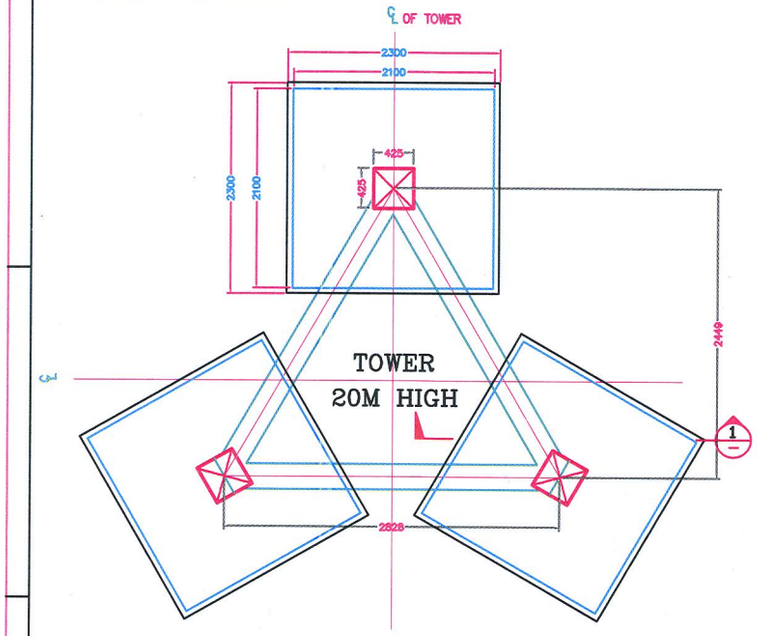
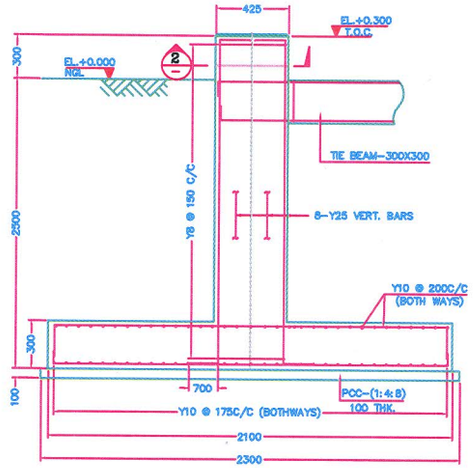
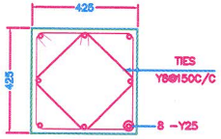


FOUNDATION KEY PLAN

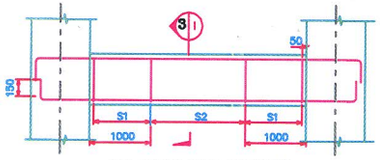


SECTION 1

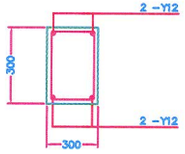


SECTION 2

COLUMN 450X450

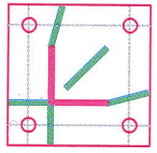


TIE BEAM (TYP DETAILS)

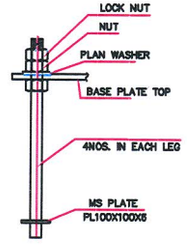


SECTION 3

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



BASE PLATE



ANCHOR BOLT

NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. USE M20 GRADE CONCRETE AND Fe 415 GRADE FOR STEEL.
3. CLEAR COVER TO MAIN REINFORCEMENT:-
   (a) 50MM FOR FOUNDATION (b) 25MM FOR BEAMS
   (c) 40MM FOR COLUMNS (d) 50MM AT ENDS
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 DETAILED 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

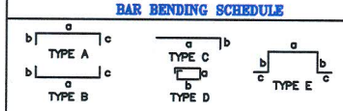
S.No	DESCRIPTION	DETAILS
1	SOIL BEARING CAPACITY	10.00 T/SQM
2	DRY DENSITY OF SOIL	1.75 T/SQM
3	ANGLE OF REPOSE	25.00 DEGREE

BILL OF MATERIALS

ITEM	UNIT	TOTAL
EXCAVATION	CUM	50.7
PCC-(1:4:8)	CUM	1.9
RCC-M20	CUM	5.56
STEEL-Fe415	KG	550

CHAIRS SHALL BE PROVIDED WHEREEVER REQUIRED

BAR BENDING SCHEDULE



REVISION NOTES

REV. NO.	DESCRIPTION		DATE	SIGN.
DRAWN	CHECKED	APPROVED	DATE	SCALE
S.K.Chauhan	MOHIT GUPTA	MOHIT GUPTA	11-01-2021	NTS

CLIENT: BHUTAN TELECOM LTD. BHUTAN

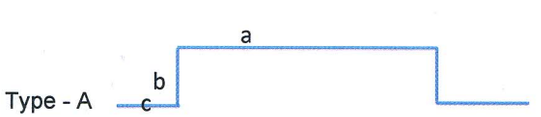
DESIGN BY: ICON POWER SOLUTIONS PVT. LTD. THIMPU, BHUTAN

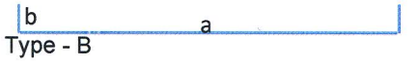
PROJECT: GENERIC ISOLATED FOUNDATION DESIGN BHUTAN

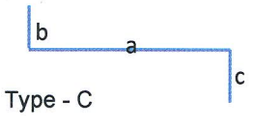
TITLE : FOUNDATION DETAILS FOR 20M HIGH TRIANGULAR TOWER SBC : 10 T/SQM

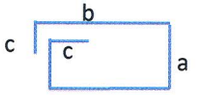
DRAWING No.	SH. NO.	REV.
AGD-319B		

Bar Bending Schedule of 20m high 3legged tower









Cover -

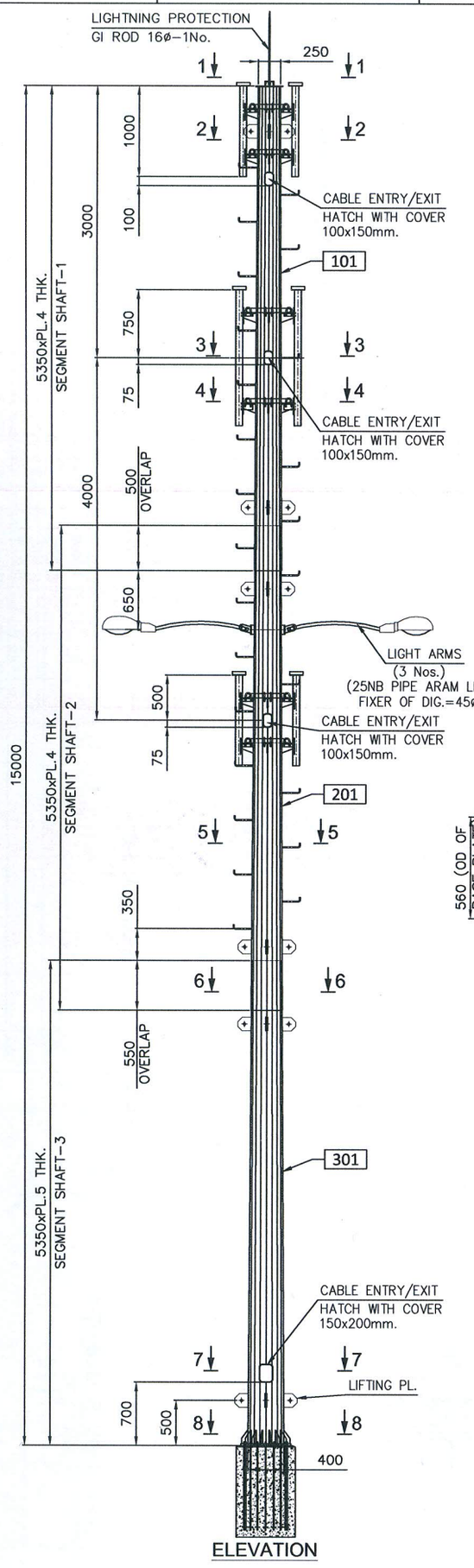
Slab	50 mm
Column	40 mm
Beam	25 mm

Item	Position	Type	Dia. Of Rebar	Size a	Size b	Size c	Length	Qty in Nos both ways or total	Unit wt	Total Weight of
			(mm)	(mm)	(mm)	(mm)	(mm)		(kg/m)	(kg)
Raft Slab	Top	B	B10	2000	150	-	2300	66	0.62	94
	Bottom	B	B10	2000	150	-	2300	78	0.62	111
Tie Beams	Top	B	B16	3153	300	-	3753	6	1.58	36
	Bottom	B	B16	3153	300	-	3753	6	1.58	36
	Strips	D	B8	250	250	80	1160	54	0.40	25
Column	Main	C	B16	2700	309	600	3609	24	1.58	137
	Ties	D	B8	317	317	80	1428	57	0.40	32
		D	B8	224	224	80	1057	57	0.40	24
							Total (5% extra considered)			550

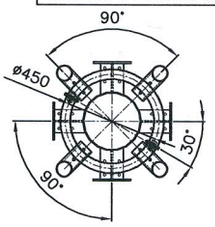
* Chairs Shall be Provided whenever required

Notes :

1. Dimensions of Bars are along the Center Lines.
3. Splicing of Bars should not be more than 50%. Length of splice as per Standards.



ELEVATION



SECTION 2-2
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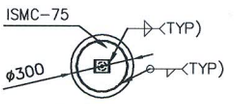
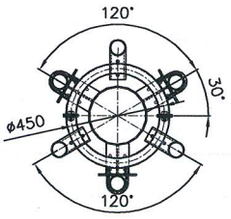


SECTION 1-1
(SCALE 1:20)

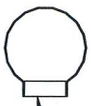
CABLE ENTRY/EXIT
HATCH WITH COVER

SECTION 3-3
(SCALE 1:20)



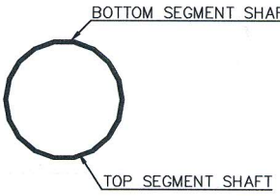
SECTION 4-4
(SCALE 1:20)

SECTION 5-5
(SCALE 1:20)



CABLE ENTRY/EXIT
HATCH WITH COVER

SECTION 7-7
(SCALE 1:20)



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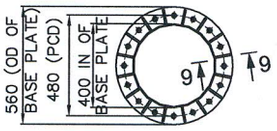
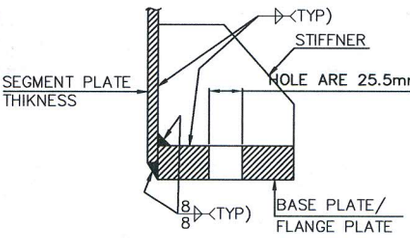


SECTION 8-8
(16 NOS. M24 BOLT)
(PLATE 20 THK.)
(SCALE 1:20)



SECTION 9-9
(SCALE 1:5)

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OPERATOR ANTENNA DETAILS HAS BEEN FURNISHED IN THE DRAWING IS BASED ON THE INPUTS COLLECTED DURING SITE VISIT WITH RESPECT TO THE ANTENNA MAKE/SPECIFICATIONS AND TECHNICIAN INPUTS.

GENERAL NOTE:

1. ALL DIMENSION ARE IN MILLIMETRE, EXPECTED OTHERWISE SHOWN.
2. POLE SHAFT PROFILE WITH 18 SIDED.
3. MATERIAL–
   - 3.1 MAIN POLE SEGMENT — E350
   - 3.2 PLATES — E250
   - 3.3 BOLTS & NUTS — QUALITY 5.6 GRADE–IS 4000–1992
   - 3.4 ANCHOR BOLTS — QUALITY 5.6 GRADE
   - 3.5 PLAIN WASHER — AS PER STANDARDASTM A 153
4. HOT DIP GALVANIZATION STRUCTURE STEEL COMPONENT ARE HOT DIP GALVANIZED IN ACCORDANCE WITH EN ISO 1461 MEAN/MIN THICKNESS– 85/70 MICRON FOR ALL STEEL THICKNESS. ANCHOR BOLTS SHALL BE FULLY GALVANIZED.
5. ANTENNA DETAILS
   - 5.1 4x 0.6m DIA MW AT 0.5M BELOW TOP LEVEL
   - 5.2 6x 1.468x0.349m GSM AT 3M BELOW TOP LEVEL
   - 5.3 6x 0.45x0.35x.15m RRU AT 7M BELOW TOP LEVEL
6. TOTAL WEIGHT OF POLE =1163.66 KGS

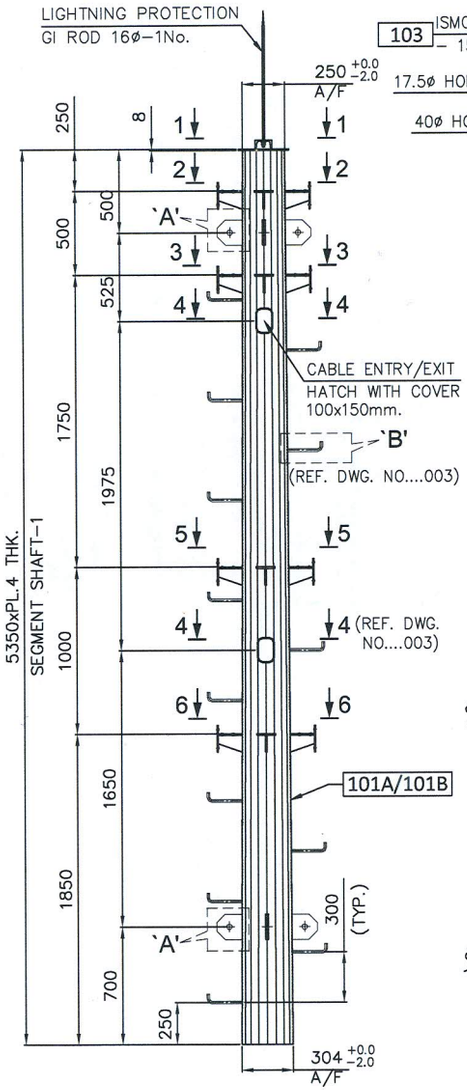
SUBMITTED FOR	APPROVAL	INFORMATION	REFERENCE	RECORD	CONSTRUCTION

TOWER PROJECT FOR BHUTAN TELECOM

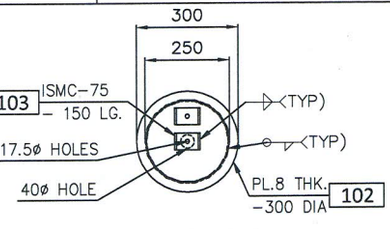
CONSULTANT:
Principle ACS Engineering India Pvt. Ltd.
Hyderabad, India

REV.	DATE	REVISION & DESCRIPTION	DRAWN	CHCK'D	APPR.
0					
1					
2					
3					

DRAWN	D.DAS	SPAR 156SJ MONOPOLE ELEVATION			
CHECKED AND VERIFIED	A.B				
APPROVED	M.S	SCALE – 1:40	SHEET	REV.	SIZE
DATE	06.02.21	2021–PACS–SPAR 156SJ–FAB–001	1 OF 1	0	A3



ELEVATION, SEGMENT-1
(SCALE 1:30)



SECTION 1-1
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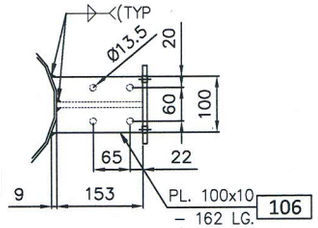

SECTION 9-9
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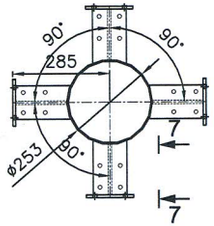

SECTION 2-2
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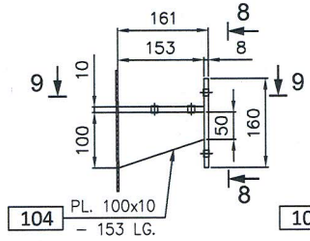

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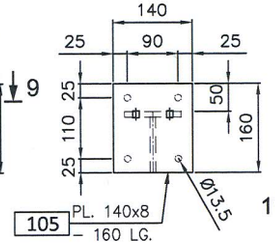
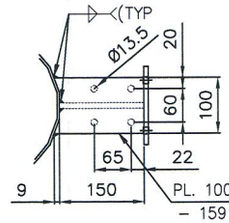


SECTION 8-8
(SCALE 1:5)



SECTION 11-11
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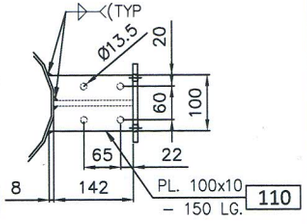

SECTION 13-13
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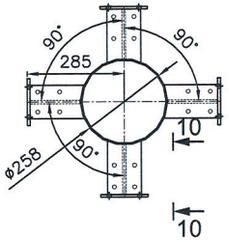

SECTION 3-3
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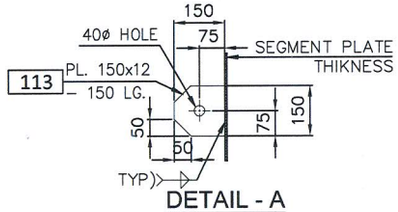

DETAIL - A
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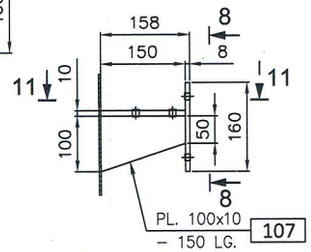
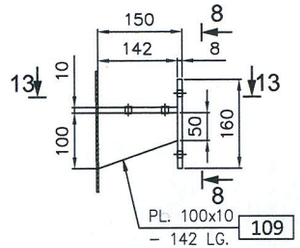
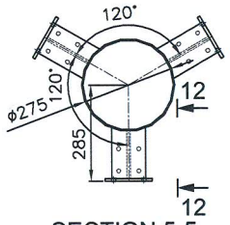


SECTION 10-10
(SCALE 1:5)



SECTION 12-12
(SCALE 1:5)



SECTION 5-5
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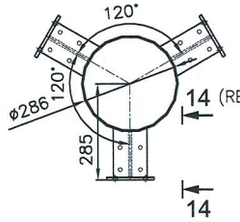

SECTION 6-6
(SCALE 1:10)

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GENERAL NOTE:

1. ALL DIMENSIONS ARE IN MILIMETERS, EXCEPT OTHERWISE SHOWN.

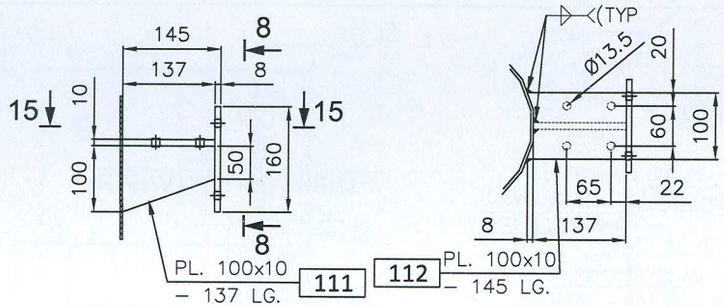
SUBMITTED FOR	✓ APPROVAL	INFORMATION	REFERENCE	RECORD	CONSTRUCTION

TOWER PROJECT FOR BHUTAN TELECOM

CONSULTANT:
Principle ACS Engineering India Pvt. Ltd.
Hyderabad, India

REV.	DATE	REVISION & DESCRIPTION	DRAWN	CHCK'D	APPR.
0					
1					
2					
3					

DRAWN	D.DAS	SPAR 156SJ			
CHECKED AND VERIFIED	A.B	DETAILS OF SEGMENT–1			
APPROVED	M.S	SCALE – 1:40	SHEET	REV.	SIZE
DATE	06.02.21	2021–PACS–SPAR 156SJ–FAB–002	1 OF 1	0	A3



SECTION 14-14
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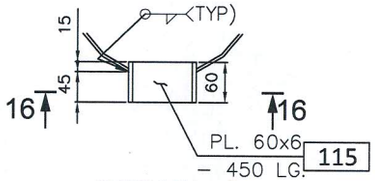
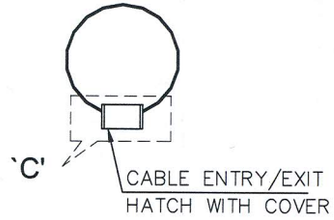
(REF. DWG. NO....002)

SECTION 15-15
(SCALE 1:5)



DETAIL - C
(SCALE 1:10)



SECTION 4-4
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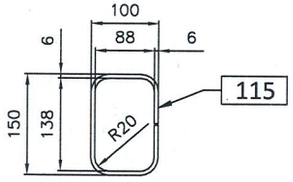

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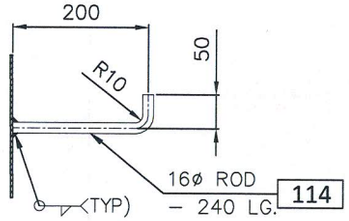

DETAIL - B
(SCALE 1:5)
(REF. DWG. NO....002)

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GENERAL NOTE:

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TOWER PROJECT FOR BHUTAN TELECOM

CONSULTANT:
Principle ACS Engineering India Pvt. Ltd.
Hyderabad, India

REV.	DATE	REVISION & DESCRIPTION	DRAWN	CHCK'D	APPR.
0					
0					
0					
0					

DRAWN	D.DAS	SPAR 156SJ DETAILS OF SEGMENT–1			
CHECKED AND VERIFIED	A.B				
APPROVED	M.S	SCALE – 1:40	SHEET	REV.	SIZE
DATE	06.02.21	2021–PACS–SPAR 156SJ–FAB–003	1 OF 1	0	A4

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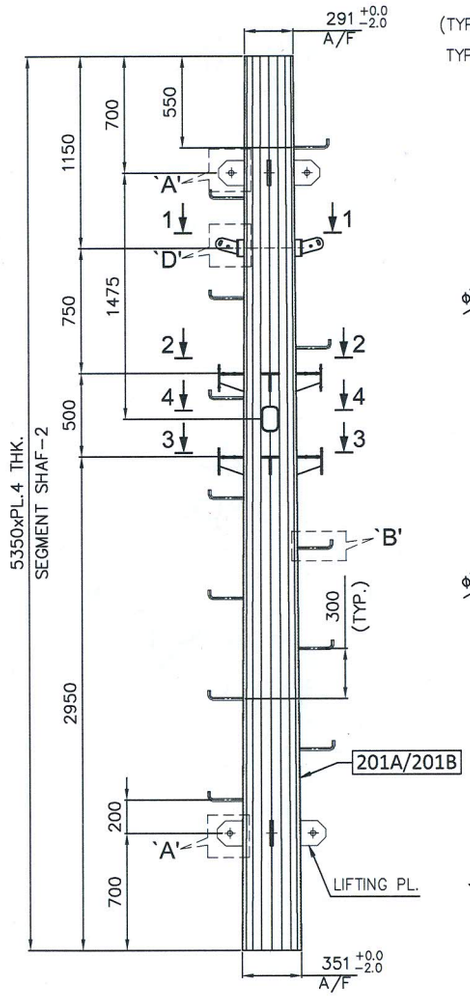
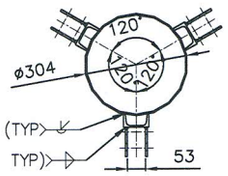
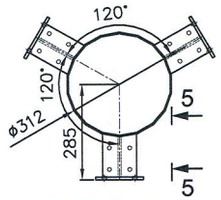


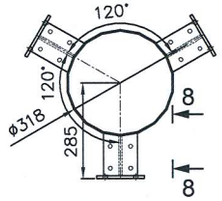
ELEVATION, SEGMENT-2
(SCALE 1:30)



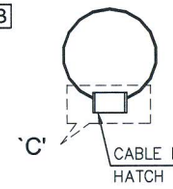
SECTION 1-1
(SCALE 1:10)



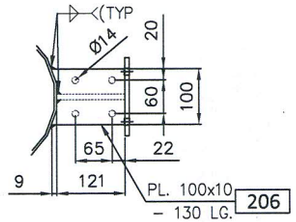
SECTION 2-2
(SCALE 1:10)



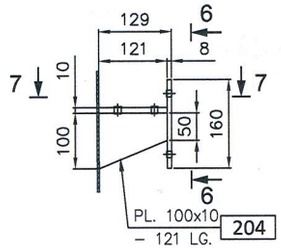
SECTION 3-3
(SCALE 1:10)



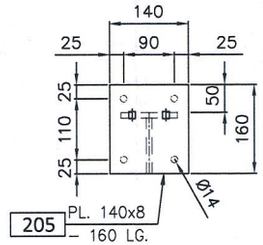
SECTION 4-4
(SCALE 1:20)



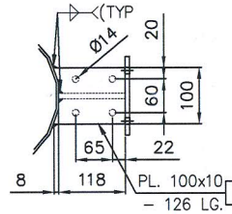
SECTION 7-7
(SCALE 1:5)



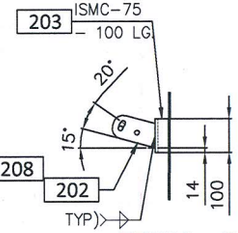
SECTION 5-5
(SCALE 1:5)



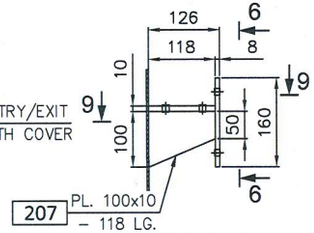
SECTION 6-6
(SCALE 1:5)



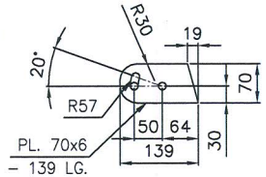
SECTION 9-9
(SCALE 1:5)



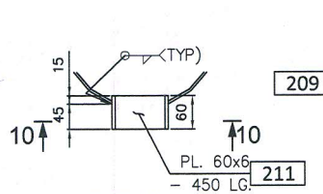
DETAIL - D
(SCALE 1:10)



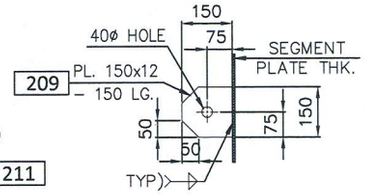
SECTION 8-8
(SCALE 1:5)



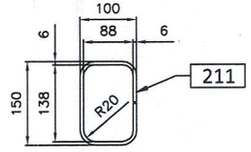
ITEM MKD.-202
(SCALE 1:5)



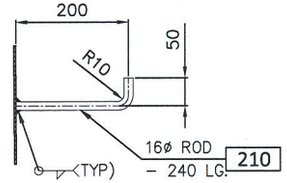
DETAIL - C
(SCALE 1:10)



DETAIL - A
(SCALE 1:10)



SECTION 10-10
(SCALE 1:10)



DETAIL - B
(SCALE 1:5)

FOR M12-13.5ø HOLE
FOR M16-17.5ø HOLE

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SUBMITTED FOR	APPROVAL	INFORMATION	REFERENCE	RECORD	CONSTRUCTION

TOWER PROJECT FOR BHUTAN TELECOM

CONSULTANT:
Principle ACS Engineering India Pvt. Ltd.
Hyderabad, India

REV.	DATE	REVISION & DESCRIPTION	DRAWN	CHK'D	APPR.
0					
1					
2					
3					

DRAWN	D.DAS	SPAR 156SJ DETAILS OF SEGMENT-2		
CHECKED AND VERIFIED	A.B			
APPROVED	M.S	SCALE – 1:40	SHEET	REV. SIZE
DATE	06.02.21	2021-PACS-SPAR 156SJ-FAB-004	1 OF 1	0 A3

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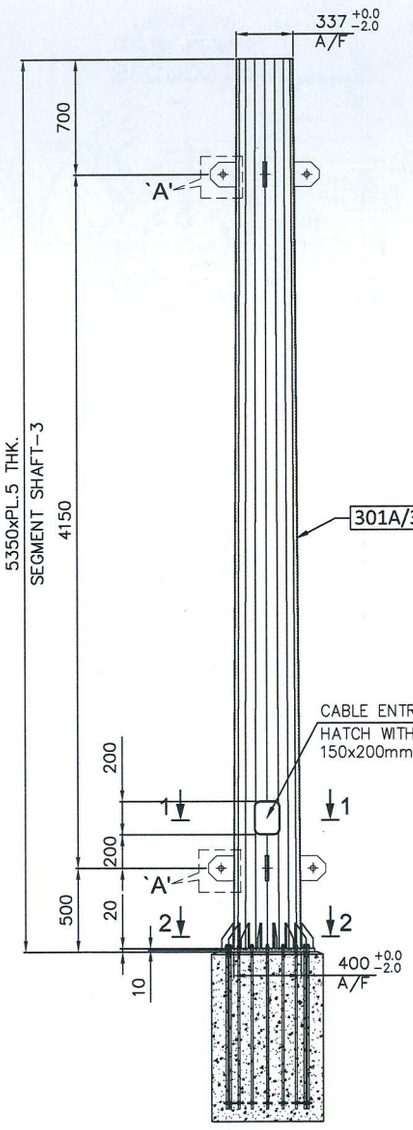
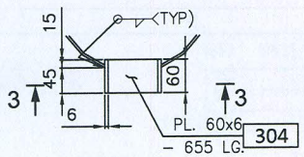
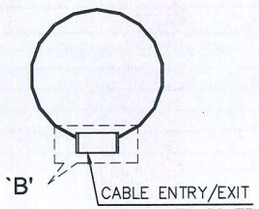


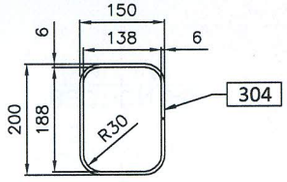
ELEVATION, SEGMENT-3
(SCALE 1:30)



DETAIL - B
(SCALE 1:10)



SECTION 1-1
(SCALE 1:20)



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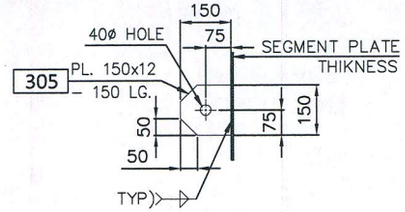
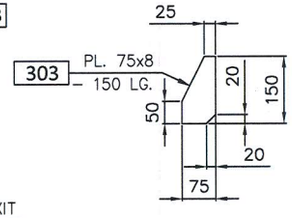
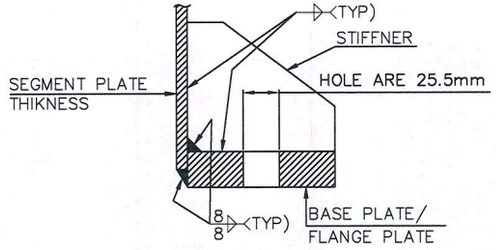


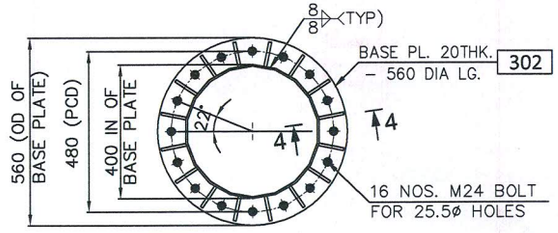
DETAIL - A
(SCALE 1:10)



BASE PLATE STIFFNERS DETAILS
(SCALE 1:10)



SECTION 4-4
(SCALE 1:5)



SECTION 2-2
(BASE PLATE)
(SCALE 1:20)

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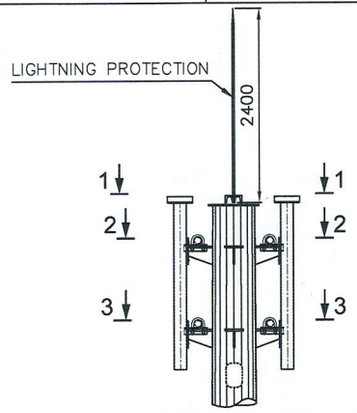
TOWER PROJECT FOR BHUTAN TELECOM

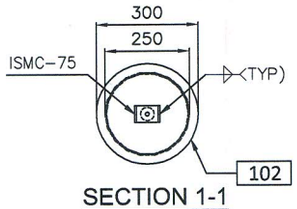
CONSULTANT:
Principle ACS Engineering India Pvt. Ltd.
Hyderabad, India

REV.	DATE	REVISION & DESCRIPTION	DRAWN	CHCK'D	APPR.
1					
2					
3					
4					

DRAWN	D.DAS	SPAR 156SJ DETAILS OF SEGMENT-3			
CHECKED AND VERIFIED	A.B				
APPROVED	M.S	SCALE – 1:40	SHEET	REV.	SIZE
DATE	06.02.21	2021-PACS-SPAR 156SJ-FAB-005	1 OF 1	0	A3



LA & ANTENNA DETAILS
(SCALE 1:20)



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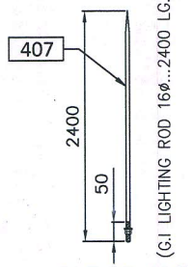
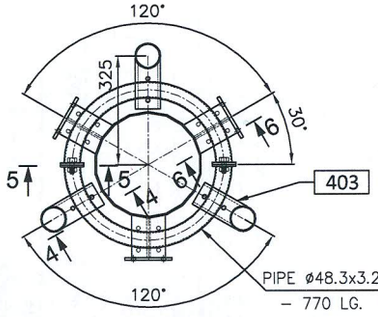
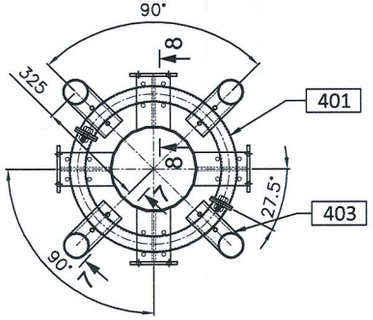
(SCALE 1:10)



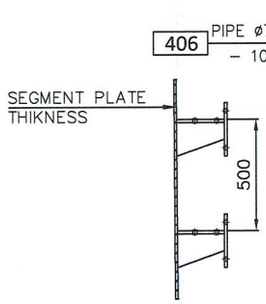
GI ROD 16Ø



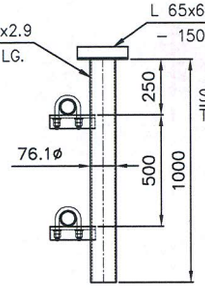
SECTION 2-2
GSM & RRU ANTENNA
(SCALE 1:10)



SECTION 3-3
FOR MW ANTENNA
(SCALE 1:10)



SECTION 8-8
(SCALE 1:10)



SECTION 7-7
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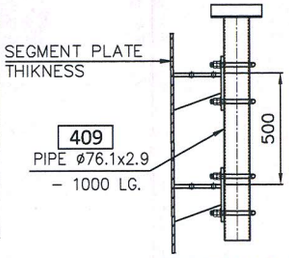
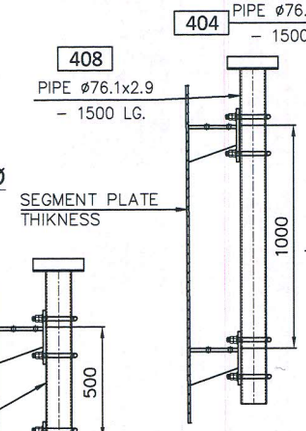


SECTION 8-8
(FOR RRU ANTENNA)
(SCALE 1:10)



SECTION 4-4
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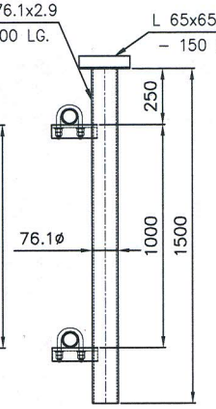

SECTION 6-6
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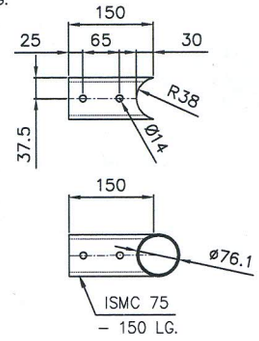
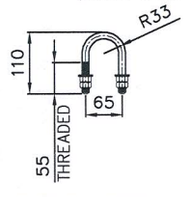
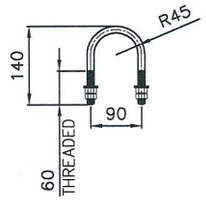


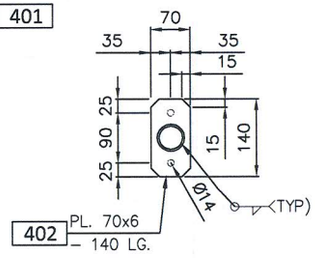
ITEM MKD.-403
(SCALE 1:5)



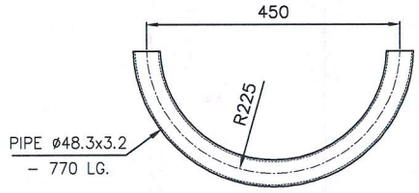
12Ø U BOLT ...265 LG.)
(FOR ø48.3 PIPE)



12Ø U BOLT ...340 LG.)
(FOR ø76.1 PIPE)



SECTION 5-5
(SCALE 1:5)



ITEM MKD.-401
(SCALE 1:5)

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GENERAL NOTE:

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SUBMITTED FOR	APPROVAL ✓	INFORMATION	REFERENCE	RECORD	CONSTRUCTION

TOWER PROJECT FOR BHUTAN TELECOM

CONSULTANT:
Principle ACS Engineering India Pvt. Ltd.
Hyderabad, India
Principle ACS Audits, Engineering And Services

REV.	DATE	REVISION & DESCRIPTION	DRAWN	CHCK'D	APPR.
0					
0					
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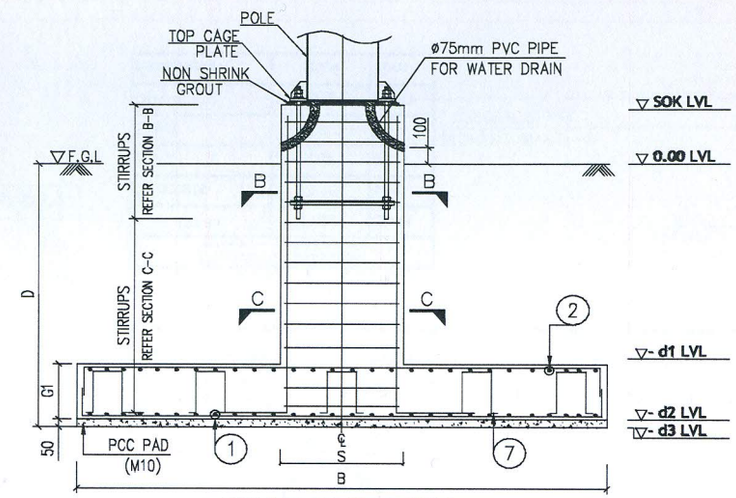
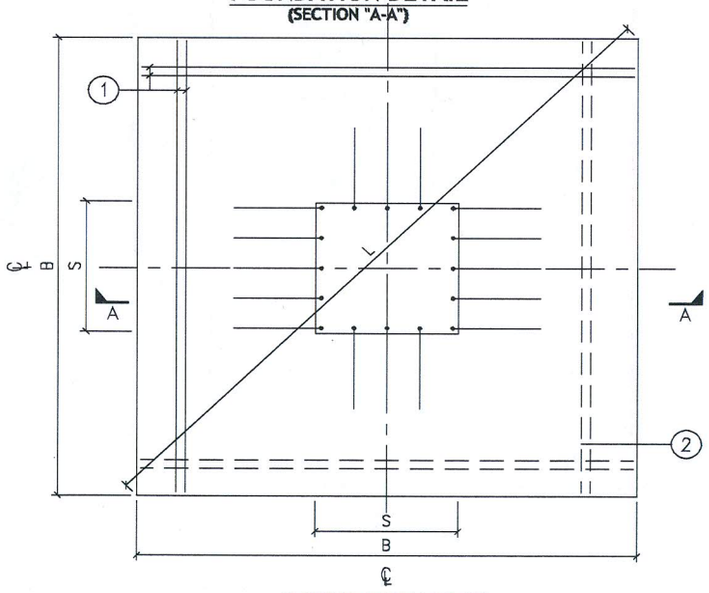
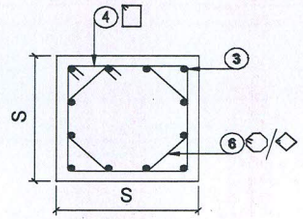
DRAWN	D.DAS	SPAR 156SJ			
CHECKED AND VERIFIED	A.B	LA & ANTENNA DETAILS			
APPROVED	M.S	SCALE – 1:40	SHEET	REV.	SIZE
DATE	06.02.21	2021-PACS-SPAR 156SJ-FAB-006	1 OF 1	0	A3



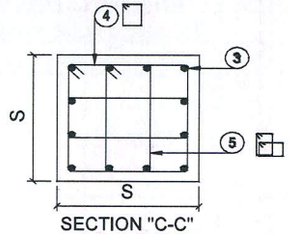
FOUNDATION DETAIL
(SECTION "A-A")



FOUNDATION PLAN
(SHOWING BOTTOM & TOP REINFORCEMENT DETAILS)



SECTION "B-B"



SECTION "C-C"

Dimensions	
L	3.748 m
B	2.650 m
S	0.850 m
D	1.750 m
d1	1.450 m
d2	1.450 m
d3	1.700 m
SOK lvl	0.500 m
Section B-B	600 mm
Section C-C	1530 mm

Assumed parameters considered in foundation design:
Allowable Net safe bearing capacity (NSBC) ≥ 10 T/m)
Ground water level : : Nil
Depth of foundation : 1.75m
material ≥ 1600 kg/m
Frustum angle ≥ 10 deg.
Density of back filling

Notes on foundation drawing:

- This is a generic foundation drawing.
- Before commencement of construction work using these designs, the owner/client/civil contractor shall carry out detailed soil investigation of every site.
  Further, the soil investigation report shall be reviewed by a consultant and certification shall be obtained to ensure conformity between assumed parameters and soil report values before start of construction.
- The foundation design is applicable only when the assumed SBC is available at (or) within the 1.75m depth from E.G.L. Inboth cases the minimum foundation depth shall be 1.75m from E.G.L.
- In case the required SBC is not available at/beyond 1.75m depth, this foundation design does not stand applicable.
- This foundation design shall not be used in case of organic silt, organic clay or peat layers are found upto depth "2b" from founding level during soil investigation (where b= pad/raft width).
- This foundation design shall not be adopted at sites where soil is subjected to ground improvements/Liquefaction.In this case special foundation shall be done.
- In case ground water table is found within the foundation depth. This foundation design does not stand applicable.

ICON Power Solution Pvt Ltd

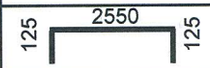
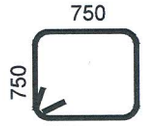
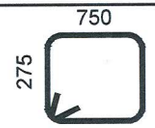
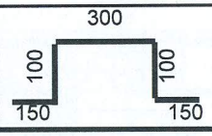
DRN BY.	CHD BY.	APD BY.	SCALE	NTS
xxxx	xxxx	xxx	PROJ.	

TITLE :- 15 Mtr. Foundation Drawing

DRG.NO:- MONOPOLE-15Mtr-001.05 SHEET NO:-

REV. NO.	00	REV. DATE	29.10.2020	AUTH. SIG.	

BAR BENDING SCHEDULE

#	Shape of Bar	Length of Bar (mm)	Dia. of Bar (mm)	Spacing (mm)	No.of Bars	Unit Weight	Total Weight per Pole
1		2800	12	130	42	0.89	104.7
2		2800	12	250	24	0.89	59.8
3		2800	20	-	12	2.47	83.0
4		3200	8	150	15	0.39	18.7
5		2250	8		44	0.39	38.6
6		2600	8	150	5	0.39	5.1
7		800	12	750	16	0.89	11.4

Weight of steel (kg)	321.3
Wastage and splices (kg)	16.1
Total Steel Quantity (kg)	337.3

Foundation Quantity

Items	Pole	Units
Concrete	3.16	cum
PCC	0.4	cum
Steel	337.3	kg
Shuttering	9.3	sq.m
Excavation	23.4	cum

ICON Power Solution Pvt Ltd

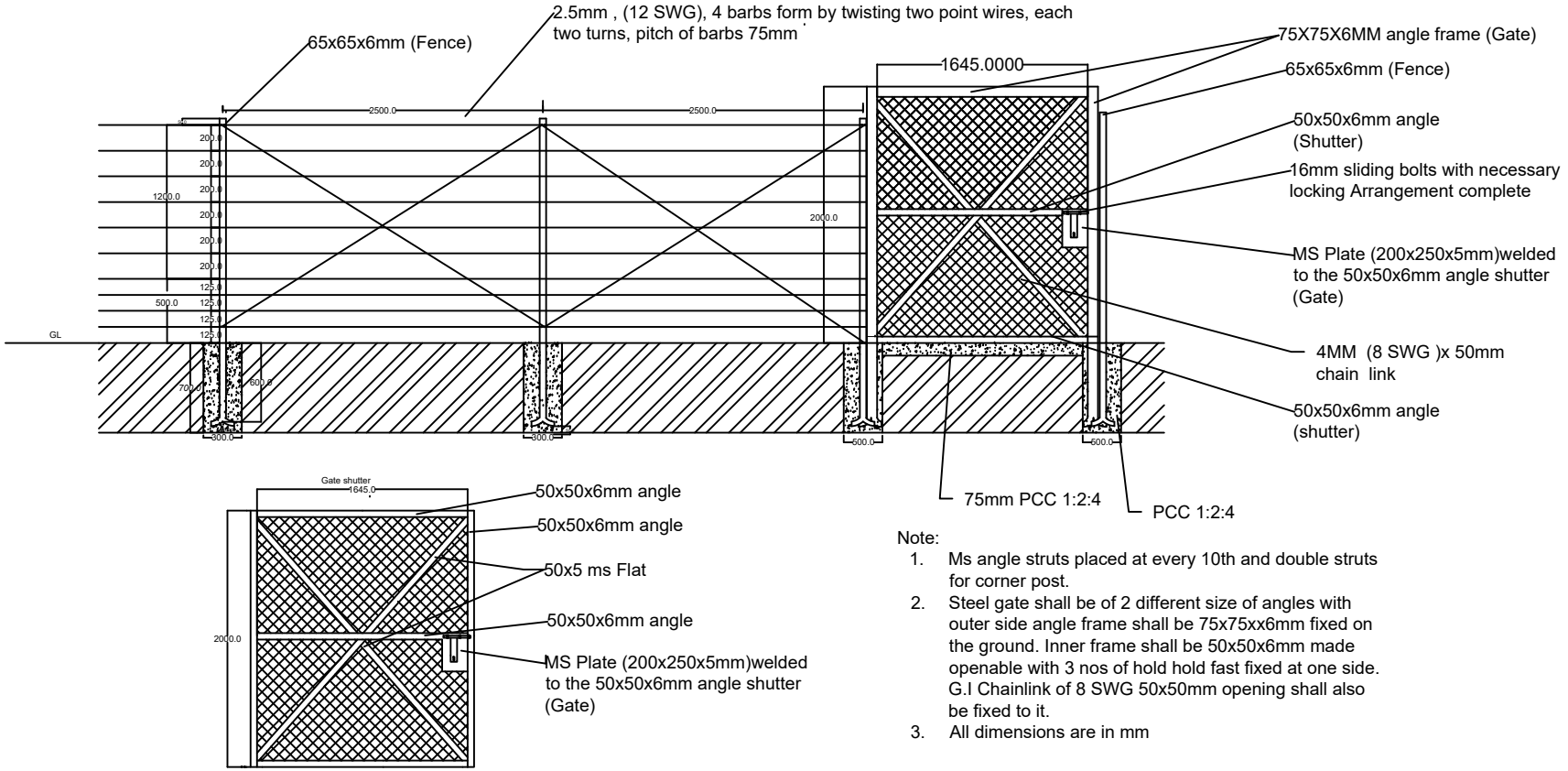
DRN BY.	CHD BY.	APD BY.	SCALE	NTS
xxxx	xxxx	xxx	PROJ.	

TITLE :- 15 Mtr. Foundation (Bar Bending)

DRG.NO:- MONOPOLE-15Mtr-001.05.1 SHEET NO:-

REV. NO.	00	REV. DATE	29.10.2020	AUTH. SIG.	

BARBED WIRE FENCING AND GATE DRAWING



Note:

1. Ms angle struts placed at every 10th and double struts for corner post.
2. Steel gate shall be of 2 different size of angles with outer side angle frame shall be 75x75xx6mm fixed on the ground. Inner frame shall be 50x50x6mm made openable with 3 nos of hold hold fast fixed at one side. G.I Chainlink of 8 SWG 50x50mm opening shall also be fixed to it.
3. All dimensions are in mm

	Title : Barbed wire fencing	BHUTAN TELECOM LIMITED	
	Checked by:	Approved by:	