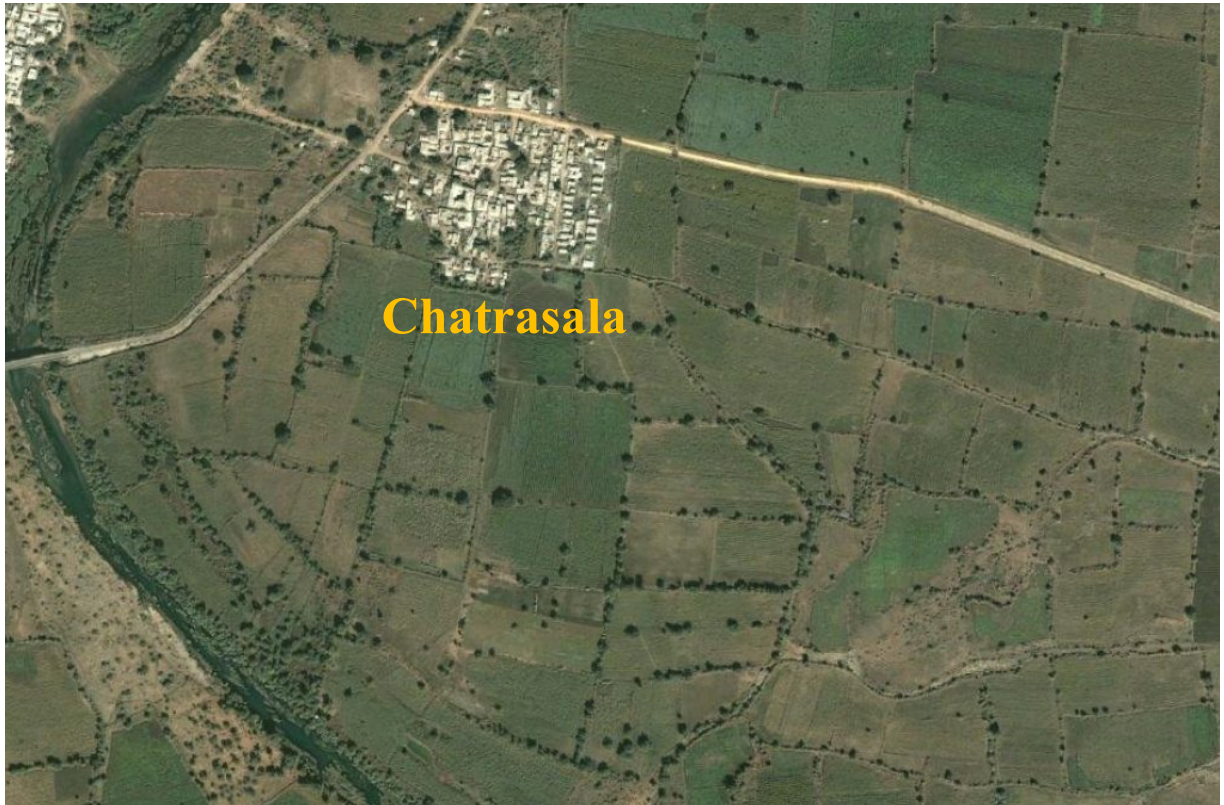


**WATER AVAILABILITY STUDY FOR PROPOSED CEMENT
PLANT, CHATRASALA VILLAGE, CHINCHOLI TALUK,
GULBARGA DISTRICT, KARNATAKA**

REPORT



Submitted to



**VICAT SAGAR CEMENTS PRIVATE LIMITED
HYDERABAD**

By



**B.S. ENVIRONMENT CONSULTANTS (P) LTD.
HYDERABAD – 500 057**

2009

Water Sustainability Studies for Vicat Sagar Cement Plant

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1. About this Report

This report is a supplemental study for the original EIA, which estimates the availability of water resources in the project area – both surface and groundwater – based on available secondary data and some field surveys of water availability in the vicinity.

It estimates also the water demands for VSCL as well as other present or projected cement plants in the vicinity and studies then the cumulative impact of those additional water consumptions.

1.1. Scope and Methodology

The scope of work carried out includes:

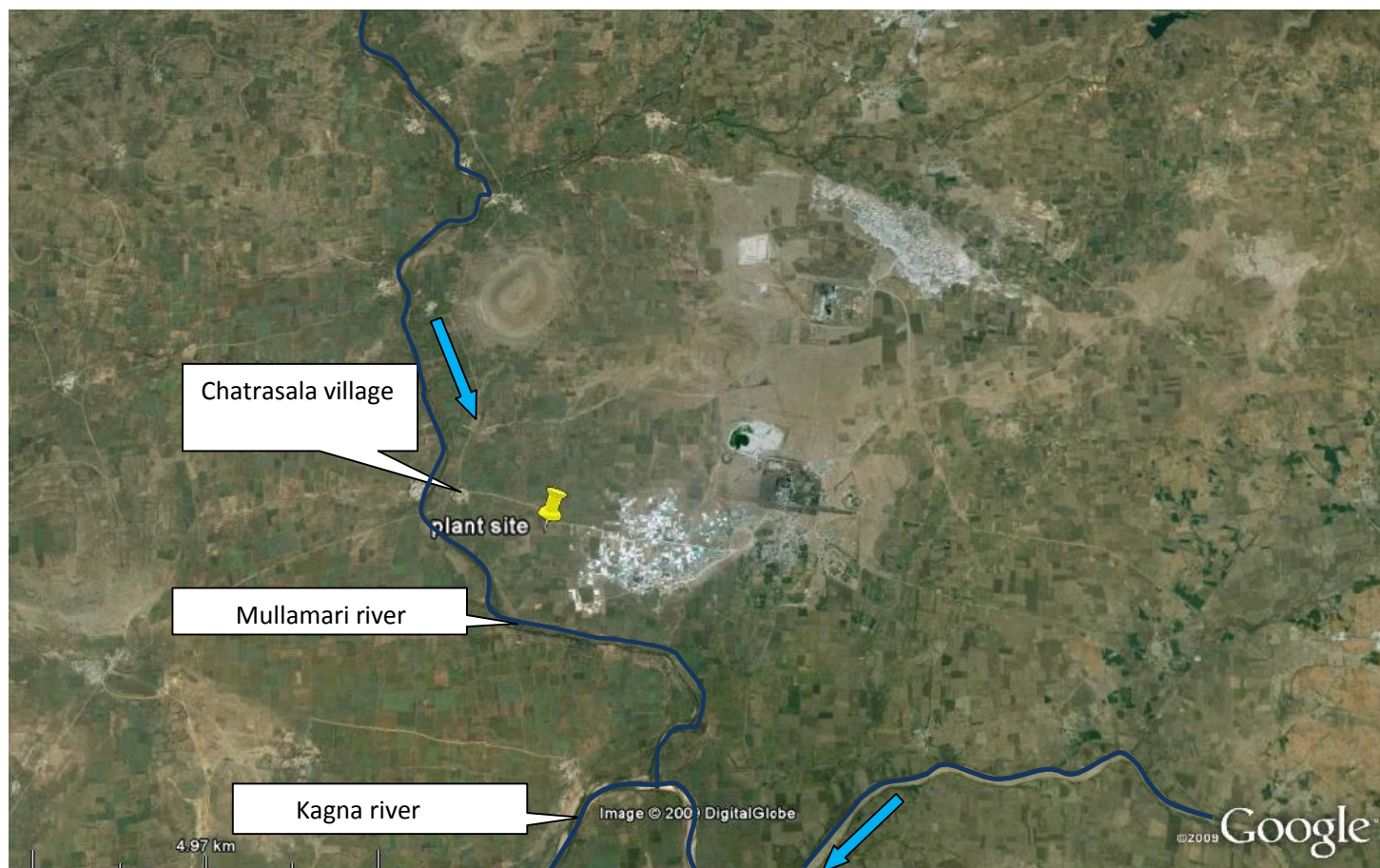
- Review and compilation of the existing data available with various government reports
- Reconnaissance survey of the area including inventory of wells and other water extraction structure
- Assessment of Hydro geological conditions of study area.
- Delineation of Watershed boundaries of the study area
- Estimation of Surface water resources in the watershed.
- Estimation of Ground water resources in the watershed
- Estimation of Ground water draft for existing and future scenarios.
- Cumulative impact of future water consumption

2. About the Study Area

VICAT SAGAR Cements Private Limited, (VSCPL) proposes to setup a green field cement plant located at Chatrasala village, Chincholi Taluk, Gulbarga District, Karnataka State. The site falls between 17° 26' to 17° 28' North Latitudes and 77° 25' to 77° 26' east longitudes and is covered in Survey of India Topographic sheets No.56 G/7 and 56 G/11.

The ground elevation at the site is 440-450 m above MSL. The site adjoins the Mullamari River which is a tributary to Kagna River, the confluence of which is in south at about 2.5 Km from village Chatrasala. The nearest big village is Karankot which is 2.4 Km South West of the plant site. Tandur is the main city nearby and is at about 13.3 Km to the east.

The area has a semi-arid climate with a normal rainfall of 777 mm which occurs more or less consistently. More than 75% of annual rainfall occurs during the months from June to September caused due to the Southwest monsoon and the remaining rainfall occurs during the winter season caused due to North east monsoon. Mild draught conditions are experienced often.



In Gulbarga district of Karnataka, major ground water bearing formations are granite, gneiss, lime stone and vesicular basalt. Ground water occurs in weathered, fractured and jointed zones of these formations. In weathered zones the ground water occurs in phreatic condition, whereas in the fractured & jointed formation it occurs in semi-confined to confined condition. The main source of recharge to ground water is precipitation, followed by seepage from canals and return flow from irrigation. Deccan Trap basalts, which comprise different lava flows and interstitial pore spaces of vesicular zone are good depositories of ground water. In lime stone, solution cavities are considered to be more potential than weathered and fractured zones¹.

In the nearby Ranga Reddy District of Andhra Pradesh, the entire district is covered by various geological formations like Archean crystalline, Deccan Traps, puranas and River Alluvium. The common ground water abstraction structures are dug wells, dug-cum-bore wells and bore wells and

¹ Ground water information booklet for Gulbarga district Karnataka
http://cgwb.gov.in/District_Profile/karnataka/GULBARGA_brochure.pdf

their yields mainly depending on the recharge conditions in the area. The entire district is underlain by consolidated rocks. Yield potential of the aquifers in these consolidated rocks varies widely².

3. Study Basin Demarcated for Assessment of Water Resources

A sub basin has been demarcated for assessment of water resources. This basin is bounded by surface/ground water divides. The concept of the basin is adopted as per the Ground Water Estimation Methodology, 1997 to suit the estimation of ground water resources in hard rock areas³. In this context the surface water basin and ground water basin are similar.

The sub basin so demarcated coincides with part of Mullamari River basin closing at its confluence with Kagna River. The basin is closed in the upstream side of Mullamari River around Polkampalli village after the confluence of few minor streams. The basin divides are shown on the map enclosed (Annexure 1).

The basin so demarcated is of 299 Sq. Kms of which 178.25 Sq. Km. area fall in Chincholi taluk, Gulbarga district of Karnataka and 120.77 Sq. Kms. in Tandur taluk of Ranga Reddy district of Andhra Pradesh. The general slope of the basin area is from north to south with highest and lowest elevation contours 520 and 440 m above MSL respectively

The plant site is located at the south and lowest point of the water basin.

3.1. Hydrogeology of Study Basin

Parts of Chincholi Taluk of Gulbarga district, Karnataka and Tandur Taluk of Ranga Reddy district of Andhra Pradesh lie in the sub basin. Deccan Trap basalts cover the Bhima lime stones in the north of the area. In the study area Granites and Gneisses (Achaean Basement) do not out crop in the area but is encountered in the bore holes at depths below 40 m below the lime stones and sandstones. Ground water occurs in water table as well as semi confining conditions. Vesicular and weathered basalts covering the lime stones in the north are generally poor aquifers with yields <2 lps. Similarly Lime stones also are poor aquifers to yield less than 1 lps in the bore holes completed in lime stones only. The lime stone quarries encounter ground water in moderate quantities and needs to be dewatered for mining purpose.

As per the Central Ground Water Board (Government of India) reports for Gulbarga district and Ranga reddy Districts, the depth of the boreholes drilled are 44 to 82m and the borehole yields

² Ground water information booklet for Ranga Reddy district Andhra Pradesh, fig. 3
(<http://cgwb.gov.in/documents/SR/Ranga%20Reddy.pdf>)

³ "While an administrative unit is convenient from development angle, it is not a natural hydrological unit. Watershed has been proposed as a more desirable option" p26 section 4.3.1; "It is proposed that watershed may be used as the unit for ground water resource assessment in hard rock areas » p29 section 4.4 ; Ground Water Estimation Methodology, 1997

have varied from 0.3 to 9.5 lps. In Tandur Taluk the depths to pre-monsoon water levels range from 5 to 10m and post-monsoon water levels are <2 m below ground level⁴. Similarly in Gulbarga district both the pre and post monsoon water levels range from 5-10m⁵.

4. Surface Water Resources

Mullamari and Kagna are the main rivers in the area though Mullamari River originates much in the north of Chincholi town, the study basin is considered downstream of it. The width of Mullamari River is about 150 m wide to the west of Chatrasala village with a bank height of 4m. During the peak season the river flow is bank full but during the lean season starting from February to June the depth of the flow is reduced.

As per the estimations of C.E. Irrigations Projects Zone, Gulbarga the river carries an average annual yield of 55.89 M cum. as measured at a gauge site at Chincholi village (See Yield Table for Lower Mullamarri Project attached with Annexure 2).

Further it is reported that the flow in the river is confined only to the months of July to January and the months February to June contains very low flows.

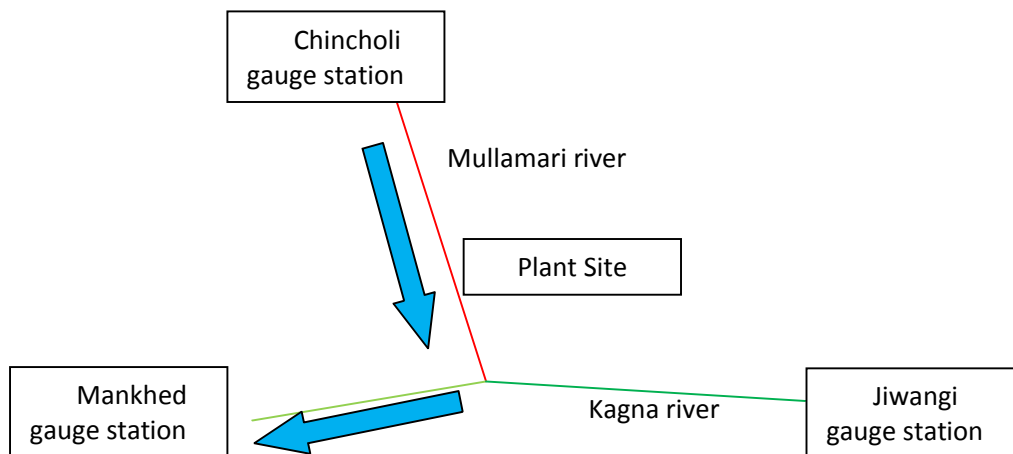
Actually the river reaches from Chincholi village downstream to Chatrasala and below is gaining stream with increasing base flows derived from the ground water discharge. With the ground water flow from the Vesicular basalt formation in to Limestone formation down the gradient, the base flows gradually increase in the river.

A gauge station maintained by Central Water Commission at Mankhed village on Kagna river downstream after the confluence of Mullamari river records a minimum flow of 0.1 cum/sec (=8640 cum/day) during the lean season.

Since the river stretch near Chatrasala village is upstream of this point and since another Gauging station at Jiwangi Village on the upstream side of Kagna river before the confluence of Mullamarri river reported the minimum flows as nil, we may safely assume that the river flow will be at least 0.05 cum/sec (4340 cum/day). (The locations of the gauge stations are shown in Annexure-1.)

⁴ Ground water information booklet for Ranga Reddy district Andhra Pradesh, fig. 4&5

⁵ Ground water information booklet for Gulbarga district Karnataka, fig. 4&5



5. Ground Water Resources

5.1. Ground Water Resources at District and Taluk Levels

The Central Ground Water Board (Govt of India) and the respective state ground water departments (Karnataka/ Andhra Pradesh) have jointly assessed the ground water resources of the area as per the Ground Water Estimation Committee Methodology, 1997 for the year 2004. The resource estimations are carried out on taluk basis or small water shed basis (about 250 Sq. Km areas).

Following reports are available for districts in which study basin exists:

- GW Information Booklet Gulbarga Dist., Karnataka
- GW Information Booklet Ranga Reddy Dist., AP

As cited in these reports, groundwater resources at Taluk level are:

- Chincholi Taluk, Gulbarga Dist.

Refer to Table 1, pg 10 of the Ground Water Information Booklet Gulbarga Dist, the groundwater resources in Chincholi Taluk are:

Taluk	Available groundwater resource	Groundwater draft for irrigation	Ground Water Draft for Domestic and Industrial use presently	Total Annual Ground Water Draft	Average Stage of Ground Water Development %
Chincholi (Ham)	7601	1859	472	2332	31 % (SAFE*)

- Tandur No. 30, Ranga Reddy Dist., AP

Refer to Report on Estimation Of Ground Water Resources In Andhra Pradesh (Government Of Andhra Pradesh,GWD) Page 200 At S.No. 30, the groundwater resources in Tandur No30 Taluk are:

Taluk	Available groundwater resource	Groundwater draft for irrigation	Ground Water Draft for Domestic and Industrial use presently	Total Annual Ground Water Draft	Average Stage of Ground Water Development %
Tandur No 30 (Ham)	425	119	23	142	33 % (SAFE*)

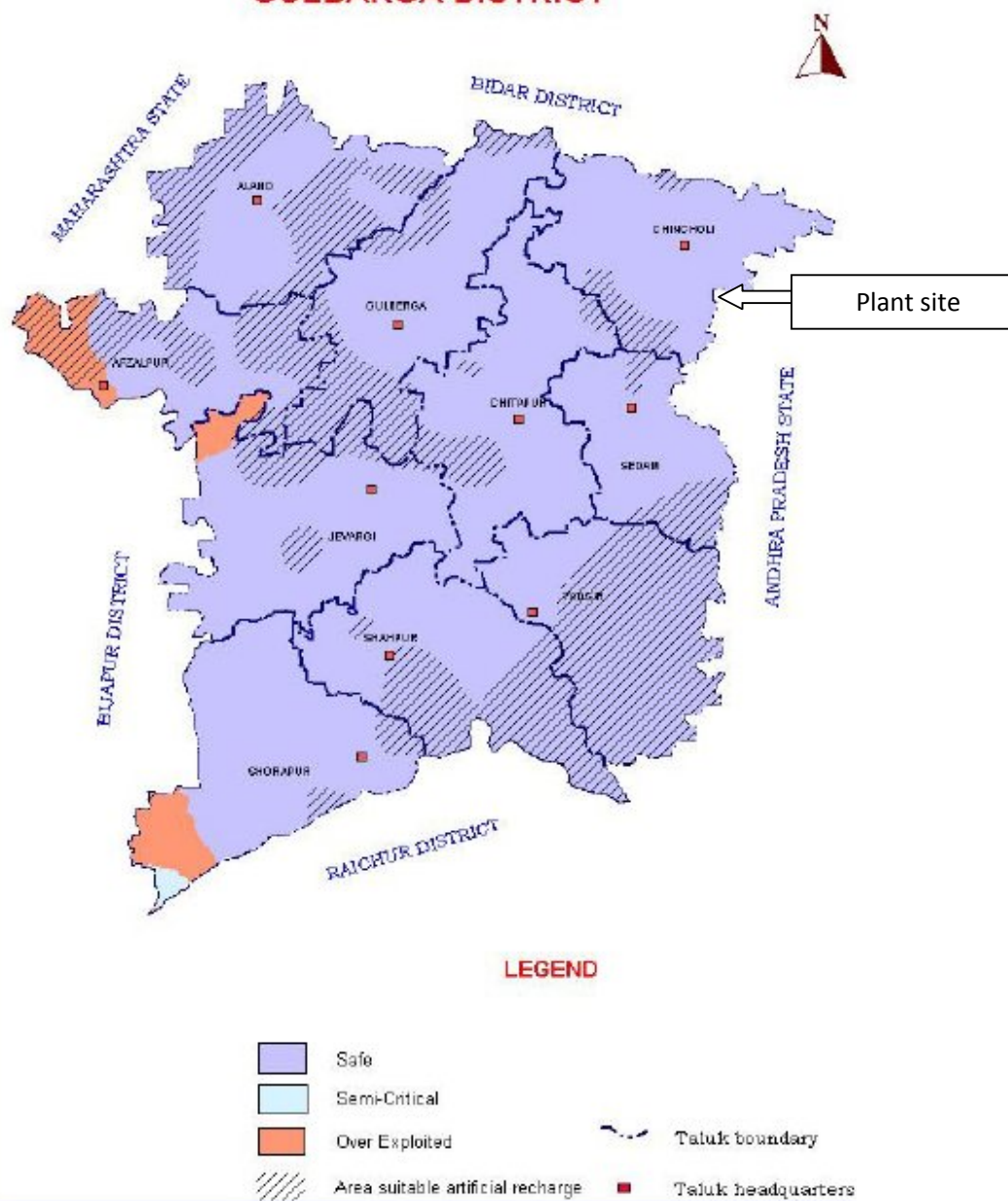
- Tandur No. 31, Ranga Reddy Dist., AP

Refer to Report on Estimation Of Ground Water Resources In Andhra Pradesh (Government Of Andhra Pradesh,GWD) Page 200 At S.No. 30, the groundwater resources in Tandur No31 Taluk are:

Taluk	Available groundwater resource	Groundwater draft for irrigation	Ground Water Draft for Domestic and Industrial use presently	Total Annual Ground Water Draft	Average Stage of Ground Water Development %
Tandur No 31 (Ham)	1988	777	89	866	44% (SAFE*)

* As per the norms set in the report of the Ground Water Estimation Committee, 1997, the areas are “Safe” where ground water resource assessment shows the stage of ground water development is at 70% or lower.

STATUS OF GROUNDWATER UTILISATION GULBARGA DISTRICT



Map from the Ground Water Information Booklet, Gulbarga District, Fig. 6 p 23

5.2. Ground Water Resources in Study Basin

Taluk	Available Water Resources (<i>Ha-m</i>)	% of district in Study basin	Groundwater in Study Basin
Chincholi	7601	32%	2402 Ha-m
Tandur 30	425	100%	425 Ha-m
Tandur 31	1988	47%	934 Ha-m
TOTAL available ground water	10014		3761 Ha-m

Using the same % to evaluate the irrigation draft and domestic and industrial draft from the watershed (see detailed calculation in table below), it appears that the global irrigation draft will be 1286Ha-m, which leads to a stage of ground water development of 34%.

As the stage of groundwater development in the watershed in the watershed is only 34%, there is ample scope for exploitation of available groundwater resource. 2475 Ha-m can be attributed to future development.

Taluk, District and State	Available Ground Water Resources Ha-m	Ground Water Draft for Irrigation Ha-m	Ground Water Draft for Domestic and Industrial use presently, Ha-m	Total Annual Ground Water Draft Ha-m	Average Stage of Ground Water Development %
*Chincholi Taluk Karnataka complete	7601	1859	472	2332	31
Chincholi part (Karnataka) in the basin 32%	2402	587	149	737	31
**Water Shed No. Tandur N (at S.no.30 of Annexure 3)) in Tandur taluk (full) , Andhra Pradesh.	425	119	23	142	33
**Water Shed No. Tandur (at S.no.31of Annexure 3) in Tandur taluk , Andhra Pradesh	1988	777	89	866	44
**Water Shed No. Tandur 31 in Tandur taluk (47%) , Andhra Pradesh	934	365	42	407	44
Total of above two water sheds in Tandur taluk , Andhra Pradesh	1359	484	65	549	40
Total of parts of Chincholi and Tandur taluk in sub basin	3761	1072	214	1286	34

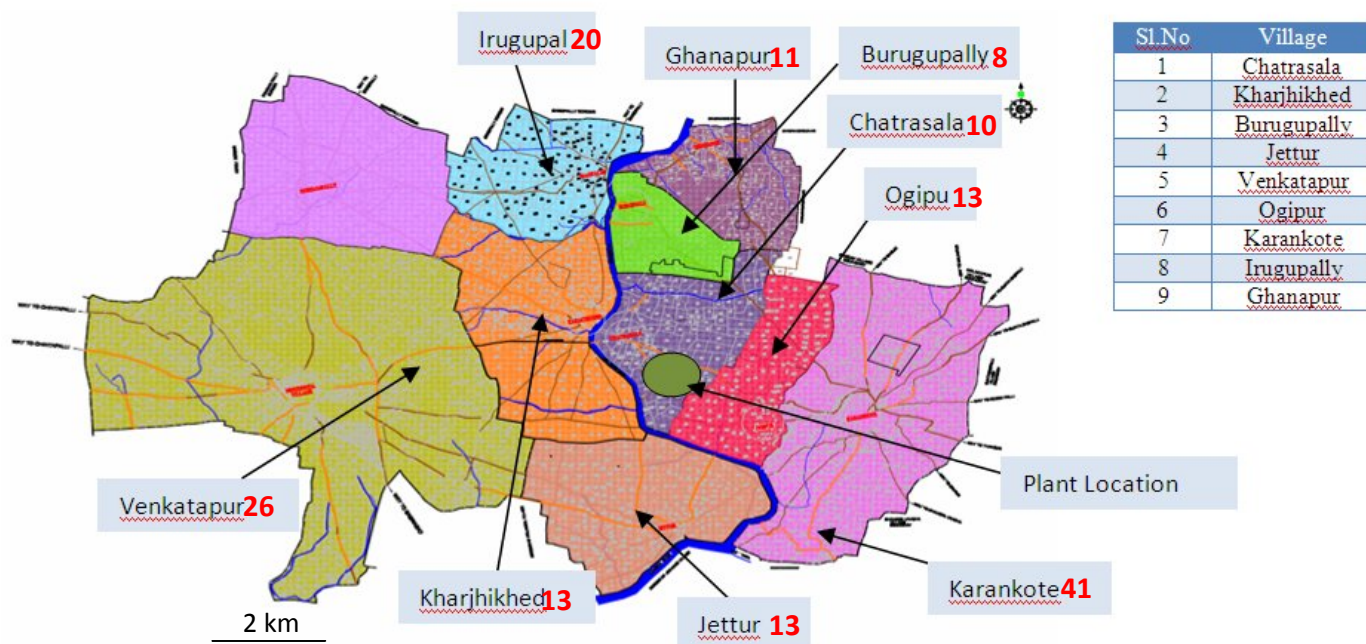
*As per Ground Water Resources Estimations by Central Ground Water Board (see Gulberga District Brochure Page 10, Table 1)

**Report on Estimation Of Ground Water Resources In Andhra Pradesh (Government Of Andhra Pradesh,GWD) Page 200 At S.No. 30&31--Annexure 3.

5.3. Ground Water Availability near the Project Site

Through a survey on site some evidence has been found of water availability precisely around the plant location. The complete survey report is in annexure 4.

A wells inventory has been carried out in 9 villages around the plant site, through interview of the well owners. See the map below. In red are the numbers of wells in each village area.



The result of this survey of 145 wells and borewells is that none of them has ever dried up so far. The well owners mentioned that there is not much seasonal fluctuation. Concerning the borewells the owners could not state anything about the level fluctuation.

	borewells for drinking/general use	borewells for irrigation	average depth (m)	nbr of borewells that dried up in the last 5 years	wells for drinking/general use	wells for irrigation	average depth (m)	nbr of wells that dried up in the last 5 years
Chatrasala	5	1	40,4	0	2	2	14,1	0
Kharchked	8	0	45,9	0	3	2	15,2	0
Burgupally	5	1	36,3	0	0	2	15,2	0
Jettur	1	0	39,6	0	0	0	14,5	0
Venkatapur	2	24	38,6	0	0	0		
Ogipur	3	5	48,8	0	2	3	24,4	0
Karankote	1	9	55,2	0	1	30	17,9	0
Irgupally	4	5	43,7	0	0	11	15,4	0
Ghanapur	6	0	36,8	0	1	4	17,4	0
TOTAL	35	45		0	9	54		0

Three owners also of 3 small limestone quarries (producing polished stones for construction) in the vicinity of the plant site were interviewed to know the depth at which water intrusion was happening. They all reported that in peak summer season the water seepage was happening at about 35 to 40 meters. They use thus dewatering pumps of 2 – 5 HP either to abandoned quarries or to the streams. In rainy season the quarries are full of rain water.

A third evidence of water availability around the plant is coming from the operation of two other cement plants nearby. We could get some precise information from one of them, The India Cement Ltd (ICL), concerning how they source water. It has been reported that the water for plant use is coming from their water storage in limestone mines and from the base flow of the Kagna river through infiltration well. Some wells also exist for the consumption of the colony.

6. Water Requirements of Vicat Sagar and Sources Available

VICAT SAGAR has projected their water requirements for their cement plant as 2892 or say 3000 cum/day. This consumption considers two production lines in the cement plants.

Section/ Department	Requirement (m ³ /Hour)			Requirement (m ³ /Day)
	Recirculation	Consumption	Total	Total
Plant Requirement				
Crusher		10	10	120
Mills:				
Coal Mill		5	5	100
Cement Mill		1	1	22
Recirculation				
Bearings at Kiln, Gearboxes, Fan Bearings at RABH, Preheater ,ESP & VFD Drives	3	-	3	60
General Usage (including Laboratory, Toilets, Washing etc.,)	-	-	-	40
Sub Total (Phase 1)				342
Phase 2				300
Sub Total (for both Phases)				642
Captive Power Plant				
Phase 1				
2 x 20 MW	-	50	50	1200
Phase 2				
1 x 20 MW	-	25	25	600
Sub-Total				1800
Residential Colony & Landscaping				
Colony (@ 150 Liters /person/day for 2000 People Living in the Colony)				300
Landscaping				150
Sub-Total				450
Total				2892

7. Water Sources Available:

June – February (Flush months):

M/s Karnataka Keeravani Nigam has already given the clearance for the supply of 0.061 TMC (1.7275 MCM/annum) out of the Mullamari river excluding the months of February to June i.e., the lean months (Annexure 2).

February to June (Lean months):

Groundwater will be the primary source of water during the lean months.

- There is evidence of Water Availability in the vicinity as reported in the study mentioned above
- During the first 2-3 years – only the first production line of the plant will be in operation hence water demand will be reduced 2000 m³/day
- There is also possibility of storing rainwater in limestone mine pits, which can be used in lean seasons. According to the mining excavation plan a storage capacity of 400 000 cum will be available to store rain water after 2 to 3 years of excavation, either through direct contribution from some nallas⁶ or through pumping out of the river in rainy season.

If plant can operate during lean season without significant impacts, then it can operate throughout the year with groundwater without significant impacts also.

8. Cumulative Impacts on Water Resources

The water requirements of the other existing and proposed cement plants are estimated based on the requirements of cooling towers and captive thermal plants as shown in the table below:

Plant	Daily consumption m ³ /day	Number of Days of consumption (1)	Annual Requirement t in m ³ /year	Annual - Requirement in Ha m	GW Availability in Study Basin (<i>as calculated above</i>)
VSCL	2892	215	621780	62	
CCI	673	335	225455	23	
ICL	963	335	322605	32	
Penna	963	335	322605	32	
Chettinad	2892	335	968820	97	
TOTAL	8383		2461265	246	2475 Ha-m

Days of consumption from ground water for VSCL : 7 months

Penna consumption assumed to be similar to ICL

Chettinad consumption assumed to be similar to VSCL

(1) Considering that no water storage is used by the different plants

⁶ A nalla is a non perennial flow which appears in rainy season

As CCI and ICL are already existing plant, it can be assumed that their consumption was already included in 2004. The Penna plant is included in the calculation even if it is outside the watershed as there is some possibility that they construct some ground water extraction structures located on the sub basin.

Nevertheless, even if we consider the whole water draft of all the cement plants in the watershed, it appears that the water consumption is marginal compared to the groundwater availability.

Moreover after 2 – 3 years of mine operation, the water storage in pits recharged by rainwater (or through pumping in the river during rainy season) will be also available for the new cement plants, reducing the groundwater usage.

9. Conclusions

The main conclusions that can be derived from secondary data available are:

- Sufficient surface water is available during flush months to meet the project's water demand.
- Sufficient ground water available at district level and study basin level as reported in CGWB reports to meet the project's water demand.
- No water shortages are reported in the plant area as per the survey carried out.
- Based on this study, the cumulative impact by Vicat Sagar as well as other cement plants on water resources in the study basin is marginal, even if all the current and projected cement plants meet their needs from ground water.

Some additional detailed field studies will be carried out during lean season in 2010.

10. References

1. Ground Water Resource Estimation Methodology-1997(Report of the Ground Water Resource Estimation Committee, Ministry of Water Resources, Government of India, June, 1997.
2. Report on Estimation of Ground Water Resources in Andhra Pradesh. (Ground Water Department, Government Of Andhra Pradesh).
3. Ground Water Information Booklet, Gulberga District, Karnataka, South Western Region, Central Ground Water Board, Bangalore, Ministry Of Water Resources, November, 2008 (down loaded from their web site.)

11. List of Appendix

Annexure-1	Basin map showing watershed area and gauging stations in and around proposed cement plant
Annexure-2	Letter from CE Irrigation projects zone, Karnataka
Annexure-3	Ground water availability tables for Tandur
Annexure-4	Note on Ground Water Availability at Chatrasala (VSCPL Plant Location) in Karnataka

ANNEXURE 1

ANNEXURE 2

Moham Raddif

①

GOVERNMENT OF KARNATKA
(Water Resource Dept.)

Office of the
Executive Engineer,
No.3 Irrigation Enquiry Division
Gulbarga,
No:IED3/PB/Ind/W/Chatersala/2008-09/1082.
dtd. 10.2.2009.

To,
The Superintendant, Engineer,
Irrigation Enquiry Circle,
YERMORUS Camp, Dist. Raichur.

Subj: Supply of Water for the Industry Purpose

Ref: Letter No:WRD/2/KBN/2008, dtd. 12.12.2008
Written by the Govt. of Karnataka Ministerial
Division, Vikas Soudha B'lore to the
Secretariat Govt. of Water Resource Depart-
ment B'lore.

2. Letter No:KUM/SHLCE/3/1119/2007-08
dtd. 18.1.08 Written by the friends Employment
of Karnataka to the Secretary Water Resource
Department.

3. Letter No:KIBL/IPM/CEG/TS/2/SH1/2008-09
dtd. 22.12.2008.

Written by Chief Engineer Karnataka Irriga-
tion Board Irrigation Project Gulbarga to
the Secretary Govt. of Karnataka Water
Resources.

4. Letter No:WRD/PMT/TA2/SE2/Industry/2008-09
dtd. 17.11.2008 Written by Chief Engineer
Water Resource Development Depot. B'lore.

5. Letter No:NTY/PB/AE1/and 2 Industry/08-09
789 dtd. 30.1.2009.

With reference to the above cited subject in refer-
ence No.2 the Manager of the M/s Sagar Cement Factory Ltd.
Chatersala taluka Chincholi has written a letter, requesting
provide the Mullamari River Water on every day to run the
cement factory each day require water 7100 TMC. With regard
to this the Secretary of the Government written a letter to
the Water Resource Department with regard to availability of
the water for the above purposes.

②

2. With regard to this already the chief Engineer of Irrigation Department Circle Gulbarga (Ref.No.3 letter which is shown above) He has intimated stating that the availability of the required water source to the Sagar Cement Factory Ltd. is every year 0.061 Tmc. (except from month of February to June it means except 5 months) water ascertain from the water & Chief Engineer Water resource Development Department, B'lore the permission may be accorded for utilisation of the required water from the Mullamari river by the Sagar Cement factory, same be intimate^{by} the Secretariate of Government.

3. The chief Engineer of Water Resource Development Board Bangalore after detailed enquiry with regard to the availability of water etc., directed to the concerned authority to intimate the same in detail.

With regard to the availability of water the following report has been given.

1. The Mullamari river not always flow, (but it is a perennial supply water)
2. Except from June to October period the other time the flow of water at Mullamari is not sufficient.

3. Below the water tank of the Mullamari Irrigation tank to Chincholi water measurement Centre without any obstacles water will flow in that area

The area from lower Mullamari Tank to water measurement centre Chincholi it measures 350.5 Sqm. And as same the distance from water measurement centre Chincholi to Kharibekhed and Chatersala village i.e., wherein proposed said cement factory place) this area measures 271.38 Sq.Mtrs.

4. On the basis of the rain fall from June to Oct. months from this water area of Mullamari, it is as follows: (The detail water sources from rain falls as per the rain fall measurement centre of Chincholi.)

- 3 -

=====			
Water sources in mm.			
50/dependant		75 Present	
=====dependence=====			
1) From Lower Mullamari Tank	54.89	11.30	
to Water Measurment Centre			
Chincholi.			
2) Chincholi , From Water	42.49	8.7	
Measurment Centre Chincholi			
to Chabersala village			
Total		97.38	20.00
OR	3.40 Tmc.	0.70 Tmc.	
=====			

- 5) 50%(present) Or 75%(Present) whichever may be taken into consideration the required water for industry purpose to the extent of 0.061 Tmc. water from July to October period available from said Mullamari river.
- 6) From November month to January month the flow of of water in Mullamari river i.e., these 3 months water flow is less than the other months, so storage of water which is required to these three months is made it is possibility to use the required water from storage by the Factory.

Herewith giving ~~xxx~~ sketch map with regard to the flow of water in ever month taking into consideration of that, the permission to be accorded to the said industry with a all conditions agreeing before the Governments Higher authorities. So, it is giving for your information and neccessary action in future and it submitting.

Enclosures:- 1) Map 3copies
 2) Checklist. 4 "
 3) ~~Water~~ Source of water and its quantity list in detail. 9 "

Yours faithfully,

STATEMENT SHOWING THE YIELD LOWER MULLAMARI PROJECT

- 1) From 1951-52 to 1983-84 : Based on rainfall run-off relationship at gauge site Chincholi
 2) From 1984-85 to 2000-01 : Flow gauge readings of Mullamari river at Chincholi
 3) From 2001-02 to 2007-08 : Flow measurement of river Mullamari at dam site based on gauge records

Sl. No.	Year		Annual yield in Mcft	Yield arranged in descending order	
1	1951	- 1952	3796	15920	
2	1952	- 1953	2133	13340	
3	1953	- 1954	4328	12410	
4	1954	- 1955	5447	8950	
5	1955	- 1956	7184	8807	
6	1956	- 1957	6204	8790	
7	1957	- 1958	3004	8480	
8	1958	- 1959	3898	8190	
9	1959	- 1960	3355	7870	
10	1960	- 1961	2182	7184	
11	1961	- 1962	4377	6670	
12	1962	- 1963	2950	6257	
13	1963	- 1964	4279	6204	
14	1964	- 1965	4446	5447	
15	1965	- 1966	2946	4873	
16	1966	- 1967	2314	4510	
17	1967	- 1968	2119	4448	
18	1968	- 1969	1646	4446	
19	1969	- 1970	2646	4377	
20	1970	- 1971	3175	4328	
21	1971	- 1972	735	4279	
22	1972	- 1973	295	3898	
23	1973	- 1974	4873	3864	
24	1974	- 1975	1228	3796	
25	1975	- 1976	2015	3355	
26	1976	- 1977	6257	3175	
27	1977	- 1978	1461	3004	
28	1978	- 1979	2360	2950	
29	1979	- 1980	2563	2946	50%
30	1980	- 1981	2197	2830	

Sl. No.	Year		Annual yield in Mcft	Yield arranged in descending order	
31	1981	- 1982	4448	2661	
32	1982	- 1983	2135	2646	
33	1983	- 1984	8807	2640	
34	1984	- 1985	6670	2580	60%
35	1985	- 1986	2640	2563	
36	1986	- 1987	2580	2360	
37	1987	- 1988	2830	2314	
38	1988	- 1989	15920	2300	
39	1989	- 1990	8480	2197	
40	1990	- 1991	12410	2182	
41	1991	- 1992	4510	2170	
42	1992	- 1993	2050	2135	
43	1993	- 1994	2300	2133	75%
44	1994	- 1995	1390	2119	
45	1995	- 1996	8790	2050	
46	1996	- 1997	8190	2015	
47	1997	- 1998	2170	1646	
48	1998	- 1999	13340	1461	
49	1999	- 2000	7870	1390	
50	2000	- 2001	8950	1263	
51	2001	- 2002	377	1228	
52	2002	- 2003	677	735	105.81
53	2003	- 2004	405	677	150.36
54	2004	- 2005	425	425	47.31
55	2005	- 2006	2661	405	605.43
56	2006	- 2007	1263	377	
57	2007	- 2008	3864	295	1973.81

Chief Engineer, KNNL,
 Irrigation Projects Zone, Gulbarga.

20/11

20/11

ANNEXURE 3

S. No	Name of the Basin	Area considered for recharge ha	Net annual groundwater availability ha.m	Current gross annual ground water draft for all uses ha.m	Annual groundwater availability for future use ha.m	Curent annual draft for irrigation ha.m	Current draft for domestic and industrial needs ha.m	Demand for domestic and Industrial needs at 2025 ha.m	Net annual ground water availability for future irrigation use ha.m	Stage of develop ment %	Catego risation
		NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
1	2	3	4	5	6	7	8	9	10	11	12
25	Pargi	24922	2515	1882	633	1761	121	222	532	75	SC
26	Bantwaram	29237	2275	1008	1267	908	100	200	1168	44	Safe
27	Mominpet	12797	1106	641	465	601	39	113	391	58	Safe
28	Marpally	14982	1208	555	653	505	50	121	582	46	Safe
29	Peddumul	17961	1462	894	568	815	79	110	536	61	Safe
30	Tandur_N	6293	425	142	284	119	23	49	257	33	Safe
31	Tandur	17429	1988	866	1122	777	89	213	998	44	Safe
32	Yalal_NE	6830	951	543	408	510	33	42	399	57	Safe
33	Yalal	10027	1345	735	611	694	40	77	574	55	Safe
34	Basheerabad	18802	2293	601	1692	519	82	130	1643	26	Safe
	District Total	590378	64262	51755	12507	42528	9227	13129	8605	81	SC
	ABSTRACT	OE = 9	Critical =5		SC =5		Safe =15		Total Basins = 34		

Note: OE = Over exploited; SC = Semi-critical; NC = non-command and NA = Not applicable; Col.no.6 = Col.no.4 - Col.no.5; Col.no.10 = Col.no.4 - (Col.no.7 + Col.no.9); Command area is nil

ANNEXURE 4

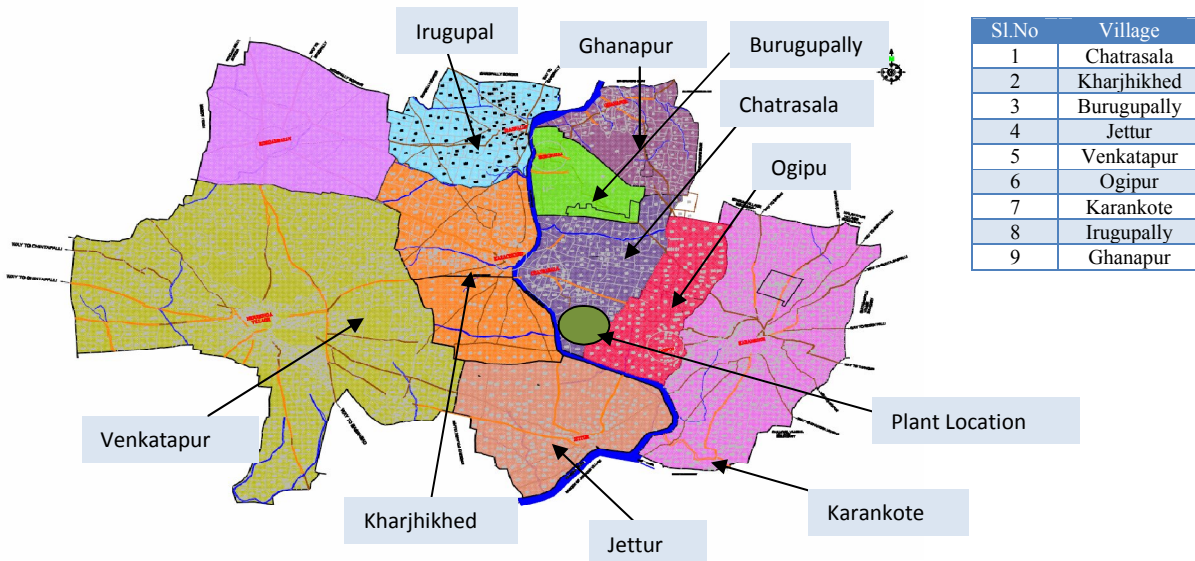
ANNEXURE 4 : NOTE ON GROUND WATER AVAILABILITY AT CHATRASALA (VSCPL PLANT LOCATION) IN KARNATAKA

This note is organized in the following parts:

- Existing Wells (shallow/deep; community/private) in the neighboring villages.
- Water table and handling of water in Lime Stone/Stone Quarries in the neighborhood.
- Information on reliability of Water Supply in the operating Cement Plants in the area.

Information about Existing Wells in the neighboring Villages:

For this purpose, as agreed in the meeting, Villages in 5 to 10 Kms. radius from the Plant site are selected and are as follows:



From these villages, information about wells/bore wells are collected

During the collection of this data/information, owners/responsible people for this were interviewed and additional information regarding the purpose, depth and seasonal fluctuation in depth was also collected. During the interview almost all the people who were interviewed replied that there is not much of variation/fluctuation in the water levels during the various seasons especially which are close to the river flow. Regarding the Bore wells they mentioned that they drilled more than required and said it was difficult to state the level variation and mentioned that they never dried up so far.

Information collected (Village wise) is summarized as below, survey number are related to the following map:

	CHATRASALA	Private/Govt.	Usage	DEPTH in feet	Dia.in inches	Location
BORE WELLS						
CH-B-1	BUS STAND	GOVT	FOR DRINKING PURPOSE	155	6"	CV ¹
CH-B-2	HANMAN TEMPLE- HAND BORE	GOVT	GENERAL USE/DRINKING	115	6"	CV
CH-B-3	SC COLONY-HAND BORE	GOVT	GENERAL USE/DRINKING	115	6"	CV
CH-B-4	NEAR SCHOOL-HAND BORE	GOVT	GENERAL USE	110	6"	CV
CH-B-5	JAIRAM REDDY	PRIVATE	HOUSE PURPOSE	160	6"	CV
CH-B-6	CHANDAPPA	PRIVATE	IRRIGATION	140	6"	SY No 137
WELLS						
CH-W-1	KUMMARWADA	GOVT	GENERAL USE	60	10'	CV
CH-W-2	RAM REDDY	PRIVATE	IRRIGATION	50	10'	SY No 129
CH-W-3	MANIK REDDY	PRIVATE	IRRIGATION	40	10'	SY No 124
CH-W-4	NEAR BRIGE	GOVT	SUPPLY TO NIDIGUNDA FOR DRINKING	35	10'	CV



Chatrasala – Water Supply



Chatrasala – Kuminari Wada – Well for General Use



Chatrasala – Manik Reddy Sy.No.124 – For Irrigation



Nidigunda – Water Supply



Chatrasala – Chandappa Sy.No.137 – For Irrigation



Chatrasala – SC Colony – Drinking/General Use



Chatrasala – Ram Reddy Sy.No.129– For Irrigation

	KHARCHKED	Private/Govt.	Usage	DEPTH in feet	Dia.in inches	Survey nbr
BORE WELLS						
KH-B-1	GRAMPANCHAYAT OFFICE - HAND PUMP	GOVT	DRINKING PURPOSE	155	6"	CV ^r
KH-B-2	KUMBAR WADA	GOVT	DRINKING PURPOSE	150	6"	CV
KH-B-3	SC COLONY	GOVT	DRINKING /GENERAL PURPOSE	150	6"	CV
KH-B-4	VADDARA COLONY	GOVT	DRINKING /GENERAL PURPOSE	150	6"	CV
KH-B-5	SC COLONY	GOVT	DRINKING /GENERAL PURPOSE	150	6"	CV
KH-B-6	NEAR MULLAMARI RIVER	GOVT	SUPPLY OF VILLAGE FOR DRINKING	150	6"	CV
KH-B-7	MASJID	PRIVATE	DRINKING /GENERAL PURPOSE	150	6"	CV
KH-B-8	THANDA	GOVT	DRINKING / GENERAL PURPOSE	150	6"	CV
WELLS						
KH-W-1	SC COLONY	GOVT	GENERAL USE	50	10'	CV
KH-W-2	GURURAJ	PRIVATE	HOUSE USE PURPOSE	50	10'	CV
KH-W-3	DESAI	PRIVATE	HOUSE USE PURPOSE	50	10'	CV
KH-W-4	JAGANNATH REDDY	PRIVATE	IRRIGATION-	50	10'	
KH-W-5	SHANKER REDDY	PRIVATE	IRRIGATION-	50	10'	SY No 39



Kharjikhed – SC Colony – For Drinking/General Use



Kharjikhed – Water Supply – For Drinking/General Use

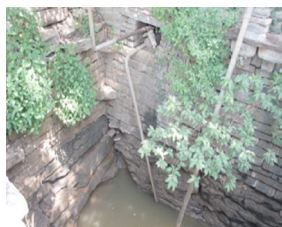


Kharjikhed – Near Govt. Hospital – General Use

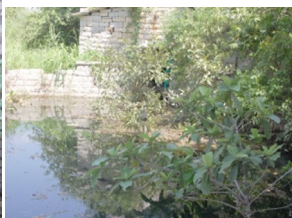
	BURUGPALLY	Private/Govt.	Usage	DEPTH in feet	Dia.in inches	Location
BORE WELLS						
BP-B-1	NEAR BUSSTAND - HAND PUMP	GOVT	DRINKING /GENERAL PURPOSE	110	6"	CV
BP-B-2	HANMAN MANDIR - HAND PUMP	GOVT	DRINKING /GENERAL PURPOSE	110	6"	CV
BP-B-3	SC COLONY - HAND PUMP	GOVT	DRINKING /GENERAL PURPOSE	110	6"	CV
BP-B-4	MAIN ROAD TO VILLAGE	GOVT	SUPPLY OF VILLAGE FOR DRINKING	155	6"	CV

¹ CV : center of the village

BP-B-5	CHANNAPPA PATIL	PRIVATE	IRRIGATION	120	6"	SY No 72
BP-B-6	AMRUTHAPPA	GOVT	DRINKING /GENERAL PURPOSE	110	6"	CV
WELLS						
BP-W-1	HANMAN MANDIR	GOVT	NOT IN USE	50	10'	CV
BP-W-2	GOVIND REDDY	PRIVATE	IRRIGATION	50	10'	SY No 44
BP-W-3	CHANNAPPA PATIL	PRIVATE	IRRIGATION	50	10'	SY No 172



Burugupally – Channappa Patil – For Irrigation



Burugupally – Govind Reddy/Bhim Reddy – For Irrigation



Burugupally – SC Colony – For Drinking/General Use



Burugupally – Channappa Patel Mali - Irrigation

	JETTUR	Private/Govt.	Usage	DEPTH in feet	Dia.in inches	Location
BORE WELLS						
JT-B-1	VILLAGE CENTRE	GOVT	GENERAL USE	130	6"	CV
WELLS						
JT-W-1	VILLAGE ENTRANCE	GOVT	DRINKING / GENERAL USE	60	10'	CV
JT-W-2	BICHI REDDY	PRIVATE	GENERAL USE	35	10'	CV



Jettur – Govt. Well – For Drinking/General Use



Jettur – Bichi Reddy Patel Private - For swimming purpose only



Jettur – Drinking/General Use

	VENKATAPUR	Private/Govt.	Usage	DEPTH in feet	Dia.in inches	Location
BORE WELLS						
VP-B-1	SC COLONY-HAND BORE	GOVT	DRINKING /GENERAL USE	120	6"	CV
VP-B-2	NEAR SCHOOL-HAND BORE	GOVT	DRINKING /GENERAL USE	120	6"	CV
VP-B-3	NARSAPPA-GANGAPUR	PRIVATE	IRRIGATION	120	6"	SY No 242
VP-B-4	TULJAPPA-GANGAPUR	PRIVATE	IRRIGATION	115	6"	SY No 292
VP-B-5	SHAMAPPA-SC	PRIVATE	IRRIGATION	125	6"	SY No 262
VP-B-6	SHIVAPPA- GANGAPUR	PRIVATE	IRRIGATION	130	6"	SY No 292
VP-B-7	BICHAPPA-BANTU	PRIVATE	IRRIGATION	135	6"	SY No 284/1
VP-B-8	SOMNATH-KANKERI	PRIVATE	IRRIGATION	145	6"	SY No 259
VP-B-9	NARSAMMA-PERUMAL	PRIVATE	IRRIGATION	155	6"	SY No 294
VP-B-10	CHANDRAPPA-BATHUL	PRIVATE	IRRIGATION	120	6"	SY No 295
VP-B-11	SAYAPPA-BURUJULA	PRIVATE	IRRIGATION	120	6"	SY No 235
VP-B-12	NARSAPPA-GOPANPALLI	PRIVATE	IRRIGATION	145	6"	SY No 296
VP-B-13	MOGALAPPA-GOVIND	PRIVATE	IRRIGATION	155	6"	SY No 147
VP-B-14	BHEEMAPPA-GOVIND	PRIVATE	IRRIGATION	145	6"	SY No 235
VP-B-15	SABANNA-PERUMAL	PRIVATE	IRRIGATION	150	6"	SY No 297
VP-B-16	SUBHASH-PERUMAL	PRIVATE	IRRIGATION	145	6"	SY No 297
VP-B-17	RAMAIAAH-PERUMAL	PRIVATE	IRRIGATION	150	6"	SY No 297
VP-B-18	DASHARATH PERUMAL	PRIVATE	IRRIGATION	130	6"	SY No 298
VP-B-19	SAIDAPPA-MANTAPUR	PRIVATE	IRRIGATION	120	6"	SY No 155
VP-B-20	KASHINATH-KANKERI	PRIVATE	IRRIGATION	120	6"	SY No 230
VP-B-21	NARSAPPA-BOMBAY	PRIVATE	IRRIGATION	110	6"	SY No 266
VP-B-22	NARSAPPA-JENDA	PRIVATE	IRRIGATION	120	6"	SY No 271
VP-B-23	HANMANTH GOVIND	PRIVATE	IRRIGATION	120	6"	SY No 285
VP-B-24	NARSAPPA BUDDA	PRIVATE	IRRIGATION	120	6"	SY No 233
VP-B-25	MARAPPA MEKAL	PRIVATE	IRRIGATION	120	6"	SY No 241
VP-B-26	CHANDRAIH POOJARI	PRIVATE	IRRIGATION	125	6"	SY No 287



Venkatapur – Marappa Mekala Sy.No.241 – For Irrigation



Venkatapur – Near School Govt. – For Drinking/General Use



Venkatapur – Tuljappa Gangapur Sy.No.292 – For Irrigation



Venkatapur – Water Supply – For Drinking/General Use



Venkatapur – Subhash Perumal Sy.No.297 – For Irrigation



Venkatapur – Hanmanth Govind – For Irrigation

	OGIPUR	Private/Govt.	Usage	DEPTH in feet	Dia.in inches	Location
BORE WELLS						
OP-B-1	HANMAN TEMPLE-HAND BORE	GOVT	DRINKING WATER	145	6"	CV
OP-B-2	NEAR SCHOOL-HAND BORE	GOVT	DRINKING WATER	145	6"	CV
OP-B-3	TAMANNA PATEL.S/O.BICHAPPA	PRIVATE	IRRIGATION	165	6"	SY No 36/2
OP-B-4	SIDDANNA PATEL.S/O.BASANTH	PRIVATE	IRRIGATION-	165	6"	SY NO 36/2
OP-B-5	NAGAPA PATEL.S/O.BASANTH	PRIVATE	IRRIGATION	165	6"	SY NO 36/2
OP-B-6	VENKATAPPA.S/O.ERAPPA	PRIVATE	IRRIGATION-	170	6"	SY NO 6
OP-B-7	PEDDEMUL RAMAPPA.S/O.BICH	PRIVATE	IRRIGATION-	170	6"	SY NO 8
OP-B-8	GRAM PANCHAYAT BORE	GOVT	GENERAL USE-	180	6"	CV
WELLS						
OP-W-1	SC COLONY	GOVT	GENERAL USE	75	10'	CV
OP-W-2	DARGA	GOVT	GENERAL USE	70	10'	CV
OP-W-3	PANDU.S/O.ERAPPA.	PRIVATE	IRRIGATION	85	10'	SY No 19
OP-W-4	KODLI MALKI REDDY.S/O.NARSI REDDY	PRIVATE	IRRIGATION	85	10'	SY No 21
OP-W-5	SC'S WELL	PRIVATE	IRRIGATION	85	10'	SY No 12



Ogipur – Near SC Colony Govt. – For General Use



Ogipur – Venkatamma W/o.Narasima Reddy – For Irrigation



Ogipur – Tamanna Patel Sy.No.36 – For Irrigation

	KARANKOTE	Private/Govt.	Usage	DEPTH in feet	Dia.in inches	Location
BORE WELLS						
KK-B-1	31 BORES	GOVT	FOR DRINKING /GENERAL USE			CV
KK-B-2	GUDDETI NARSAPPA	PRIVATE	IRRIGATION	185	6"	SY No 200
KK-B-3	SRIPADA RAO	PRIVATE	IRRIGATION	195	6"	SY No 224
KK-B-4	KONDA PENTAPPA	PRIVATE	IRRIGATION	185	6"	SY No 314
KK-B-5	KATTA BHAGWAN	PRIVATE	IRRIGATION	175	6"	SY No 258
KK-B-6	P.PRABHAKER GOUD	PRIVATE	IRRIGATION	180	6"	SY No 188/B
KK-B-7	K.NARSAIAH GOUD	PRIVATE	IRRIGATION	170	6"	SY No 188/B
KK-B-8	K.NARSAIAH GOUD	PRIVATE	IRRIGATION	180	6"	SY No 188/B
KK-B-9	KATTA CHINA DASTAIAH	PRIVATE	IRRIGATION	180	6"	SY No 226
KK-B-10	KATTA PEDA DASTAIAH	PRIVATE	IRRIGATION	180	6"	SY No 188
WELLS						
KK-W-1	8 WELLS	GOVT	FOR DRINKING / GENERAL USE			CV
KK-W-2	RANGA REDDY	PRIVATE	IRRIGATION	55	10'	SY No 236

KK-W-3	P.FAKIR SAB	PRIVATE	IRRIGATION	65	10'	SY No 208
KK-W-4	B.FAKIR SAB	PRIVATE	IRRIGATION	50	10'	SY No 217
KK-W-5	BHIMAPPA KATTA	PRIVATE	IRRIGATION	45	10'	SY No 148
KK-W-6	SMT SUBHADRAMMA	PRIVATE	IRRIGATION	75	10'	SY No 134
KK-W-7	D.NARASAPPA	PRIVATE	IRRIGATION	65	10'	SY No 159
KK-W-8	SOMESWAR RAO	PRIVATE	IRRIGATION	60	10'	SY No 336
KK-W-9	B.SAVITRI BAI	PRIVATE	IRRIGATION	80	10'	SY No 329
KK-W-10	BHEEM RAO	PRIVATE	IRRIGATION	70	10'	SY No 187
KK-W-11	BASANTH REDDY	PRIVATE	IRRIGATION	60	10'	SY No 375
KK-W-12	S.NURANDAPPA	PRIVATE	IRRIGATION	45	10'	SY No 350
KK-W-13	P.NAGAMMA	PRIVATE	IRRIGATION	40	10'	SY No 191
KK-W-14	C.MOULANA	PRIVATE	IRRIGATION	35	10'	SY No 226
KK-W-15	IQBAL	PRIVATE	IRRIGATION	45	10'	SY No 328
KK-W-16	ABDULNASSEER	PRIVATE	IRRIGATION	50	10'	SY No 231
KK-W-17	SRINIVAS RAJU	PRIVATE	IRRIGATION	55	10'	SY No 215
KK-W-18	KATTA SABAMMA	PRIVATE	IRRIGATION	55	10'	SY No 258
KK-W-19	POLICE NARAYANA	PRIVATE	IRRIGATION	65	10'	SY No 236
KK-W-20	K. BADARAPPA	PRIVATE	IRRIGATION	65	10'	SY No 169
KK-W-21	MATTAM MALLIKARJUN	PRIVATE	IRRIGATION	65	10'	SY No 167
KK-W-22	KURA BICHAPPA	PRIVATE	IRRIGATION	65	10'	SY No 169
KK-W-23	PULIKONDA NARSAPPA	PRIVATE	IRRIGATION	65	10'	SY No 200
KK-W-24	CHIRA DASTAPPA	PRIVATE	IRRIGATION	75	10'	SY No 188
KK-W-25	RAJVAR MOGLAPPA	PRIVATE	IRRIGATION	40	10'	SY No 144
KK-W-26	DARMI BHEEMANNA	PRIVATE	IRRIGATION	70	10'	SY No 201
KK-W-27	VADLA KALLAPPA	PRIVATE	IRRIGATION	65	10'	SY No 376
KK-W-28	MOOSI SHARANAPPA	PRIVATE	IRRIGATION	55	10'	SY No 355
KK-W-29	K.NARSI REDDY	PRIVATE	IRRIGATION	60	10'	SY No 367
KK-W-30	KATTA BHAGWANTHAPPA	PRIVATE	IRRIGATION	55	10'	SY No 318
KK-W-31	THANDUR VITAL	PRIVATE	IRRIGATION	65	10'	SY No 305



Karankote – Near Moose Sharnappa House – Drinking/General Use



Karankote – Gogi Ramarao – Drinking purpose



Karankote – Main Bazar – Near Veerasam House – Drinking purpose



Karankote – Near Madipati Veerappa House – General Use



Karankote – Kishanrao, Teacher – Drinking/General Use



Karankote – Near Gram Panchayat Govt. – Drinking/General Use



IRGUPALLY		Private/Govt.	Usage	DEPTH in feet	Dia.in inches	Location
BORE WELLS						
IP-B-1	WAHID PATEL -HAND PUMP	PRIVATE	HOUSE PURPOSE	110	6"	CV
IP-B-2	MOINUDDIN-HAND PUMP	PRIVATE	HOUSE PURPOSE	110	6"	CV
IP-B-3	HANMAN MANDIR	GOVT	SUPPLY TO VILLAGE FOR DRINKING	175	6"	CV
IP-B-4	NEAR MASJID-HAND PUMP	GOVT	DRINKING/GENERAL USE	125	6"	CV
IP-B-5	MAHBUB PATEL	PRIVATE	IRRIGATION	160	6"	SY No 16
IP-B-6	AHMED ALI	PRIVATE	IRRIGATION	145	6"	SY No 25
IP-B-7	BASWARAJ	PRIVATE	IRRIGATION	155	6"	SY No 9
IP-B-8	AMJADALI	PRIVATE	IRRIGATION	155	6"	SY No 79
IP-B-9	RASOOL PATEL	PRIVATE	IRRIGATION	155	6"	SY No 72
WELLS						
IP-W-1	NARSI REDDY	PRIVATE	IRRIGATION-	60	10'	SY No 82
IP-W-2	SUBHAN REDDY	PRIVATE	IRRIGATION-	65	10'	SY No-4
IP-W-3	SUBHAN REDDY	PRIVATE	IRRIGATION-	65	10'	SY No-86

IP-W-4	CHANDRASHEKAR	PRIVATE	IRRIGATION-	45	10'	SY No 53
IP-W-5	SHAMSU PATEL	PRIVATE	IRRIGATION	40	10'	SY No 103
IP-W-6	NAYAMAT PATEL	PRIVATE	IRRIGATION-	35	10'	SY No 109
IP-W-7	BICHAPPA	PRIVATE	IRRIGATION	40	10'	SY No 14
IP-W-8	BHIMSHAPPA	PRIVATE	IRRIGATION-	45	10'	SY No 5
IP-W-9	NAGAPPA	PRIVATE	IRRIGATION-	45	10'	SY No 6
IP-W-10	FAKIR PATEL	PRIVATE	IRRIGATION-	45	10'	SY No 88
IP-W-11	RASOOL PATEL	PRIVATE	IRRIGATION-	55	10'	SY No 85



Irugupally – Shamshu Patel – For Irrigation



Irugupally – Bhimshappa – For Irrigation



Irugupally – Subhan Reddy – For Irrigation



Irugupally – Rasool Patel – For Irrigation

GHANAPUR		Private/Govt.	Usage	DEPTH in feet	Dia.in inches	Location
BORE WELLS						
GP-B-1	NEAR SCHOOL - HAND PUMP	GOVT	DRINKING /GENERAL PURPOSE	115	6"	CV
GP-B-2	SC COLONY- HAND PUMP	GOVT	DRINKING /GENERAL PURPOSE	115	6"	CV
GP-B-3	SC COLONY- HAND PUMP	GOVT	DRINKING /GENERAL PURPOSE	120	6"	CV
GP-B-4	NEW COLONY- HAND PUMP	GOVT	DRINKING /GENERAL PURPOSE	125	6"	CV
GP-B-5	MUSLIM COLONY- HAND PUMP	GOVT	DRINKING /GENERAL PURPOSE	125	6"	CV
GP-B-6	BUSSTAND- HAND PUMP	GOVT	DRINKING /GENERAL PURPOSE	125	6"	CV
WELLS						
GP-W-1	MASJID	PRIVATE	DRINKING/GENERAL PURPOSE	55	10'	CV
GP-W-2	SHARANAPPA PATIL	PRIVATE	IRRIGATION	80	10'	SY No 55
GP-W-3	HANMANTH MASTER	PRIVATE	IRRIGATION	45	10'	SY No 21
GP-W-4	RAYAPPA PUJARI	PRIVATE	IRRIGATION	45	10'	SY No 15
GP-W-5	BASAPPA HALIMANI	PRIVATE	IRRIGATION	60	10'	SY No 70



Ghanapur – Masjid Private – For General Use



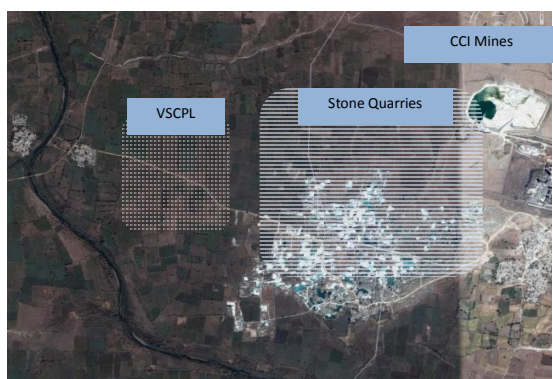
Ghanapur – Grama Panchayat – SC Colony – Drinking/General Use



Ghanapur – SC Colony – For Drinking Water

Water Table in neighboring Quarries:

For the purpose of this was to ascertain the Water table and also to know if water was being pumped out of the Quarries, team was deputed to meet with Mine Owners/Operators and were interviewed to know the depth at which water intrusion was happening and was told that, in peak summer season it was at about 35 to 40 Meters depth. However, during Rainy Season, percolation was happening at lower depths, especially when river is full.



People met during the visit are as follows:

- Mr.Shankar, native of Mahabubnagar District of Andhra Pradesh who owns quarry of 0.5 Acre for last three years.
- Mr.Nagappa, representative of Mr.Zilani who resides at Tandur, Andhra Pradesh and owns 1.0 Acres.
- Mr.Basavaraj representative of Mr.Jaggu Gowd, who resides at Karankot villages and owns 2.0 Acres

Dewatering of the quarries is using 2~5 HP pumps either to abandoned Quarries or to the Streams.



Information regarding the reliability of Water supply for the neighboring Cement Plants

There are two operation Cement Plants and one under construction in the immediate neighborhood. One is ICL, Visakha and CCI. We could get information about the sources of water supply for these plants. However, we could collect information about availability and storage from only one Plant (ICL, Visakha). Information is as follows:

Both the Plants are sourcing water from Kagina River. Even though the nearest point for drawing water would from Mullamarri River, since they could not get approval from Karnataka Government. Karnataka Government refused to give approval since both the plants are in Andhra Pradesh.

CCI (Government of India undertaking) :



India Cement Limited (ICL, Visakha) :



Both plants are storing Water in their Mine pits :



Additional information about ICL Plant Water Supply:

The water is mainly sourced from Kagina River which is the nearest river in Andhra Pradesh State. The Mullamari River is nearby but in Karnataka state, and ICL could not get the approval to tap the water from another state.

That is why ICL implemented a 9 km pipeline. Three numbers of infiltration wells were sunk in the river bed and connected to common well on the river bank. From the common well, they laid a pipe line and pumping to an intermittent well which is 5 Kms. away. From there they are pumping to storage tanks having total capacity of 5000 cubic meters.

During summer, they had utilized the water from mines storage for the new second line. The mine storage is mainly filled by rain water in rainy season and only marginally through seepage.

Pumps	2 Nos. (100 m ³ /hr each)
Intermittent storage well	5 Kms. 2 Pumps (100 m ³ /hr. each)
Plant Storage	1000 M ³ x 3 at Colony / 2000 M ³ at Plant.



The plant also uses groundwater as additional source, but not for industrial use (infiltration well and now the mine basin storage are enough). This water is used for the colony for instance.

ICL implemented 7 bore holes of roughly 250 meter depth and 160 mm diameter. Out of each bore well a continuous flow out of a 2" (50 mm) dia pipe is observed.

They did not run dry recently at least not since they use the Kagna river and mine storage as main water source.

