABLE TO BE PROVIDED IN THE RELAY ROOM IN CONSULTATION WITH ASTE/DSTE/CN.
6. OPENING OF REQUIRED SIZE FOR CABLE ENTRY TO BE PROVIDED AT THE BASEMENT LEVEL OF RELAY ROOM IN CONSULTATION WITH ASTE/DSTE/CN.
7. FLOOR LEVEL SHOULD BE AT A HEIGHT OF 1.0 M FROM RAIL LEVEL.
8. ARRANGEMENTS FOR FIXING EXHAUST FAN IN RELAY, BATTERY & EQUIPMENT ROOMS TO BE MADE AS SHOWN.
9. ALL THE WINDOWS AND VENTILATORS SHALL BE PROVIDED WITH DUST PROOF WIRE MESH.
10. RDSO TYPE VENTILATORS TO BE PROVIDED.
11. WATER TAP WITH SINK TO BE PROVIDED IN TECHNICIAN ROOM WHERE AVAILABLE
12. HEIGHT OF WINDOWS SHOULD BE 0.91 M ABOVE FLOOR LEVEL.
13. TWO TIER BATTERY STAND SHALL BE PROVIDED IN BATTERY ROOM WITH ACID PROOF TILES.

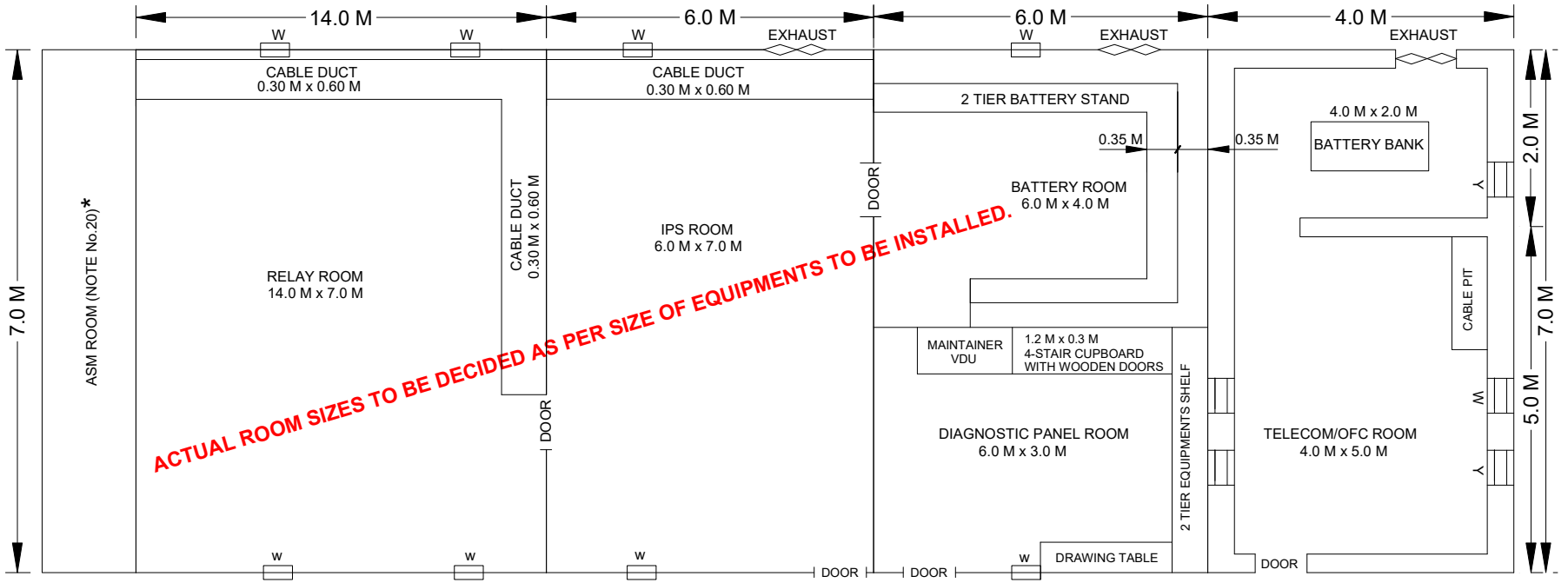
OIL ROOM FOR NON-RE AREA



14. ACTUAL ROOM SIZES TO BE DECIDED AS PER SIZE OF EQUIPMENTS TO BE INSTALLED.
15. NUMBER OF RELAY RACKS AND `EI' RACKS MAY VARY AS PER APPROVED SIP, TOC & TYPE OF EI.
16. SIZE OF TELECOM / OFC ROOM IS AS PER TELECOM MANUAL (DRG. NO. RDSO/TCDO/COP-03)
17. ROOF SHALL BE SLANTING TO PREVENT WATER ACCUMULATION.
18. 4-STAIR CUPBOARD WITH WOODEN SLIDING DOORS SHALL BE PROVIDED BY ENGG. DEPT.
19. 2 TIRE EQUIPMENT SHELF TO BE PROVIDED BY ENGG. DEPT.
20. ASM/ OPERATING PANEL ROOM SHALL BE AS PER REQUIREMENT OF OPERATING DEPARTMENT. *

Drg.No. 21-D2

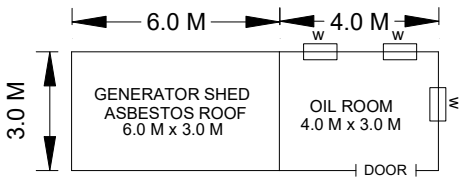
S&T BUILDING PLAN FOR 5 TO 8 ROAD STATIONS



NOTE:

1. ALL DIMENSIONS ARE IN METERS.
2. THE DOOR SHOULD BE FLUSH TYPE AND OPENED INSIDE.
3. THE DOOR OF RELAY ROOM SHOULD BE PROVIDED WITH DOUBLE LOCK ARRANGEMENT TO BE OPENED BY TWO KEYS INDEPEDENT.
4. FLOORING AND WALLS IN RELAY ROOM SHOULD BE PROVIDED WITH VITREOUS ENAMEL TILES OF COLOURS APPROVED BY S&T TO AVOID ACCUMULATION OF DUST.
5. CABLE DUCT FOR LAYING OF CABLE TO BE PROVIDED IN THE RELAY ROOM IN CONSULTATION WITH ASTE/DSTE/CN.
6. OPENING OF REQUIRED SIZE FOR CABLE ENTRY TO BE PROVIDED AT THE BASEMENT LEVEL OF RELAY ROOM IN CONSULTATION WITH ASTE/DSTE/CN.
7. FLOOR LEVEL SHOULD BE AT A HEIGHT OF 1.0 M FROM RAIL LEVEL.
8. ARRANGEMENTS FOR FIXING EXHAUST FAN IN RELAY, BATTERY & EQUIPMENT ROOMS TO BE MADE AS SHOWN.
9. ALL THE WINDOWS AND VENTILATORS SHALL BE PROVIDED WITH DUST PROOF WIRE MESH.
10. RDSO TYPE VENTILATORS TO BE PROVIDED.
11. WATER TAP WITH SINK TO BE PROVIDED IN TECHNICIAN ROOM WHERE AVAILABLE
12. HEIGHT OF WINDOWS SHOULD BE 0.91 M ABOVE FLOOR LEVEL.
13. TWO TIER BATTERY STAND SHALL BE PROVIDED IN BATTERY ROOM WITH ACID PROOF TILES.

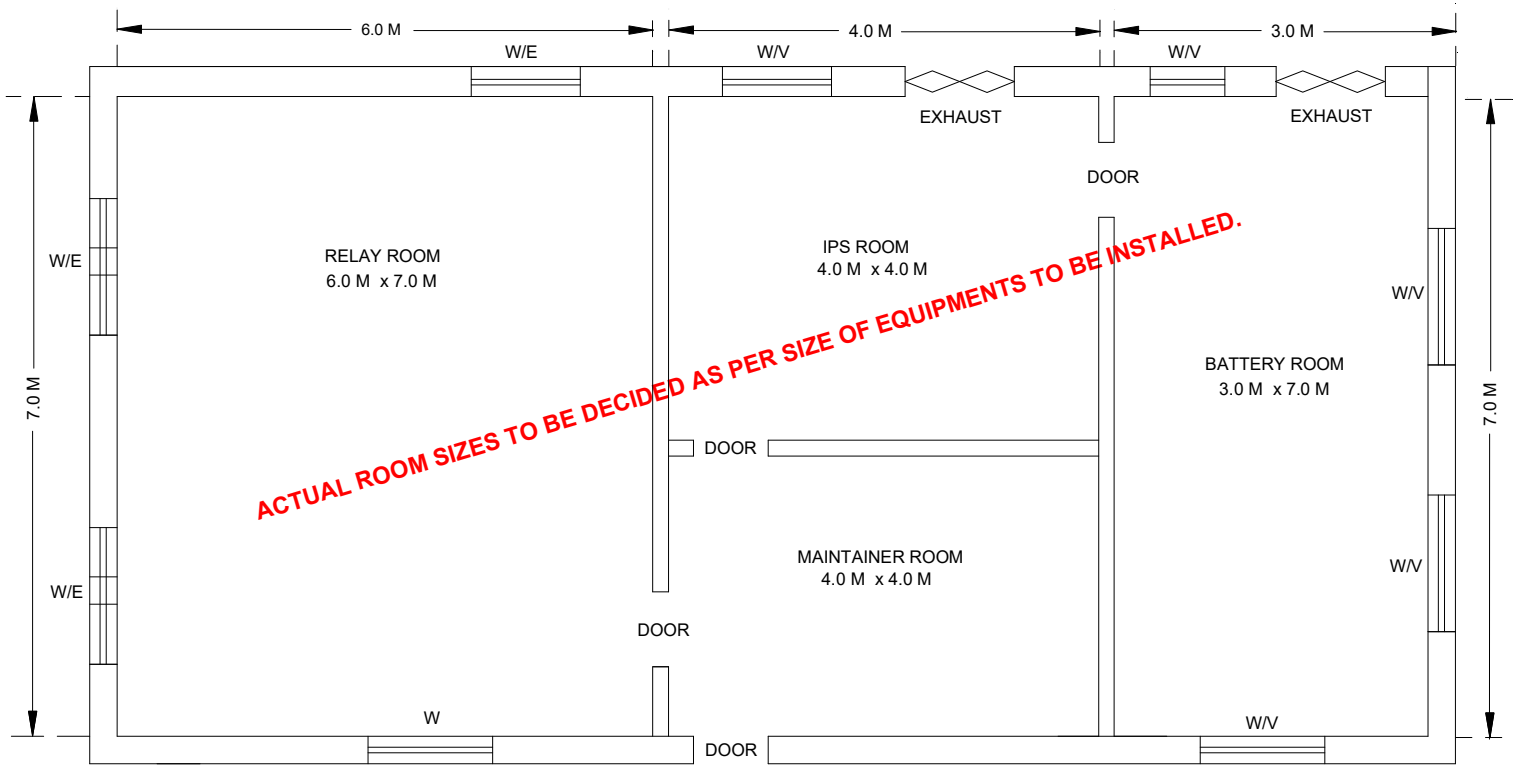
OIL ROOM FOR NON-RE AREA



14. ACTUAL ROOM SIZES TO BE DECIDED AS PER SIZE OF EQUIPMENTS TO BE INSTALLED.
15. NUMBER OF RELAY RACKS AND `EI' RACKS MAY VARY AS PER APPROVED SIP, TOC & TYPE OF EI.
16. SIZE OF TELECOM / OFC ROOM IS AS PER TELECOM MANUAL (DRG. NO. RDSO/TCDO/COP-03)
17. ROOF SHALL BE SLANTING TO PREVENT WATER ACCUMULATION.
18. 4-STAIR CUPBOARD WITH WOODEN SLIDING DOORS SHALL BE PROVIDED BY ENGG. DEPT.
19. 2 TIRE EQUIPMENT SHELF TO BE PROVIDED BY ENGG. DEPT.
20. ASM/ OPERATING PANEL ROOM SHALL BE AS PER REQUIREMENT OF OPERATING DEPARTMENT. *

Drg.No. 21-D3

S&T BUILDING PLAN FOR END GOOMTYS (EI)

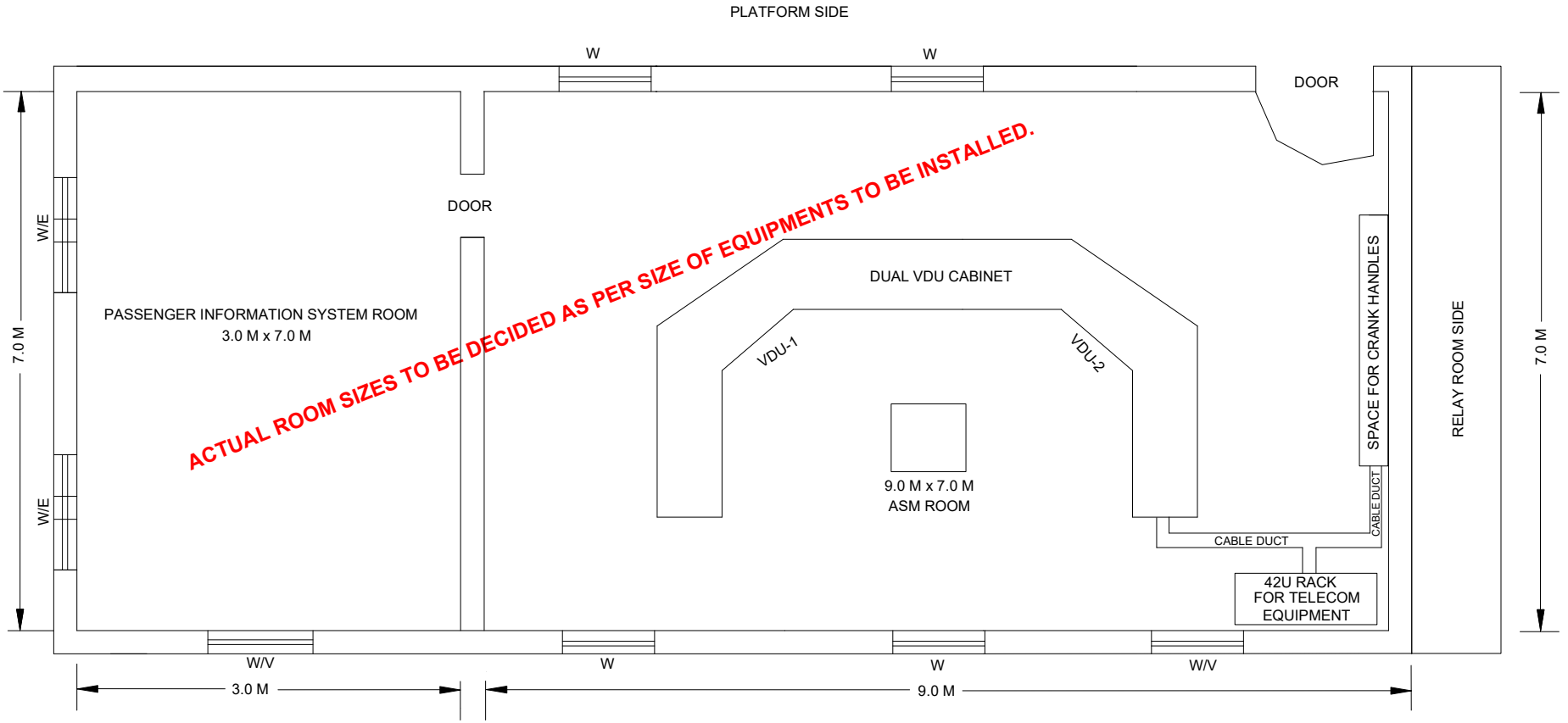


NOTE:-

1. ALL DIMENSIONS ARE IN METERS.
2. THE DOOR SHOULD BE FLUSH TYPE AND OPENED INSIDE.
3. FLOORING AND WALLS INSIDE GOOMTY SHOULD BE PROVIDED WITH VITREOUS ENAMEL TILES OF COLOUR APPROVED BY S&T TO AVOID ACCUMULATION OF DUST.
4. CABLE DUCT FOR LAYING OF CABLE TO BE PROVIDED IN CONSULTATION WITH ASTE / DSTE / CN.
5. OPENING OF REQUIRED SIZE FOR CABLE ENTRY TO BE PROVIDED AT THE BASEMENT LEVEL IN CONSULTATION WITH ASTE / DSTE / CN.
6. FLOOR LEVEL SHOULD BE AT A HEIGHT OF 1.0 M FROM RAIL LEVEL.
7. ARRANGEMENTS FOR FIXING EXHAUST FAN IN BATTERY & EQUIPMENT ROOMS TO BE MADE AS SHOWN.
8. ALL WINDOWS AND VENTILATORS SHALL BE PROVIDED WITH DUST PROOF WIRE MESH.
9. RDSO TYPE VENTILATORS TO BE PROVIDED.
10. HEIGHT OF WINDOWS SHOULD BE 0.91 M ABOVE FLOOR LEVEL.
11. TWO TIER BATTERY STAND SHALL BE PROVIDED IN BATTERY ROOM WITH ACID PROOF TILES.
12. ROOF SHALL BE SLANTING TO PREVENT WATER ACCUMULATION.

Drg.No. 21-D4

ASM ROOM LAYOUT PLAN

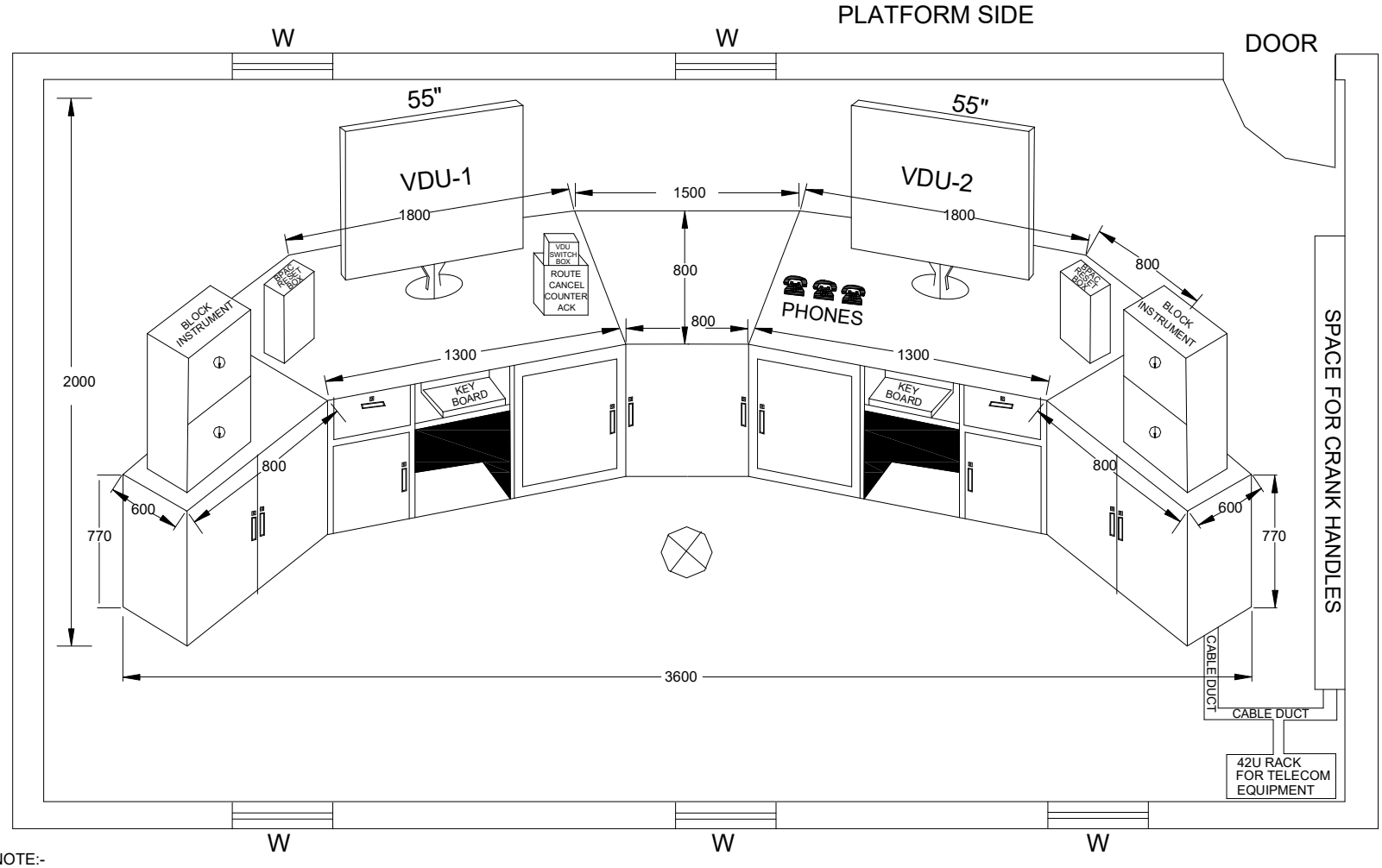


NOTE:-

1. ALL DIMENSIONS ARE IN METERS.
2. THE DOOR SHOULD BE FLUSH TYPE AND OPENED INSIDE.
3. FLOORING AND WALLS INSIDE ASM ROOM SHOULD BE PROVIDED WITH VITREOUS ENAMEL TILES OF COLOUR APPROVED BY S&T TO AVOID ACCUMULATION OF DUST.
4. CABLE DUCT FOR LAYING OF CABLE TO BE PROVIDED IN CONSULTATION WITH ASTE / DSTE / CN.
5. OPENING OF REQUIRED SIZE FOR CABLE ENTRY TO BE PROVIDED AT THE BASEMENT LEVEL IN CONSULTATION WITH ASTE / DSTE / CN.
6. TICKETING WINDOW TO BE PROVIDED IN CONSULTATION WITH OPERATING & COMMERCIAL DEPARTMENT AS PER SITE CONDITION AND ORIENTATION.
7. PANEL TO BE LOCATED IN SUCH A WAY THAT THE ASM WHILE OPERATING THE PANEL IS FACING THE PLATFORM.
8. THE DIRECTION OF THE MOVEMENT SHOULD BE ALIGNED TO THE ACTUAL MOVEMENT.
9. THE SIZE OF ASM ROOM TECHNICALLY REQUIRED FOR S&T EQUIPMENT, SPACE REQUIREMENT OF OPERATING/COMMERCIAL TO BE CATERED IN CONSULTATION WITH RESPECTIVE DEPT.

Drg.No. 21-D5

SM TABLE WITH DUAL VDUs



NOTE:-

1. FOR BIGGER YARDS, NUMBER OF VDUs MAY BE INCREASED.
2. FOR JUNCTION STATIONS, NUMBER OF BLOCK INSTRUMENTS MAY BE MORE THAN TWO VDU TABLE SIZE TO BE MODIFIED TO SUIT ABOVE.
3. ALL DIMENSIONS ARE IN MM.

CONTACT CONFIGURATION (8F/8B) & (12F/4B)

Sl.No.	54			
Sht.No.	01	QNI		8F-8B
	A	B	C	D
1/2				
Sht				
3/4				
Sht				
5/6				
Sht				
7/8				
Sht				

Sl.No.	05			
Sht.No.	11			12F-4B
	A	B	C	D
1/2				
Sht				
3/4				
Sht				
5/6				
Sht				
7/8				
Sht				

INDICATES BACK CONTACT

CONTACT ANALYSIS FORMAT (8F/8B)

Sl.No.	54		SMR						R1	R2
									W	W
Sht.No.	01		QNI	POSITION					8F-8B	
A1	Sht.	A2	B1	Sht.	B2	C1	Sht.	C2	D1	Sht.	D2
W	No.	W	W	No.	W	W	No.	W	W	No.	W
A3	Sht.	A4	B3	Sht.	B4	C3	Sht.	C4	D3	Sht.	D4
W	No.	W	W	No.	W	W	No.	W	W	No.	W
A5	Sht.	A6	B5	Sht.	B6	C5	Sht.	C6	D5	Sht.	D6
W	No.	W	W	No.	W	W	No.	W	W	No.	W
A7	Sht.	A8	B7	Sht.	B8	C7	Sht.	C8	D7	Sht.	D8
W	No.	W	W	No.	W	W	No.	W	W	No.	W

Sl.No.	01		SPARE						R1	R2
									W	W
Sht.No.	11		QNI	POSITION					8F-8B	
A1	Sht.	A2	B1	Sht.	B2	C1	Sht.	C2	D1	Sht.	D2
W	No.	W	W	No.	W	W	No.	W	W	No.	W
A3	Sht.	A4	B3	Sht.	B4	C3	Sht.	C4	D3	Sht.	D4
W	No.	W	W	No.	W	W	No.	W	W	No.	W
A5	Sht.	A6	B5	Sht.	B6	C5	Sht.	C6	D5	Sht.	D6
W	No.	W	W	No.	W	W	No.	W	W	No.	W
A7	Sht.	A8	B7	Sht.	B8	C7	Sht.	C8	D7	Sht.	D8
W	No.	W	W	No.	W	W	No.	W	W	No.	W

Note: W-Number of wires per clip
R1-F2 - Rack - 1 - 'F'- Row - Second relay
R1R2 - Relay coil
INDICATES BACK CONTACT

PRINT IN COLOUR

CONTACT ANALYSIS WITH POSTING OF CONTACTS (12F/4B)

Sl.No.	05	18A TPPR						R1	R2
								1	1
Sht.No.	11	QNI		R1-F2				12F-4B	
A1	Sht.	A2	B1	Sht.	B2	C1	Sht.	C2	D1	Sht.	D2
			1	16	2	1	16	1	1	29	1
			18 NWLR			18 WF 'K'			18 A/B TRSR		
A3	Sht.	A4	B3	Sht.	B4	C3	Sht.	C4	D3	Sht.	D4
1	36	1	1	36	1	1	35	1	1	52	1
S 3/21 TSR			S4 HR			S1 HR			18E		
A5	Sht.	A6	B5	Sht.	B6	C5	Sht.	C6	D5	Sht.	D6
1	16	2	1	39	1	2	53	1	1	53	1
18 NWLR			S30 HR			28W			18F		
A7	Sht.	A8	B7	Sht.	B8	C7	Sht.	C8	D7	Sht.	D8
1	53	1				1	53	1	1	53	1
28R						28W			28 R1		

Sl.No.	07	CLT TPR						R1	R2
								1	1
Sht.No.	11	QNI		R1-F3				12F-4B	
A1	Sht.	A2	B1	Sht.	B2	C1	Sht.	C2	D1	Sht.	D2
1	39	2	1	35	1	1	31	1	1	53	1
S 30 HR			S1 HR			26 OVSR			29W		
A3	Sht.	A4	B3	Sht.	B4	C3	Sht.	C4	D3	Sht.	D4
1	28	1	1	31	1	1	26	1			
S 26/28 ASR			4 OVSR			S 3/4 ASR					
A5	Sht.	A6	B5	Sht.	B6	C5	Sht.	C6	D5	Sht.	D6
1	26	1	1	28	1	2	29	1	1	25	1
S3/Sh-21 UYR3			Sh-10/28 UYR3			18 A/B UYR1			S1 UYR3		
A7	Sht.	A8	B7	Sht.	B8	C7	Sht.	C8	D7	Sht.	D8
			1	53	1						
			29R								

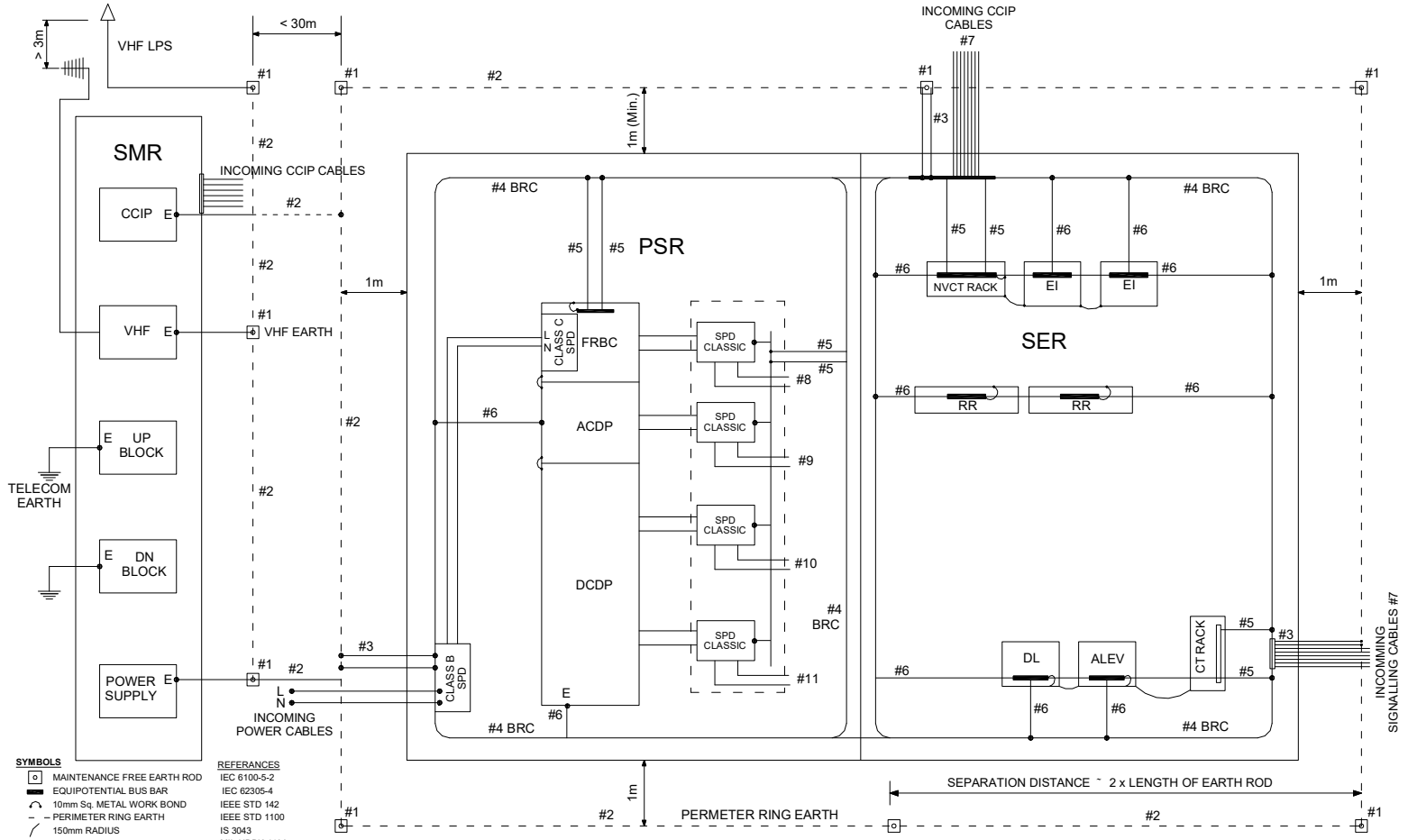
Note: W-Number of wires per clip
R1-F2 - Rack - 1 - 'F'- Row - Second relay
R1R2 - Relay coil

INDICATES BACK CONTACT

PRINT IN COLOUR

Drg.No. 21-D8

BONDING & EARTHING CONNECTIONS FOR SIGNALLING EQUIPMENTS



SYMBOLS

- MAINTENANCE FREE EARTH ROD
- EQUIPOTENTIAL BUS BAR
- 10mm Sq. METAL WORK BOND
- – – PERIMETER RING EARTH
- 150mm RADIUS

REFERANCES

- IEC 6100-5-2
- IEC 62305-4
- IEEE STD 142
- IEEE STD 1100
- IS 3043
- MIL-HDBK-419A

SPECIAL NOTES:

1. #1 MAINTENANCE FREE EARTH (RDSO SPEC)
2. #2 6x50mm GALVANIZED STEEL TAPE BURIED AT 600mm
3. #3 2nos 3x25mm COPPER TAPES OR 4nos 35mm Sq COPPER CABLE (RDSO SPEC.)
4. #4 3x25mm COPPER TAPE (BONDING RING CONDUCTOR) MOUNTED ON INSULATED STAND-OFFS
5. #5 16mm Sq. COPPER CABLE (1.5m LENGTH MAX)
6. #6 10mm Sq. COPPER CABLE (1.5m LENGTH MAX)
7. #7 ARMOURING OF CABLES CONNECTED TO EBB (AT WALL FOR NEW STATIONS)
8. #8 110V DC SUPPLY (BUSBAR & POINT MACHINES)
9. #9 110V AC SUPPLY (BUSBAR FOR SIGNALS & TRACK CIRCUITS)
10. #10 24V DC SUPPLY (EXT)
11. #11 24V DC SUPPLY (INT)

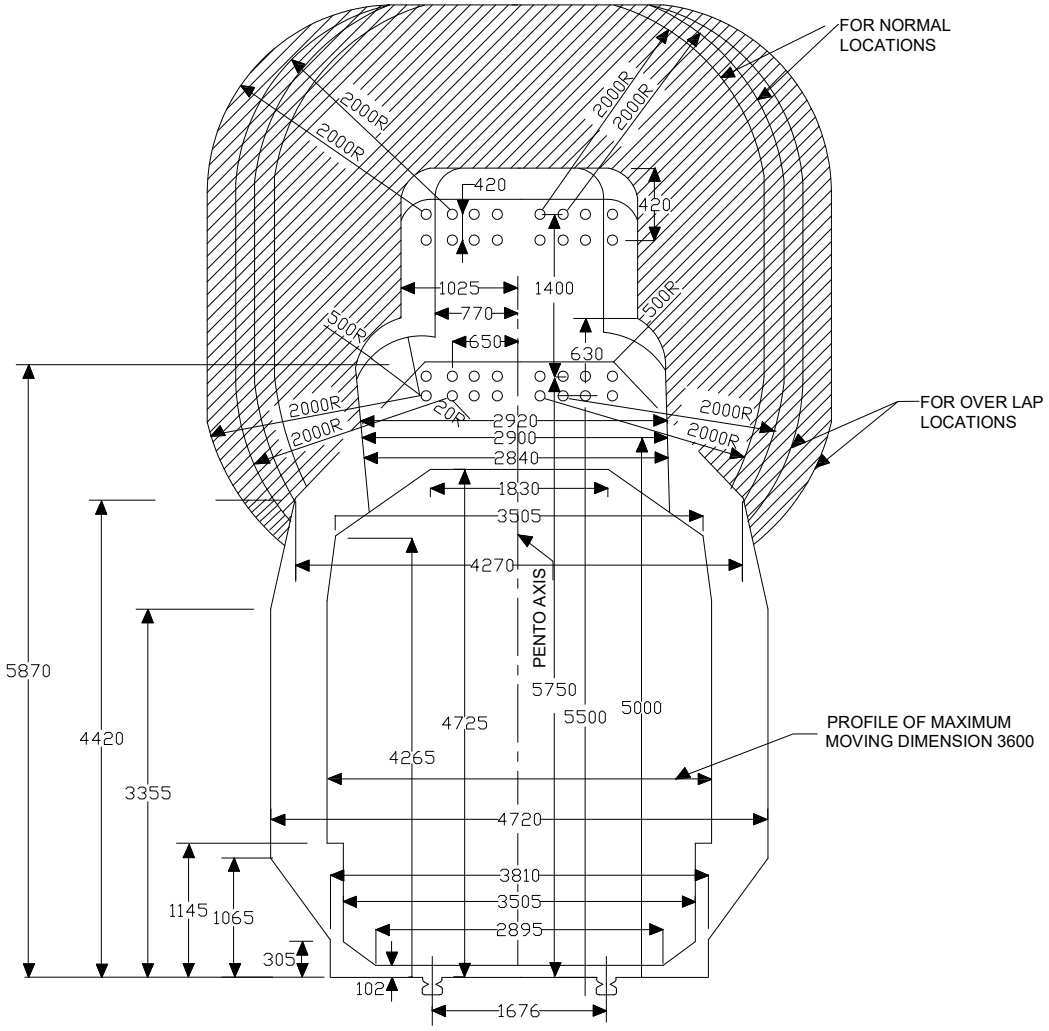
ABBREVATIONS:

1. ACDP - AC DISTRIBUTION PANEL
2. ALEV - AXLE COUNTER EVALUATOR
3. BRC - BONDING RING CONDUCTOR
4. CCIP - CONTROL CUM INDICATION PANEL
5. CT - CABLE TERMINATION
6. DCDP - DC DISTRIBUTION PANEL
7. DL - DATALOGGER
8. EI - ELECTRONIC INTERLOCKING
9. FRBC - FLOAT RECTIFIER CUM BOOST CHARGER
10. LPS - LIGHTNING PROTECTION SYSTEM
11. NVCT - NON-VITAL CABLE TERMINATION
12. PEC - PARALLEL EARTH CONDUCTOR
13. PSR - POWER SUPPLY ROOM
14. RR - RELAY RACK
15. SER - SIGNALLING EQUIPMENT ROOM
16. SMR - STATION MASTER'S ROOM
17. SPD - SURGE PROTECTION DEVICES
18. VHF - VERY HIGH FREQUENCY

GENERAL NOTES:

1. CLASS A,B,C & D SPDs PROVIDED AS PER RDSO SPEC.
2. ALL BURRIED CONNECTIONS SHALL BE EXOTHERMICALLY WELDED
3. ALL CABLE TRAYS SHALL BE FULLY BONDED TO EACH OTHER AND SUPPORTING METAL WORK (PEC)

SIGNAL CLEARANCE DIAGRAM TO SUIT 25 KV AC TRACTION FOR TANGENT TRACKS AND CURVED TRACKS WITH S.E.60



SCALE 1 CM = 500 MM

NOTE :

(1) ALL DIMENSIONS GIVEN ARE IN MILLIMETRES.

(2) IN APPLYING THE DIAGRAM TO CURVES IT SHOULD BE INCLINED SO THAT THE AXIS OF THE DIAGRAM IS NORMAL TO THE TRACK PLAN.

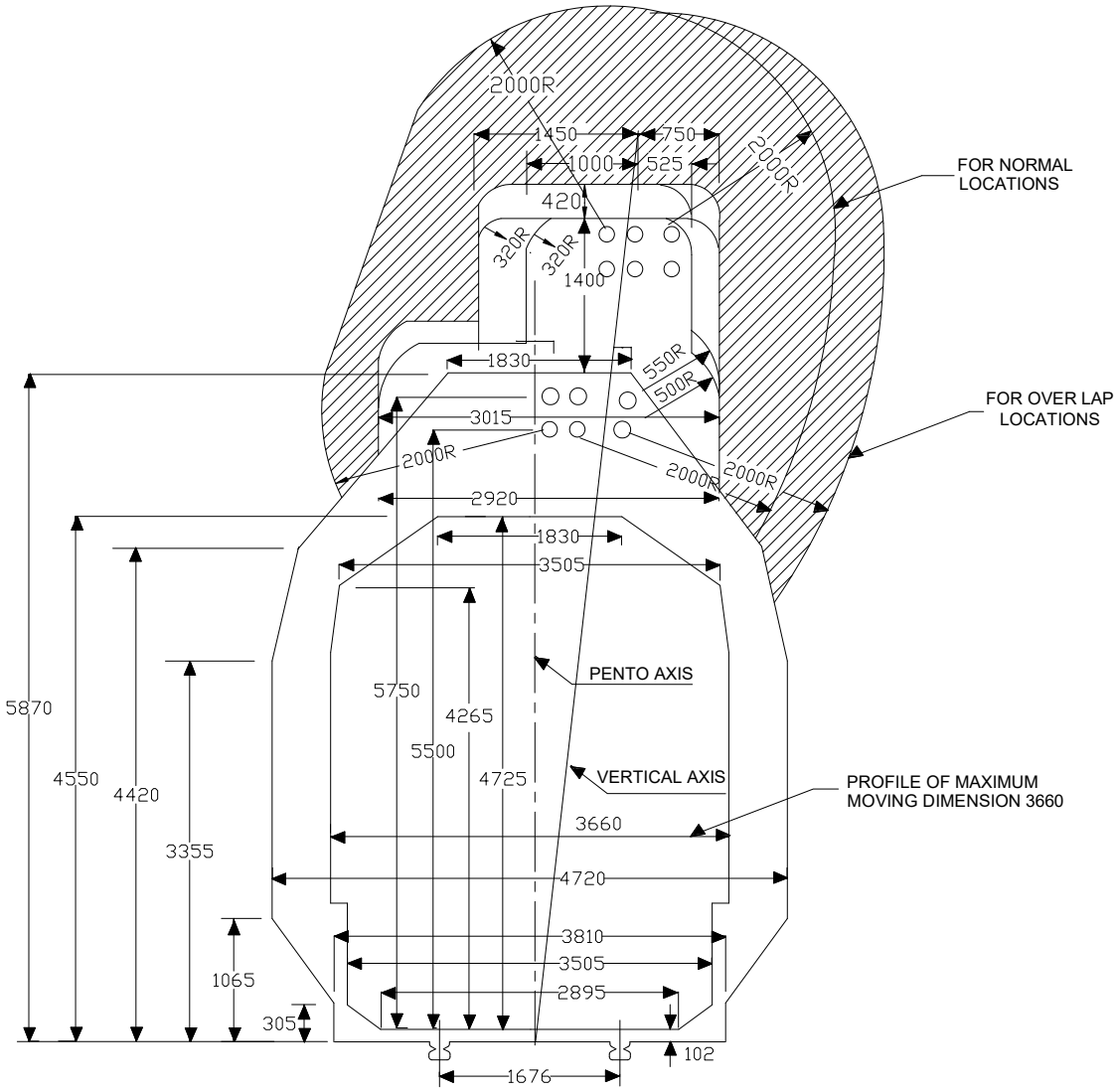
(3) THE DIAGRAM IS NOT APPLICABLE TO TURNOUTS.

(4) THIS DIAGRAM IS NOT APPLICABLE TO THE ANCHOR SPAN WHERE THE CONDUCTORS ARE OUTSIDE THE TRACK ZONE.

(5) THE CURVES ARE DRAWN FOR THE MAXIMUM CANT APPLICABLE, THEREFORE, FOR LESSER CANT IT MAY BE ECONOMICAL TO DECIDE THE CLEARANCE AT SITE JOINTLY WITH THE ELECTRICAL DEPARTMENT.

(6) CURVES IN FULL LINE ARE FOR TANGENT TRACK AND THOSE IN DOTTED LINE FOR CURVES TRACK WITH S.E.60.

SIGNAL CLEARANCE DIAGRAM TO SUIT 25 KV AC TRACTION FOR CURVED TRACKS WITH 60 TO 140 S.E.



SCALE 1 CM = 500 MM

NOTE :

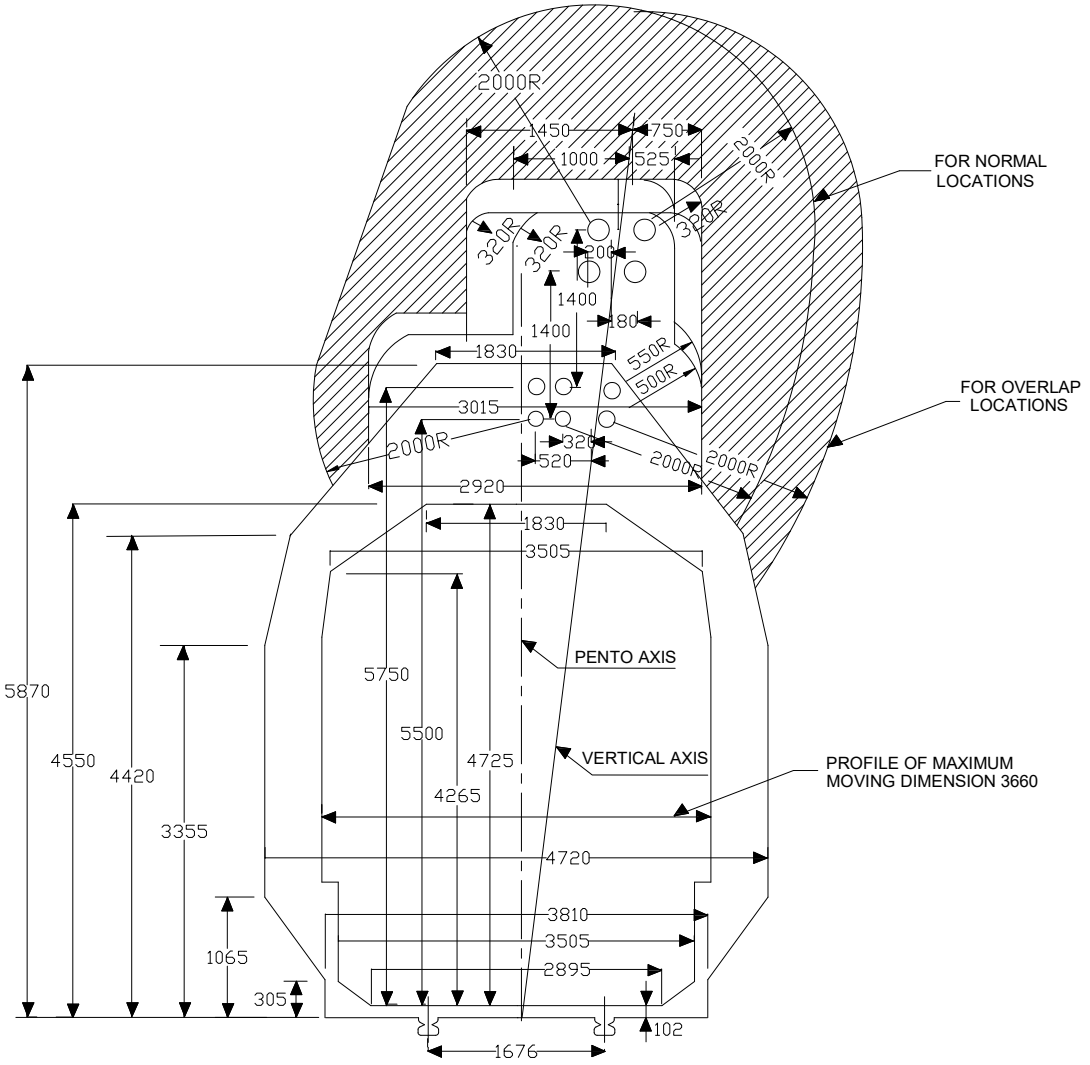
(1) ALL DIMENSIONS GIVEN ARE IN MILLIMETRES.

(2) THE DIAGRAM IS NOT APPLICABLE TO TURNOUTS.

(3) THIS DIAGRAM IS NOT APPLICABLE TO THE ANCHOR SPAN WHERE THE CONDUCTORS ARE OUTSIDE THE TRACK ZONE.

(4) THE CURVES ARE DRAWN FOR THE MAXIMUM CANT APPLICABLE, THEREFORE, FOR LESSER CANT IT MAY BE ECONOMICAL TO DECIDE THE CLEARANCE AT SITE JOINTLY WITH THE ELECTRICAL DEPARTMENT.

SIGNAL CLEARANCE DIAGRAM TO SUIT 25 KV AC TRACTION FOR CURVED TRACKS WITH 140 TO 185 S.E.



SCALE 1 CM = 500 MM

NOTE :

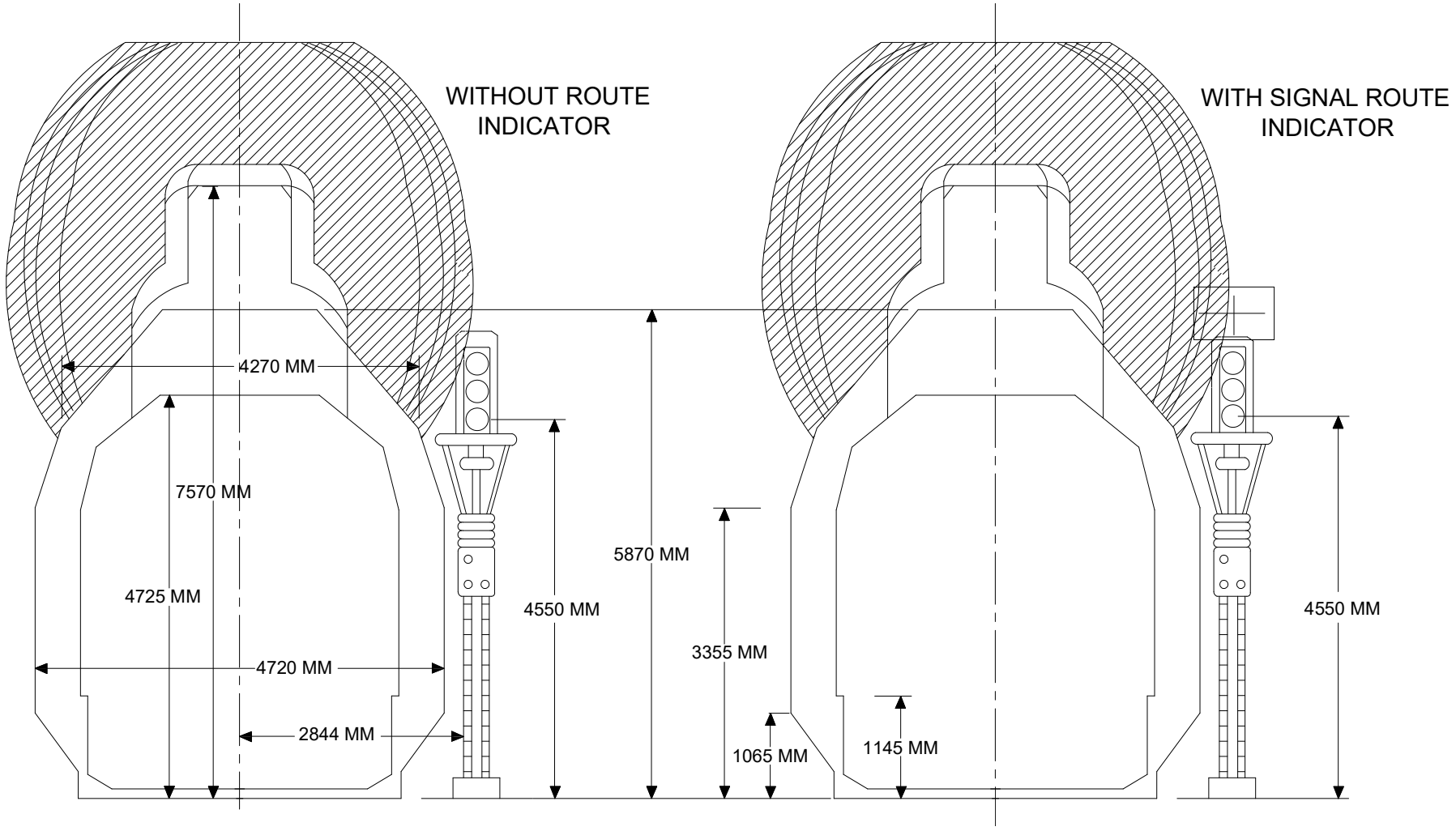
(1) ALL DIMENSIONS GIVEN ARE IN MILLIMETRES.

(2) THE DIAGRAM IS NOT APPLICABLE TO TURNOUTS.

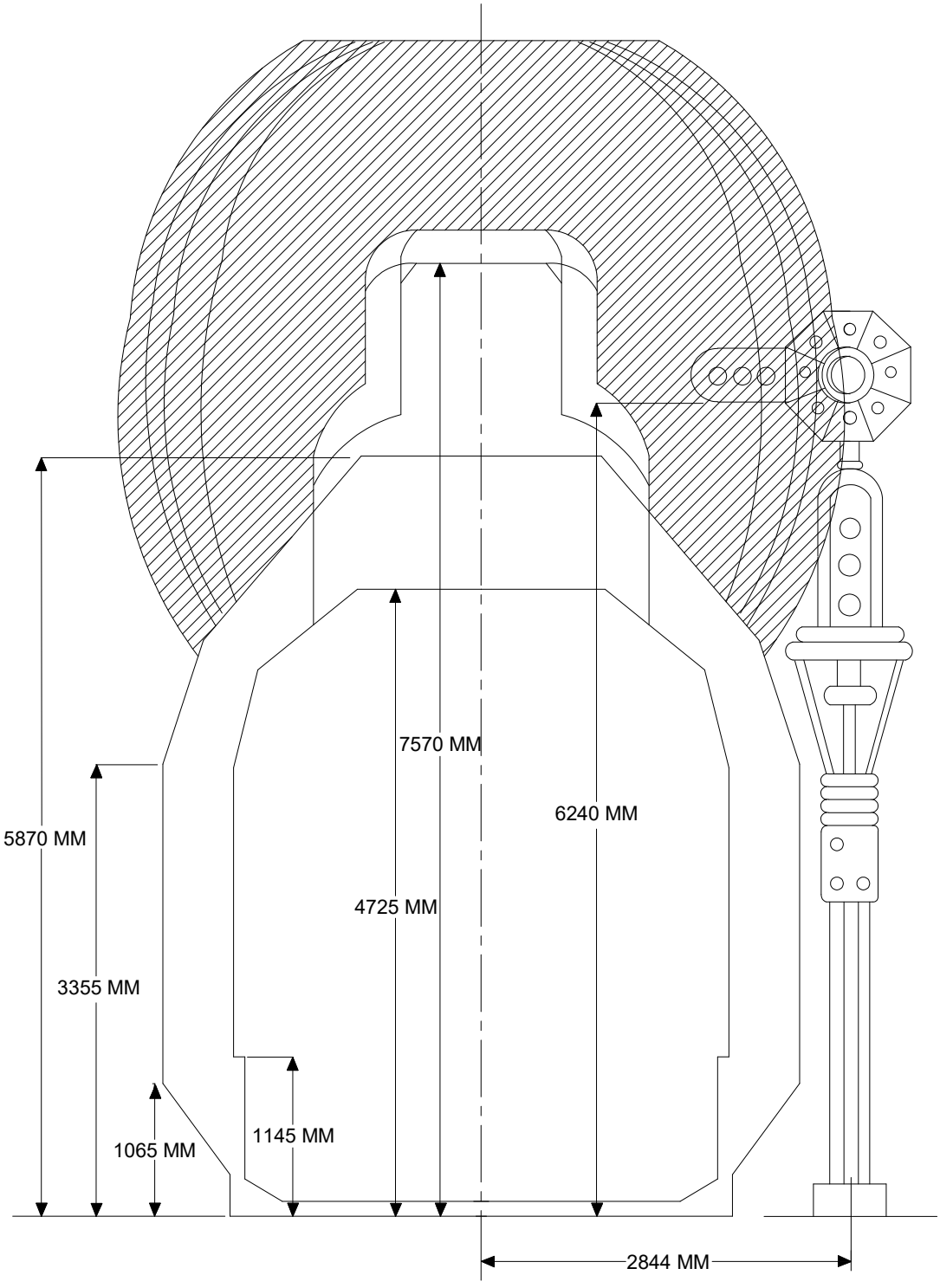
(3) THIS DIAGRAM IS NOT APPLICABLE TO THE ANCHOR SPAN WHERE THE CONDUCTORS ARE OUTSIDE THE TRACK ZONE.

(4) THE CURVES ARE DRAWN FOR THE MAXIMUM CANT APPLICABLE, THEREFORE, FOR LESSER CANT IT MAY BE ECONOMICAL TO DECIDE THE CLEARANCE AT SITE JOINTLY WITH THE ELECTRICAL DEPARTMENT.

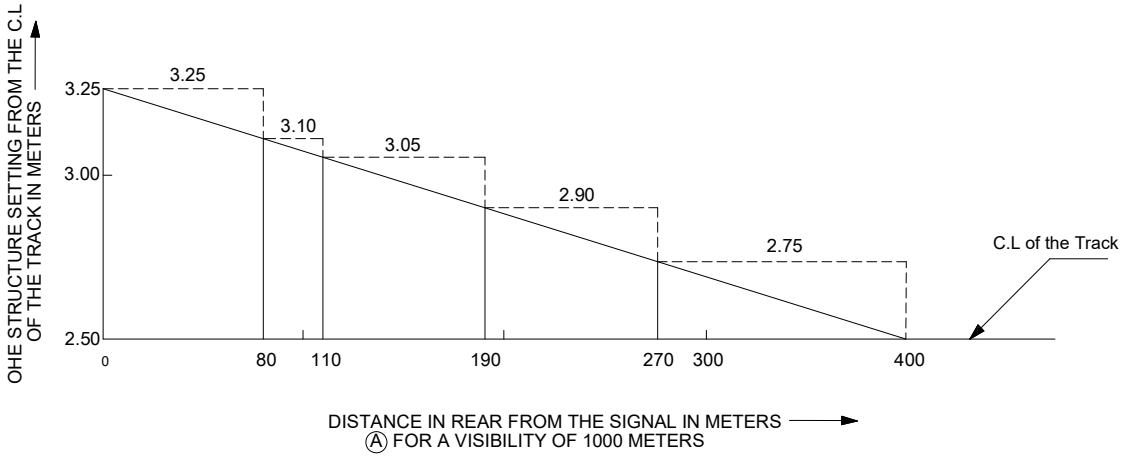
COLOUR LIGHT SIGNAL LEFT HAND OR RIGHT HAND BROAD GUAGE (TANGENT TRACK)

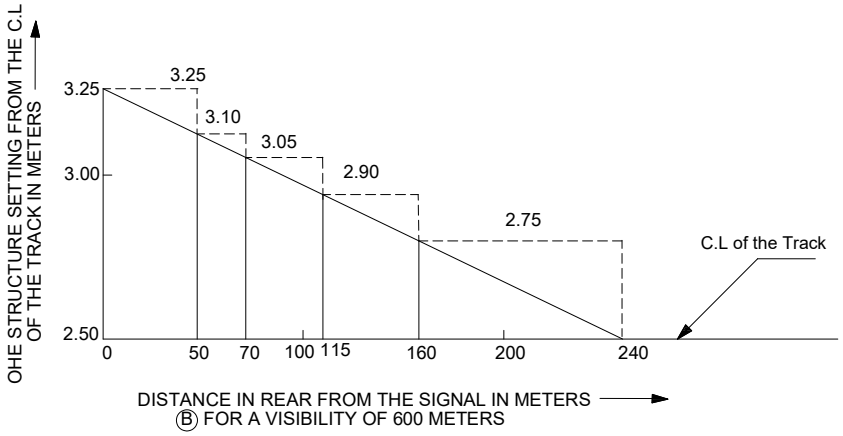


COLOUR LIGHT SIGNAL WITH JUNCTION ROUTE INDICATOR LEFT HAND OR RIGHT HAND BROAD GUAGE (TANGENT TRACK)



DISTANCE IN REAR FROM THE SIGNAL IN METERS





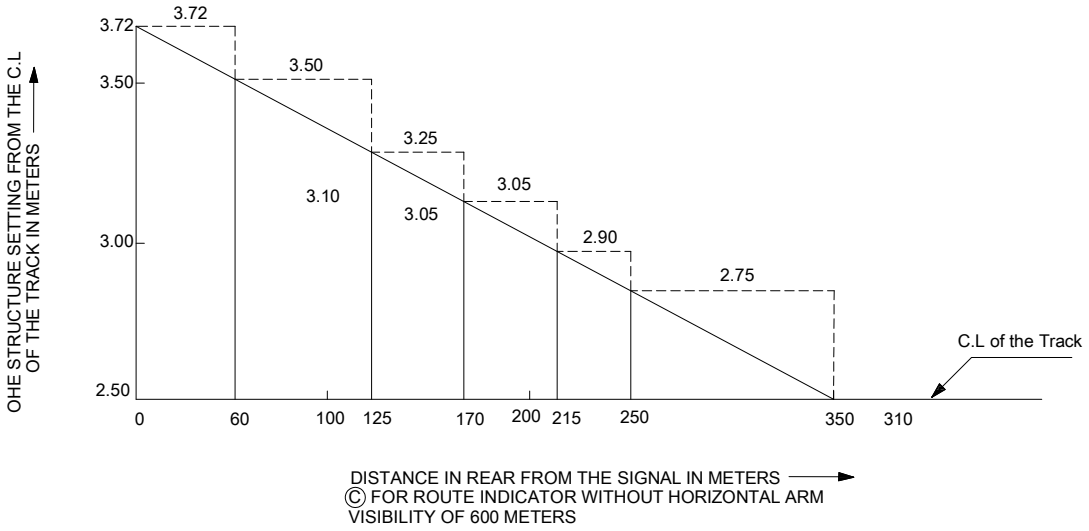
(1) THE FULL LINE REPRESENTS THE MINIMUM SETTINGS OF THE STRUCTURES.

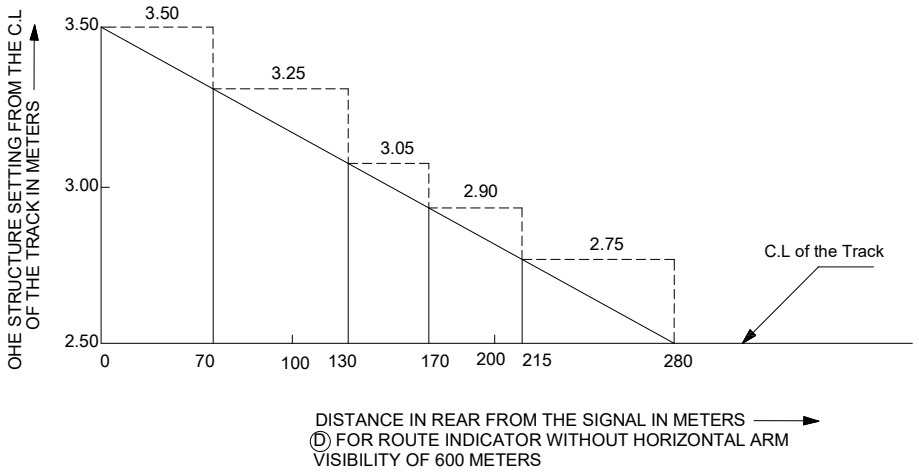
(2) THE DOTTED LINE REPRESENTS THE RECOMMENDED RATIONALISED SETTINGS OF OHE STRUCTURES.

(3) IF WARRANTED BY SITE CONDITIONS, SETTINGS OTHER THAN THE RECOMMENDED RATIONALISED ONES MAY BE ADOPTED PROVIDED THESE DO NOT INFRINGE THE MINIMUM SETTINGS REPRESENTED BY THE FULL LINE.

(4) WITH THE STANDARD SIGNAL FITTINGS (LADDER WIDTH 600 MM & SIGNAL UNIT WIDTH 440 MM). THE LC SIGNAL POST SHALL BE AT 2.844 M (9'-4") FROM THE LC OF TRACK.

DISTANCE IN REAR FROM THE SIGNAL IN METERS-FOR ROUTE INDICATOR WITHOUT HORIZONTAL ARM





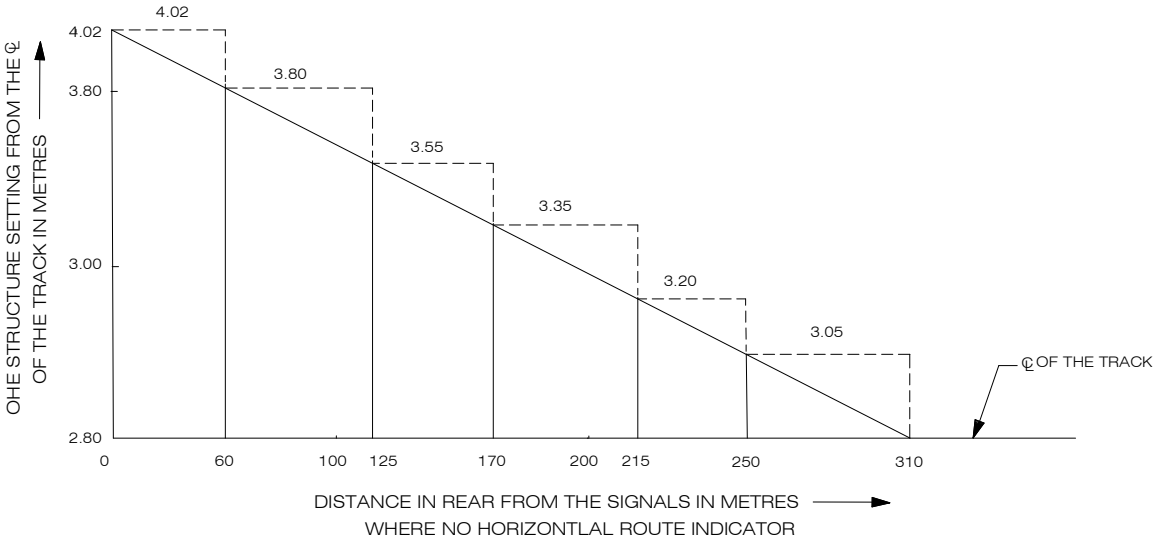
(1) THE FULL LINE REPRESENTS THE MINIMUM SETTINGS OF THE STRUCTURES.

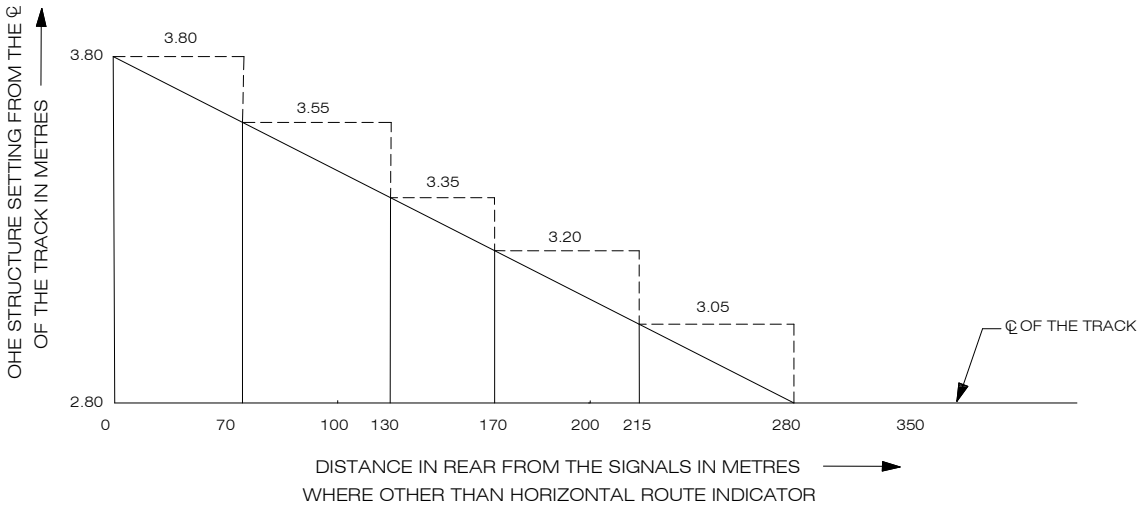
(2) THE DOTTED LINE REPRESENTS THE RECOMMENDED RATIONALISED SETTINGS OF OHE STRUCTURES.

(3) IF WARRANTED BY SITE CONDITIONS, SETTINGS OTHER THAN THE RECOMMENDED RATIONALISED ONES MAY BE ADOPTED PROVIDED THESE DO NOT INFRINGE THE MINIMUM SETTINGS REPRESENTED BY THE FULL LINE.

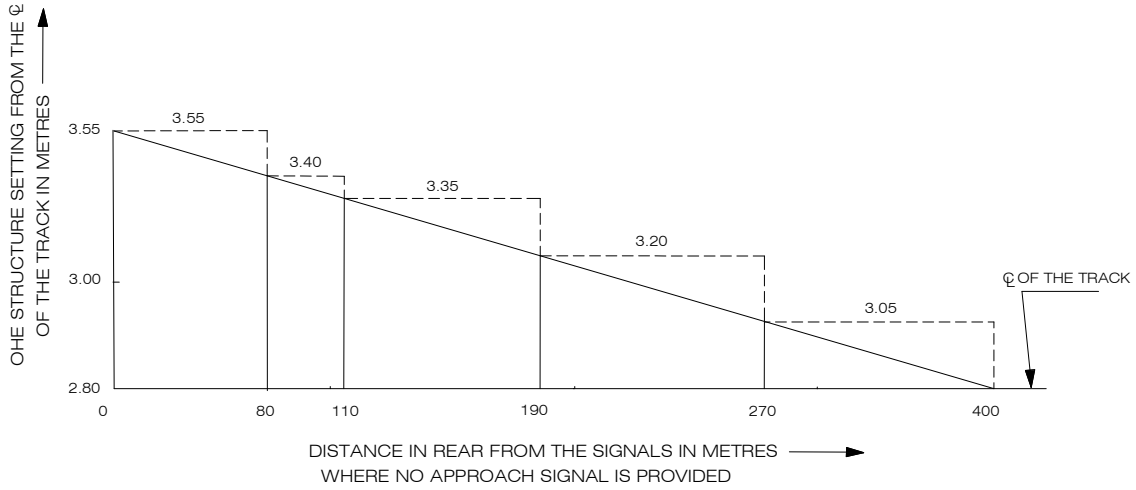
(4) WITH THE STANDARD SIGNAL FITTINGS (LADDER WIDTH 600 MM & SIGNAL UNIT WIDTH 440 MM). THE LC SIGNAL POST SHALL BE AT 2.844 M (9'-4") FROM THE LC OF TRACK.

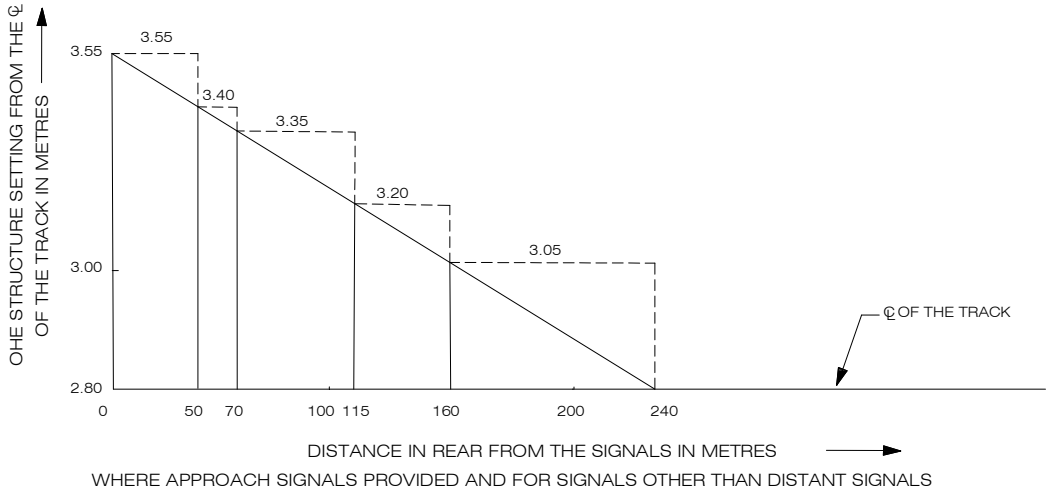
DISTANCE IN REAR FROM THE SIGNAL IN METERS (FOR HIGH RISE OHE)





DISTANCE IN REAR FROM THE SIGNAL IN METERS (FOR HIGH RISE OHE)





IMPLANTATION OF OHE STRUCTURES WITH RESPECT TO COLOUR LIGHT SIGNAL

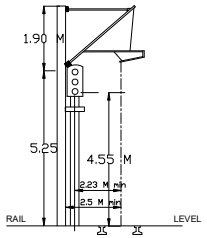


FIG.1

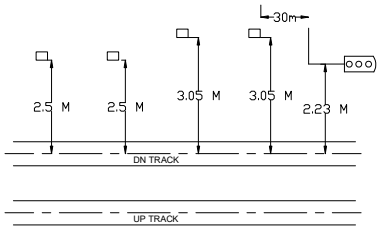


FIG.2

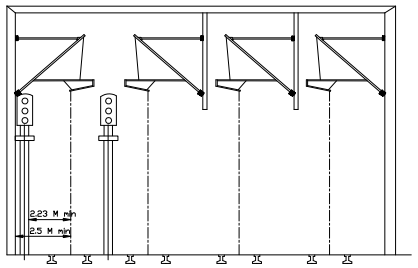


FIG.3

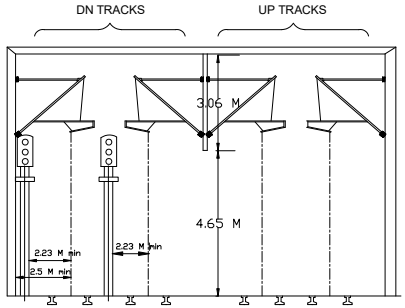


FIG.4

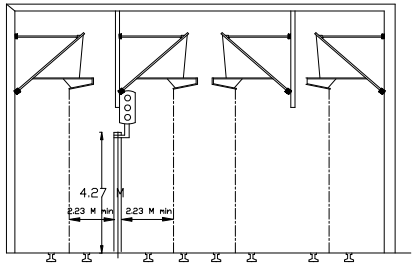


FIG.5

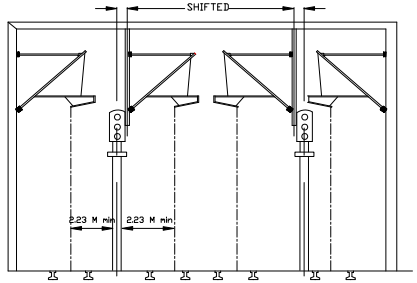


FIG.6

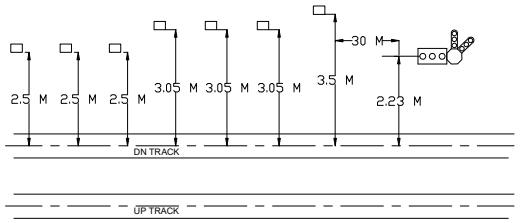


FIG.7

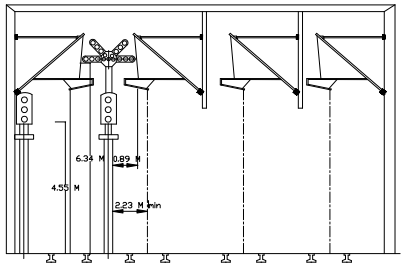
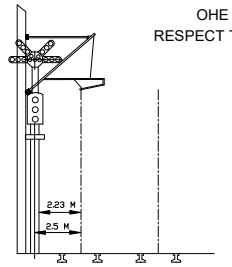


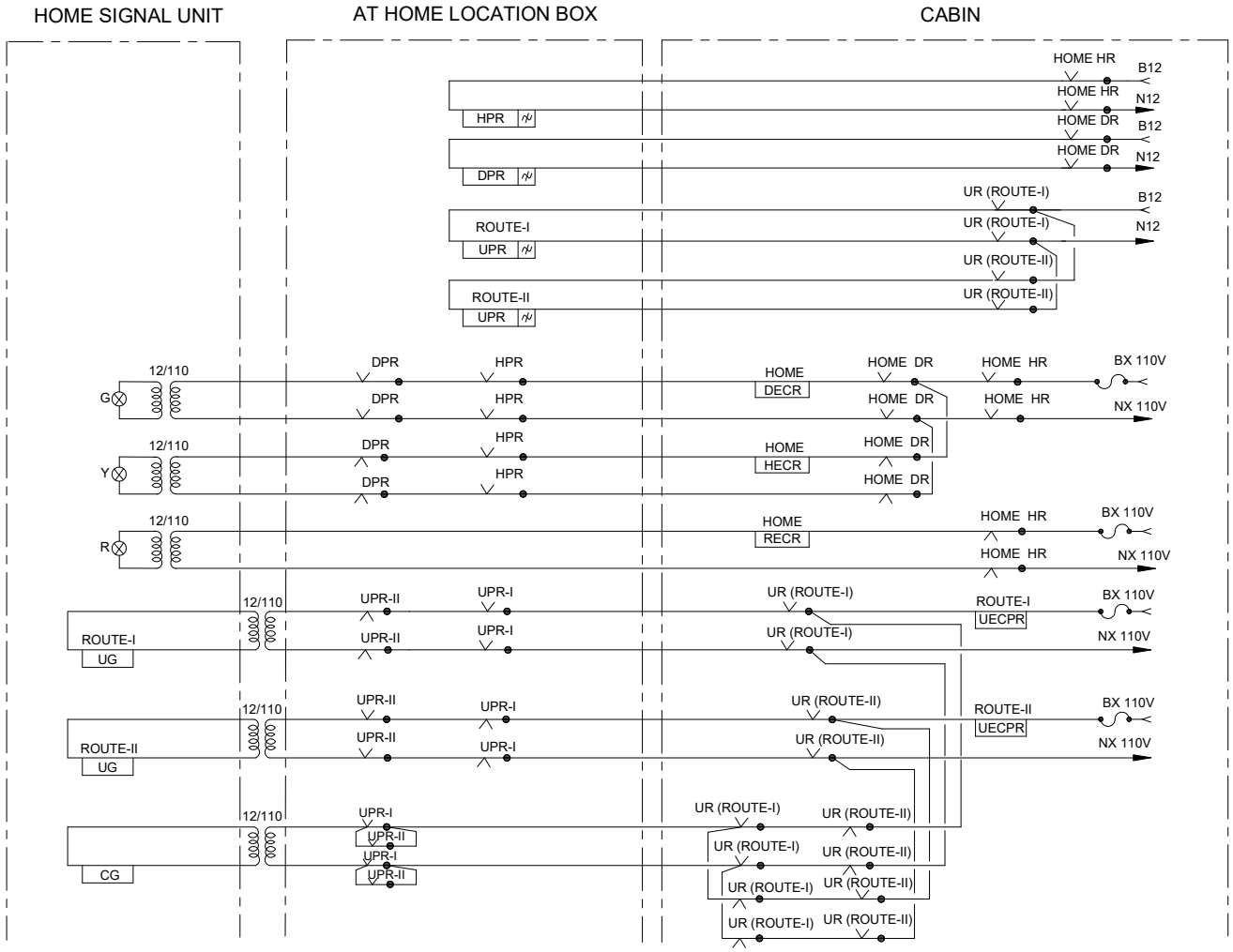
FIG.8



IMPLANTATION OF
OHE STRUCTURES WITH
RESPECT TO COLOUR LIGHT SIGNALS

FIG.9

SIGNALLING FEED ARRANGEMENT WITH CUT-IN RELAYS



CONVERSION FORMULAE

To Convert	Multiply by
Inches to Centimeters	2.54
Centimeters to Inches	0.393701
Feet to Meters	0.3048
Meters to Feet	3.2808
Yards to Meters	0.9144
Meters to Yards	1.09361
Miles to kilometers	1.60934
Kilometers to Miles	0.621371
Sq Inches to Sq Cm	6.4516
Sq Cm to Sq Inches	0.155
Sq Meters to Sq Feet	10.7639
Sq Feet to Sq Meters	0.092903
Sq Yards to Sq Meters	0.836127
Sq Meters to Sq Yards	1.19599
Sq Miles to Sq Kilometers	2.58999
Sq Kilometers to Sq Miles	0.386103
Gallons to Liters	4.546
Liters to Gallons	0.22
Pounds to Grams	453.592
Grams to Pounds	0.00220462
Pounds to Kilograms	0.4536
Kilograms to Pounds	2.20462
Tons to Kilograms	1016.05
Kilograms to Tons	0.0009842

Paper Sizes	
A0	841 x 1189 mm
A1	594 x 841 mm
A2	420 x 594 mm
A3	297 x 420 mm
A4	210 x 297 mm
A5	148 x 210 mm

CONVERSION TABLES

Length

Centimeters	Cm or Inch	Inch
2.54	1	0.394
5.08	2	0.787
7.62	3	1.181
10.16	4	1.575
12.70	5	1.969
15.24	6	2.362
17.75	7	2.756
20.32	8	3.150
22.86	9	3.543
25.40	10	3.937
50.80	20	7.874
76.20	30	11.811
101.60	40	15.748
127.00	50	19.685

Mass (Weight)

Kilo gram (Kg)	Kg or lb	Pounds (lb)
0.454	1	2.205
0.907	2	4.409
1.361	3	6.614
1.814	4	8.819
2.268	5	11.023
2.722	6	13.228
3.175	7	15.432
3.629	8	17.637
4.082	9	19.842
4.536	10	22.046
9.072	20	44.092
13.608	30	66.139
18.144	40	88.185
22.680	50	110.231

Length

Kilo meters (KM)	KM or Miles	Miles
1.609	1	0.621
3.219	2	1.243
4.828	3	1.864
6.437	4	2.485
8.047	5	3.107
9.656	6	3.728
11.265	7	4.350
12.875	8	4.871
14.484	9	5.592
16.093	10	6.214
32.187	20	12.427
48.280	30	18.641
64.374	40	24.855
80.467	50	31.069

Area

Hectares (ha)	Acres or Hectares	Acres
0.405	1	2.471
0.809	2	4.942
1.214	3	7.413
1.619	4	9.884
2.023	5	12.884
2.428	6	14.826
2.833	7	17.297
3.237	8	19.769
3.642	9	22.240
4.047	10	24.711
8.094	20	49.421
12.140	30	70.132
16.187	40	98.842
20.234	50	123.553

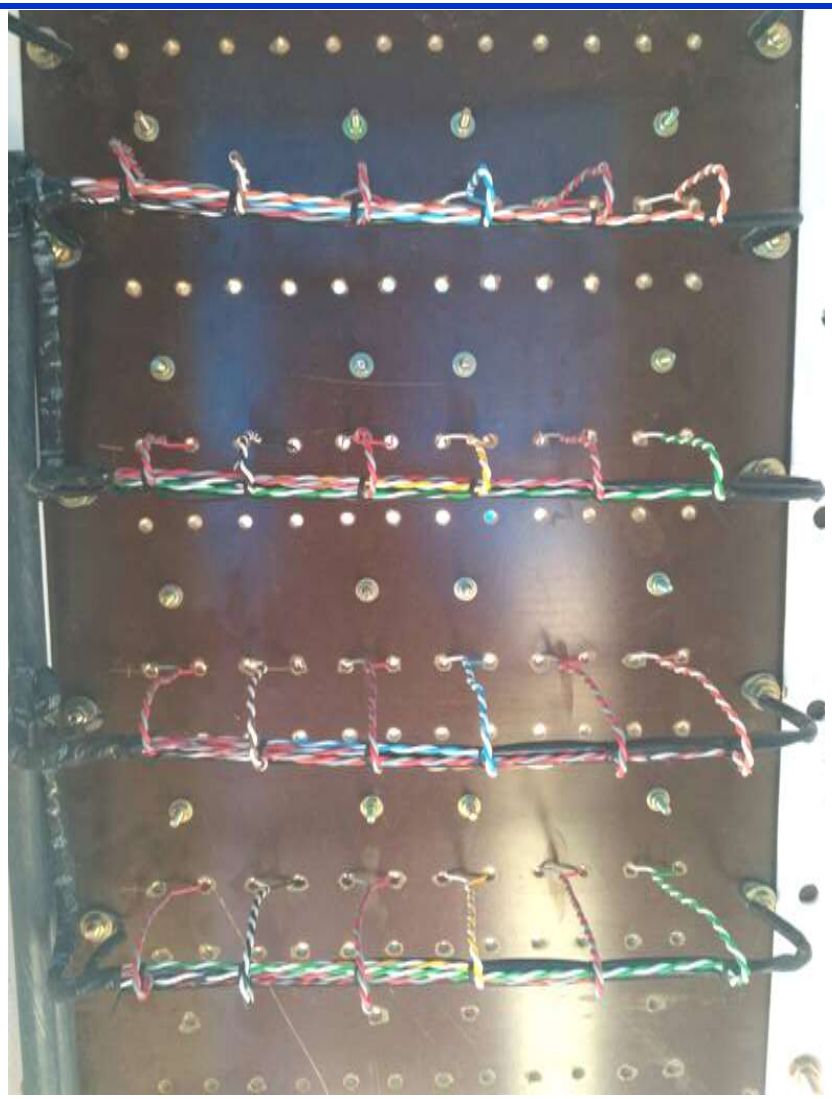
INSTALLATION PHOTOGRAPHS

RCC MARKERS

CABLES COVERING AT 1.2 M DEPTH

RCC DUCT - 1

RCC DUCT - 2



QUAD TWISTING

CABLE ENTRY GI BENDS

COIL PITS BEHIND BOXES

HDPE PIPES FOR FUTURE CABLE ENTRY

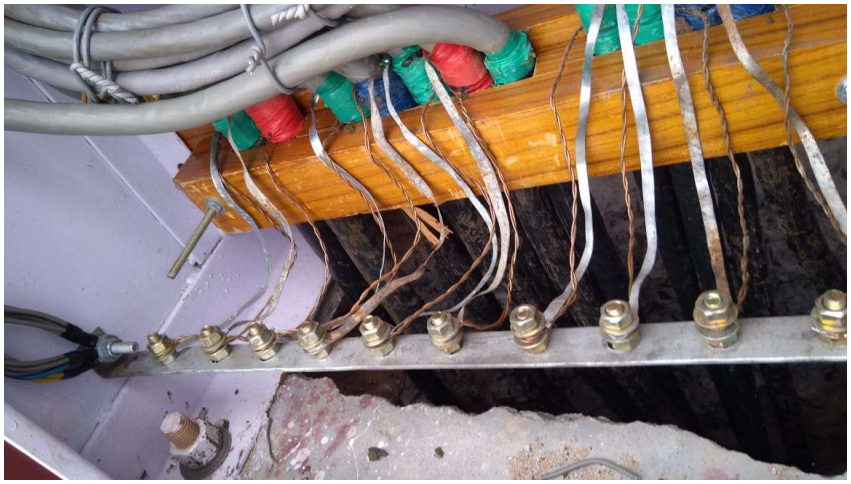
CONCRETING WITH SHUTTERS IN ROCKY AREA

CROSSING MINOR BRIDGE

CABLE DUCT IN PLATFORM 1

TELE CONSOLE IN ASM ROOM

MS FLAT EARTHING AT LOCATION BOXES



GI FLAT FOR ARMOUR EARTHING IN BOXES

X MARK OF STEEL PLATES FOR IN OPERATIVE SIGNALS – 1

X MARK OF STEEL PLATES FOR IN OPERATIVE SIGNALS – 2

THICKWEB SWITCH POINT MACHINE

THICKWEB SWITCH POINT LAYOUT

RELAY ROOM LAYOUT

CABLE TERMINATIONS

PERIMETER EARTHING

SM's ROOM VDU LAYOUT

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