

GENERAL DESCRIPTION

SCENE:
The basic wind speed of the solar bracket is related to the elevation angle of the photovoltaic panel. The basic wind speed for the elevation angle of 15, 25, 35, and 45 degrees is 40, 40, 35, and 31 m/s (3s time interval). The soil bearing capacity at the bottom of foundation should not be less than 100kPa. The support and foundation can be placed in flat terrian where the ground surface roughness category is C in ASCE 7-05 (B in GB50009-2001) .In some particular scene, such as island and mountain peak, site designer should recheck the foundation dedign and modify the drawing.

FOUNDATION SELECTION PRINCIPLE:
1.Selection of foundation grade shall be decided by bracket height, angle.

NOTICE:
1.Wind speed is 3 second gust;
2.If site basic wind velocity exceed the design basic wind speed, or soil bearing capacity at the bottom of foundation is less than 100kPa (most is quicksand or swampland), foundation drawing should be modified. HQ GTS or R&D can be contacted.

说明

支架及基础应用场景:
该太阳能支架设计的基本风速与光伏板仰角有关，仰角为15、25、35、45度的基本风速为40、40、35、31m/s（3S时距）。按照光伏支架高度的不同分为：低支架基础和高支架基础。所有基础所在位置的地基土承载力不小于100kPa。设计适用于美标C类（中标B类）地面粗糙度的平坦地区或稍有起伏地区，对于海岛或山峰等特殊地形的应用，需要站点设计人员根据实际情况对基础重新验算，并做相应的变形设计。

- 基础选型的一般原则:
- 1.根据支架高度、角度的不同选择基础；
- 注:
- 1.风速为3s时距；
 - 2.若站点基本风速高于基本风速，或者地基土承载力低于100kPa（大部分为流沙或沼泽地区），基础需重新设计。可以联系配套服务或机关研发人员。

客户:

签名: _____

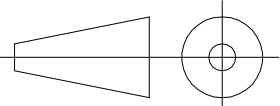
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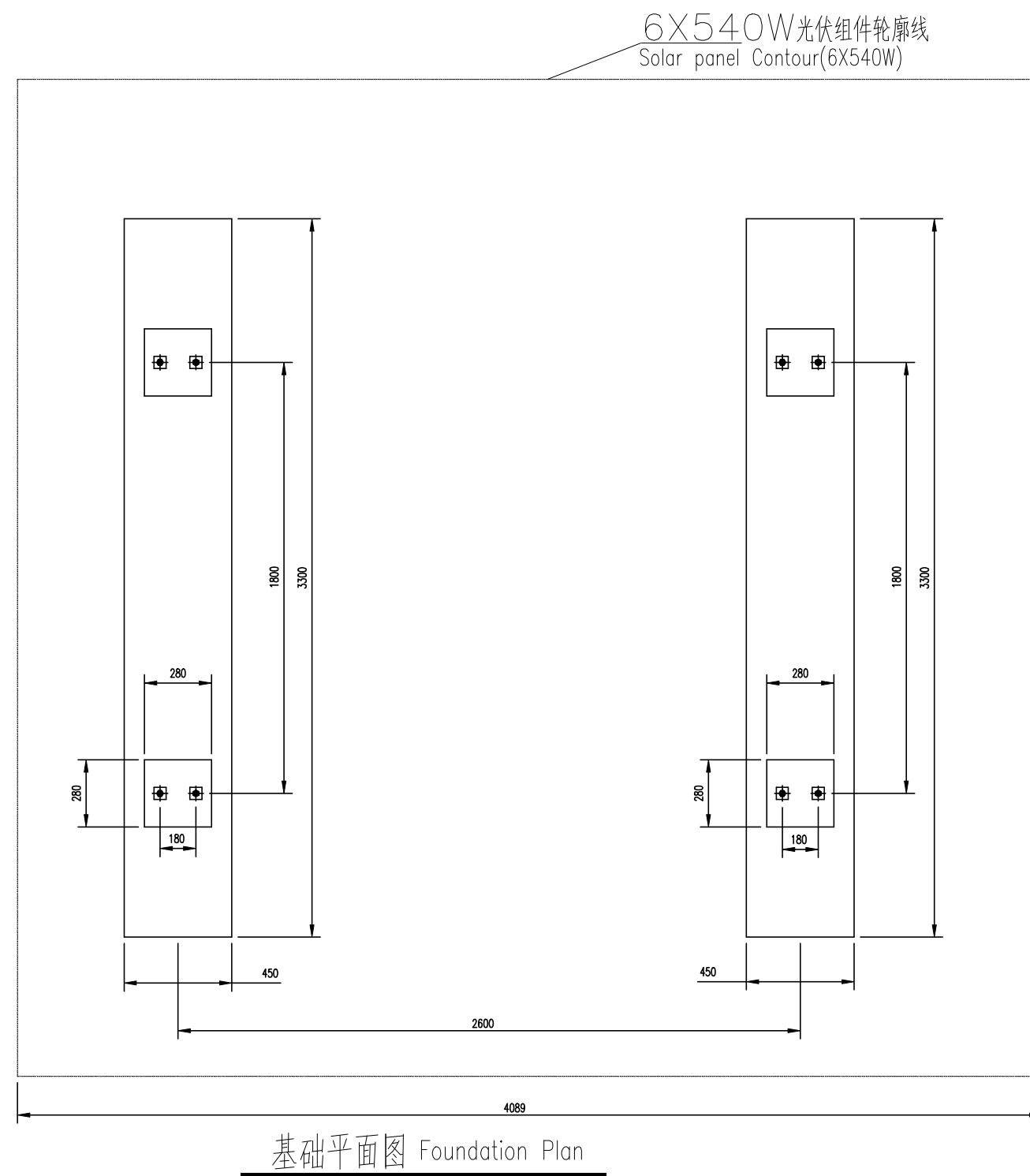


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签名: _____

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项目: Project:			
备注: Remark:			
图名: Drawing title:			
备注: Sharp A Bracket 3.0 Foundation (High solar bracket) Remark: A型支架3.0条形基础 (高支架)			
编码:Part-No:			
版本: Version:			
比例: Scale:		图号: NO.:	
结构编号:			
设计: Designed:			
检查: Checked:			
审核: Verified:			
批准: Approved:			



客户：

簽名：

分包商：



簽名：

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图名:

Drawing title:

备注: Sharp A Bracket 3.0 Foundation (High solar bracket)

Remark: A型支架3.0条形基础(高支架)

编码:Part-No:

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单条基础钢筋表 Steel Bar List of Each Foundation

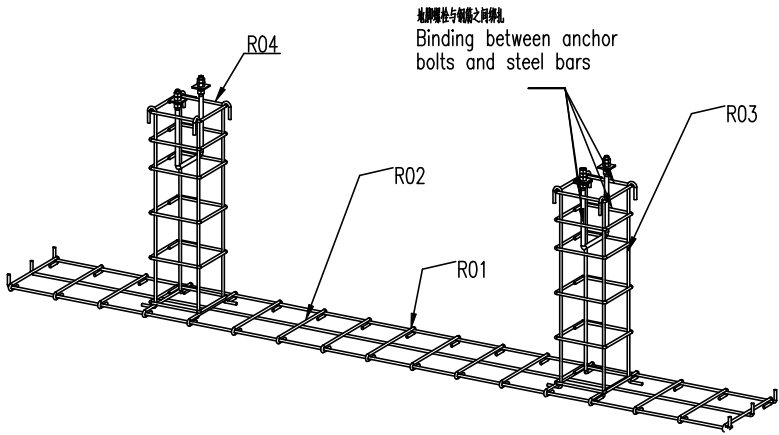
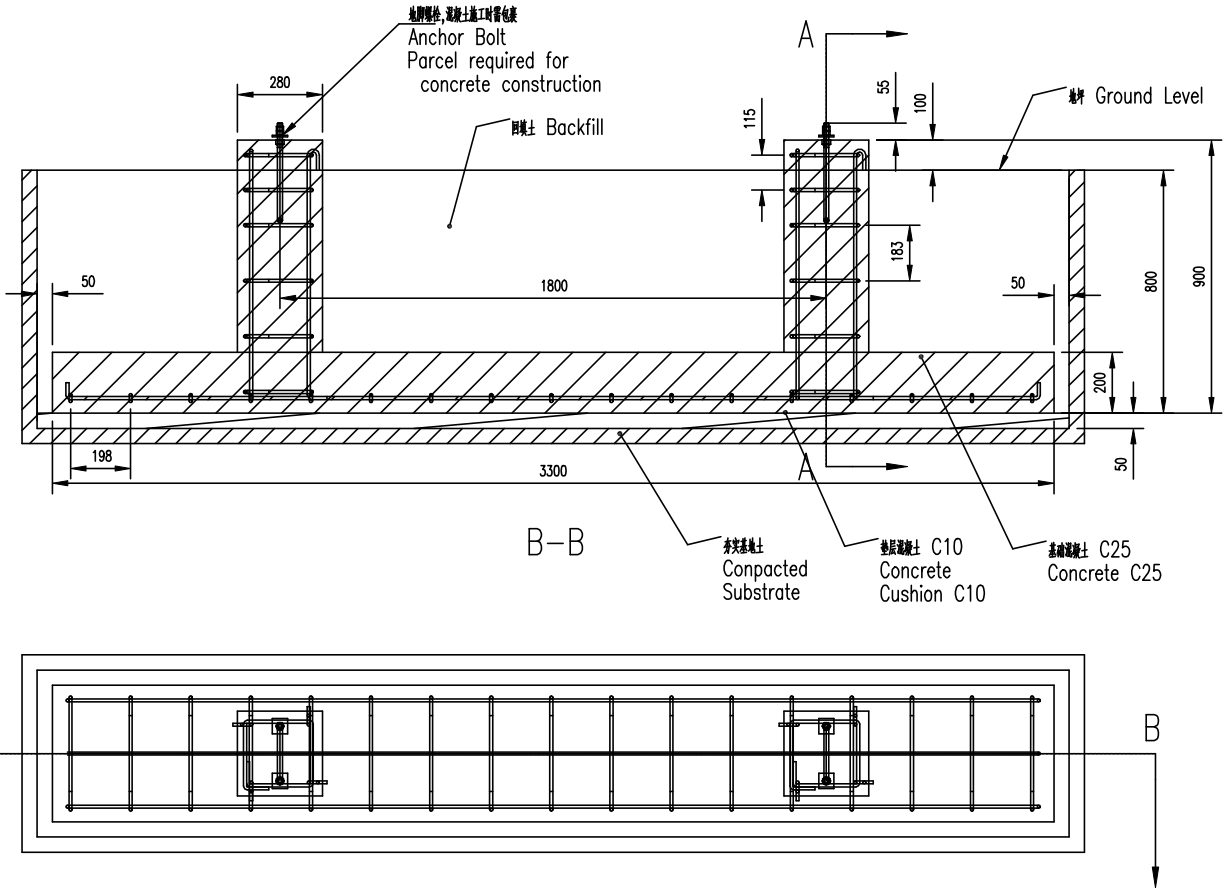
编号 No.	直径 Dia. d(mm)	间距 Spacing (mm)	A (mm)	B (mm)	C (mm)	长度 Length (mm)	数量 Quantity	总长 Total Length (m)	单位重量 Weight (Kg/m)	总重 Total Weight (Kg)
R01	10	175	50	3200	50	3300	3	9.9	0.62	19.53
R02	10	198	50	350	50	450	17	7.7	0.62	
R03	10	190	50	800	50	900	8	7.2	0.62	
R04	10	/	210	210	70	560	12	6.7	0.62	

单条基础混凝土用量和开挖 Concrete and Excavation List of Each Foundation

基础混凝土	Concrete	(m ³)	0.407	垫层混凝土	Concrete Cushion	(m ³)	0.094
土方开挖	Excavation	(m ³)	1.59	土方回填	Backfill	(m ³)	1.1

钢筋外形图 Steel bar shape

编号No.	形状 Shape	长度 Length
R01	A-B-C	L=A+B+C
R02	A-B-C	L=A+B+C
R03	A-B-C	L=A+B+C
R04	A-B-C	L=2(A+B+C)

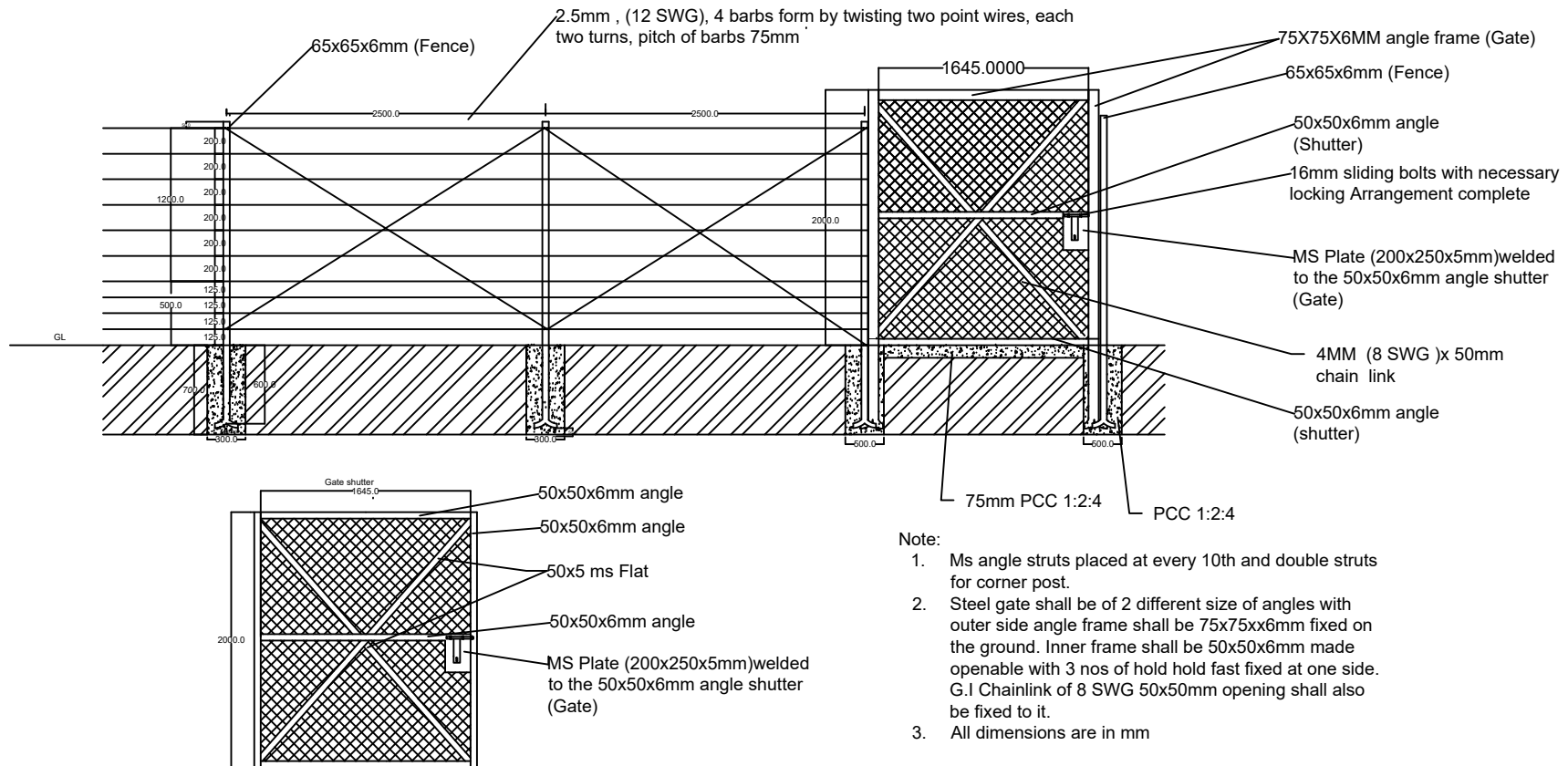


说明:

Notes:

- 容许的施工误差: $\pm 3\text{mm}$;
Allow scope of Construction error: $\pm 3\text{mm}$;
- 设计基本风速与仰角有关。
基底土承载力不小于100kPa。
The design basic wind speed is related to the elevation angle.
Basal soil bearing capacity(f_{ak}) should be more than 100Kpa,
除特别说明外,所有长度的单位均为mm;
All dimensions are millimeter unless otherwise stated;
- 钢筋屈服强度:335MPa($d=10\text{mm}$);
Yield strength (yield point) of steel: 335MPa($d=10\text{mm}$);
- 基础混凝土:C25;垫层混凝土:C10
Concrete of Foundation:C25; Concrete Cushion: C10
- 若未特别说明,基础保护层厚度一律采用50mm;
Thickness of Concrete Cover is 50mm unless otherwise stated;
- 浇注混凝土前必须校正基础模板位置和尺寸正确;
Verify base dimension before casting concrete;
- 基础浇注过程中必须进行振捣;
Vibration of concrete should be performed during pouring concrete;
- 基础浇注完成后需养护至少3天;
Concrete surface should be kept wet for 3 days after casting;
- 地脚螺栓绑在钢筋R04上。
Anchor bolt could be fixed on R04.

BARBED WIRE FENCING AND GATE DRAWING



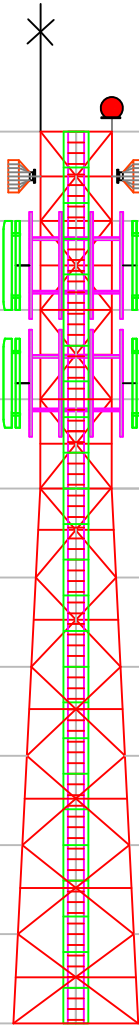
Title : Barbed wire fencing

BHUTAN TELECOM LIMITED

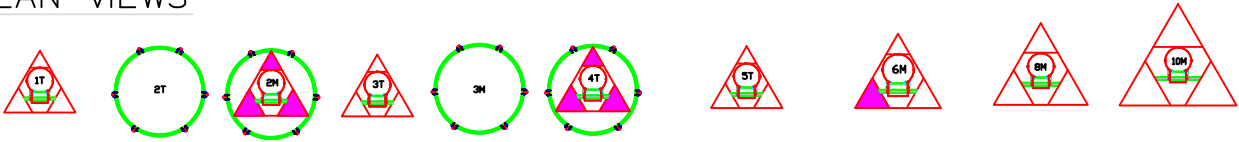
Checked by:

Approved by:

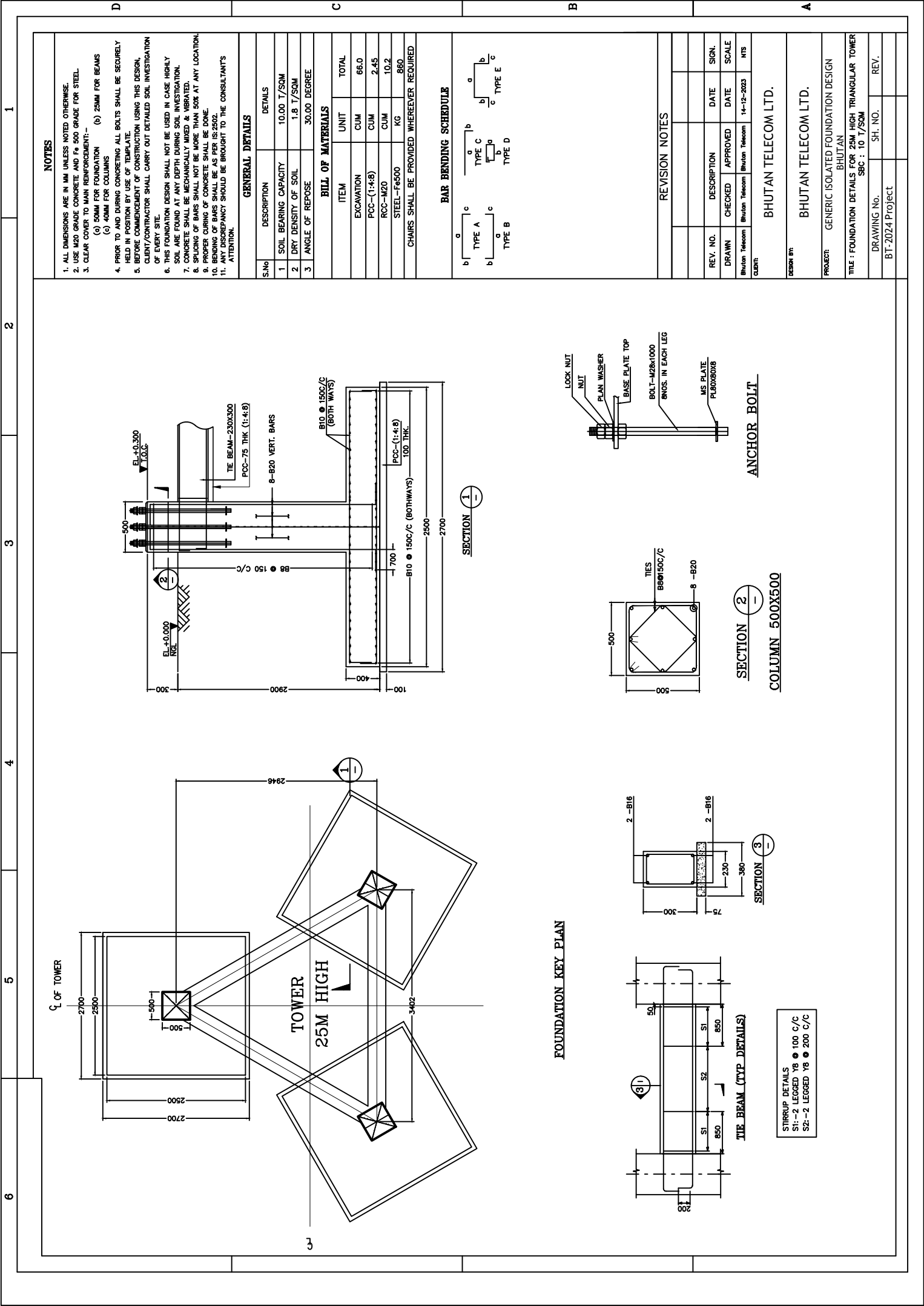
LEVEL	25000	22500	20000	17500	15000	12500	10000	7500	5000	2500	0000
FACE WIDTH	2000	2000	2000	2000	2000	2250	2500	2750	3000	3250	3500
PLATFORM			Working Platform	Working Platform		Rest Platform					
LEG JOINT NAME	A	B		C	D	E	F				
LEG LENGTH	2500	2500	2500	2500	2503	2503	2503	2503	2503	2503	2503
LEGS SIZE	65x65x6	75x75x6	100x100x10	120x120x10	130x130x12						
PANEL NO	1	2	3	4	5	6	7	8	9	10	
LENGTH(METER)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
DIAGONALS	50x50x4	55x5	60x60x5	50x5	50x50x5	55x55x5					
PANEL TOP- HORIZONTALS	50x50x4	50x50x4									
PANEL MID- HORIZONTALS	45x45x04	45x45x04	50x50x4	50x50x4	50x50x4	50x50x4	50x50x4	50x50x4	50x50x4	50x50x4	
PLAN BRACING	45x45x04	45x45x04									
SEC. BRACING											



PLAN VIEWS



1)Remote Radio Head- 6+4nos (Total Weight 270kgs.) 2)Sectoral Antennas - 6+4nos (Total Weight 242kgs.) 3)Microwave Antennas (0.9m)-2nos (Total Weight 50kgs.) 4)Microwave Antennas (1.2m)-2nos (Total Weight 60kgs.) 5)Antennas Mounting Structure (Total Weight 270kgs.)	TITLE	25 METER TOWER	Wind Speed	180 KMPH	Design	TIA/EIA-222 G
	SUB. TITLE	TRIANGULAR ANGULAR TOWER	Deflection	< 1.0 Degree	Rev.	
	Drawing	BT - 2024 Project	Loading	892 kgs.	Drawn Date	08-12-2023
	BHUTAN TELECOM LTD.			Tower Weight 4450 kgs.		



CL OF TOWER

TOWER
25M HIGH

FOUNDATION KEY PLAN

TIE BEAM (TYP DETAILS)

STIRRUP DETAILS
S1:-2 LEGGED Y8 @ 100 C/C
S2:-2 LEGGED Y8 @ 200 C/C
S3:-2 LEGGED Y8 @ 200 C/C

- NOTES**
1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
 2. USE M20 GRADE CONCRETE AND F4 500 GRADE FOR STEEL.
 3. CLEAR COVER TO MAIN REINFORCEMENT:-
(a) 50MM FOR FOUNDATION (b) 25MM FOR BEAMS
(c) 40MM FOR COLUMNS
 4. PRIOR TO AND DURING CONCRETING ALL BOLTS SHALL BE SECURELY HELD IN POSITION BY USE OF TEMPLATE.
 5. BEFORE COMMENCEMENT OF CONSTRUCTION USING THIS DESIGN, CLIENT/CONTRACTOR SHALL CARRY OUT DETAIL SOIL INVESTIGATION OF EVERY SITE.
 6. THIS FOUNDATION DESIGN SHALL NOT BE USED IN CASE HIGHLY SOIL ARE FOUND AT ANY DEPTH DURING SOIL INVESTIGATION.
 7. CONCRETE SHALL BE MECHANICALLY MIXED & VIBRATED.
 8. SPLICING OF BARS SHALL NOT BE MORE THAN 50% AT ANY LOCATION.
 9. PROPER CURING OF CONCRETE SHALL BE DONE.
 10. BENDING OF BARS SHALL BE AS PER IS:2502.
 11. ANY DISCREPANCY SHOULD BE BROUGHT TO THE CONSULTANT'S ATTENTION.

GENERAL DETAILS	
S.No	DESCRIPTION
1	SOIL BEARING CAPACITY 10.00 T/SQM
2	DRY DENSITY OF SOIL 1.8 T/SQM
3	ANGLE OF REPOSE 30.00 DEGREE

BILL OF MATERIALS	
ITEM	UNIT
EXCAVATION	CUM
PCC-(1:4:8)	CUM
RCC-M20	CUM
STEEL-F4500	KG
CHAIRS SHALL BE PROVIDED WHEREVER REQUIRED	860

BAR BENDING SCHEDULE	
b	a
TYPE A	TYPE C
b	a
TYPE B	TYPE D
a	b
TYPE E	TYPE F

REVISION NOTES	
REV. NO.	DESCRIPTION
DRAWN	CHECKED
APPROVED	DATE
DATE	SCALE
DATE	NTS

Bhutan Telecom	Bhutan Telecom	Bhutan Telecom	14-12-2023	NTS
CLIENT:				
BHUTAN TELECOM LTD.				

CLIENT:	BHUTAN TELECOM LTD.			
DESIGN BY:	BHUTAN TELECOM LTD.			
PROJECT:	GENERIC ISOLATED FOUNDATION DESIGN BHUTAN			
TITLE : FOUNDATION DETAILS FOR 25M HIGH TRIANGULAR TOWER SEC : 10 T/SQM				
DRAWING No.	SH. NO.	REV.		
BT-2024 Project				

LEVEL	30000	27500	25000	22500	20000	17500	15000	12500	10000	7500	5000	0000
FACE WIDTH	2000	2000	2000	2000	2000	2250	2500	2750	3000	3250	3500	4000
PLATFORM			Working Platform		Working Platform		Rest Platform					30 Mtr
LEG JOINT NAME	A		B		C		D		E		F	G
LEG LENGTH	2500	2500	2500	2500	2503	2503	2503	2503	2503	2503	2503	5006
LEGS SIZE	65x65x6		75x75x6		100x100x10		120x120x10		130x130x12		150x150x12	
PANEL NO	1	2	3	4	5	6	7	8	9	10	11	
LENGTH(METER)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	
DIAGONALS	50x50x4	55x5	60x60x5	50x5	50x5	50x50x5	55x55x5	65x65x6				
PANEL TOP- HORIZONTALS	50x50x4	50x50x4										
PANEL MID- HORIZONTALS	45x45x04	45x45x04	50x50x4	50x50x4	50x50x4	50x50x4	50x50x4	50x50x4	50x50x4	50x50x4	50x50x4	
PLAN BRACING	45x45x04	45x45x04	50x50x4	50x50x4	50x50x4	50x50x4	50x50x4	50x50x4	50x50x4	50x50x4	50x50x4	
SEC. BRACING											45x45x4	

PLAN VIEWS

1)Remote Radio Head-9nos (Total Weight 245kgs.)	TITLE	30 METER TOWER	Wind Speed	180 KMPH	Design	TIA/EIA-222 G
2)Sectoral Antennas -9nos (Total Weight 215kgs.)	SUB. TITLE	TRIANGULAR ANGULAR TOWER	Deflection	< 1.0 Degree	Rev:	
3)Microwave Antennas 0.6m-2nos (Total Weight 50kgs.)	Drawing	BT - 2024 Project	Loading	935 kgs.	Drawn Date	08-12-2023
4)Microwave Antennas 0.9m-2nos (Total Weight 60kgs.)		BHUTAN TELECOM LTD		Tower Weight 5750 kgs.		
5)Microwave Antennas 1.2m-2nos (Total Weight 60kgs.)						
6)Microwave Antennas 1.8m-1nos (Total Weight 40kgs.)						
7)Antennas Mounting Structure (Total Weight 270kgs.)						

BHUTAN TELECOM LTD.	
DESIGN BY:	
BHUTAN TELECOM LTD.	
PROJECT:	GENERIC ISOLATED FOUNDATION DESIGN BHUTAN
TITLE : FOUNDATION DETAILS FOR 30M HIGH TRIANGULAR TOWER SBC : 10 T/30M	
DRAWING No.	SH. NO.
BT-2024 Project	