

Vendor Document Review Sheet

PROJECT TITLE:	4G Project
VENDOR NAME:	RS Infra & Ganges Internationale
DOCUMENT TITLE:	Generic Square Raft Foundation Drawing of GFT12B 40m Towers_50m/s-SBC-7.5T/m2 (Full Water Table)-Square Raft
VENDOR DOCUMENT NO.	J15009-DC041-40-GFT12B-7.5FWT.PC-R0
VENDOR REVISION NO:	0

VENDOR DOCUMENT REVIEW FEEDBACK

Permission to proceed does not constitute acceptance or approval of Design Detail, Calculations, Analysis, Test Methods or Materials developed OR selected by Vendor, and does NOT relieve Vendor from FULL compliance with Contractual Obligations

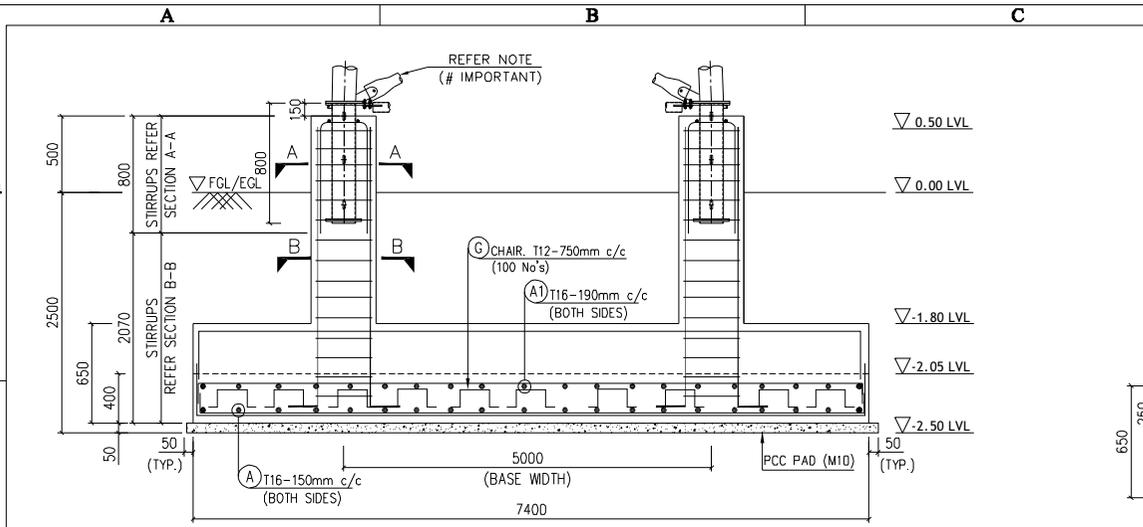
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| <input type="checkbox"/> 1 Work may proceed. | <input type="checkbox"/> 5 Revise and Resubmit. Work may not proceed. |
| <input checked="" type="checkbox"/> 2 Review not required, Work may proceed. | <input type="checkbox"/> 6 For Information Only |
| <input type="checkbox"/> 3 Revise & Resubmit at Final stage | <input type="checkbox"/> SUP Superseded |
| <input type="checkbox"/> 4 Revise & Resubmit. Work may proceed, subject to incorporation of changes | <input type="checkbox"/> CAN Cancelled / Not required. |

By: **Nikhil Bhagwat** Date: **29-09-2015**

Discipline:																								
Equipment No. (if applicable)																								
MR Number (if applicable)	<table border="1"> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>																							
Project No	PO No	Cat. Code	Seq. No.	Rev No																				
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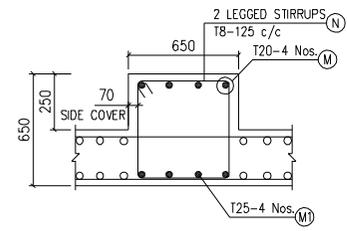


TOWER SPECIFICATION :

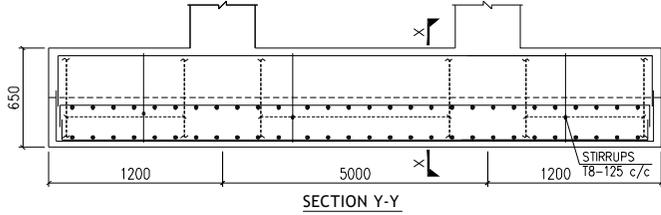
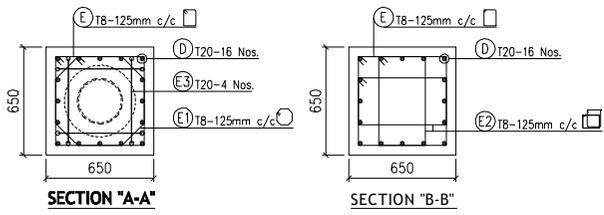
- TYPE OF TOWER : GFT12B
- BASIC WIND SPEED : 50 m/sec
- TERRAIN CATEGORY : 2
- MEAN PROBABLE DESIGN LIFE : 50 years

FOUNDATION FORCES TABLE (UNFACTORED)

CHARACTERISTIC REACTIONS					
FOUNDATION FORCES	SHAFT REACTIONS				
M (kNm)	V (kN)	H (kN)	COMP. (kN)	UPLIFT (kN)	SHEAR (kN)
2837	88	124	685	626	41



TOWER FOUNDATION ELEVATION



NOTES ON GENERIC FOUNDATION DRAWING

- THIS IS A GENERIC FOUNDATION DRAWING.
- THE FOLLOWING ARE THE ASSUMED PARAMETERS CONSIDERED DURING FOUNDATION DESIGN
 NET SAFE BEARING CAPACITY (NSBC) = $7.5 T/m^2$
 GROUND WATER TABLE = AT GROUND LEVEL
 DEPTH OF FOUNDATION = 2.5m FROM FGL
 DRY DENSITY OF SOIL (ρ_s) = $1.7 T/m^3$
 ANGLE OF INTERNAL FRICTION (ϕ) = 12.5°
- 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 CONSIDERED NSBC IS AVAILABLE AT OR WITHIN 2.5m DEPTH FROM FGL IN BOTH CASES THE MINIMUM FOUNDATION DEPTH SHALL BE 2.5m FROM FGL.
 IN CASE THE REQUIRED NSBC IS AVAILABLE BEYOND 2.5m DEPTH, THIS FOUNDATION DESIGN DOES NOT STAND APPLICABLE.
- THIS FOUNDATION DESIGN SHALL NOT BE USED IN CASE ORGANIC SILT, ORGANIC CLAY OR PEAT LAYERS ARE FOUND AT ANY DEPTHS DURING SOIL INVESTIGATION.
- THIS FOUNDATION DESIGN SHALL NOT BE ADOPTED AT SITES WHERE GROUND IMPROVEMENTS IS REQUIRED.
- ANY DISCREPANCY IN THE DRAWING & SITE CONDITIONS SHALL BE BROUGHT TO THE NOTICE OF SITE ENGINEER & CONSULTANT.
- IN CASE TOP OF PEDESTAL IS FOUND TO BE LOWER THAN THE ROAD LEVEL/HIGH FLOOD LEVEL, THEN BASE PLATE ENCASEMENT SHALL BE TAKEN UP IN CONSULTATION WITH THE SITE ENGINEER/INCHARGE/CONSULTANT.

IMPORTANT:
 IT IS IMPORTANT THAT THE CAST-IN PART IS PLACED IN LEVEL AND THE CAST-IN PART TUBE IS FILLED WITH CONCRETE UP TO THE MIDDLE OF THE TOP HOLE AS SHOWN ON DRAWINGS OF CAST-IN PARTS.

TOTAL QUANTITIES			
DESCRIPTION	TOWER FOUNDATION	D.G PLATFORM	TOTAL QUANTITY
CONCRETE (cum)	27.2	4.0	31.2
PCC (cum)	2.81	0.26	3.07
REINFORCEMENT (Kg)	3450.09	481.5	3931.59
EXCAVATION (cum)	176.4	-	176.4

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09.09.15	0	ISSUED FOR APPROVAL	SUBASH	SSR

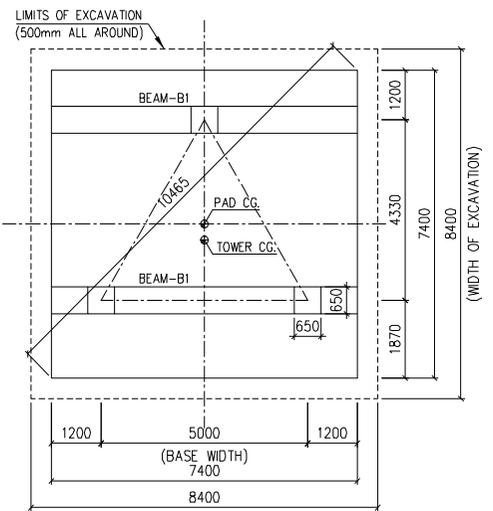
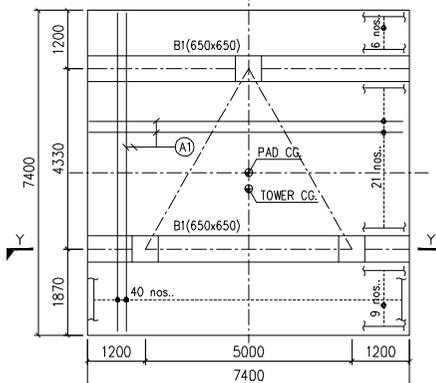
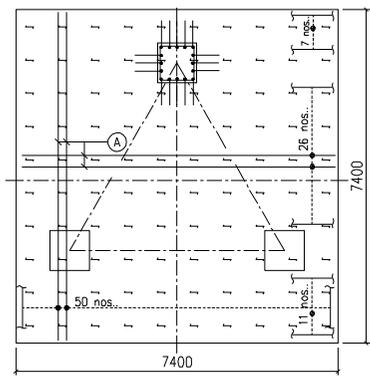
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 Ramboll India Telecom, Hyderabad.
 PLOT No. 32, KAVURI HILLS, NEAR JUBILEE HILLS ROAD No.36, HYDERABAD-500033, INDIA.
 Tel:+91-40-40322000, Fax:+91-40-40322003, E mail:services@ramboll.in, www.ramboll.in.

PROJECT:- GENERIC FOUNDATION FOR GROUND BASED MW TOWER
 (TOWER TYPE : GFT12B - 50 m/s)

NAME	DATE	TITLE : GENERIC SQUARE RAFT FOUNDATION DRAWING FOR 40m TOWER	SCALE:
DSGN	SUBASH	09.09.15	NTS.
DRWN	BAS	09.09.15	
CHKD	SUBASH	09.09.15	
APPD	SSR	09.09.15	

DRG. No.: J115009-D0C41-40-GFT12B-7-5FWT-PC
 SIZE: A3 REV: 0

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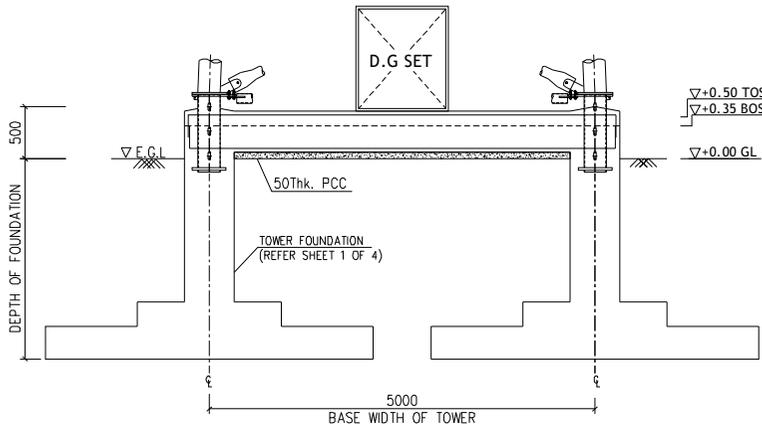
PLAN VIEW

EXCAVATION PLAN

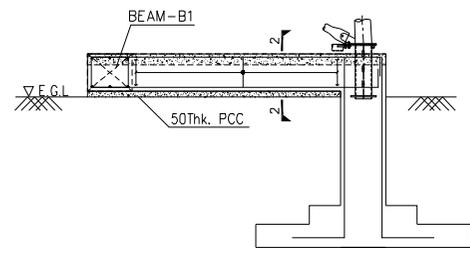
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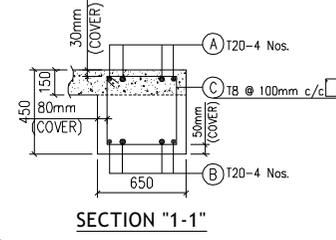
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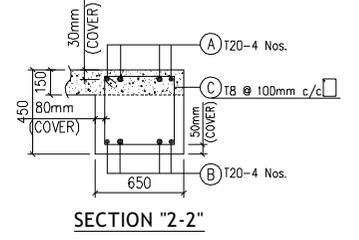
ISOLATED TOWER FOUNDATION ELEVATION
(SHOWING D.G SET PLATFORM)



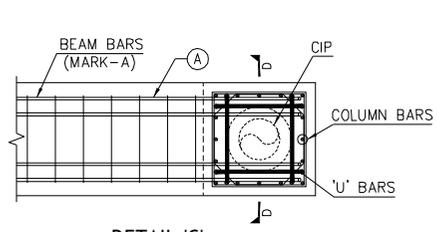
SECTION B-B
(BEAM-B2 650x450)



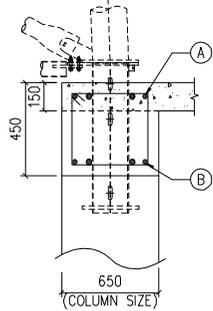
SECTION "1-1"



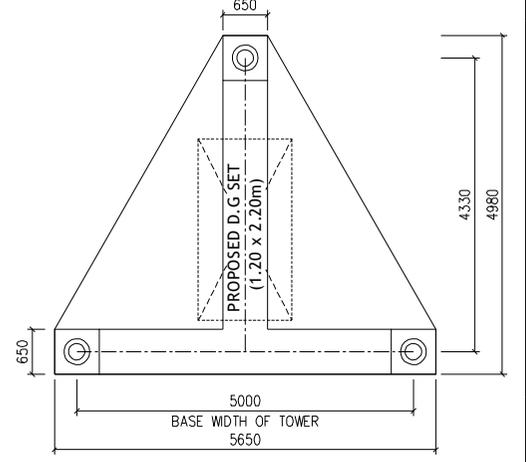
SECTION "2-2"



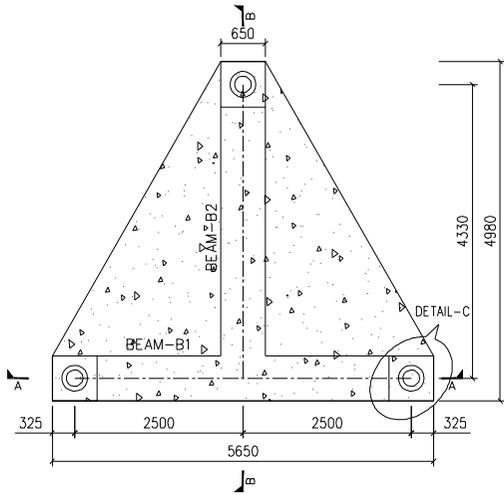
DETAIL 'C'
TYPICAL COLUMN-BEAM SECTION
(SHOWING COLUMN & BEAM REINFORCEMENT)



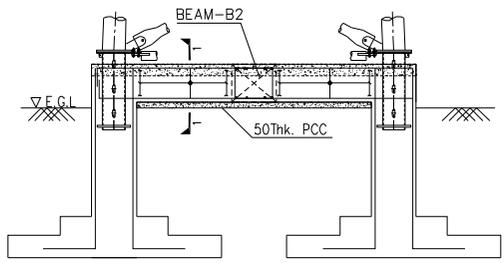
SECTION "D-D"
(Typ.)



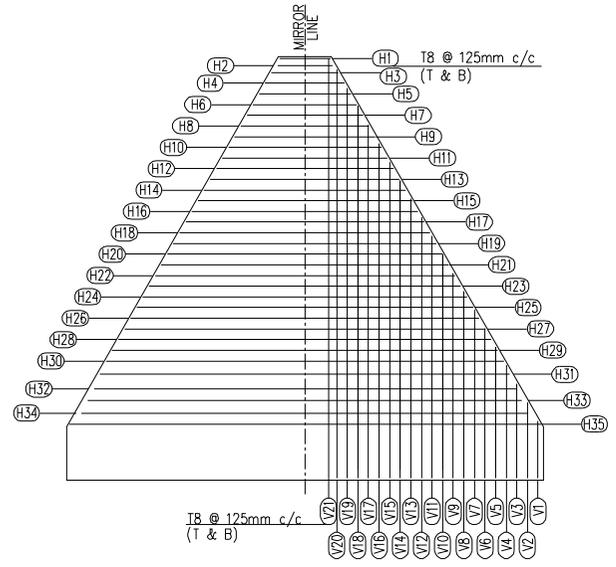
D.G SET PLAN VIEW



PROPOSED "T" SHAPE BEAM LAYOUT FOR D.G SET PLATFORM
(INSIDE OF TOWER COLUMNS)



SECTION A-A
(BEAM-B1 650x450)



SLAB DETAIL (150mm Thk.)
(SHOWING TOP & BOTTOM REINFORCEMENT)

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Tel:+91-40-40322000, Fax:+91-40-40322003, E mail:services@ramboll.in, www.ramboll.in.

PROJECT:- **D.G SET FOUNDATION INSIDE TOWER**
(TOWER TYPE : GFT12B - 50 m/s)

DSGN	SUBASH	09.09.15	TITLE: STRUCTURAL DETAILS OF 'T' SHAPE D.G PLATFORM	SCALE: NTS. SHEET: 2 OF 4
DRWN	BAS	09.09.15		
CHKD	SUBASH	09.09.15		
APPD	SSR	09.09.15		
DRG. No. J15009-D041-40-GFT12B-D-G-CASE1				

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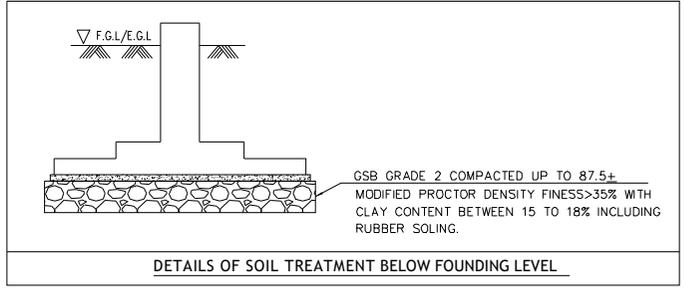
A							
BAR BENDING SCHEDULE							
ITEM	MARK	DIA (mm)	DESCRIPTION	LENGTH (mm)	NOS.	UNIT WT. (kg/m)	TOTAL WT. (kg)
BEAM-B1	A	20		6000	4	2.47	59.3
	B	20		6000	4	2.47	59.3
	C	8		1890	40	0.39	29.5
BEAM-B2	A	20		5290	4	2.47	52.3
	B	20		5290	4	2.47	52.3
	C	8		1890	38	0.39	28.01
SLAB	H1	8		667	2	0.39	0.5
	H2	8		812	2	0.39	0.6
	H3	8		956	2	0.39	0.7
	H4	8		1100	2	0.39	0.9
	H5	8		1245	2	0.39	1.0
	H6	8		1389	2	0.39	1.1
	H7	8		1533	2	0.39	1.2
	H8	8		1678	2	0.39	1.3
	H9	8		1822	2	0.39	1.4
	H10	8		1967	2	0.39	1.5
	H11	8		2111	2	0.39	1.6
	H12	8		2255	2	0.39	1.8
	H13	8		2400	2	0.39	1.9
	H14	8		2544	2	0.39	2.0
	H15	8		2688	2	0.39	2.1
	H16	8		2833	2	0.39	2.2
	H17	8		2977	2	0.39	2.3
	H18	8		3121	2	0.39	2.4
	H19	8		3266	2	0.39	2.5
	H20	8		3410	2	0.39	2.7
	H21	8		3554	2	0.39	2.8
	H22	8		3699	2	0.39	2.9
	H23	8		3843	2	0.39	3.0
	H24	8		3987	2	0.39	3.1
	H25	8		4132	2	0.39	3.2
	H26	8		4276	2	0.39	3.3
	H27	8		4420	2	0.39	3.4
	H28	8		4565	2	0.39	3.6
	H29	8		4709	2	0.39	3.7
	H30	8		4853	2	0.39	3.8
	H31	8		4998	2	0.39	3.9
	H32	8		5142	2	0.39	4.0
	H33	8		5286	2	0.39	4.1
	H34	8		5431	2	0.39	4.2
	H35	8		5590	2	0.39	4.36

B						
V1	8	612	673	4	0.39	1.0
V2	8	828	890	4	0.39	1.4
V3	8	1045	1106	4	0.39	1.7
V4	8	1261	1323	4	0.39	2.1
V5	8	1478	1539	4	0.39	2.4
V6	8	1694	1756	4	0.39	2.7
V7	8	1911	1972	4	0.39	3.1
V8	8	2128	2189	4	0.39	3.4
V9	8	2344	2405	4	0.39	3.8
V10	8	2777	2622	4	0.39	4.1
V11	8	2838	2838	4	0.39	4.4
V12	8	2994	3055	4	0.39	4.8
V13	8	3210	3271	4	0.39	5.1
V14	8	3427	3488	4	0.39	5.4
V15	8	3643	3704	4	0.39	5.8
V16	8	3860	3921	4	0.39	6.1
V17	8	4076	4137	4	0.39	6.5
V18	8	4293	4354	4	0.39	6.8
V19	8	4509	4570	4	0.39	7.1
V20	8	4570	4787	4	0.39	7.5
V21	8	4920	4915	4	0.39	7.67

TOTAL STEEL WT = 458.6 kg
WASTAGE (5%) = 22.9 kg
TOTAL STEEL WT. PER D.G PLATFORM = 481.5 kg

C						
BAR BENDING SCHEDULE						
MARK	DIA (mm)	DESCRIPTION	LENGTH (mm)	NOS./ TOWER	UNIT WT. Kg/m	TOTAL WEIGHT
A	16		7300	94	1.58	1143.6
A1	16		7300	76	1.58	924.6
M	20		7300	8	2.47	156.1
M1	25		7300	8	3.85	243.3
N	8		2270	107	0.39	94.7
D	20		2820	48	2.47	415.0
E	8		2400	71	0.39	66.5
E1	8		2150	21	0.39	17.6
E2	8		1800	102	0.39	71.6
E3	20		2000	12	2.47	59.3
G	12		1050	100	0.89	93.5

TOTAL STEEL WT = 3285.80 kg
WASTAGE (5%) = 164.29 kg
TOTAL STEEL WT. PER TOWER = 3450.09 kg



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PROJECT >		D.G SET FOUNDATION INSIDE TOWER (TOWER TYPE : GFT12B - 50 m/s)	
NAME	DATE	TITLE : STRUCTURAL DETAILS OF 'T' SHAPE D.G PLATFORM	SCALE:
DSGN	SUBASH 09.09.15		NTS.
DRWN	BAS 09.09.15		SHEET:
CHKD	SUBASH 09.09.15		3 OF 4
APPD	SSR 09.09.15		

DRG. No. J15009-D041-40-GFT12B-D-G-CASE1

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GENERAL NOTES

GENERAL & MATERIAL

1. ALL DIMENSIONS ARE IN "mm" U.O.S.
2. RCC & PCC SHALL BE OF GRADE M20 & M10 RESPECTIVELY.
3. MINIMUM CEMENT CONTENT OF M20 CONCRETE SHALL BE 300 Kg/m³ WITH WATER CEMENT RATIO OF 0.55 (27.5 LITRES/50 Kg BAG OF CEMENT).
4. FOR AGGRESSIVE SOIL/EXPOSURE CONDITIONS, MINIMUM GRADE OF CONCRETE SHALL BE REFERRED AS PER IS456 2000, TABLE 3 AND 5'.
5. PCC/LEAN CONCRETE SHALL BE OF GRADE M10 WITH MIX PROPORTION OF 1:3:6
6. STEEL GRADE IS Fe415 U.O.S. AS PER IS 1786 / IS 1159
7. IF ANY LEVEL DIFFERENCE IN EXISTING GROUND IS FOUND, THEN SOIL EXCAVATION FOR FOUNDATION SHALL BE STARTED WITH REFERENCE TO THE LOWER LEVEL AND THE SOIL SHALL BE BACK FILLED AND COMPACTED UPTO THE TOP MOST LEVEL OF NATURAL GROUND LEVEL TO AVOID SOIL EROSION.
8. VERIFY THE ADJACENT SITE FEATURES BEFORE EXCAVATION, PROPER CARE SHALL BE TAKEN TO AVOID DAMAGE TO ADJACENT STRUCTURE.
9. ANY DISCREPANCY IN THE DRAWING VS SITE CONDITIONS SHALL BE BROUGHT TO THE NOTICE OF SITE ENGINEER & CONSULTANT (Ramboll India Pvt. Ltd.)
10. FOLLOWING CEMENT AND STEEL BRANDS TO BE USED FOR CONSTRUCTION. IF ANY DEVIATION IN THE BELOW MATERIAL PRIOR APPROVAL TO BE TAKEN FROM CLIENT.
CEMENT BRANDS : L & T, BIRLA KESORAM, CCI,RASI,KCP,PRIYA GOLD,ZUVARI,PENNA POWER, CORAMANDEL. - (53 GRADE - OPC)
STEEL BRANDS : TATA TISCON, SAIL, KAMADHENU, VIZAG TMT, THERMAX, SARVOTHAM, SUJANA, JAYARAJ, KDM, SIMHADRI

TECHNICAL SPECS

11. MINIMUM COVER TO THE MAIN REINFORCEMENT
FOR COLUMNS 50mm FOR BEAMS 30mm
FOR PAD 50mm
FOR STRIP 50mm.
12. THE LAP LENGTH/DEVELOPMENT LENGTH OF BARS SHOULD BE 50 ϕ AND STAGGERED. HOWEVER, IT IS PREFERABLE TO WELD BARS IN CHIMNEY/COLUMN. WELD SHALL BE CONTINUOUS FOR A MINIMUM LENGTH OF 450mm PER EACH BAR WITH 10mm THICK WELD ON BOTH SIDES.
13. NO CONSTRUCTION JOINT SHALL BE ALLOWED OTHER THAN SPECIFIED.
14. CONSTRUCTION SHALL BE CARRIED OUT IN ACCORDANCE TO VARIOUS PROVISIONS LAID DOWN IN IS:456/IS:800 STANDARDS.
15. STRIPPING OF FORMWORK SHALL BE CARRIED OUT AFTER A MINIMUM PERIOD OF 24 HRS AFTER CONCRETING.

EXCAVATION & BACKFILLING

16. THE SIDE SLOPES FOR EXCAVATION SHALL BE DIVIDED AS PER THE FOLLOWING GUIDELINES.
 - a) FOR SANDY SOILS, SLOPE IV:2H
 - b) FOR CLAYEY SOILS, SLOPE IV:1H
 - c) FOR HARD STRATA, VERTICAL CUT
 ALTERNATIVELY, SUFFICIENT SHEET PILES/SHORING SHALL BE USED DURING EXCAVATION TO PREVENT SIDE COLLAPSE.
17. SAND BEDDING/STONE BEDDING SHALL BE PROVIDED IN FOUNDATIONS OF MARSHLY AND WET BLACK COTTON SOIL.
18. IN CASE OF NO GROUND WATER, ALL FOUNDATION PITS SHALL BE SOAKED WITH WATER FOR 24 HOURS AND COMPACTED WELL BEFORE PLACING P.C.C.
19. LOOSE POCKETS OF SOIL, (IF ANY FOUND) IN FOUNDATION PITS SHALL BE COMPLETELY REMOVED FOR LOOSE MATERIAL AND FILLED WITH P.C.C & COMPACTED WELL BEFORE FOUNDATIONS IS LAID.
20. FOUNDATION PIT SHALL BE KEPT DRY (FREE FROM WATER) DURING LAYING OF PCC & RCC AND FURTHER TO A PERIOD OF 48 HOURS (MIN.) FROM THE CONCRETE LAYING TIME.
21. ALL BACK FILLING OF FOUNDATION SHOULD BE DONE WITH WELL COMPACTED MURRUM SOIL.
22. THE BACK FILLING MATERIALS SHOULD BE CLEAN AND FREE FROM ORGANIC OR OTHER FOREIGN MATERIALS.
23. SOIL BACK FILL SHALL BE DONE IN LAYERS OF APPROX. 150-200mm, EACH LAYERS SHALL BE DENSELY COMPACTED BY SPRINKLING MINIMUM QUANTITY OF WATER AS NECESSARY FOR PROPER COMPACTION.
24. CARE SHALL BE TAKEN THAT THE BACK FILLING IS STARTED FROM THE CENTRE TOWARDS THE OUTER ENDS
25. AFTER BACK FILLING 50mm HIGH EARTHEN EMBANRSCENT(BUND) TO BE MADE ALONG THE SIDES OF EXCAVATED PITS AND SUFFICIENT WATER WILL BE POURED OVER THE BACK FILLED EARTH FOR ATLEAST 24HRS.

CURING

27. CURING OF FOUNDATIONS SHALL BE CARRIED OUT OVER A MINIMUM PERIOD OF 7 DAYS. IN THE FOLLOWING MANNER.
 - a) BASE RAFT, BEAM SHALL BE KEPT CONTINUOUSLY IN DAMP OR WET CONDITION BY PONDING OR BY COVERING WITH SACKING FOR A MINIMUM PERIOD OF 2 DAYS AFTER FINAL SETTING TIME OF CONCRETE (\approx 12 HRS)
 - b) BACK FILLING SHALL START AFTER 72 HRS OF CONCRETING.
 - c) AFTER COMPLETION OF BACK FILLING THE SOIL SHALL BE KEPT MOIST/DAMP/WET CONDITION UPTO 7 DAYS FROM CONCRETING.
28. TOWER ERECTION SHALL START AFTER 7 DAYS OF CONCRETING AND OR MIN. 3 DAYS AFTER ANCHOR BOLT SETTING.
29. IN CASE TOP OF PEDESTAL IS FOUND TO BE LOWER THAN THE ROAD LEVEL/HIGH FLOOD LEVEL, THEN BASE PLATE ENCASEMENT SHALL BE TAKEN UP IN CONSULTATION WITH THE SITE ENGINEER/INCHARGE/CONSULTANT.

TEMPLATE ASSEMBLY/ GROUTING

30. VERIFY BOLT, NUT SIZE AND LENGTH AS PER TEMPLATE/BASE ASSEMBLY DRAWING.
31. CHECK THE INTEGRITY OF BOLT AND NUT BEFORE EXECUTION AT SITE. IF ANY PLAY FOUND, CONSULT SITE ENGINEER/CONSULTANT.
32. GROUTING UNDER BASE PLATE HAS TO BE DONE WITH M20 GRADE CONCRETE. (1 : 1½ : 2½) USING BABY CHIPS (5 TO 10mm).
33. SURFACE OF THE GROUT SHALL BE SMOOTHLY FINISH WITH CM(1:5).
34. AS MUCH AS POSSIBLE THICKNESS OF THE GROUT SHOULD BE LESS.

LEGEND

- U.O.S. - UNLESS OTHERWISE SPECIFIED.
 - INDICATES CHAIR LOCATIONS
 F.G.L - FINISHED GROUND LEVEL
 E.G.L - EXISTING GROUND LEVEL
 T & B - TOP AND BOTTOM
 TOS - TOP OF SLAB
 BOS - BOTTOM OF SLAB

TOWER SPECIFICATION :

1. TYPE OF TOWER : CFT12B
2. BASIC WIND SPEED : 50 m/sec
3. TERRAIN CATEGORY : 2
4. MEAN PROBABLE DESIGN LIFE : 50 years
5. ANTENNA LOADING TABLE

S.No.	ANTENNA TYPE (Name)	SIZE OF ANTENNA (w x b x h (or) diameter), mm	No.s	HEIGHT (m)
1.	Remote Radio Head	290 x 127 x 440	9	40
2.	eNodeB Antenna	500 x 150 x 1900	9	40
3.	Microwave antenna	2.4m	1	38.75
4.	Microwave antenna	1.8m	2	38.75
5.	Microwave antenna	1.2m	5	38.75
6.	Microwave ODU	200 x 200 x 85	4	40
7.	Grounding Bar	100 x 8 x 200	1	40
8.	WiFi Antenna	312 x 229 x 163	3	15
9.	LED Light	310 x 510 x 64	4	15
10.	Surveillance camera	243 dia & 287' depth	3	10

6. FOUNDATION FORCES TABLE (UNFACTORED)

CHARACTERISTIC REACTIONS					
FOUNDATION FORCES			SHAFT REACTIONS		
M (kNm)	V (kN)	H (kN)	COMP. (kN)	UPLIFT (kN)	SHEAR (kN)
2837	88	124	685	626	41

RELEASED FOR CONSTRUCTION

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DATE	REVISION	REVISION DESCRIPTION	CHECKED	APPROVED
09.09.15	0	ISSUED FOR APPROVAL	SUBASH	SSR

ENGINEERING BY :- **RAMBOLL INDIA PVT. LTD.**
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PROJECT :- **GENERIC FOUNDATION FOR GROUND BASED MW TOWER**
 (TOWER TYPE : GFT12B - 50 m/s)

NAME	DATE	TITLE : GENERIC SQUARE RAFT FOUNDATION DRAWING	SCALE:
DSGN SUBASH	09.09.15	FOR 40m TOWER SBC : 7.5 T/m ² (FULL WATER TABLE)	NTS.
DRWN BAS	09.09.15		
CHKD SUBASH	09.09.15		
APPD SSR	09.09.15		

DRG. No. J1|5|0|0|9|-|0|C|4|1|-|4|0|-|G|F|T|1|2|B|-|7|-|5|F|W|T|-|P|C

RELEASED FOR PRELIMINARY TENDER INFORMATION APPROVAL CONSTRUCTION