



पावर ग्रिड कारपोरेशन ऑफ इंडिया लिमिटेड  
(भारत सरकार का उद्यम)



POWER GRID CORPORATION OF INDIA LIMITED  
(A Government of India Enterprise)

पावरग्रिड

दक्षेपात्र-I क्षेत्र, कवाडिगूडा मेन रोड, सिकंदराबाद-500 080 (टी.एस.)  
SRTS-I RHQ, Kavadiguda Main Road, Secunderabad-500 080 (T.S.)  
दूरभाष Tel : 040-27546658, फैक्स Fax : 040-27546637

CIN : L40101DL1989GOI038121

Ref: SRTS-I:RTIM-77:2608:2019

BY REGD. POST ACK DUE

Dt.14.10.2019

**Shri V. Arun Kumar, Proprietor**  
Sri Sai Lakshmi Constructions,  
3-17C-28/1, Sri Sai 40 Buildings,  
Godarigunta, Kakinada – 533 003,  
East Godavari District, Andhra Pradesh

Dear Sir,

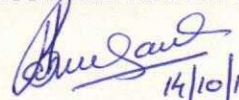
**Sub: Information under Right To Information (RTI) Act, 2005 – Reg.**  
**Ref: Your RTI application Dt:25.09.2019, received by us on 30.09.2019**

**Information requested by Applicant Shri V. Arun Kumar under RTI Act.**

Sl. No	Information Requested by Applicant	Information by POWERGRID
1	Complete Specification of Earthwork in excavation in different types of soil	Enclosed at Annexure-I (Page No.370-376)
2	Complete specification of Concrete of all grades, including accepted cement consumption per cubic meter of concrete by PGCIL for each grade of concrete	Enclosed at Annexure – I (Page No.373)
3	Reinforcement schedule including chairs, submitted by TPL to PGCIL for the Angle Towers No. 22B/0, 29/0, 30/0 and 39/0	Reinforcement schedule submitted by M/s TPL is not available. However, drawings followed for the foundations are enclosed at Annexure-II

Thanking you,

Yours sincerely,  
for POWER GRID CORPORATION OF INDIA LIMITED,

  
14/10/19  
(K.P. Balanarayan)

Sr. General Manager-AM/CPIO

**Copy to:**

CGM I/C:SR-I:AA:Sec'bad - for kind information please.

पंजीकृत कार्यालय: बी-9 कुतुब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली-110 016, दूरभाष : 011-26560112, फैक्स : 011-26601081

Registered Office: B-9, Qutub Institutional Area, Katwaria Sarai, New Delhi - 110 016. Tel. : 011-26560112, Fax : 011-26601081

केन्द्रीय कार्यालय: सौदामिनी, प्लॉट नं - 2, सेक्टर-29, गुरुग्राम-122 001 (हरियाणा) ई पी ए बी एक्स : 0124-2822000, फैक्स : 0124-2571762

Corporate Office: Saudamini, Plot No. 2, Sector-29, Gurugram-122 001 (Haryana) EPABX : 0124-2822000, Fax : 0124-2571762

Website : <http://www.powergridindia.com>

## 2.0 Foundations

2.1 Foundation includes supply of all labour, tools & machineries, materials such as cement, sand, coarse aggregates and reinforcement steel and all associated activities, such as, excavation, concreting etc.

## 2.2 Type of Foundations

The foundation shall generally be of open cast type. Reinforced Cement Concrete footing shall be used for all type of normal towers. All the four footings of the tower and their extensions shall be similar for a particular location, except where soil condition and or water table are different at different legs. The total depth of foundation below ground level shall generally be upto 3.5 meters. For Hard Rock type and also where specific site conditions / properties demand foundation of different depths (lower or higher), the same shall be adopted with prior approval of Employer

## 2.3 Classifications of Foundations:

The foundation designs shall depend upon the type of soil, sub soil water level and the presence of surface water which have been classified as follows

## 2.3.1 Normal dry

To be used for locations where normal dry cohesive or non-cohesive soils are met. Foundations in areas where surface water encountered from rain runoff or agricultural fields (except paddy fields) shall also be classified as normal dry.

## 2.3.2 Sandy Dry Soil

To be used for locations where cohesion less pure sand or sand with clay content less than 10% met in dry condition.

## 2.3.3.1 Wet

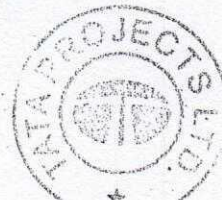
To be used for locations:

Where sub-soil water is met between 1.5 meters and the depth of foundation below the ground level.

## 2.3.3.2 Wet Paddy

To be used for locations:

Which are in surface water for long period with water penetration not exceeding one meter below the ground level e.g. paddy fields.



2.3.4 Partially Submerged

To be used at locations where sub-soil water table is met between 0.75 meter and 1.5 metre below the ground level.

2.3.5 Fully Submerged

To be used at locations where sub-soil water table is met at less than 0.75 meter below the ground level.

2.3.6.1 Fully Submerged Black Cotton Soil

To be used at locations where soil is clayey type, not necessarily black in colour, which shrinks when dry and swells when wet, resulting in differential movement. For designing foundations, for such locations, the soil is considered submerged in nature.

2.3.6.2 Wet Black Cotton Soil

To be used at locations where soil is clayey type, not necessarily black in colour, which shrinks when dry and swells when wet, resulting in differential movement. For designing foundations, for such locations, where sub-soil water is met between 1.5 meters and the depth of foundation below the ground level.

2.3.6.3 Dry Black Cotton Soil

To be used at locations where soil is clayey type, not necessarily black in colour, which shrinks when dry and swells when wet, resulting in differential movement. For designing foundations, for such locations, where no sub-soil water is met upto the depth of foundation.

2.3.7 Fissured - Rock

To be used at locations where decomposed or fissured rock, hard gravel, kankar, limestone, laterite or any other soil of similar nature is met. Under cut type foundation is to be used for fissured rock locations.

In case of fissured rock locations, where water table is met at 1.5M or more below ground level, wet fissured rock foundations shall be adopted. Where fissured rock is encountered with subsoil water table less than 0.75 meter below ground level, submerged fissured rock foundations shall be adopted. In case of dry locations dry fissured rock foundations shall be adopted.

2.3.8 Hard Rock



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The locations where chiseling, drilling and blasting is required for excavation, Hard rock type foundations are to be used. For these locations rock anchoring is to be provided to resist uplift forces.

23.9 Where soil is of composite in nature, classification of foundation shall be according to the type of soil predominant in the footing.

Above foundation classification and their use is indicative and shall be as per the classification approved by Employer during execution stage.

## 24 Design of Foundations

24.1 Design of foundations as classified under Cl. 2.3 for all towers and towers with extensions shall be developed by the Employer based on the soil properties. The indicative shape of foundation is also enclosed in this specification.

24.2 Depending on the site conditions other types of foundations shall also be designed and provided by the Employer suitable for Intermediate conditions under the above classifications to effect more economy or to suit specific site conditions encountered.

24.3 The proposal for these types of foundations shall be submitted by the Contractor based on the detailed soil investigation and duly recommended by Engineer-in-charge.

24.4 The construction drawings /working drawings of all type of foundations classified as in clause 2.3 shall be provided to the contractor progressively during execution stage. The drawings for other foundations designed for specific site conditions shall be provided based on actual site requirements only.

24.5 The provisional quantities of excavation, concreting and reinforcement steel required for the project are furnished in the BPS.

## 25 Soil Investigation

The Contractor shall be required to undertake soil investigation as per clause 4.0 of Section III at some tower locations as required by the Employer. The provisional number of soil testing locations is furnished in BPS.

## 26 Properties of Concrete

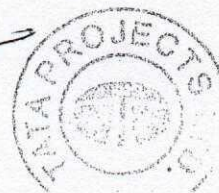
### 26.1 For open cast type foundation

The cement concrete used for the foundations shall generally be of grade M-20 having 1:1.5:3 nominal mix ratio with 20mm coarse aggregate for chimney



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portion and 20mm/40mm aggregates for pyramid or slab portion. All the properties of concrete regarding its strength under compression, tension, shear, punching and bending etc. as well as workmanship will conform to IS:456.

## 2.6.2

The Quantity of minimum cement to be used per unit quantity of consumption for different mix (nominal mix) of concrete should be as follows:

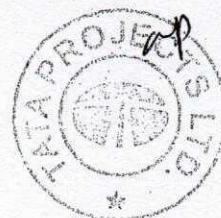
Sl. No.	Description	Unit	Quantity of minimum Cement to be used per Unit quantity of work (in kgs)
1.	1:1.5:3 nominal mix concrete	Cu.m.	400
2.	1:2:4 nominal mix concrete	Cu.m.	320
3.	1:4:8 nominal mix concrete	Cu.m.	170
4.	Random Rubble Masonry with 1:6 cement mortar	Cu.m.	83

Alternatively, Ready Mix concrete can also be used. The ready mix concrete shall conform to IS:4926. The consumption of cement, selection and use of Materials for the ready mix concrete shall be in accordance with IS:456. The concrete grade shall be of M20 grade design mix as per IS: 456.

## 2.6.3

Cement used shall be ordinary Portland Cement, unless mentioned otherwise, conforming to the latest Indian Standard Code IS:269 or IS:8112 or IS:12269.

Alternatively, other varieties of cement other than ordinary Portland Cement such as Portland Pozzolana Cement conforming to IS:1489 (latest edition) or Portland Slag Cement conforming to IS:455 (Latest edition) can also be used. The Contractor shall submit the manufacturer's certificate, for each consignment of cement procured, to the Employer. However Employer reserves the right to direct the Contractor to conduct tests for each batch/lot of cement used by the Contractor and Contractor will conduct those tests free of cost at the laboratory so directed by the Employer. The Contractor shall also have no claim towards suspension of work due to time taken in conducting tests in the laboratory. Changing of brand or type of cement within the same structure shall not be permitted without the prior approval of the Employer. Sulphate Resistant Cement shall be used if Sulphate content is more than the limits specified in IS:456, as per Geotechnical investigation report.



The curing time of cement will be decided at the time of execution of the work under the contract based on the certificate from a reputed laboratory which will be obtained and submitted by the Contractor.

- 2.6.4 Concrete aggregates shall conform to IS:383.
- 2.6.5 The water used for mixing concrete shall be fresh, clean and free from oil, acids & alkalis, organic materials or other deleterious substances.

2.6.6 Reinforcement shall conform to IS:1786 for deform and cold twisted bars (Fe 500). If mentioned in the BPS, epoxy coated reinforcement shall conform to IS 13620. Thermo Mechanically Treated (TMT)-bars (equivalent grade) in place of cold twisted bars are also accepted. Hard drawn steel wire shall conform to IS 432. All reinforcement shall be clean and free from loose mill scales, dust, loose rust and coats of paint, oil or other coatings, which may destroy or reduce bond. Contractor shall supply either prefabricated reinforcement or fabricate at site and place reinforcement to shapes and dimensions as indicated or as required to carry out the intent of approved foundation drawings and Specifications.

Spacers, chairs, stays, hangers and annealed steel wire for binding etc. as may be necessary, should be used for proper completion of the foundation job. Spacers or chairs should be placed at a maximum spacing of 1m and closer spacing shall be provided wherever necessary.

2.7 Construction of Tower Foundation, Stub Setting and Earthing

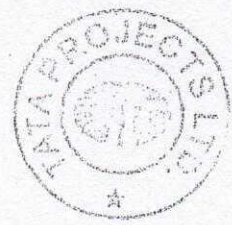
2.7.1 Excavation

2.7.1.1 The excavation work for foundations shall be taken up by the contractor progressively stretch wise / section wise after obtaining approval from Employer the proposed stretch wise / section wise tower schedule, profile etc. as per detailed survey along the approved route alignment.

2.7.1.2 Except as specifically otherwise provided, all excavation for footings shall be made to the lines and grades of the foundations. The excavation wall shall be vertical and the pit dimensions shall be based on an assumed clearance of 150mm on all sides of the foundation pad. For footings with undercut, care shall be taken to carry out excavation as per drawing without any side clearance. All excavation shall be protected so as to maintain a clean sub grade and provide worker safety until the footing is placed, using timbering, shoring, shuttering, dewatering etc. as approved by the Employer. Contractor shall especially avoid disturbing the bearing surface of the pad. Any sand, mud, silt or other undesirable materials which may accumulate in the excavated pit or borehole shall be removed by Contractor before placing concrete.



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2.7.1.3 The soil to be excavated for tower foundations shall be classified as follows depending upon the physical state of the soil at the time of excavation irrespective of the type of foundation installed.

a) Dry Soil

Soil removable either manually, by means of a spade and shovel or mechanically by proclaims, excavators etc.

Excavation done in dry soil for wet, partially submerged, fully submerged and wet black cotton type of foundations shall also be covered under this.

b) Wet Soil

Where the subsoil water table is encountered within the range of foundation depth or land where pumping or bailing out of water is required due to presence of surface water shall be treated as wet soil. The excavation done in wet soil in case of wet, partially submerged, fully submerged and wet black cotton type of foundation shall also be covered under this.

c) Dry Fissured Rock

Limestone, laterite, hard conglomerate or other soft or fissured rock in dry condition which can be quarried or split with crowbars, wedges, pickaxes etc. However, if required, light blasting may be resorted to for loosening the material but this will not in any way entitle the material to be classified as hard rock.

d) Wet Fissured Rock

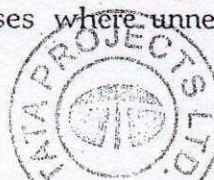
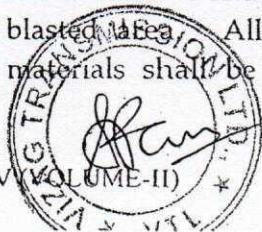
Above fissured rock, when encountered with subsoil water within the range of foundation depth or land where pumping or bailing out of water is required, shall be treated as wet fissured rock.

e) Hard Rock

Any rock excavation, other than specified under fissured rock above, for which blasting, drilling, chiseling are required. The unit rate quoted for hard rock excavation shall be inclusive of all costs for such drilling (including drilling required for anchoring), chiseling and blasting, etc.

2.7.1.4 No extra payment shall be admitted for the removal of fallen earth into a pit or borehole once excavated.

2.7.1.5 Where rock is encountered, the holes for tower footings shall preferably be drilled. Blasting where resorted to as an economy measure, shall be done with utmost care to minimise fracturing rock and using extra concrete for filling the blasted holes. All necessary precautions for handling and use of blasting materials shall be taken. In cases where unnecessarily large quantities are



excavated/ blasted, resulting in placement of large volumes of concrete, payment of concrete shall be limited to design volumes of excavation, concreting, reinforcement etc. In case where drilling is done, the stubs may be shortened suitably with the approval of the Employer.

The Contractor shall arrange & supply requisite blasting material, and be responsible for its storage and use, without any extra cost to the Employer.

Indian Standard IS:3764 shall be followed regarding safety of excavation work.

**Unit Rates and Measurement for Foundation**

The bidder is required to quote the unit rates for different foundation activity, namely, excavation for different types of soils, concreting, supply and placement of reinforcement steel and stub setting in the BPS.

The unit rates of excavation for each type of soil shall include excavation along with all associated activities like shoring, shuttering, dewatering, till completion of foundation work stock piling, dressing, back filling of foundations after concreting with excavated/borrowed earth (irrespective of lead) and consolidation of earth, carriage of surplus earth to the suitable point of disposal as required by the Employer or any other activity required for to completion of foundation work in all respect.

The measurement for excavation shall be made on the basis of design excavation volume arrived at considering dimension of pit leaving 150mm gap around (except for under cut foundations) the base pad or actually excavated whichever is less and the unit rate of this item as indicated in Letter of Award. The payment for excavation shall be made as per actual type of soil encountered at the time of excavation, but the total payment for excavation portion shall not exceed the amount as payable for excavation considering the soil type same as that of foundation classification. The decision of the Employer shall be final and binding with respect to classification of soil and foundations.

Form boxes shall be used for casting of foundations. The unit rate of concreting shall include the cost of supply, fabrication and placement of form boxes, cement, water, coarse and fine aggregates mixing and placing of concrete, curing of concrete and any other activities related / required for completion of concreting works of foundation. The payment for this item shall be made as per the actual volumes of concreting completed but limited to design volume based on unit rates indicated in the letter of award.

The unit rate of 'Reinforcement Steel' shall include supply and placement of reinforcement steel, stirrups, wire for binding the reinforcement, chairs, bolsters and spacers etc. as required to complete the foundation work. The payment of



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PAGE-21



Modified dog for fdn @ 220/0 of PVTL Line

22

220/0

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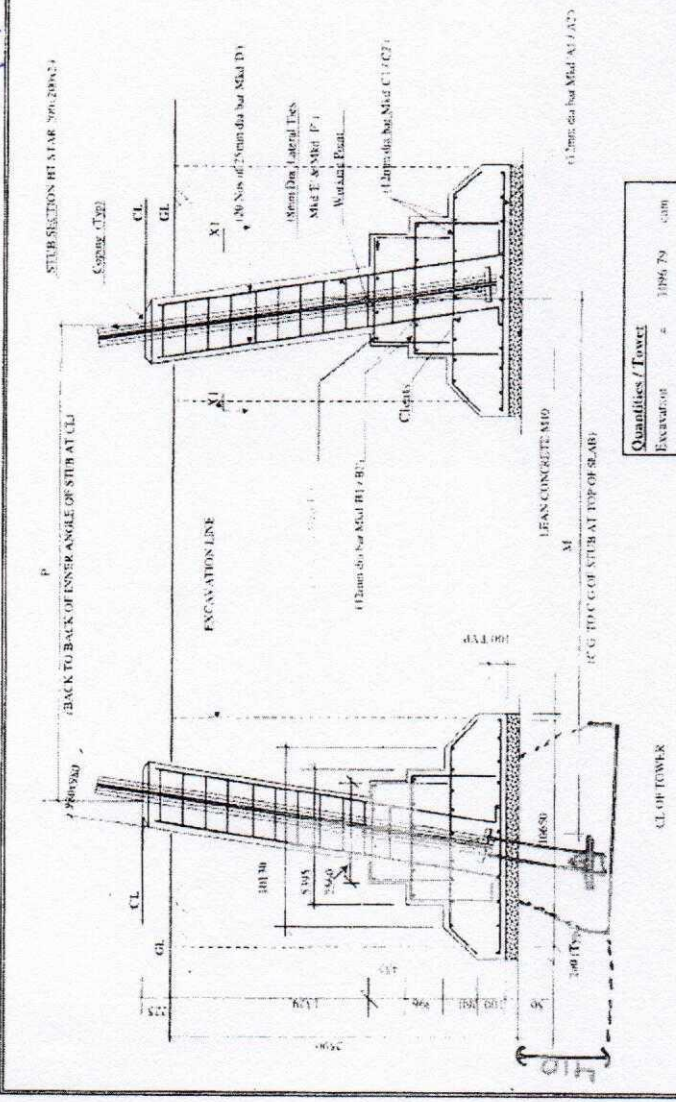
BAR BENDING SCHEDULE

Sl. No.	Sketch	Dim. in MM	Qty	Unit Wt. in Kg.	Total Wt. in Kg.
A1	[Sketch]	12	236	0.888	210.342
A2	[Sketch]	12	236	0.888	210.342
B1	[Sketch]	13	68	0.888	60.496
B2	[Sketch]	12	68	0.888	60.496
B3	[Sketch]	15	64	0.888	56.832
C1	[Sketch]	12	148	0.888	131.328
C2	[Sketch]	2	196	0.888	174.072
D1	[Sketch]	25	20	3.851	77.020
D2	[Sketch]	0	20	0.000	0.000
E	[Sketch]	8	10	0.94	9.400
F	[Sketch]	8	10	0.94	9.400
G	[Sketch]	8	20	0.94	18.800
H	[Sketch]	8	10	0.94	9.400

Excavation plan details

Slope = 1:0.19081447

Level	CG of slab	Area in sq. m	Volume in cu. m
0.1	0	1096.79	1096.79
0.2	0	221.66	221.66
0.3	0	27.68	27.68
0.4	0	3062.76	3062.76



Quantities / Tower

Excavation	= 1096.79	cum
Concrete (1:1.5:3)	= 221.66	cum
Concrete (1:3:6)	= 27.68	cum
Reinforcement	= 3062.76	kg

10. This special foundation is to be used only after approval from head of region.

9. This foundation is to be used only after exhausting the alternative of 3 m depth normal foundation.

NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED
2. CONCRETE GRADE IS M 20 UNLESS OTHERWISE SPECIFIED
3. CONCRETE COVER IS 25mm UNLESS OTHERWISE STATED
4. MIX PROPERTIES CONFORMING TO IS 456-1988
5. STEEL USED IS E500 CONFORMING TO IS 1786. PMS INDICATED AS TOR
6. WHEREVER NECESSARY TO CLEAR STUB & CLAT. STIRRUPS ARE TO BE ADJUSTED AT SITE
7. FOR DETAILS OF STUB & CLATS. REFER DRAWING NO. CC-ENG-CT
8. FOR ARRANGEMENT OF BAR. REFER DRG. NO. CC-ENG-CT-3 (STAIR ARRANGEMENT)

POWER GRID CORPORATION OF INDIA LIMITED  
(A GOVERNMENT OF INDIA ENTERPRISE)

35KV DC Veevnagiri, Shikhalim TL with HEXA ACSR ZERRA Conductor

Title : Construction Drawing of Foundation  
For Tower Type: DCI 04/69 M EXTN.  
Foundation Type: DFR (40M BODY EXTN.)  
Scale: Drawing No. CC-ENG-CT-3 (WIND ZONE-5)

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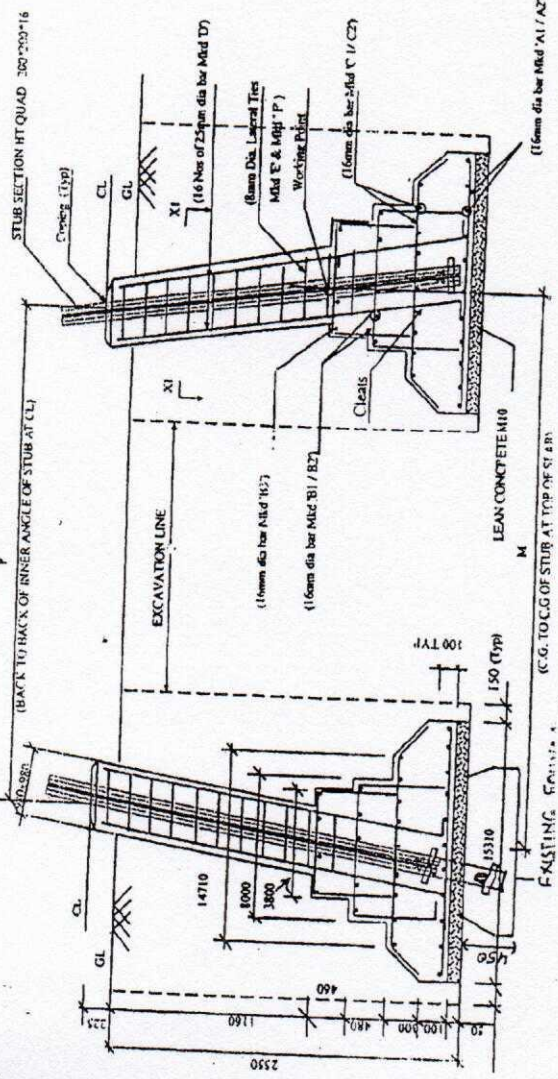
DCM	ACM	GM	ED
(ENGINEER)	(ENGINEER)	(ENGINEER)	(ENGINEER)

Rev. No.	DATE	DESCRIPTION	ISSUED BY	CHKD	APPD

CC-ENG-CT-3

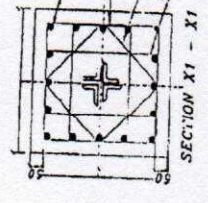
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N.T.S.



Quantities / Tower

Excavation	= 2485.46 cum.
Concrete (1:1.5:2)	= 313.92 cum.
Concrete (1:3:6)	= 46.88 cum.
Reinforcement	= 58915.93 kg



- NOTES
1. ALL DIMENSIONS ARE IN MM. UNLESS OTHERWISE SPECIFIED
  2. CONCRETE GRADE IS M20 UNLESS OTHERWISE SPECIFIED.
  3. CONCRETE COVER IS 50mm UNLESS OTHERWISE STATED.
  4. MIX PROPERTIES CONFORMING TO IS 456:2000
  5. STEEL USED IS F450 CONFORMING TO IS 1786, 1963 INDICATED AS TOR.
  6. WHEREVER NECESSARY TO CLEAR STUB & CLEAR STIRRUPS ARE TO BE ADJUSTED AT SITE
  7. FOR DETAILS OF STUB & CLEATS, REFER DRAWING NO. CC-ENGG-TL-7531-612-2055
  8. FOR ARRANGEMENT OF BARS REFER Dwg. NO. CC-ENGG-TL-7531-612-2055

BAR BENDING SCHEDULE

Bar No	Sketch	Dist. in MM	Length in MM	No. of Tower	Unit weight in Kg	Total weight in Kg
A1	15210	16	15210	180	1.578	4320.243
A2	17010	16	17010	180	1.578	3417.001
B1	7900	16	9160	58	1.578	874.969
B2	6300	16	7960	58	1.578	778.531
B3	3700	16	5580	58	1.578	510.704
C1	14610	16	15558	116	1.578	2847.861
C2	4155	16	4729	232	1.578	1800.984
D	2568	25	2868	16	3.853	176.806
E	2568	0	2868	0	0.000	0.000
F	800	8	2638	11	0.395	11.462
G	622	8	2816	22	0.395	24.471

THE FOUNDATION HAS BEEN DESIGNED FOR FOLLOWING PARAMETERS

TYPES OF SOIL: FS

UNIT WEIGHT: 1400 / 940 Kg/Cum

BEARING CAPACITY: 13675 Kg/m<sup>2</sup>

ANGLE OF REPOSE: 30 / 15 Degree

WATER TABLE: 0 TO 0.25 M FROM CL

Total weight of steel required is Kg = 58915.93

Excavation plane details

Slope: 0.2325750

Level	CG of stub in mm	F in mm	M in mm	N in mm
+0 M	0	2290	2344	3548
+6.8 M	0	2371	2683	3783

90 THIS FOUNDATION IS TO BE USED ONLY AFTER EXHAUSTING THE ALTERNATIVE OF 3M DEPTH NORMAL FOUNDATION. 10 THIS SPECIAL FOUNDATION IS TO BE USED ONLY AFTER APPROVAL FROM HEAD OF REGION.

**POWER GRID CORPORATION OF INDIA LIMITED**  
(A GOVERNMENT OF INDIA ENTERPRISE)

Project : 765 kV D/C TL  
Vesmagiri Shrikulam TL  
(WZ 5, 50 MS)

Title : Construction Drawing of Foundation  
For Tower Type: DD-0.66.0 M Extn.  
Foundation Type : FS (Equal Body Extn.)  
Itesa-Zebra Conductor (FOUNDATION DEPTH 2.55 M)

Scale : Drawing No. CC-ENGG-TL-7531-612-P-4-04TBCB SDF  
LOC NO 6/0 29/0 & 29A/0

CLEAR BY: [Signatures]

DESIGN: [Signatures]

DATE: [Signatures]

ISSUED BY: [Signatures]

CHKD: [Signatures]

APPD: [Signatures]

DESCRIPTION: Modified dng. for form @ 29p of PURL line

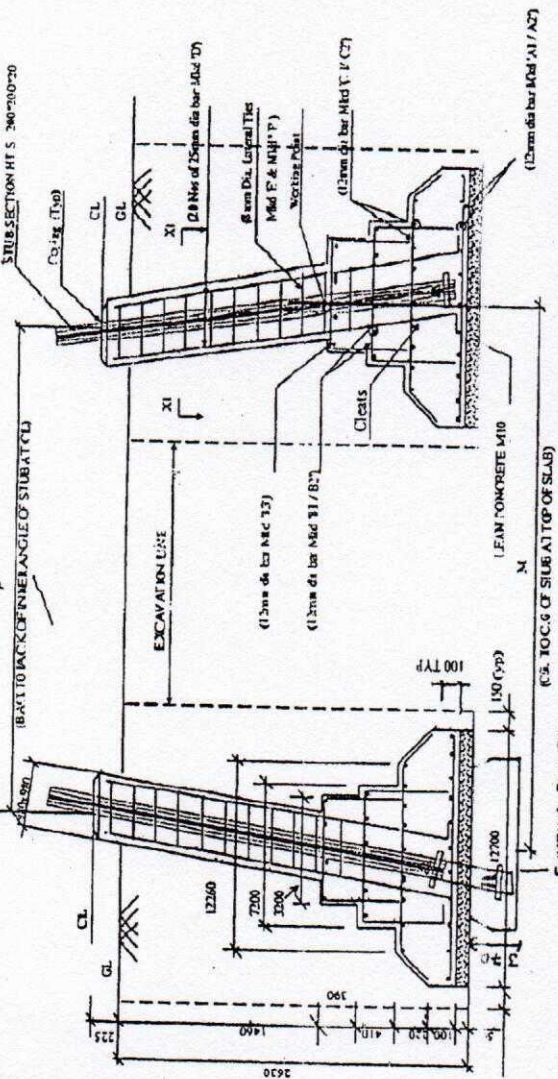
206. 272 - 4151-36 = 4358 B-8

14/10/19

99/0-00-0 -FS.

Modified design for fdm @ 30% of PVTL line  
*Shubanshu*  
 14/10/19

DRG No. F.S



**BAR BENDING SCHEDULE**

Mark No	SKETCH	Dist in MM	Nos/ Tower	Unit Wt in Kg	Wt/Leg /tower in Kg	Total weight in Kg
A1		12	12600	0.121	2441.526	9846.144
A2		12	10120	0.121	1977.043	7908.172
B1		12	8450	0.128	600.968	2403.992
B2		12	7100	0.148	394.364	2017.526
B3		12	4700	0.148	308.499	1381.596
C1		12	12382	0.152	1304.949	5307.794
C2		12	3191	0.158	915.407	3661.621
D		23	2956	1.853	227.789	911.156
D		0	2656	0.906	0.000	0.000
E		8	1670	0.295	15.946	63.784
F		8	3038	0.395	11.287	53.148
G		8	2022	0.395	24.261	105.044

THE FOUNDATION HAS BEEN DESIGNED FOR FOLLOWING PARAMETERS  
 TYPE OF SOIL: FS  
 UNIT WEIGHT: 1440 / m<sup>3</sup> Kg/cm<sup>3</sup>  
 BEARING CAPACITY: 13673 Kg/m<sup>2</sup>  
 ANGLE OF REPOSE: 30 / 15 Degree  
 WATER TABLE: 0 TO 0.75 M FROM GL

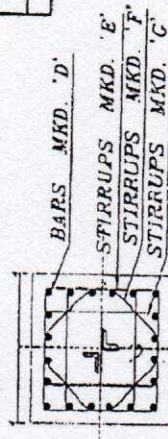
Excavation plane details

Level	CG of STUD	P	N	M
+9 M	0	18981	15609	27719

Slope = 0.1779651

Quantities / Tower

Excavation	1771.83	cu.m.
Concrete (M10)	308.06	cu.m.
Concrete (M20)	32.26	cu.m.
Reinforcement	33410.60	kg



- NOTES SECTION: X1 - X1
1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED
  2. CONCRETE GRADE IS M20 UNLESS OTHERWISE SPECIFIED
  3. CONCRETE COVER IS 50mm UNLESS OTHERWISE STATED
  4. BOX PROPERTIES CONFORMING TO IS 45-2009
  5. STEEL USED IS E500 CONFORMING TO IS 1716. 1981 INDICATED AS TOR
  6. WHENEVER NECESSARY TO CLEAR STUDS & CLEAR STIRRUPS ARE TO BE ADJUSTED AT SITE
  7. FOR DETAILS OF STUDS & CLEATS REFER DRAWING NO. CC-ENG-7L-52261-25010
  8. FOR ARRANGEMENT OF BARS REFER DRC. NO. CC-ENG-7L-641812-PIB-ACH-TRCB

9. THIS FOUNDATION IS TO BE USED ONLY AFTER EXHAUSTING THE ALTERNATIVE OF 3M DEPTH NORMAL FOUNDATION. 10. THIS SPECIAL FOUNDATION IS TO BE USED ONLY AFTER APPROVAL FROM HEAD OF REGION.

**POWER GRID CORPORATION OF INDIA LIMITED**  
 (A GOVERNMENT OF INDIA ENTERPRISE)

DATE	DESIGN	CHK	APP	DATE	DESIGN	CHK	APP

Project : 765 KV D/C TL  
 Veemagiri Shrikulam TL  
 (WZ 5, 50 M/S)  
 Title : Construction Drawing of Foundation  
 For Tower Type: DB-4-0.0 M Body Extn.  
 Foundation Type: FS (Equal Body Extn.)  
 Hexa-Zebra Conductor FOUNDATION DEPTH 2.63 M  
 Scale : Drawing No. CC-ENG-7L-7522-61Z-P-4 04TBCB SDF  
 CC-ENG-7L-7522-61Z-P-4 04TBCB SDF  
 LOC NO-3100.23/0.27/0.30/0

DETAILS OF FOUNDATION

2477.08 + 161.944 = 2639.024  
 831659

Modified log of dm @ 39% of PVTL line  
 Shubant 14/10/19

**BAR BENDING SCHEDULE**

Mk. No.	SKETCH	Dist. in MM	Length in MM	No. of Bars	Urea Wt. in Kg.	Wt. of Tower in Kg.	Total weight of steel required in Kg. = 13129.62
A1		12	11800	218	0.888	1934.724	8962.296
A2		12	9120	218	0.888	1964.201	7216.812
B1		12	702	78	0.888	53.171	2137.884
B2		12	622	78	0.888	41.740	1808.960
B3		12	492	24	0.888	31.759	1217.900
C1		12	11800	124	0.888	1112.968	5219.160
C2		12	3113	292	0.888	890.048	4434.102
D1		25	2916	20	3.853	224.760	898.828
D2		0	2916	9	0.600	0.190	0.890
E		8	1930	10	0.395	14.407	67.988
F		8	2870	10	0.395	11.752	46.628
G		8	2986	10	0.395	23.886	91.186
H		8	180	0	0.395	0.000	0.000

**Excavation plan details** Slope = 0.18081447

Level	CG of Sub	Area in sq. m	Volume in cu. m
0 M	19993	296.34	291.18
1 M	21138	217.09	302.58
2 M	22283	228.84	327.77
3 M	23428	240.59	339.06

**Quantities / Tower**

Excavation	= 1491.84	cu.m
Concrete (1:1.5:3)	= 277.76	cu.m
Concrete (1:2:6)	= 27.38	cu.m
Reinforcement	= 31129.62	kg

**Notes:**

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED
2. CONCRETE GRADE IS M20 UNLESS OTHERWISE SPECIFIED
3. CONCRETE COVER IS 25MM UNLESS OTHERWISE STATED
4. MIX PROPERTIES CONFORMING TO IS 546-2000
5. STEEL USED IS E250 CONFORMING TO IS 1786-1985 INDICATED AS TOR
6. WHEREVER NECESSARY TO CLEAR STUB & CLEAR STIRRUPS ARE TO BE ADJUSTED AT SITE
7. FOR DETAILS OF STUB & CLEAR, REFER DRAWING NO. CC-ENG-11
8. FOR ARRANGEMENT OF BARS REFER DRG. NO. CC-ENG-TL-3-STEP-BAR ARRANGEMENT

**Notes:**

9. This foundation is to be used only after exhausting alternative of 3m depth normal foundation.
10. This special foundation is to be used only after approval from head of region.

**POWER GRID CORPORATION OF INDIA LIMITED**  
 (A GOVERNMENT OF INDIA ENTERPRISE)

785 AV DC Veeragiri Substation TL with HEXA ACSR ZEBRA Conductor

**Title :** Construction Drawing of Foundation  
**For Tower Type:** DC (05/6/9 M Extn.)  
**Foundation Type :** WET (9M BODY EXTN.)  
 (WIND ZONE-III)

**Scale** Drawing No. CC-ENG-TL-7422361Z P 2 2382

**Rev No** **Date** **Description**

**DESIGNER** **CHECKED** **DATE** **APPD** **INSD BY** **DATE** **DESCRIPTION**

**Rev No** **Date** **Description**

**39/0**