

**GOVERNMENT OF TELANGANA  
 TELANGANA DRINKING WATER SUPPLY PROJECT  
 Rural Water Supply & Sanitation Department**

**TELANGANA WATER GRID**



**L&T Construction - Water, Smart World & Communication  
 CHENNAI**

<b>CLIENT:</b> RURAL WATER SUPPLY AND SANITATION DEPARTMENT (WATER GRID), TELUNGANA.	<b>CONSULTANT :</b> WAPCOS LIMITED
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<b>PROJECT :</b>	PROVIDING DRINKING WATER TO HABITATIONS IN KOMARAMBHEEM ASIFABAD SEGMENT IN ADILABAD DISTRICT
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<b>SUPPLIER / CONTRACTOR:</b>	L&T Construction, Water, Smart World and Communication
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<b>JOB Ref. No. :</b> LE150883	<b>TITLE :</b>  <b>DESIGN OF SUMP - 100KL CAPACITY KODDUGUDA AT ASIFABAD MANDAL</b>																
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**Submitted sir,**

**Sub:** RWS&S-TDWSP- Kodduguda 100KL clear water sump in Asifabad Mandal-  
Komarambheem Asifabad Segment-Adilabad District-Designs -Approval-Reg.

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Kindly peruse the Designs of the following 100KL Clear Water sump at Kottuguda (V), Asifabad (M), submitted by the Executive Engineer TDWSP Asifabad Division, Adilabad district for approval.

**1. 100 KL Clear Water Sump.**

The Executive Engineer TDWSP Asifabad Division has submitted Structural Designs & Drawings of 100KL Clear Water sump based on the field conditions and as per the estimate provisions, the structural designs & drawings for the above structure is verified with RWS&S standard Type Designs and submitted for approval.

The following design parameters were considered:

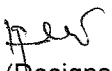
- Capacity : 100KL
- Net SBC of Soil : 10.0 t/ sqm
- Grade of concrete & Steel : M 30 & Fe 415
- Dia of sump Inner to Inner: 7.50mts
- Sidewall Height :2.75 mts
- Sidewall Thickness:150mm
- Top Slab thickness: 150 to 100 mm tapered
- RaftSlab thickness: 250mm

As per the above parameters the structural design and drawings of the clear water sump is verified, as per similar Type designs available and approved by the RWS&S Department considering the SBC and type of soil, duly following IS codes, IS: 456-2000, SP:16, 34, IS:3370 and IS 1893-2002 (seismic codes). The sizes and steel proposed in the designs and drawings of all components are safe and sufficient.

The additional points noted after checking the designs are:

- Detailed Estimate of the Structure with these specifications has to be prepared and compared with the provision made in sanctioned estimate. Such that deviation if any is within authorized limits. If any deviations noticed, the Estimate should be submitted for obtaining approval from the Competent Authority.

Subject to approval a draft memo addressed to the EE, TDWSP Asifabad Division, for communicating approved Structure is put up for kind perusal and approval.

  
AEE (Designs)

TDWSP, Nirmal Circle

  
DEE (Designs)

TDWSP, Nirmal Circle

  
Superintending Engineer,

TDWSP, Nirmal Circle

### Design Of 100 KL Capacity Sump at

**Data**

Location				
Safe bearing Capacity	sbc	Safe	100 Kn/m <sup>2</sup>	
Capacity	v		100 KL	
Free Board	fb		0.25 m	
Dead Storage	ds		0.20 m	
Dia of sump	d		7.50 m	
Projection from side wall	ps		0.15 m	
Depth of the tank	h		2.75 m	
Depth of tank above GL	dgl		0.50 m	
Depth of tank below GL			2.25 m	
thickness of PCC (lean mix cc1:6:10)	couter wt		0.00 m	
Th. Of Bottom Slab	bsth	Provided th is Sufficient	0.25 m	0.12 m
Depth of Water table below GL	wl	Safe Against Uplift	2.00 m	

**Top Dome**

Rise of the dome			1.20	
Radius of the dome			6.46	
Thickness of Dome	td	150 to 100	0.1	0.125 m
Dia of Reinforcement	db			8 mm
Reinforcement Spacing				125 mm c/c

Provide 8 mm dia Tor @ 125 mm C/c both radially and in the form of circular rings

**Top Ring Beam**

Width of ring beam	rb		300 mm	
Depth of ring Beam	dtrb	Provided size is sufficient	250 mm	101 mm
Dia of hoop bars	dbrb		12 mm	4 Nos
Dia of Stirrups			8 mm	150 mm 175

**Side Wall**

Depth of the tank	h		2.75 m	
Th. Of Side wall	sth		0.150 m	117 mm
Depth of tank above GL	dgl		0.50 m	

**Moments**

Inner Side	3.58 Kn-m
Outer Side	4.499 Kn-m

**Hoop force**

Inner Side	68.35 Kn (Tension)
Outer Side	81.34 Kn (Compression)

**Reinforcement**

Reinforcement	Vertical	Ast	Dia	Spacing Provided	Required
Inner face	Vertical	317 mm <sup>2</sup>	10 mm	150 mm	150
	Horizontal	263 mm <sup>2</sup>	10 mm	150 mm	150
Outer face	Vertical	398 mm <sup>2</sup>	10 mm	150 mm	150
	Horizontal	263 mm <sup>2</sup>	10 mm	150 mm	150

**Bottom slab**

Safe bearing Capacity	sbc		100 Kn/m <sup>2</sup>	
Th. Of Bottom Slab	bsth	Provided th is Sufficient	0.250 m	0.12 m
Dia of Bottom Slab	db		8.10 m	
Size of Haunch	bh		0.20 m	
effective cover to reinforcement for raft slab	covraft		65 mm	

**Moments**

Radial	4.57 Kn-m
Circumferential	4.57 Kn-m

Reinforcement	Top mesh	Ast	Dia	spacing Provided	Required
	Top mesh	219 mm <sup>2</sup>	10 mm	125 mm	130
	Bottom mesh	240 mm <sup>2</sup>	10 mm	125 mm	150

Max Ring Tension	bmcfps	0.0077	0.0068	0.0059	
Max. -ve BM	rtcfs	0.579	0.598	0.617	
Max +ve BM	mbms (bmcfs*pas*hbgl^2)			4.50 Kn-m	
Max. Ring compression	mpbms (bmcfps*pas*hbgl^2)			1.25 Kn-m	
Th. Of Side Wall	mrts rtcfs*pas*d/2			81.34 Kn	
	(MAX(mbm,mbms)*10^6*6/(2*1000))^0.			117 mm	
Eff Th. Of Side wall	edswi				Th. Provided is Sufficient
Max Inner face moment	bmi MAX(mpbms,mbm)			3.58 Kn-m	
Max outer face moment	bmo MAX(mpbm,mbms)			4.50 Kn-m	
Area of Steel					
Reinforcement					
Min Steel	pt	0.24% for <15m span	0.35%	0.24	0.16 %
Area of Bending Steel inner side	Astm	MAX(pt*sth*10^4,bmi*10^6/(130*0.87*ε			317 mm <sup>2</sup> on each side
Area of steel outer face	Astpbm	MAX(pt*sth*10^4,(bmo*10^6/(130*0.87*			398 mm <sup>2</sup> on each side
Area of Steel for Hoop	Asth	MAX(pt*sth*10^4,CEILING(mrt*1000/4*			526 mm <sup>2</sup> for two sides
Vertical Steel Spacing					
<u>inner face</u>	vsp				
Spacing		FLOOR(pi*dbi^2/4*1000/Astm,25)			150 mm
Provide 10 mm dia TOR @ 150 mm C/c					
<u>Outer face</u>	vspo				
Spacing		FLOOR(pi*dbo^2/4*1000/astpbm,25)			150 mm
Provide 10 mm dia TOR @ 150 mm C/c spacing					
<u>Horizontal Steel</u>					
Spacing	hsp	FLOOR(pi*dbh^2/2*1000/Asth,25)			150 mm
Provide 10 mm dia TOR @ 150 mm C/c on both faces in staggered fashion					
<b>Design Of Bottom Slab</b>					
Projection from side wall	ps				0.15 m
Dia of Bottom Slab	dbb	d+2*sth+2*ps			8.10 m
Size of Haunch	bh				0.2 m
Dia of Bar	top dbbs				10 mm
	bottom dbbsb				10 mm
Load on Bottom Slab					
Wt of Top Dome		2*pi*rd*hd*wd			225.27 Kn
Wt of Ring Beam		pi*(d+rb/1000)*rb*drb*25/10^6			45.95 Kn
Wt Of Side wall		pi*(d+sth)*sth*(h-dtrb)*25			225.31 Kn
Wt of Haunch		pi*(d-bh)*bh^2/2*25			11.47 Kn
Total Load	wbs				508.00 Kn
Max Pr on Soil	prb	Wbs/(pi*(d)*1)			5.08 sq m 0.14405
Bottom Slab is designed as circular Slab loaded with UDL and Simply Supported on edges					
				r	3.825 3.05
Radial moment	mri	3/16*prb*((dbb/2)^2-((d+sth)/2)^2)-wbs/			-1.06 mrb 4.57 Kn-m
Circuferential Moment	mti	1/16*prb*(3*(dbb/2)^2-((d+sth)/2)^2)-wb			4.18 mtb 4.57 Kn-m
for uplift		Net uplift load on bottom slab			-1.25 Kn/m <sup>2</sup>
for uplift		max Radial moment			-2.56 -2.56 Kn-m
		max Circuferential Moment			-2.56 -2.56 Kn-m
Max Radial Moment	mr	IF(wl>hbgl,0,CEILING(3*prb*(dbb/2)^2/			4.57 Kn-m 2.56 Kn-m
Max Circuferential moment	mt	IF(wl>hbgl,0,CEILING(prb*(dbb/2)^2/16			4.57 Kn-m 2.56 Kn-m

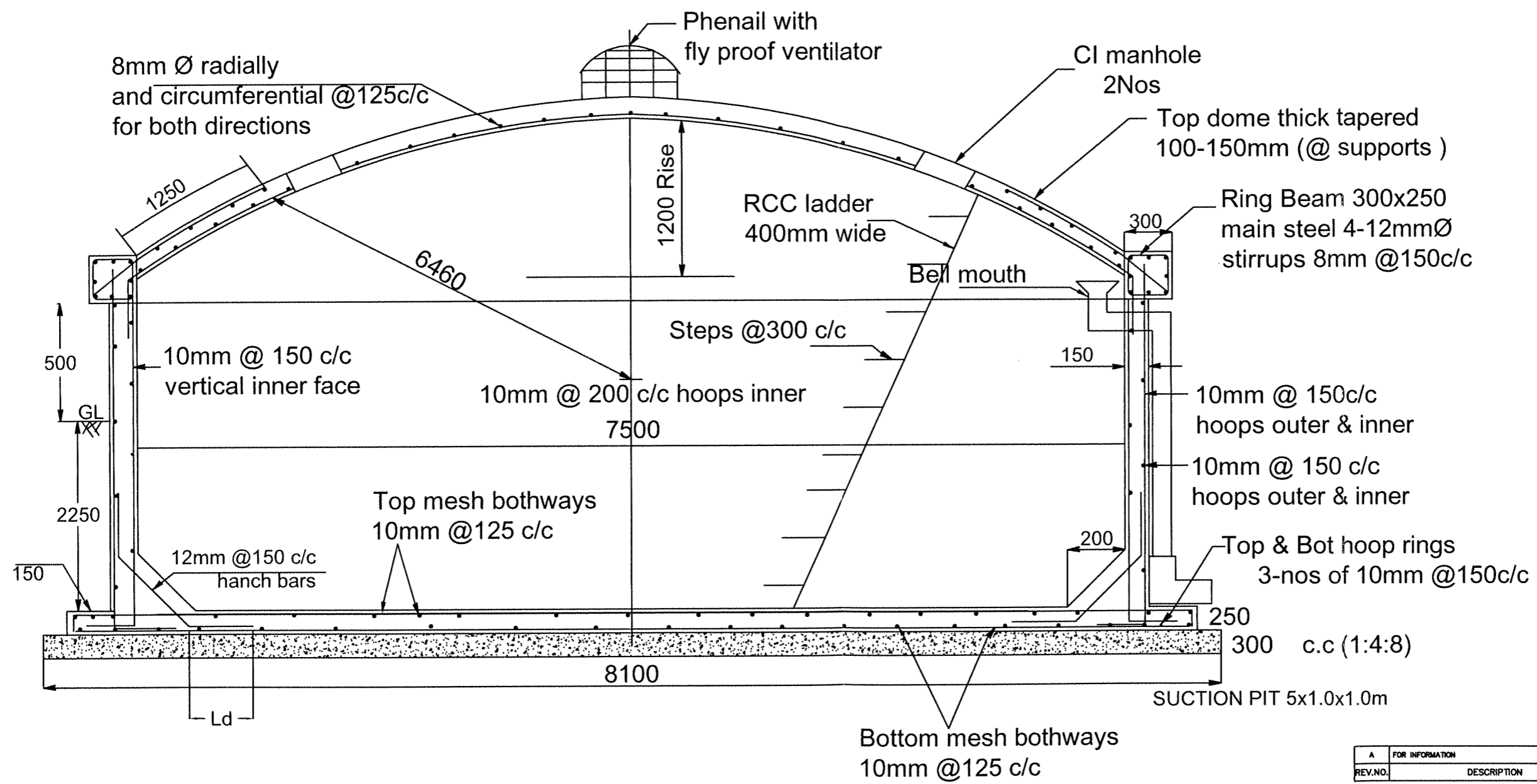
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Asst. Executive Engineer  
TDWSP Asifabad

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Dy. Executive Engineer  
TDWSP Asifabad

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Executive Engineer  
TDWSP Asifabad

3/4 APPROVED  
*Dy*  
SE, TDWSP  
NIRMAL

# 100KL SUMP



All dimenstions are in 'mm'  
 Concrete mix V.R.C.C M30  
 Steel Fe-415  
 Reinforcement details shall be as per IS-SP34

*[Signature]*  
 Asst. Executive Engineer  
 TDWSP Asifabad

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 Dy. Executive Engineer  
 TDWSP Asifabad

*[Signature]*  
 Executive Engineer  
 TDWSP Asifabad

*[Signature]*  
 SE, TDWSP  
 NIRMAL

**"APPROVED"**

A FOR INFORMATION		DESIGNED	DRAWN	CHECKED	APPROVED
REV.NO.	DESCRIPTION				
REVISIONS					
<b>L&amp;T Construction</b> Water, Smart World & Communication.					
CLIENT: RURAL WATER SUPPLY AND SANITATION DEPARTMENT, TELANGANA.			CONSULTANT:		
PROJECT: PROVIDING DRINKING WATER TO HABITATIONS IN KOMARAMBHEEM ASIFABAD SEGMENT IN ADILABAD DISTRICT (PRIMARY GRID)					
SUPPLIER/CONTRACTOR: <b>L&amp;T Construction</b> Water & Effluent Treatment SBG					
JOB No:	LE150883	TITLE:	SCALE:		
NAME	SIGN	DATE	KODDUGUDA AT ASIFABAD MANDAL SUMP - 100KL		
DRAWING No: LE150883-C.W.S.-RW-PP-1272		SIZE:	REV:		
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CHECKED BY	SIGN	DATE
CIVIL & STRUCTURAL		
MECHANICAL		
ELECTRICAL		
INSTRUMENTATION		