

TD-106-1 Rev No. 5		Form No.			PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION BHEL R.C PURAM, HYDERABAD –32		Doc.No: PY60057	
							Rev No.: 01	
							Page 1 of 6	
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.			TECHNICAL SPECIFICATION FOR SUPPLY OF SUPERSTRUCTURE FOR MODULE MOUNTING STRUCTURE (MMS) <u>PROJECT</u> : <u>1X65 MW SPV POWER PLANT, NLC, NEYVELI, Tamilnadu</u> <u>BHEL's CUSTOMER</u> : <u>NEYVELI LIGNITE CORPORATION LIMITED</u>					
Ref.	Doc	Prepared By: (-Sd-) G.SESHU KIRAN		Checked By : (-Sd-) SURESH.P		Approved By : (-Sd-) J.K PATTANAIAK		Date : 03.12.16

TD-106-2 Rev No. 5 Form No.		PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION BHEL R.C PURAM, HYDERABAD –32		Doc.No: PY60057																					
				Rev No.: 01																					
				Page 2 of 6																					
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. A. INTRODUCTION Bharat Heavy Electricals Limited (BHEL), a premier Maharatna public sector undertaking in the field of Manufacturing entire range of power plant equipments and has proven turnkey abilities for executing power plants from concept to commissioning. BHEL PE&SD Hyderabad executing solar PV Projects. NLC is Setting up of 130MW grid interactive solar PV power project at Neyveli site, Cuddalore district, Tamilnadu state, India comprises of two nos. blocks of capacity 65 MWp each. The solar PV power project at Neyveli site is located within NLC's command area adjoining township at Neyveli. BHEL is setting up one of block of 65 MW capacity. The 65MW block which is being executed by BHEL is again subdivided into two sub-blocks of 40MW & 25MW blocks which are located 7-8 km apart. <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Plant Location</td> <td>:</td> <td>Neyveli site, Cuddalore district</td> </tr> <tr> <td>State</td> <td>:</td> <td>Tamilnadu</td> </tr> <tr> <td>Nearest Important Town</td> <td>:</td> <td>Neyveli</td> </tr> <tr> <td>Nearest Railway Station</td> <td>:</td> <td>Vridhachalam Jn</td> </tr> <tr> <td>Nearest Airport</td> <td>:</td> <td>Chennai</td> </tr> </table> The PV modules shall be mounted on metallic structures called Module Mounting Structures (MMS). This document describes the technical specification for super structure for MMS. B. SCOPE This specification covers manufacturing (as per BHEL furnished drawings), inspection, packing, delivery to site of MMS (Module Mounting Structure) Superstructure. MMS Super structure shall be manufactured as per the technical details (i.e. dimension, thickness, holes, galvanization, shape etc) of various elements of MMS i.e. Rafter, Purlin, Bracings and Sag-angles, which are furnished as part of this specification / attached drawings (please refer attached Annexure-1) <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Variant No.</th> <th>Scope of Supply</th> <th>BHEL Material Code</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>Supply of Super Structure of MMS (Rafter, Purlins, Bracings, Splice Plates and Sag Angles etc.)</td> <td>PY9760057018</td> </tr> </tbody> </table> C. MATERIAL SPECIFICATION MMS frames, assembly of the structures, etc. shall conform to Indian standards as mentioned in the list of code. Refer Annexure-1 for details of structural members. All cold formed sections shall be minimum yield stress 350MPa and Hot rolled sections of minimum yield stress 250MPa. IS: 2062 - Hot Rolled Medium and High Tensile Structural Steel IS: 811 - Cold Formed Light Gauge Structural Steel Sections IS: 513 - Cold-rolled low carbon steel sheets and strips					Plant Location	:	Neyveli site, Cuddalore district	State	:	Tamilnadu	Nearest Important Town	:	Neyveli	Nearest Railway Station	:	Vridhachalam Jn	Nearest Airport	:	Chennai	Variant No.	Scope of Supply	BHEL Material Code	01	Supply of Super Structure of MMS (Rafter, Purlins, Bracings, Splice Plates and Sag Angles etc.)	PY9760057018
Plant Location	:	Neyveli site, Cuddalore district																							
State	:	Tamilnadu																							
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Ref.	Doc																								

TD-106-2 Rev No. 5	Form No.		PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION BHEL R.C PURAM, HYDERABAD –32	Doc.No: PY60057 Rev No.: 01 Page 3 of 6
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		All materials shall be fabricated in shop such that welding in field shall not be required. Activities like Welding, Galvanization, Punching of holes etc., are not allowed at site. 1 The tolerances for materials will be as per IS Standards: IS 811-1987 a. Dimension sheet tolerance will be as per IS:1852-1985 b. Member tolerance for (i) Rolling/Forming(web, flange, lip, straightness, etc)- IS 802 P-I, Section 1 & IS 811 (ii) Punching- IS 802 P-II 2. The thickness of plate shall be as mentioned in fabrication drawings only. D. COATING FOR STRUCTURAL STEEL WORKS MMS frames, assembly of the structures, etc. shall be of MS hot dip galvanized. Hot dip galvanization shall be as per IS: 4759 /ASTM A123 and the coating minimum thickness shall be maintained by 80 micron. IS: 4759 - Hot-dip zinc coatings on structural steel and other allied products E. SUB VENDOR FOR STRUCTURAL STEEL 1 Structural steel should conform to relevant Indian Standards. 2 Structural steel should be sourced from reputed make of supplier to similar construction /infrastructure projects. <u>The Bidder should furnish documentary evidence to prove above (1) & (2)</u> F. INSPECTION BHEL shall provide dispatch clearance after inspection of material and verification of required/relevant documents. G. MANUFACTURING QUALITY PLAN (MQP) Customer approved MQP for the MMS items are enclosed along with this tender specification. Inspection shall be carried out as per customer approve QAP and documents shall be furnished as per QAP (Refer Annexure-2.) H. MARKING INSTRUCTIONS All items shall have unique identification number (Numbering system shall be furnished by BHEL after placing PO. Bidder shall ensure the same before dispatch of material to site). The identification number of each item shall be stencilled with red paint in bold letters on every part on 100% basis.		
Ref. Doc				

TD-106-2 Rev No. 5	Form No.		PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION BHEL R.C PURAM, HYDERABAD –32	Doc.No: PY60057 Rev No.: 01 Page 4 of 6								
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		I. PACKING INSTRUCTIONS The MMS structural items shall be packed in bundles with steel straps. Necessary precautionary provisions (strips of plastic, fiber, rubber etc) shall be used to prevent the steel straps from damaging the galvanized surface. Adequate quantity of steel straps shall be provided depending upon the length of MMS items. Bundles shall be with appropriate lot quantity (50 Nos, 100 Nos etc per bundle) to facilitate ease of handling and accounting. Bundles shall be provided with name tags giving part number, quantity and month of manufacturing. J. NOTES TO BIDDER I. <u>Bidders shall quote material as per price bid format. BHEL reserves right to order items as per NIT terms & conditions.</u> II. Bidders are advised to contact BHEL for essential technical queries in writing during pre-bid stage. In case no such clarifications are sought during pre-bid stage, it will be assumed that bidder has no comments or observations on BHEL's specification and no deviations from the specifications are taken by the bidder. III. BHEL/NLC reserves the rights to carry out surveillance visits at the works of vendor/ galvanizer to check/ monitor the MMS structure manufacturing/ galvanizing processes as and when required. IV. Offers with incomplete information will not be considered for evaluation, and are likely to be rejected outright without any further interaction with the Bidder. V. In the event of any conflict between these specifications, drawings, related standards, codes etc. the vendor shall refer the matter to the purchaser for clarifications during pre-bid stage. K. DELIVERY SCHEDULE The split order delivery schedule of items at site for <u>Supply of Super Structure of MMS (BHEL Material Code: PY9760057018)</u> shall be as per NIT conditions.: <table border="1" data-bbox="536 1384 1010 1536" style="margin: 10px auto;"> <thead> <tr> <th>Lot</th> <th>% Quantity</th> </tr> </thead> <tbody> <tr> <td>Lot-1</td> <td>20</td> </tr> <tr> <td>Lot-2</td> <td>40</td> </tr> <tr> <td>Lot-3</td> <td>40</td> </tr> </tbody> </table> For successful bidder "No separate manufacturing clearance is applicable PO date shall be considered as manufacturing clearance date". Bidder to supply all members in its scope in proportions required for erection of complete Module Mounting Structure i.e., each lot supplied shall contain all the members (parts) in scope of bidder.			Lot	% Quantity	Lot-1	20	Lot-2	40	Lot-3	40
		Lot	% Quantity									
Lot-1	20											
Lot-2	40											
Lot-3	40											
Ref. Doc												

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				Page 5 of 6																										
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. L. LIST OF ANNEXURES Following input documents and specifications are enclosed to facilitate the bidder to furnish the offer: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Annexure No.</th> <th style="width: 40%;">Document/ Drawing Title</th> <th style="width: 30%;">Doc. No.</th> <th style="width: 20%;">Rev</th> </tr> </thead> <tbody> <tr> <td rowspan="2" style="text-align: center;">1</td> <td rowspan="2" style="text-align: center;">GA & Fabrication drawings of MMS</td> <td style="text-align: center;">PY-DS-1-M088-1260-01</td> <td style="text-align: center;">01</td> </tr> <tr> <td style="text-align: center;">PY-DH-3-M088-1260-01 (04 sheets)</td> <td style="text-align: center;">03</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">QAP Guidelines and Format</td> <td style="text-align: center;">ANNEXURE-2</td> <td style="text-align: center;">00</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">Pre-Bid Queries format</td> <td style="text-align: center;">ANNEXURE-3</td> <td style="text-align: center;">00</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">No deviation format</td> <td style="text-align: center;">ANNEXURE-4</td> <td style="text-align: center;">00</td> </tr> <tr> <td style="text-align: center;">5</td> <td style="text-align: center;">Price bid format</td> <td style="text-align: center;">ANNEXURE-5</td> <td style="text-align: center;">01</td> </tr> </tbody> </table> Notes: Incase if bidder found any document/annexure no. listed in the technical specification and is missing from the attachment, it is bidder's responsibility to highlight the missing attachment.					Annexure No.	Document/ Drawing Title	Doc. No.	Rev	1	GA & Fabrication drawings of MMS	PY-DS-1-M088-1260-01	01	PY-DH-3-M088-1260-01 (04 sheets)	03	2	QAP Guidelines and Format	ANNEXURE-2	00	3	Pre-Bid Queries format	ANNEXURE-3	00	4	No deviation format	ANNEXURE-4	00	5	Price bid format	ANNEXURE-5	01
Annexure No.	Document/ Drawing Title	Doc. No.	Rev																											
1	GA & Fabrication drawings of MMS	PY-DS-1-M088-1260-01	01																											
		PY-DH-3-M088-1260-01 (04 sheets)	03																											
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Ref. Doc																														

Ref. Doc.

THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

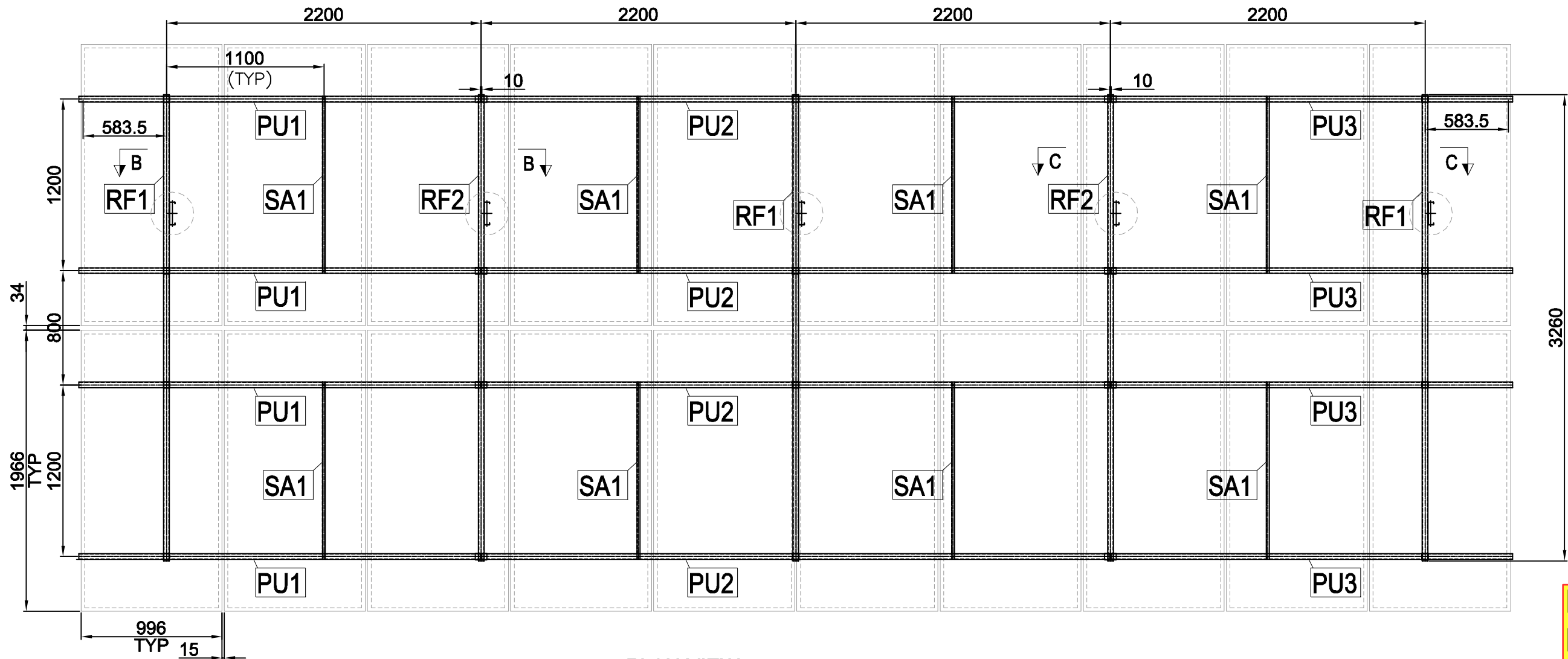
GENERAL DIMENSIONAL LIMITS, FITS & TOLERANCES AS PER HY0230261

INVENTORY NO	SIGN. AND DATE	REF. DRG. NO.	COMPUTER FILE NAME	REV.	DATE	ALTERED CHD/APPD	ZONE	REV.	DATE	ALTERED CHD/APPD	ZONE	REV.	DATE	ALTERED CHD/APPD	ZONE	REV.	DATE	ALTERED CHD/APPD	ZONE	REV.	DATE	ALTERED CHD/APPD	ZONE	REV.	DATE	ALTERED CHD/APPD	ZONE	REV.	DATE	ALTERED CHD/APPD	ZONE

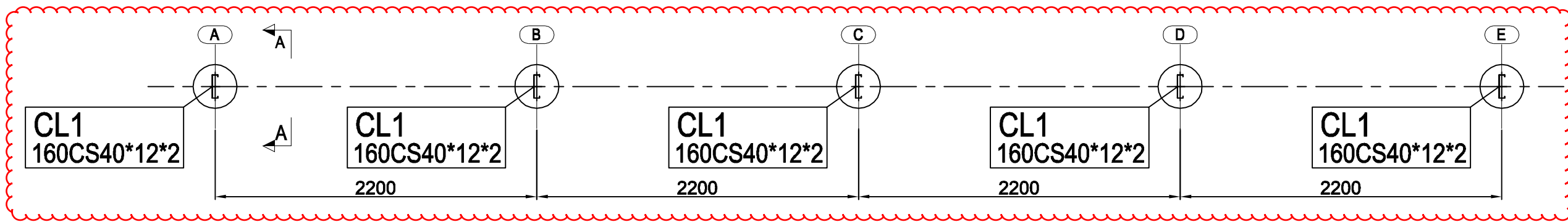
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

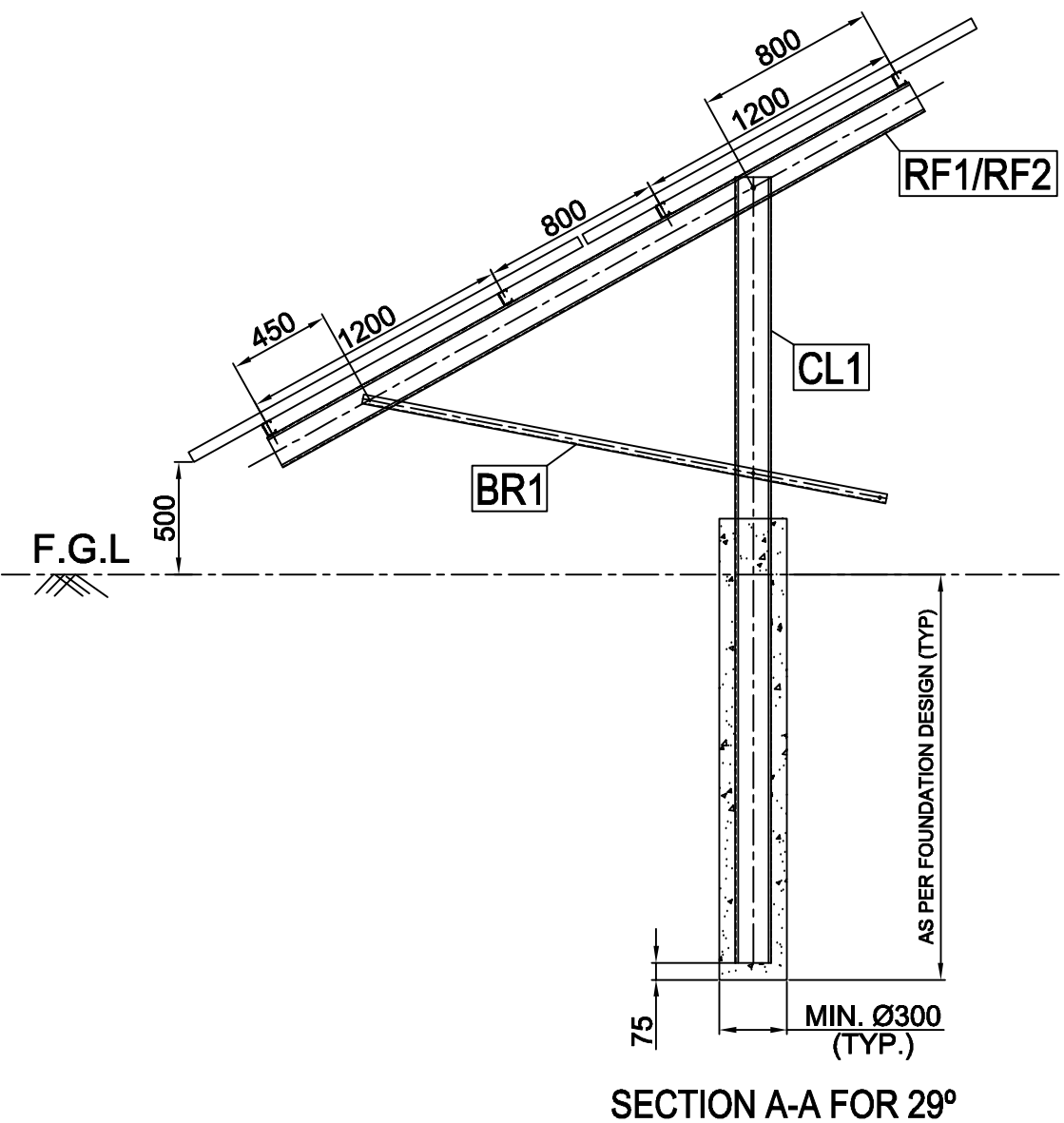
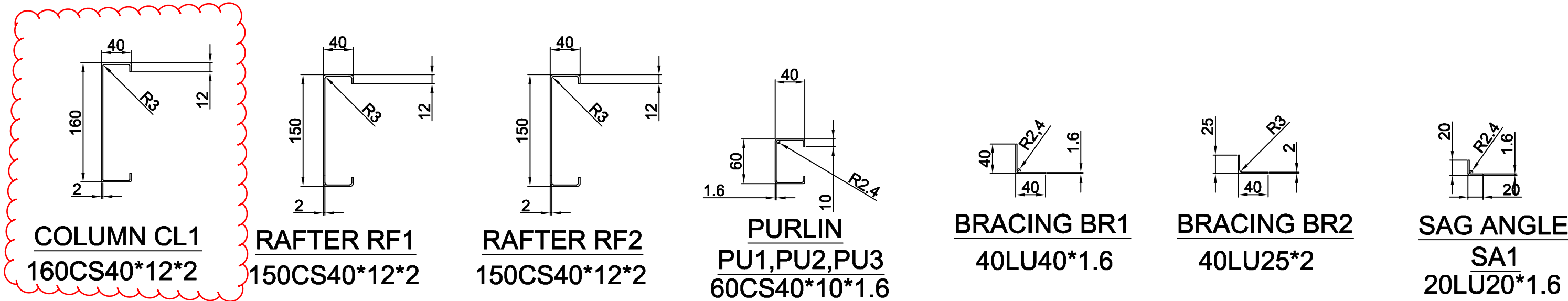
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BHEL DRG. NO.
SHT. 01 OF 01



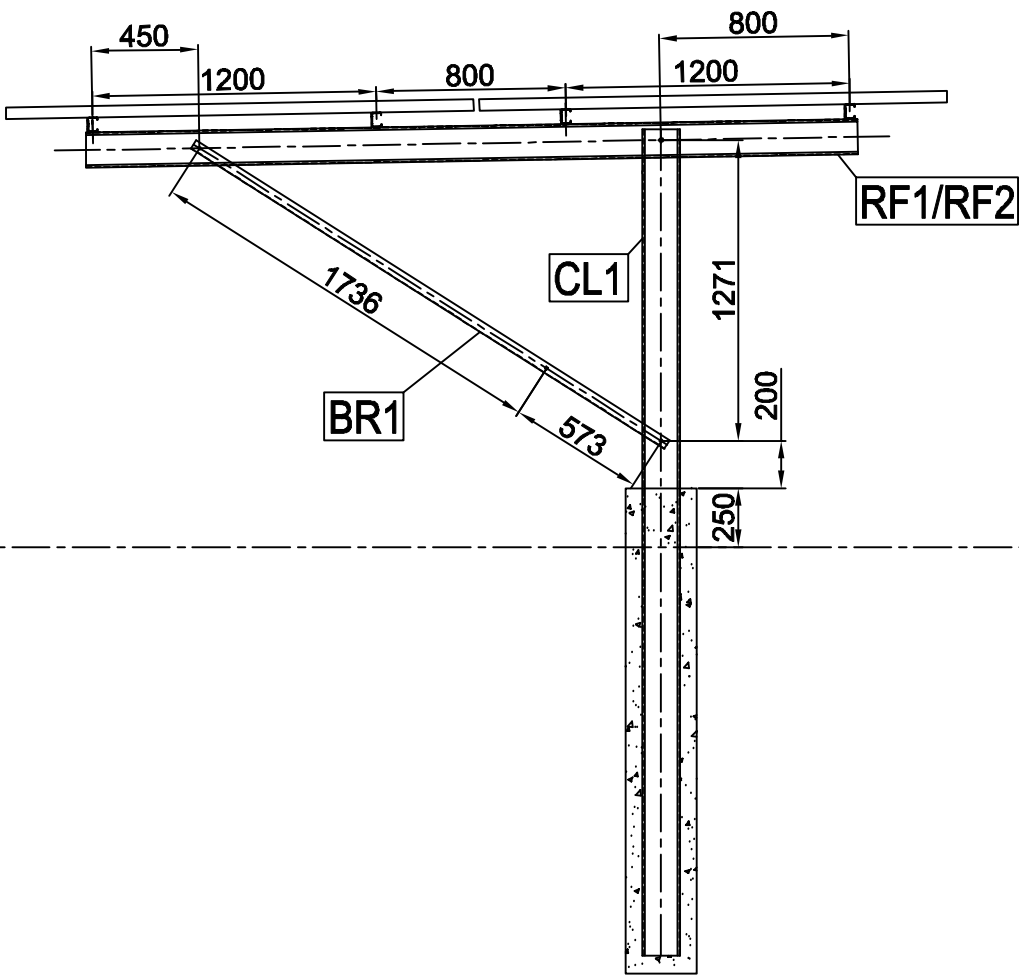
PLAN VIEW



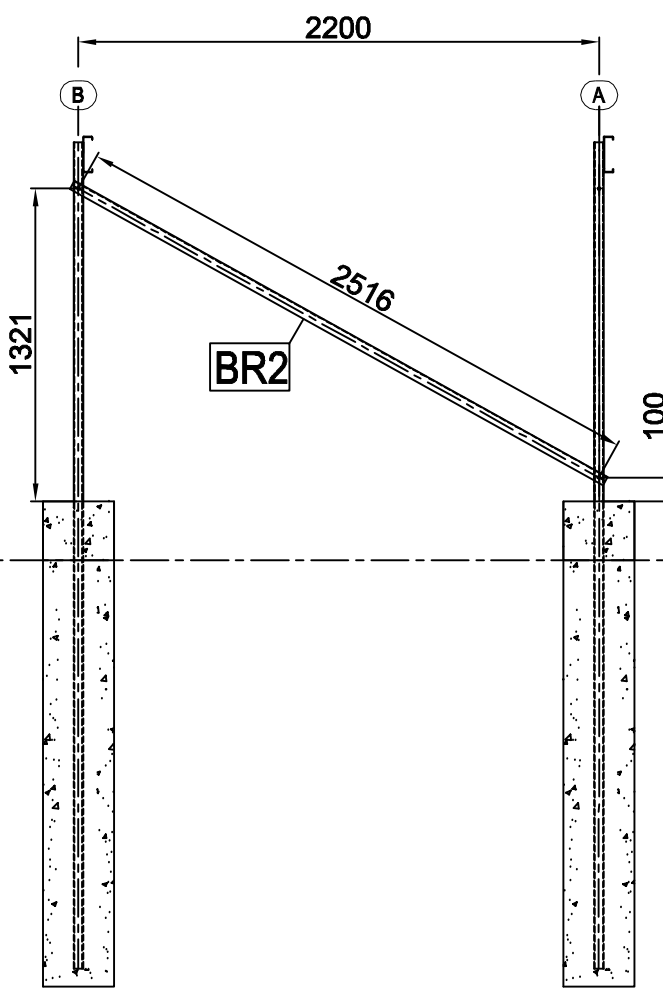
PILE FOUNDATION LAYOUT



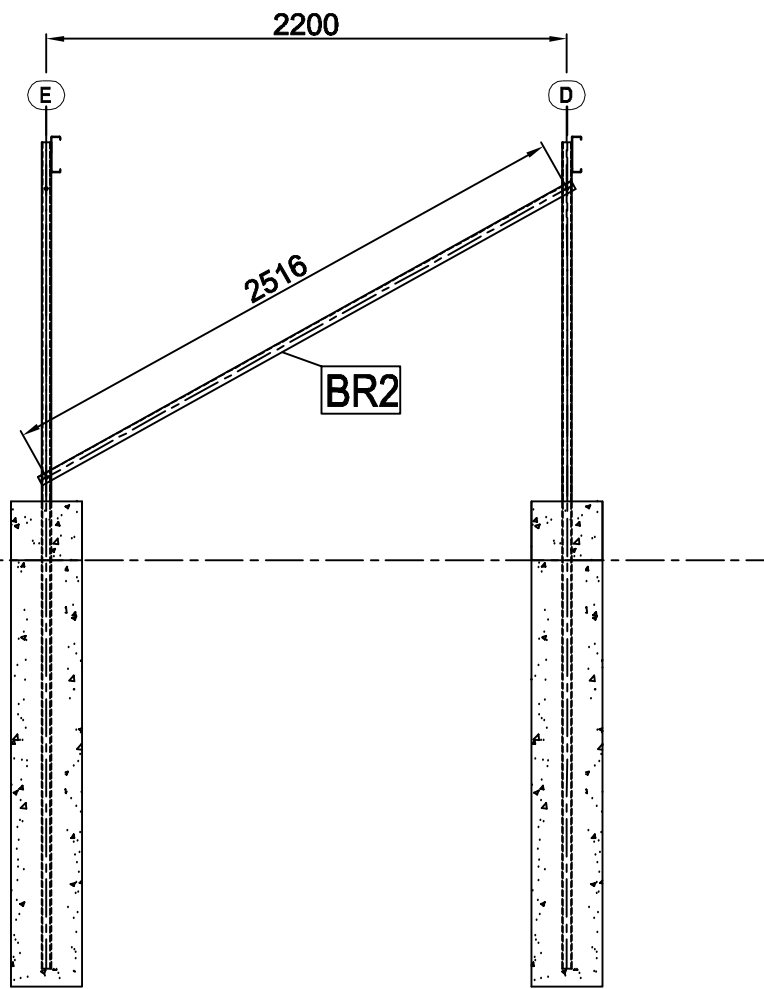
SECTION A-A FOR 29°



SECTION A-A FOR 1°



SECTION B-B



SECTION C-C

DETAIL OF PARTS						
S.No	PART MARK	DESCRIPTION	SIZE	QUANTITY No.	MATERIAL SPECIFICATION	GRADE GALVANIZATION
1	CL1	C-COLUMN	160CS40X12X2	5	COLD FORM	FY350 HOT DIP 80 µm
2	RF1	C-RAFTER	150CS40X12X2	3	COLD FORM	FY350 HOT DIP 80 µm
3	RF2			2		
4	PU1	C-PURLIN	60CS40X10X1.6	4	COLD FORM	FY350 HOT DIP 80 µm
5	PU2			4		
6	PU3			4		
7	BR1	ANGLE BRACING	40LU40X1.6	5	COLD FORM	FY350 HOT DIP 80 µm
8	BR2	ANGLE BRACING	40LU25X2	2	COLD FORM	FY350 HOT DIP 80 µm
9	SA1	SAG ANGLE	20LU20X1.6	8	COLD FORM	FY350 HOT DIP 80 µm

Not in Superstructure
Material scope of supply

Not in Superstructure
Material supplier scope of supply

NOTES:-

- MATERIAL**
- DIMENSIONS FOR COLD ROLLED STEEL ANGLE/CHANNEL SECTIONS SHALL BE IN ACCORDANCE WITH IS:811:1987.
 - DIMENSIONS OF PLATES, FLAT BARS SHALL CONFORM TO IS:1730.
 - ALL COLD FORMED STEEL MATERIAL SHALL HAVE A STRENGTH AS MENTIONED IN BOM.
 - BOLTS, NUTS, SCREWS, WASHERS ETC SHALL BE OF STAINLESS STEEL SS304 OF CLASS A2-70 AND OF SIZES AS PER RELEVANT IS CODES.

GENERAL NOTES

- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
- DO NOT SCALE THE DRG. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
- FABRICATION AND ERECTION SHALL BE CARRIED OUT IN ACCORDANCE WITH IS:800 AND IS:801.
- MIN. CLEARANCE BETWEEN LOWER EDGE OF MODULE & FGL SHALL BE 500MM AS SHOWN.
- TOC/HEIGHT OF COLLAR FOR MMS FOUNDATION SHALL BE 250MM ABOVE FGL.

GALVANIZATION :

ALL STRUCTURAL MEMBERS SHALL BE GALVANIZED TO MINIMUM OF 80 MICRONS OF HOT DIP GALVANIZATION FOR ALL SECTIONS AS IN ACCORDANCE WITH IS:4759.

FOLLOWING CODES HAVE BEEN USED FOR DESIGN

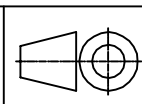
- IS 875 - CODE OF PRACTICE FOR DESIGN LOAD
- IS 801 - CODE OF PRACTICE FOR USE OF COLD-FORMED LIGHT GAUGE STEEL STRUCTURE
- IS 800 - CODE OF PRACTICE FOR USE OF HOT-ROLLED STEEL STRUCTURE

Annexure-1

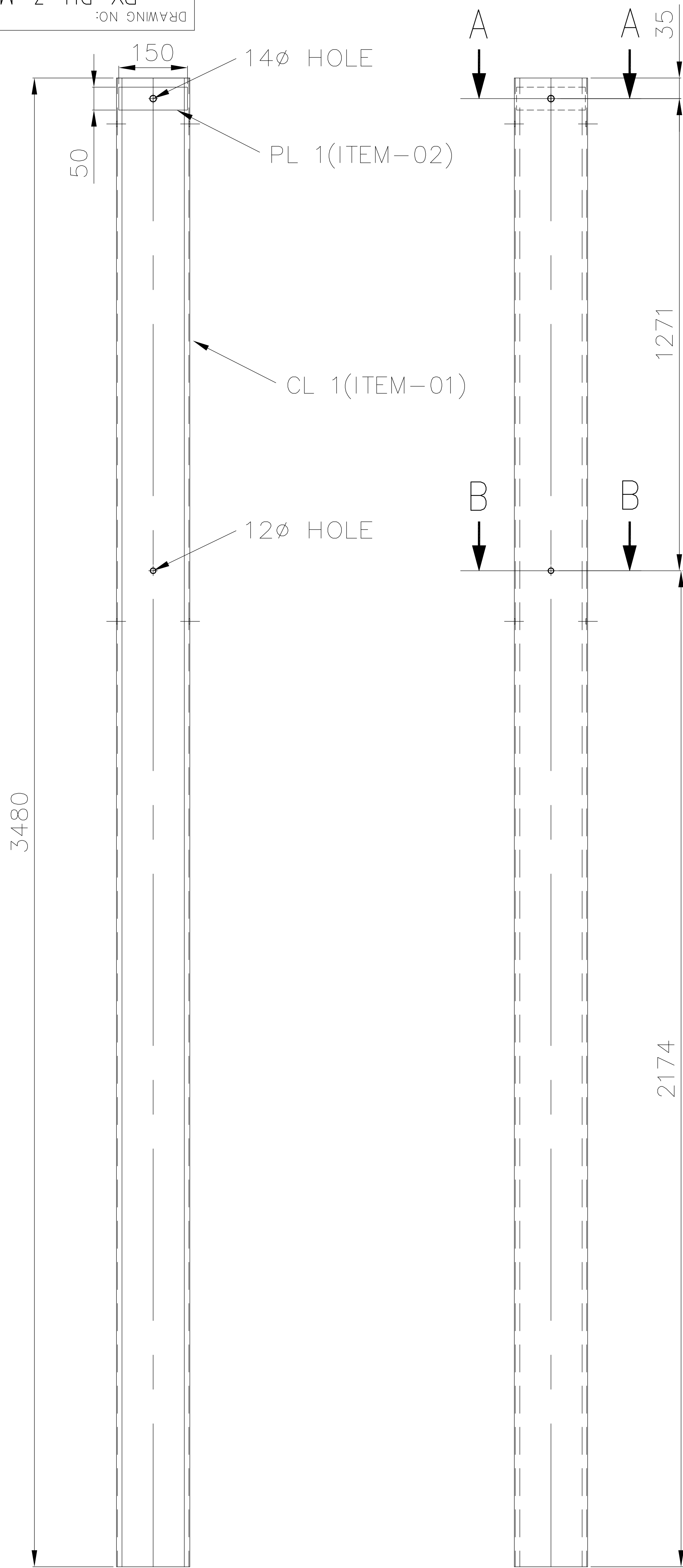
PROJECT : 65MWp SOLAR POWER PLANT AT NEYVELI

CUSTOMER:  NEYVELI LIGNITE CORPORATION LTD.
NEYVELI-TAMILNADU

	BHARAT HEAVY ELECTRICALS LTD.		NAME	SIGN.	DATE	NO.OF VAR.
	DRN.	SRK		-sd-	14.07.16	
	CHD.	PVG		-sd-	16.07.16	N.A.
	APPD.	EC		-sd-	18.07.16	

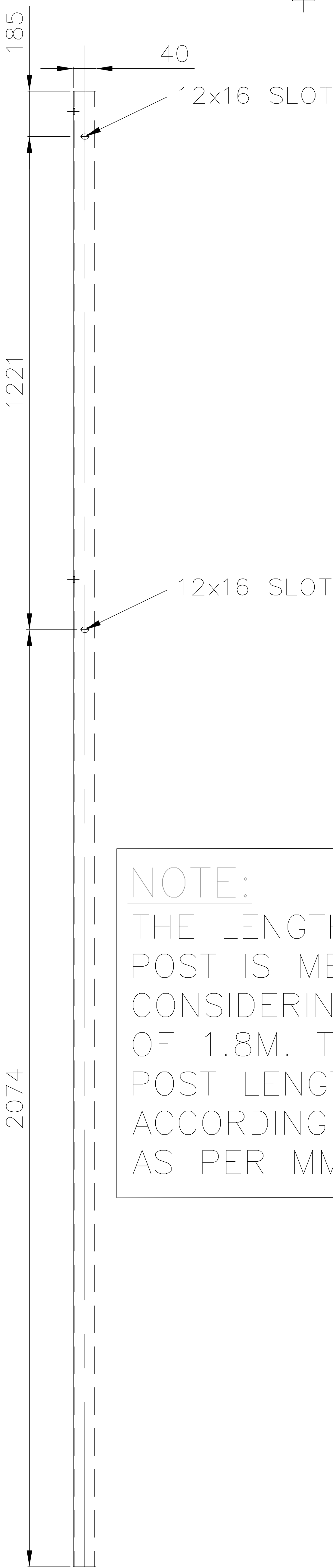
DEPT. PE&SD CODE 450	UNTOL. DIMS. GR. g/m/f		SCALE	WEIGHT (KG) N.A.	REF. TO ASSY. DRG. N.A.	ITEM NO. N.A.	NO.OF ITEMS N.A.
TITLE GENERAL ARRANGEMENT OF MODULE MOUNTING STRUCTURE (MMS)				CARD CODE NA	BHEL DRG NO. PY-DS-1-M088-1260-01	REV. 01	
				SHT. No	01	NO. OF SHT.	01

10-09Z1-3-M088-1260-01
DRAWING NO.:

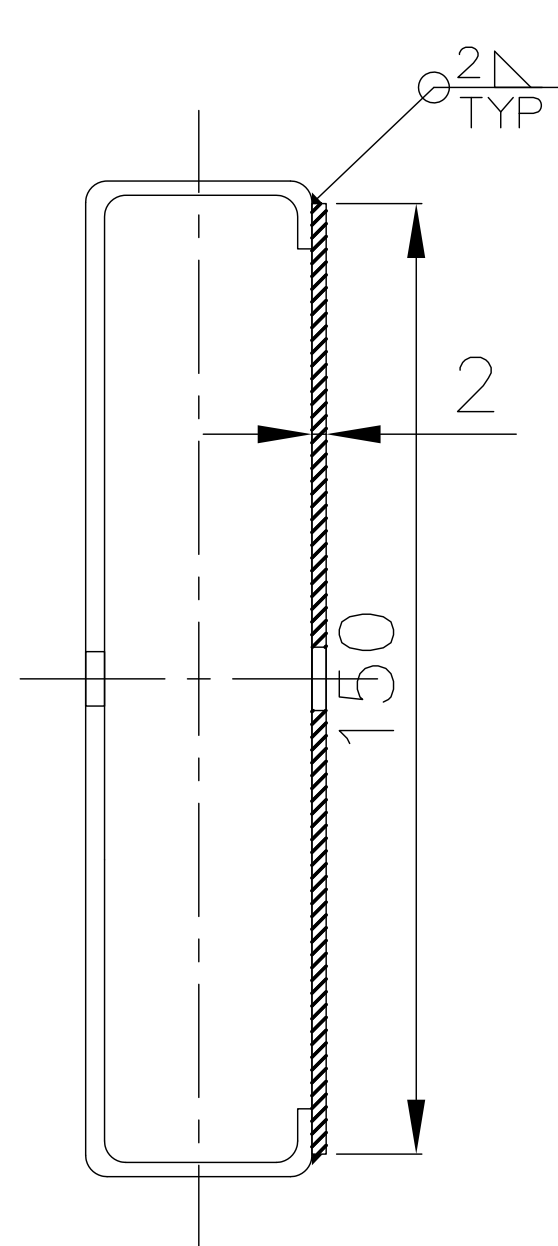


FRONT VIEW

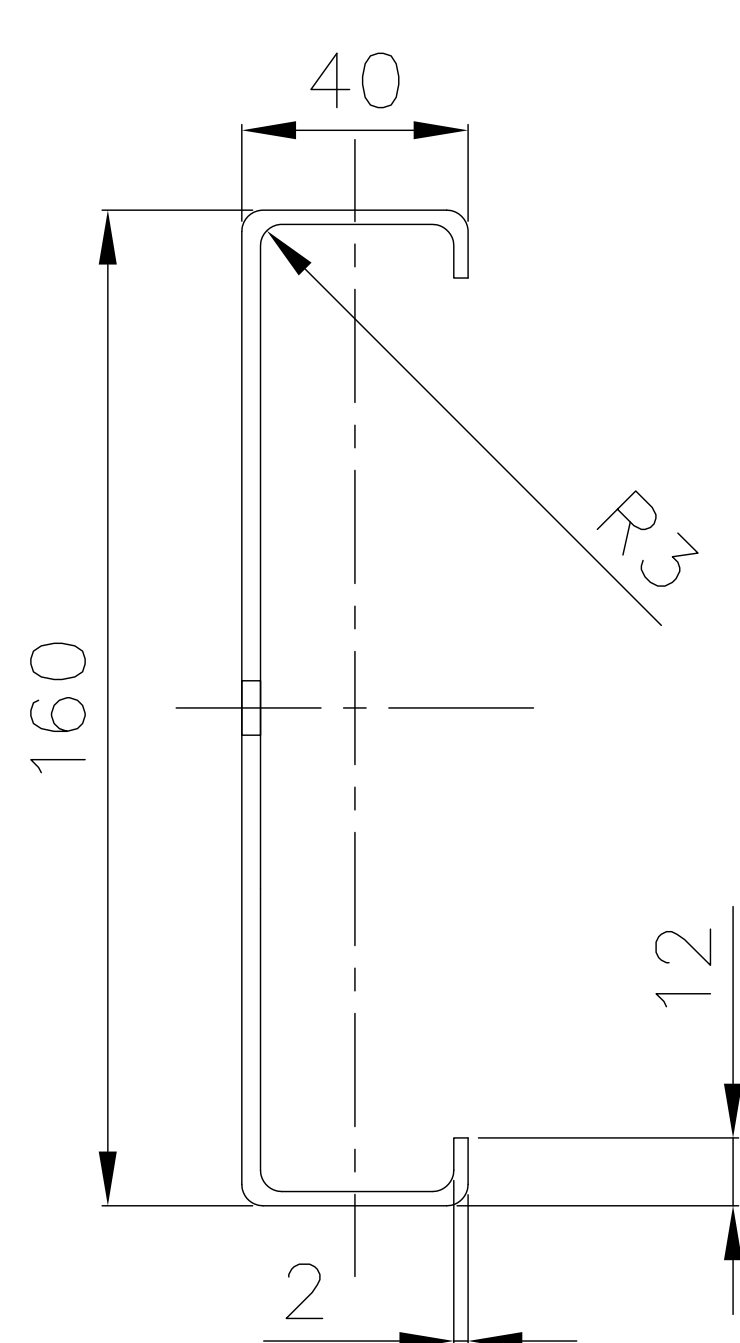
REAR VIEW



SIDE VIEW



SECTION A-A



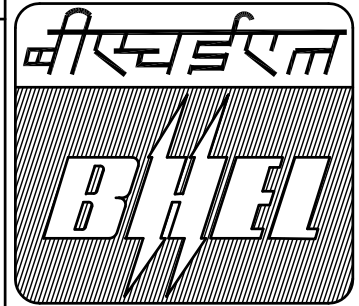
SECTION B-B

- GENERAL NOTES
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
 - HOLE SIZES ARE SHOWN AFTER GALVANIZATION.
 - REMOVE ALL BURRS AND SHARP EDGES.
 - MIN. THICKNESS OF GALVANIZATION SHALL BE 80 MICRON AS PER IS:4759/ASTM123.

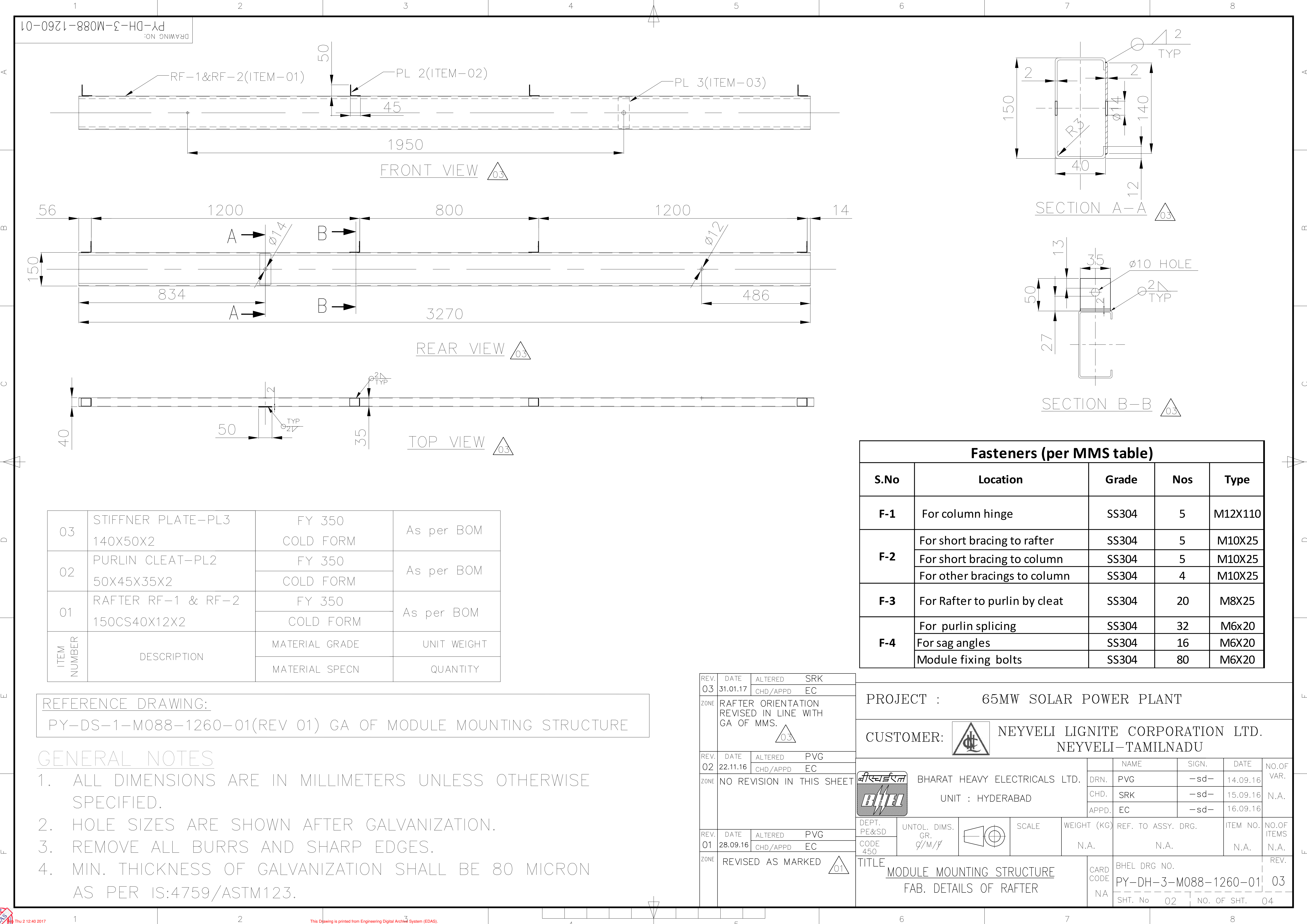
NOTE:
THE LENGTH OF COLUMN POST IS MENTIONED CONSIDERING PILE LENGTH OF 1.8M. THE COLUMN POST LENGTH SHALL VARY ACCORDING TO PILE LENGTH AS PER MMS GA DRG.

02	STIFFNER PLATE – PL1 150X50X2	FY 350	As per BOM
		COLD FORM	
01	COLUMN CL-1 160CS40X12X2	FY 350	As per BOM
		COLD FORM	
ITEM NUMBER	DESCRIPTION	MATERIAL GRADE	UNIT WEIGHT
		MATERIAL SPECN	QUANTITY

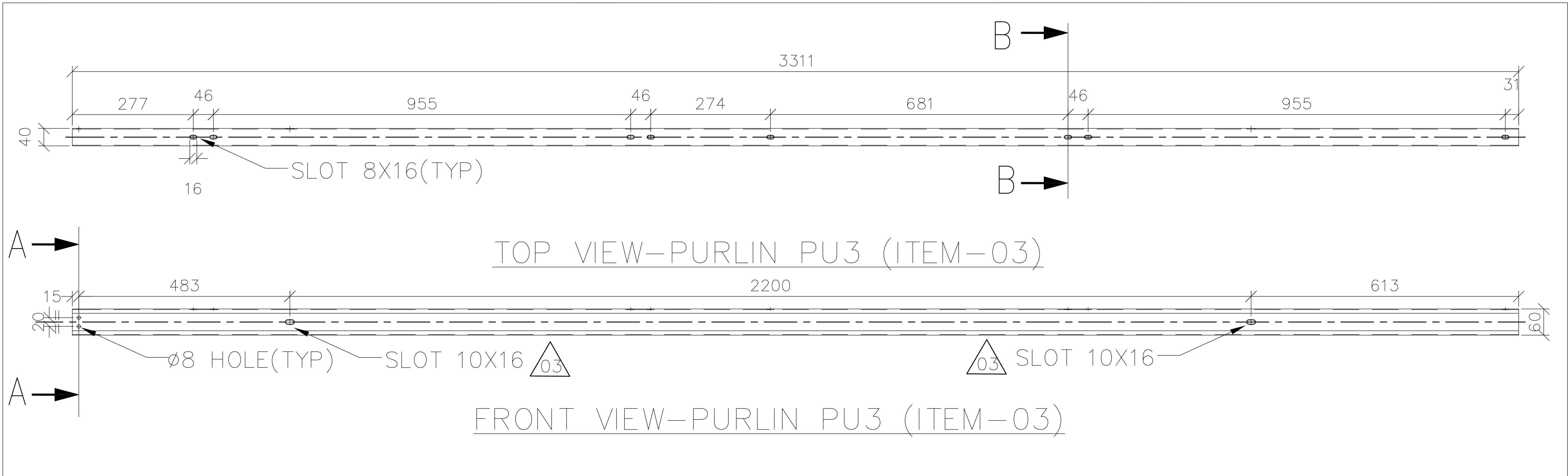
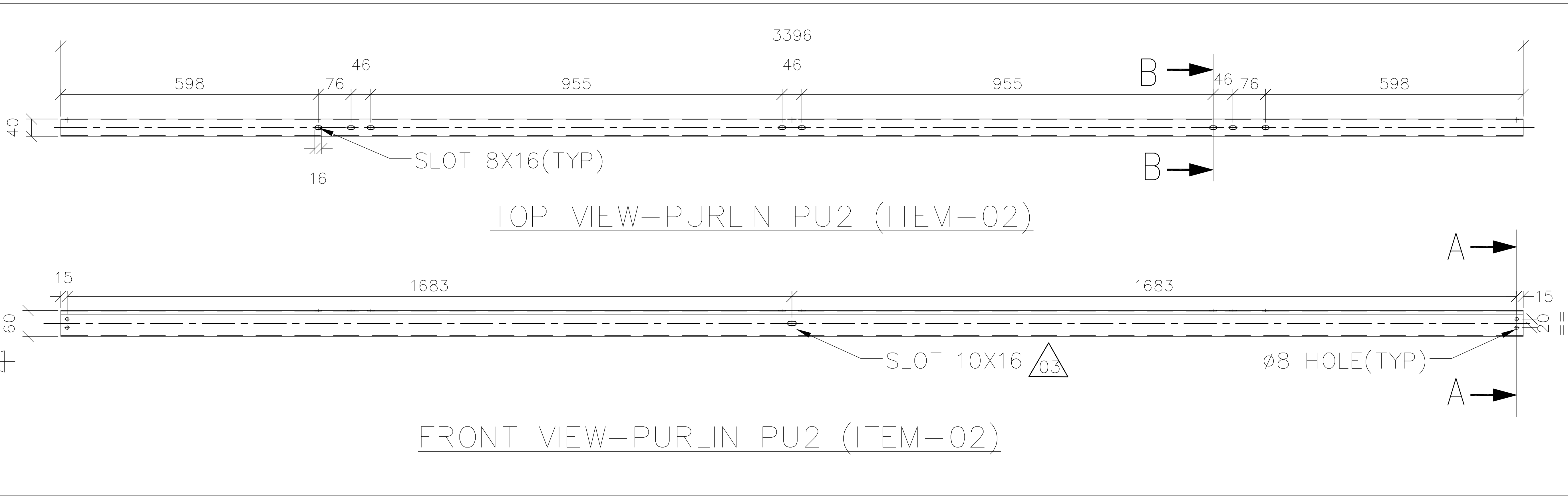
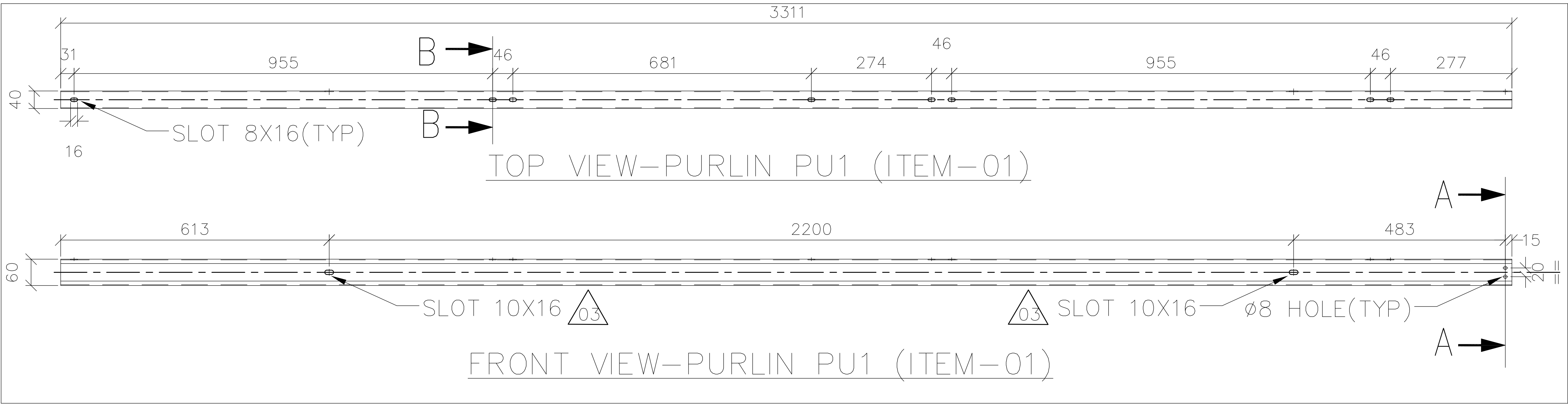
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ZONE	SLOT SIZE REVISED IN LINE WITH FLANGE WIDTH. REVISED AS MARKED		
REV. 01	DATE 28.09.16	ALTERED CHD/APPD	PVG EC
ZONE	REVISED AS PER NLC COMMENTS AS MKD.		

PROJECT : 65MW SOLAR POWER PLANT				
CUSTOMER:  NEYVELI LIGNITE CORPORATION LTD. NEYVELI-TAMILNADU				
 BHARAT HEAVY ELECTRICALS LTD. UNIT : HYDERABAD	NAME	SIGN.	DATE	NO.OF VAR.
	DRN.	PVG	-sd-	14.09.16
	CHD.	SRK	-sd-	15.09.16
DEPT. PE&SD CODE 450	UNTOL. DIMS. GR. q/m/f	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.
			N.A.	N.A.
TITLE MODULE MOUNTING STRUCTURE FAB. DETAILS OF COLUMN			CARD CODE NA	BHEL DRG NO. PY-DH-3-M088-1260-01
			SHT. No 01	NO. OF SHT. 04

REFERENCE DRAWING:
PY-DS-1-M088-1260-01(REV 01) GA OF MODULE MOUNTING STRUCTURE



10-09Z1-880W-3-HD-λP
DRAWING NO:

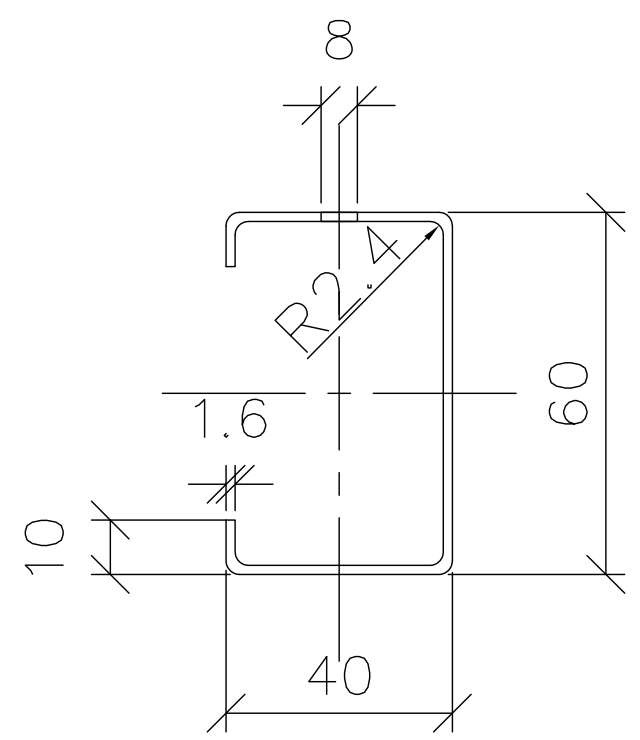


REFERENCE DRAWING:
PY-DS-1-M088-1260-01(REV 01)-
GA OF MODULE MOUNTING STRUCTURE

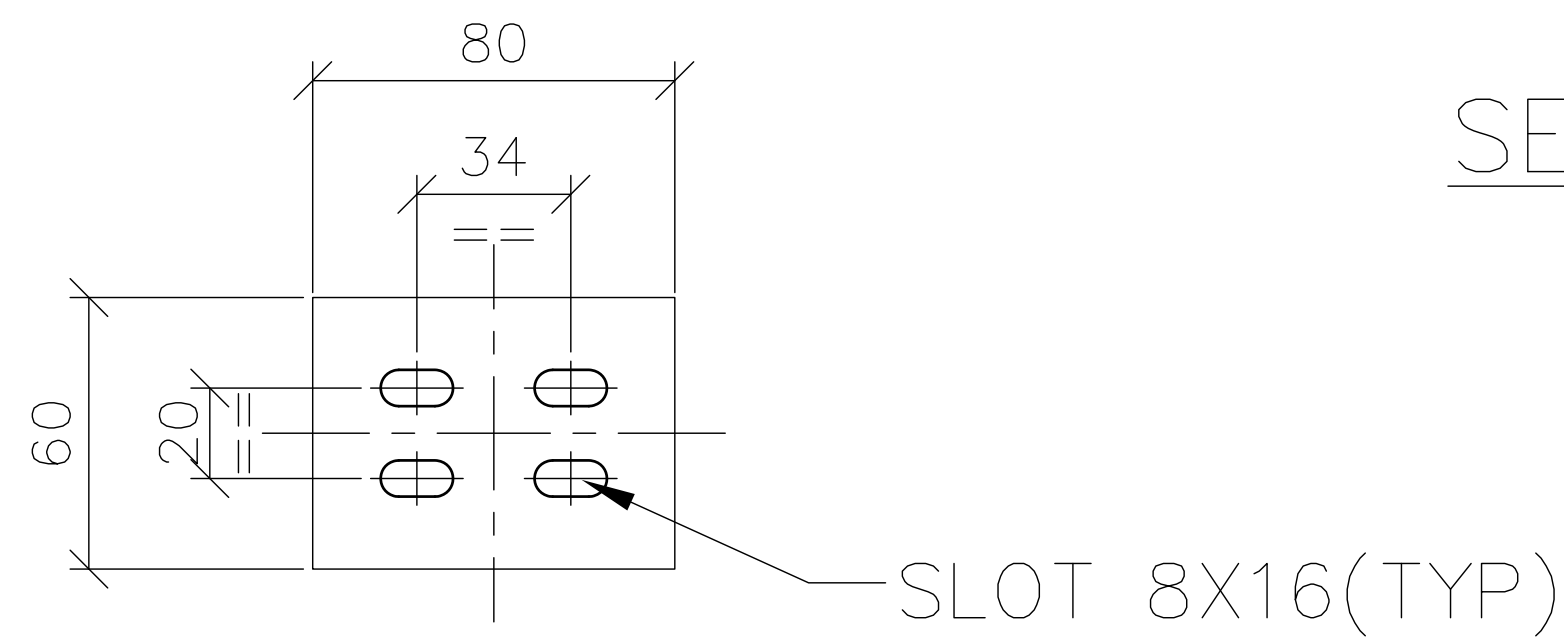
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ZONE	MISSING DIMENSION SHOWN			ZONE	NO REVISION IN THIS SHEET			ZONE	REVISED AS PER CUSTOMER COMMENTS AS MKD.		
			03								01

GENERAL NOTES

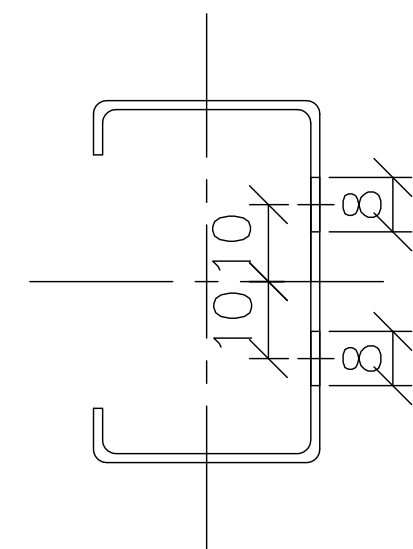
- ALL DIMENSIONS ARE IN MM UNO.
- HOLE SIZES ARE SHOWN AFTER GALVANIZATION.
- REMOVE ALL BURRS AND SHARP EDGES.
- MIN. THICKNESS OF GALVANIZATION SHALL BE 80 MICRON AS PER IS:4759/ASTM123.



SECTION B-B



SPLICE PLATE-SP
(ITEM-04)



SECTION A-A

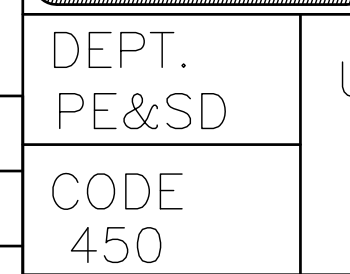
04	SPLICE PLATE-SP 80X60X5	FY 350 COLD FORM	As per BOM
03	PURLIN PU3 60CS40X10X1.6	FY 350 COLD FORM	As per BOM
02	PURLIN PU2 60CS40X10X1.6	FY 350 COLD FORM	As per BOM
01	PURLIN PU1 60CS40X10X1.6	FY 350 COLD FORM	As per BOM
ITEM NUMBER	DESCRIPTION	MATERIAL GRADE	UNIT WEIGHT
		MATERIAL SPECN	QUANTITY

PROJECT : 65MWp SOLAR POWER PLANT

CUSTOMER:  NEYVELI LIGNITE CORPORATION LTD.
NEYVELI-TAMILNADU

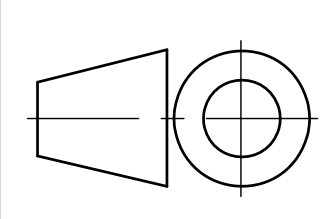


BHARAT HEAVY ELECTRICALS LTD.
UNIT : HYDERABAD



DEPT.
PE&SD
CODE
450

UNTOL. DIMS.
GR.
Q/M/F



SCALE

WEIGHT (KG)
N.A.

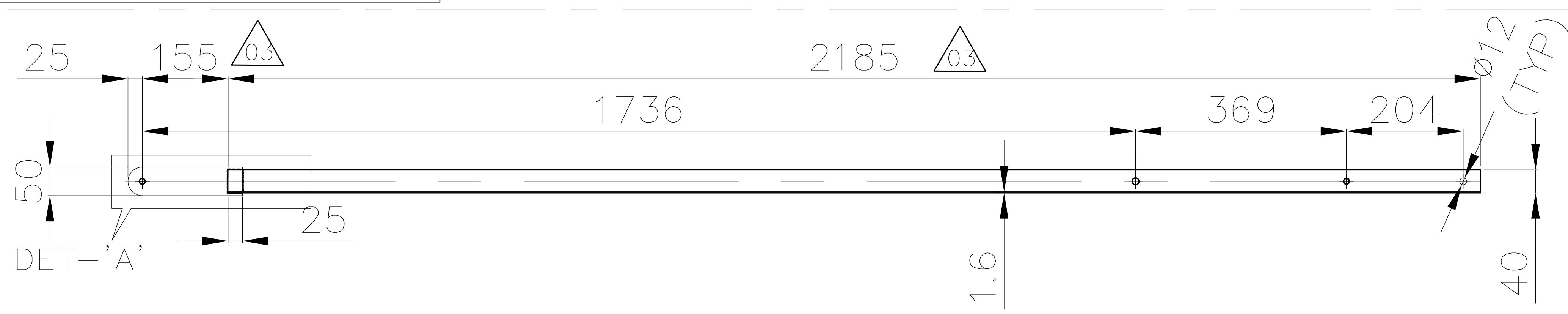
NAME	SIGN.	DATE	NO.OF VAR.
DRN. PVG	-sd-	14.09.16	N.A.
CHD. SRK	-sd-	15.09.16	
APPD. EC	-sd-	16.09.16	

REF. TO ASSY. DRG.	ITEM NO.	NO.OF ITEMS
N.A.	N.A.	N.A.

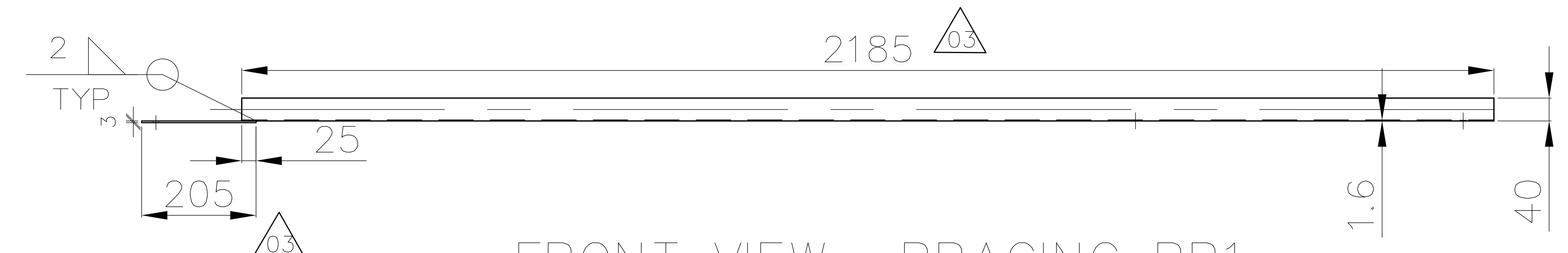
CARD CODE NA	BHEL DRG NO. PY-DH-3-M088-1260-01	03
SHT. No 03	NO. OF SHT. 04	REV.

TITLE
MODULE MOUNTING STRUCTURE
FAB. DETAILS OF PURLIN

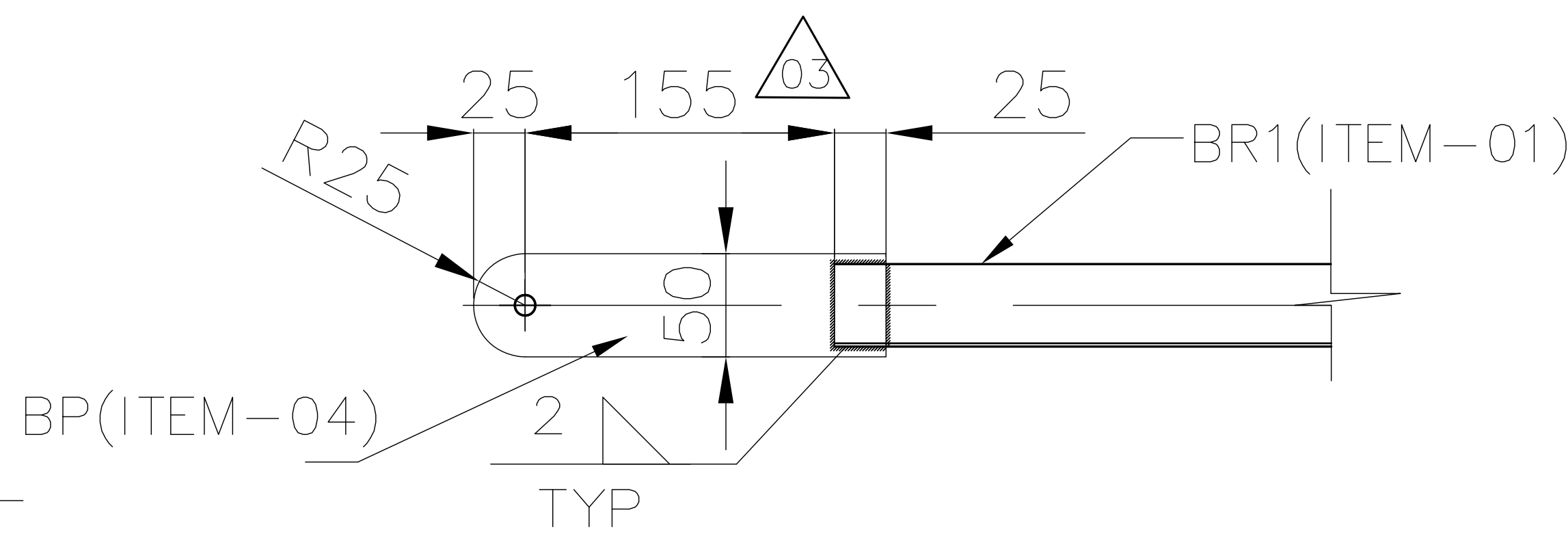
10-0921-3-M088-1260-01
DRAWING NO.:



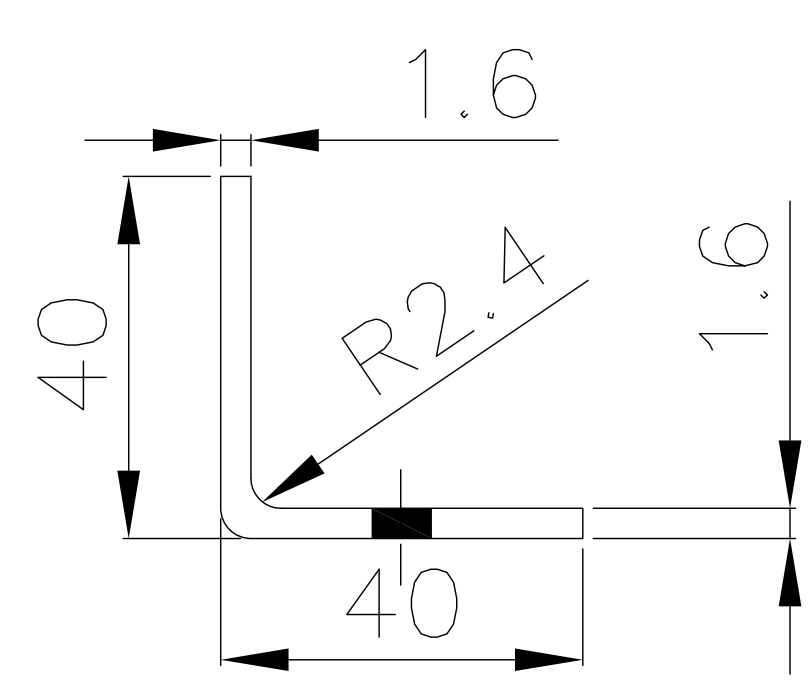
TOP VIEW- BRACING BR1



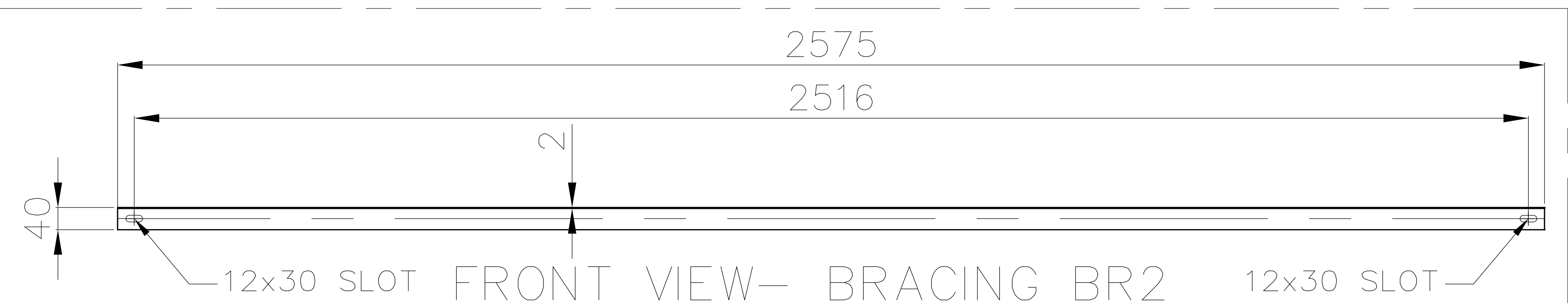
FRONT VIEW- BRACING BR1



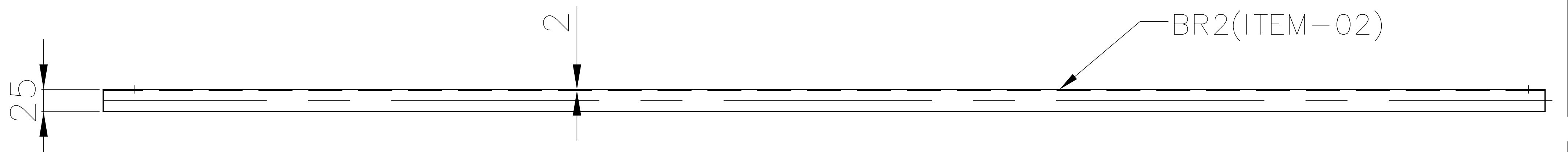
DET-'A'
BRACE PLATE BP



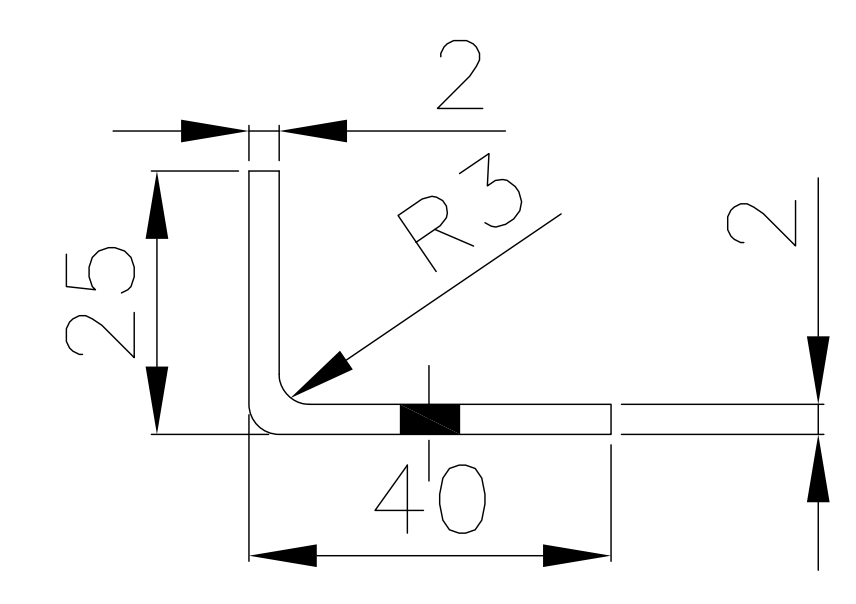
SECTIONAL VIEW
BRACING BR1



FRONT VIEW- BRACING BR2



TOP VIEW- BRACING BR2

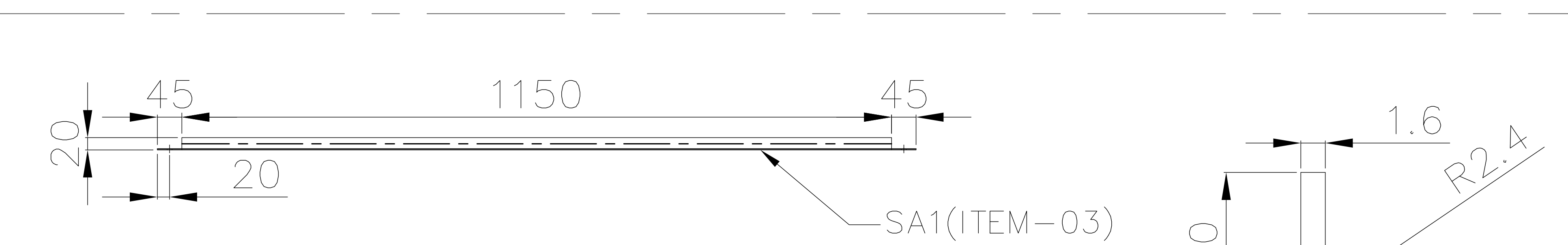


SECTIONAL VIEW
BRACING BR2

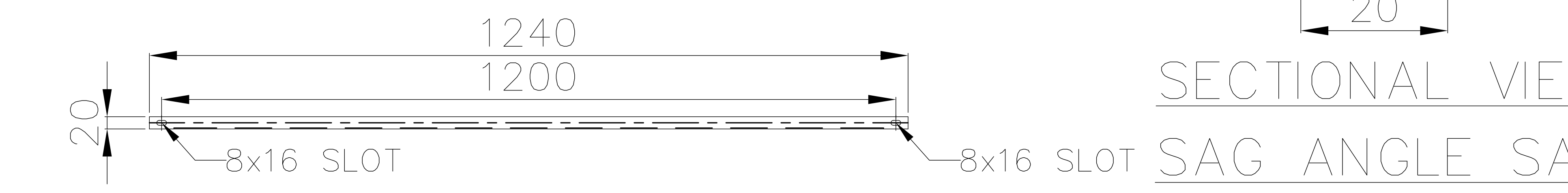
GENERAL NOTES

1. ALL DIMENSIONS ARE IN MM UNO.
2. HOLE SIZES ARE SHOWN AFTER GALVANIZATION.
3. REMOVE ALL BURRS AND SHARP EDGES.
4. MIN. THICKNESS OF GALVANIZATION SHALL BE 80 MICRON AS PER IS:4759/ASTM123.

03	04	BRACE PLATE 205X50X3	FY 350	As per BOM
			COLD FORM	
03	03	SAG ANGLE-SA1 20LU20X1.6	FY 350	As per BOM
			COLD FORM	
02	02	BRACING-BR2 40LU25X2	FY 350	As per BOM
			COLD FORM	
01	01	BRACING-BR1 40LU40X1.6	FY 350	As per BOM
			COLD FORM	
ITEM NUMBER		DESCRIPTION	MATERIAL GRADE	UNIT WEIGHT
			MATERIAL SPECN	QUANTITY



TOP VIEW- SAG SA1



SECTIONAL VIEW
SAG ANGLE SA1



FRONT VIEW- SAG SA1

REFERENCE DRAWING:
PY-DS-1-M088-1260-01 (REV 01) GA OF MODULE MOUNTING STRUCTURE

REV.	DATE	ALTERED	SRK
03	01.02.17	CHD/APPD	EC
ZONE	REVISED AS PER PROTO OBSERVATIONS.		
03			
REV.	DATE	ALTERED	PVG
02	22.11.16	CHD/APPD	EC
ZONE	NO REVISION IN THIS SHEET		
REV.	DATE	ALTERED	PVG
01	28.09.16	CHD/APPD	EC
ZONE	ADDITIONAL SLOT SHOWN IN BR-1 FOR 11.5° TILT		
01			

PROJECT :		65MWp SOLAR POWER PLANT			
CUSTOMER:		NEYVELI LIGNITE CORPORATION LTD. NEYVELI-TAMILNADU			
	BHARAT HEAVY ELECTRICALS LTD.		NAME	SIGN.	DATE
	UNIT : HYDERABAD		DRN.	PVG	14.09.16
			CHD.	SRK	15.09.16
			APPD.	EC	16.09.16
DEPT. PE&SD	UNTOL. DIMS. GR.	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.
CODE 450	Q/M/F		N.A.	N.A.	N.A.
TITLE			CARD CODE	BHEL DRG NO.	REV.
MODULE MOUNTING STRUCTURE			NA	PY-DH-3-M088-1260-01	03
FAB. DETAILS OF BRACINGS & SAG ANGLE			SHT. No	04	NO. OF SHT. 04

MMS Super Structure (per MMS Table)				
Project: 1 x 65 MW NLC Solar PV Project, Neyveli , TN				
S.No	Item Description	Qty (in Nos.)	Total Weight (in KG)	
			Without Galv.	With min 80μ Galv.
1	Rafter RF1/RF2 (incl. required number of Purlin Cleats & Stiffner Plates as shown drg no. PY-DH-3-M088-1260-01 (Sh 02))	5	62.5	67.1
2	Purlins (as shown in drg no. PY-DH-3-M088-1260-01 (Sh 03))			
	PU1	4	24.4	26.7
	PU2	4	25.0	27.3
	PU3	4	24.4	26.7
	Splice Plate-SP	8	1.5	1.6
3	Bracings & Sag Angle(as shown in drg no. PY-DH-3-M088-1260-01 (Sh 04))			
	BR1 (incl. Base Plate)	5	11.7	12.7
	BR2	2	4.9	5.3
	SA1	8	4.6	5.0
	Total in (KG)		159.0	172.3

NOTES:

- 1 The weights mentioned above are theoretical weights.
- 2 The above mentioned structural elements are per MMS table. Total 4680 tables are envisaged
- 3 A total tolerance of 3% (max.) is allowed on the PO quantity.
- 4 PO quantity is on finished product i.e, after galvanization.
- 5 Supply of the total number of structural elements are to be ensured by vendor.



QUALITY ASSURANCE PLAN

ITEM:-MODULE MOUNTED STRUCTURE

ANNEXURE-2

PROJECT	NLC-SOLAR PV POWER PROJECT 65MW Neyveli TN
CUSTOMER	M/s. Neyveli Lignite Corporation Ltd
CONSULTANT	---
VENDOR	M/s. BHARAT HEAVY ELECTRICALS LTD.

APPROVED
WITHOUT PREJUDICE TO
CONTRACTUAL RIGHTS

Sign: *Stamp* Date: 15/11/16
Name & Design: C.M./C.I.V.I.L.

P & BD/Corporate Office
For NLC India Ltd

00	02.11.16	First submission to NLC			
Rev. No.	Date	Details of Revision			
PROJECT ENGINEERING AND SYSTEMS DIVISION BHEL, RAMACHANDRAPURAM, HYDERABAD- 502032.			CHECKED (AKN)	APPROVED (KPP)	DATE 02.11.16
					DOC.NO. PESD/QA/NLC /0001
					REV.NO. 00



		MANUFACTURING QUALITY PLAN (PROJECT SPECIFIC)							MQP. NO.: PESD/QA/NLC /0001					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PRODUCT: MODULE MOUNTED STRUCTURE			REV NO: 00		DATE: 02-Nov-2016				
		PAGE 1 OF 4												
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS	
										P	W	V		
1.0	RAW MATERIALS & BOUGHT OUT ITEMS													
1.1	Hot Rolled Structural & Cold Forming Sections	Chemical composition	Major	Chemical	1 per heat/cast	IS 2062 – 2006	IS 2062 – 2006	MTC	√	2	2	1		
		Tensile Test	Major	Mechanical		IS 2062 – 2006	IS 2062 – 2006		√	2	2	1		
		Bend Test	Major	Mechanical		IS 2062 – 2006	IS 2062 – 2006		√	2	2	1		
		Visual Check for Surface finish	Major	Visual	10%	IS 2062 – 2006	IS 2062 – 2006	Internal Test Reports	√	2	2	1		
		Dimensions												
		For Angle, Channel – Leg length	Major	Measure	10%	IS 808 – 1989 (Angle, Channel)	IS 808 – 1989 (Angle, Channel)	Fabricator Inspection Report	√	2	2	1		
		For Cold forming Sections	Major	Measure	10%	IS 852 & IS 811	IS 852 & IS 811		√	2	2	1		
		For Plates thickness	Major	Measure	10%	IS 1852 - 1985	IS 1852 - 1985		√	2	2	1		
2.0	INPROCESS INSPECTION													
2.1	Fabrication	Forming / Rolling	Major	Measure	1 st Piece & Every 50 th Piece	Approved Drawing	Approved Drawing	Inspection Report		2	2	1		
		Cutting	Major	Visual	1 st Piece & Every 50 th Piece	Approved Drawing	Approved Drawing	Inspection Report		2	2	1		

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL/BHEL NOMINATED INSPECTION AGENCY 2 FOR VENDOR/SUB VENDOR 3. NLC AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

PREPARED BY



BHEL QA SIGNATURE & STAMP

APPROVED BY



BHEL QA SIGNATURE & STAMP

APPROVED BY

CUSTOMER'S SIGNATURE & STAMP

		MANUFACTURING QUALITY PLAN (PROJECT SPECIFIC)							MQP. NO.: PESD/QA/NLC /0001				
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PRODUCT: MODULE MOUNTED STRUCTURE				REV NO: 00		DATE: 02-Nov-2016		
									PAGE 2 OF 4				
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY P W V			REMARKS
2.2	Fabrication	Stamping	Major	Visual	1 st Piece & Every 50 th Piece	Approved Drawing	Approved Drawing	Inspection Report		2	2	1	
		Hole Punching	Major	Measure	1 st Piece & Every 50 th Piece	IS 802 – P – II - 2006	IS 802 – P – II - 2006	Inspection Report		2	2	1	
		Edge Security for all Cutting Areas	Major	Visual	1 st Piece & Every 50 th Piece	IS 802 – P – II - 2006	IS 802 – P – II - 2006	Inspection Report		2	2	1	
		Hole Distance & Orientation	Major	Measure	1 st Piece & Every 50 th Piece	IS 802 – P – II - 2006	IS 802 – P – II - 2006	Inspection Report		2	2	1	
		Dimension	Major	Measure	1 st Piece & Every 50 th Piece	IS 802 – P – II - 2006	IS 802 – P – II - 2006	Inspection Report		2	2	1	
2.3	Inspection of Weld	WPS, WPQ & PQR	Critical	Document review	100%	IS 822 – 1970	IS 822 – 1970	WPS, WPQ & PQR	✓	2	2	1	
		DPT	Major	NDT	1 piece per allotted lot.	IS 822 – 1970	IS 822 – 1970	Inspection Report	✓	2	2	1	
		Weld Size	Major	Visual	10%	Approved Drawings	Approved Drawings	Inspection Report		2	2	1	
		Proto Assembly* (Applicable for super structure supplier.)	Design verification	Critical	Prototype test	One Structure	Approved Drawings	Approved Drawings	Test Report	✓	2	-	1

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL/BHEL NOMINATED INSPECTION AGENCY 2 FOR VENDOR/SUB VENDOR 3. NLC AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.	PREPARED BY  BHEL QA SIGNATURE & STAMP	APPROVED BY  BHEL QA SIGNATURE & STAMP	APPROVED BY CUSTOMER'S SIGNATURE & STAMP
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		MANUFACTURING QUALITY PLAN (PROJECT SPECIFIC)						MQP. NO.: PESD/QA/NLC /0001					
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PRODUCT: MODULE MOUNTED STRUCTURE			REV NO: 00		DATE: 02-Nov-2016			
								PAGE 3 OF 4					
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	
3.0	FINAL INSPECTION & TESTING												
3.1	MMS (Column post / Super structure as applicable to supplier)	Surface Finish, Defect & Dichromating	Major	Visual	100%	IS 2629 – 1985	IS 2629 – 1985	Inspection Report	√	2	1, 3	1	A) "1&3" shall witness randomly 5 pieces/sets for dimension, surface defect and finish per allotted lot. B) For mass & uniformity of Zn coating "1&3" shall witness 3 samples per allotted lot.
		Dimensions	Major	Measure	As Per IS 4759 - 1996	IS 802 – II – 1978	IS 802 – II – 1978	Inspection Report	√	2	1, 3	1	
		Surface Defect & Finish	Major	Visual	100%	IS 2629 – 1985	IS 2629 – 1985	Inspection Report	√	2	1, 3	1	
		Thickness of Zinc Coating	Major	Measure	As Per IS 4759 - 1996	IS 4759 – 1996	IS 4759 – 1996	Inspection Report	√	2	1, 3	1	
		Mass of Zinc Coating	Major	Test	As Per IS 4759 - 1996	IS 6745 – 1975	IS 6745 – 1975	Inspection Report	√	2	1, 3	1	
		Uniformity of Zinc Coating	Major	Chemical	As Per IS 4759 - 1996	IS 2633 – 1986	IS 2633 – 1986	Inspection Report	√	2	1, 3	1	
		Adhesion Test	Major	Physical	As Per IS 4759 - 1996	IS 2629 - 1985	IS 2629 - 1985	Inspection Report	√	2	1, 3	1	
4.0	PRESERVATION & PACKING												
4.1	Packing	Packing	Major		Random	BHEL Specification	BHEL Specification	--		2	2	1	

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL/BHEL NOMINATED INSPECTION AGENCY 2 FOR VENDOR/SUB VENDOR 3. NLC AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.	PREPARED BY  BHEL QA SIGNATURE & STAMP	APPROVED BY  BHEL QA SIGNATURE & STAMP	APPROVED BY CUSTOMER'S SIGNATURE & STAMP
---	---	---	---

		MANUFACTURING QUALITY PLAN (PROJECT SPECIFIC)						MQP. NO.: PESD/QA/NLC /0001						
								REV NO: 00		DATE: 02-Nov-2016				
		PROJECT ENGINEERING & SYSTEMS DIVISION BHEL, RC PURAM, HYD-502032			PRODUCT: MODULE MOUNTED STRUCTURE			PAGE 4 OF 4						
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENC E DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	D	AGENCY P W V			REMARKS

Notes:-

1. This Standard MQP should be read along with specification (Latest revision as per PO), approved drawings & approved datasheet (as applicable).
2. Drawing/datasheet shall prevail over quality plan for contradiction if any.
3. Any project/customer specific requirements which shall be notified have to be fulfilled by the vendor at the time of execution of order.

Revision History:-

Rev No.	Date	Revision Status	Rev No.	Date	Revision Status
00	02-11-16	Initial Issue			

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL/BHEL NOMINATED INSPECTION AGENCY 2 FOR VENDOR/SUB VENDOR 3. NLC AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

PREPARED BY



BHEL QA SIGNATURE & STAMP

APPROVED BY



BHEL QA SIGNATURE & STAMP

APPROVED BY

CUSTOMER'S SIGNATURE & STAMP



PROJECT: - NLC 1x65 MWp Solar PV Project, Neyveli site, Cuddalore district, Tamilnadu India

ANNEXURE-3 of PY 60057

[illegible]

TD-106-1 Rev No. 5	Form No.		BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION RCPURAM, HYD-32	ANNEXURE-04 Rev No. 00 Page 1 of 1								
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company. <u>DEVIATION FROM SPECIFICATION</u> If the proposal submitted has got any deviation from the technical stipulations in the bidding document, the Bidder shall tabulate below the full particulars of such deviations and shall sign below. Additional sheets may be enclosed, if necessary. Deviation is to be furnished with mention of specific clause numbers. Technical and commercial deviations to scope of supply and services, shall be indicated separately. Bidders shall bring put only those deviations which are impractical to meet (or) not advisable <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 8%;">SI.No</th> <th style="width: 15%;">CLAUSE NO.</th> <th style="width: 40%;">DESCRIPTION AS PER SPECIFICATION</th> <th style="width: 37%;">DEVIATION BY BIDDER</th> </tr> </thead> <tbody> <tr> <td style="height: 300px;"></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> We confirm that all the deviations/exceptions to the Technical Specification PY60054 , Job Specification and enclosures including reference documents attached are listed in this Annexure only. No other deviations or exceptions even if mentioned elsewhere shall be considered for any technical/ commercial evaluation or for ordering. Signature of Bidder's Authorized representative .with date..... Date					SI.No	CLAUSE NO.	DESCRIPTION AS PER SPECIFICATION	DEVIATION BY BIDDER				
SI.No	CLAUSE NO.	DESCRIPTION AS PER SPECIFICATION	DEVIATION BY BIDDER									

PRICE BID FORMAT								
RFQ No. <u>T7J1Q05522</u> Dt. <u>26-03-2017</u> Due Date(Tech Bid): <u>03-04-2017</u>								
S.No	Description	Qty	Unit	Unit Rate (Rs.)	Total Value (unit Rate x Qty) (Rs.)	TAXES & DUTIES (%)		
						ED	CST	VAT
1	Main Item PY9760057018: Supply of Super Structure of MMS (balance structural elements in MMS like rafters, purlins, bracings etc.) as per BHEL spec PY60057	8,06,300	kg					
2	Optional Item	6,00,000	kg	Refer Note (7) below -----				
						TAXES & DUTIES (%)		
						ST	Other Cess	
3	Packing & Forwarding							
4	Freight							
5	Insurance	by BHEL						

NOTES:

- Please quote base rate as asked above; indicate P&F either inclusive or mention extra in terms of % . indicate Freight either inclusive or extra in terms of % indicate Taxes & Duties applicable in terms of %
- L1, L2 and so on shall be established based on 'total cost to BHEL'
- BHEL intends to split the order between two bidders in the ratio of 60% and 40%. Lowest (L1) bidder will be awarded 60% of total requirement. For awarding the balance 40% requirement, the following procedure shall be adopted:-
For 40 % of the requirement, L1 bidder's price will be counter offered to the other bidders in the order of the tender rankings, who will have option of accepting full or part thereof in intervals of 10% (i.e, 10%, 20%, 30% or 40%).
Left out quantity from 40% if any, will be offered to L1 bidder, who will have option to accept or refuse this quantity in full or in part as above.
- For the purpose of the matching the price of L1 bidder, "L2 bidder would have to adjust their base price, according the taxes & duties applicable to him, by reducing all other components on pro-rata basis to that of L1 bidder such that, their reduced total quoted price shall be equal to the L1 bidder's price.
- A quantity tolerance of +/-3 % is allowed in despatches based on actual numbers required for the project. Payment shall be made on actual despatches
- Measurement of weight shall be on the finished product and Vendor shall submit certified Weigh Bridge documents for empty truck & loaded truck.
- BHEL may require further quantity of not more than 600 MT, which if required, shall be offered to bidders on whom order for the original quantity is proposed / placed.
Such quantity shall be initially offered in the same split ratio of the Main Item / original order.
The bidders shall have the option of either accepting or refusing BHEL's offer for such additional quantity in part or in full or more to make up further quantities not accepted by other bidders. Price and delivery schedule for optional items shall be same as that of original order.

The Price bid shall be submitted in the above format (reproducing is acceptable, but shall contain all the above content including notes), duly signed & stamped by authorised signatory of bidder.