



# केन्द्रीय भूमिजल बोर्ड

जल शक्ति मंत्रालय, जल संसाधन, नदी विकास  
और गंगा संरक्षण विभाग

भारत सरकार

**Central Ground Water Board**

Ministry of Jal Shakti,  
Department of Water Resources, River Development  
and Ganga Rejuvenation  
Government of India

Report on

## **AQUIFER MAPPING AND MANAGEMENT PLAN**

**Shirahatti Taluk, Gadag District, Karnataka**

दक्षिण पश्चिमी क्षेत्र, बेंगलुरु

South Western Region, Bengaluru

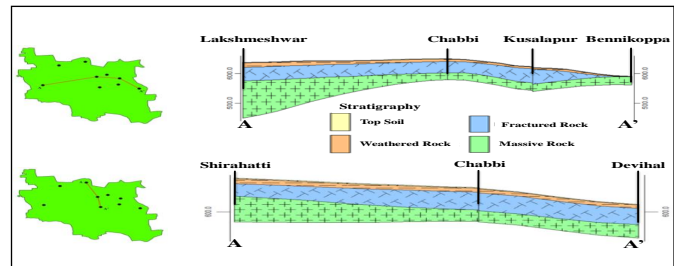
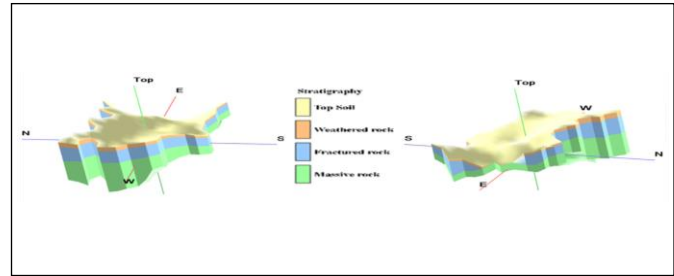
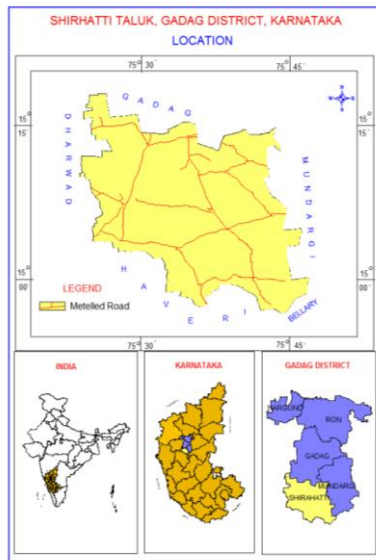
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# AQUIFER MAPS AND MANAGEMENT PLAN, SHIRAHATTI TALUK, GADAG DISTRICT, KARNATAKA STATE

(AAP: – 2021-2022)



By

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# AQUIFER MANAGEMENT PLAN OF SHIRAHATTI TALUK, GADAG DISTRICT, KARNATAKA STATE

## 1 SALIENT FEATURES

Name of the taluk: **SHIRAHATTI**

District: **GADAG**

State: Karnataka

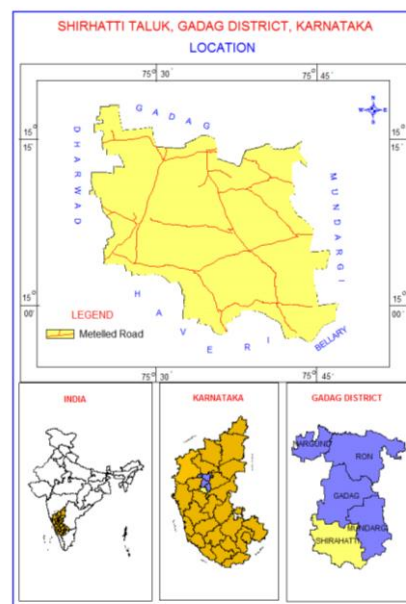
Area: 949 sq.km.

Population: 2,00,669 ( 2011 census)

Annual Normal Rainfall: 689 mm

### 1.1 Aquifer Management Study Area

Aquifer Mapping Studies have been carried out in Shirahatti taluk, Gadag district of Karnataka, covering an area of 949 sq.kms under National Aquifer Mapping. The taluk is located between North Latitudes  $14^{\circ}57'25.2''$  and  $15^{\circ}18'21.6''$  and East Longitudes between  $75^{\circ}26'2.4''$  to  $75^{\circ}46'44.4''$  and is falling in parts of Survey of India Toposheets 48 M/8,M/11, M/12, M16, 48N/9 and 48 N/13 . The study area is bounded, on the North by Gadag taluk, on the South by Savanur & Haveri taluks, on the East by Mundargi Taluk, on the West by Kundagol taluk. Location map of Shirahatti taluk of Gadag district is presented in **Fig-1**. Shirahatti is taluk head quarter . There are 87 villages and 28 gram panchayats in this taluk.



**Fig-1: Location map**

## 1.2 Population

According to 2011 census, the population in Shirahatti taluk is 2,00,669. Out of which 1,01,877 are males while 98,792 are females. The average sex ratio of Shirahatti taluk is 970. The Shirahatti taluk has an overall population density of 507 persons per sq.km. The decadal variation in population from 2001-2011 is 9.57% in Shirahatti taluk. Details of Population of Shirahatti taluk is given in **Table-1**.

**Table-1.Details of Population**

Male	Female	SC	ST	TOTAL	No. of Villages	No. of GPs	Literacy %	Density
101877	98792	42570	13430	200669	87	28	71.26	436

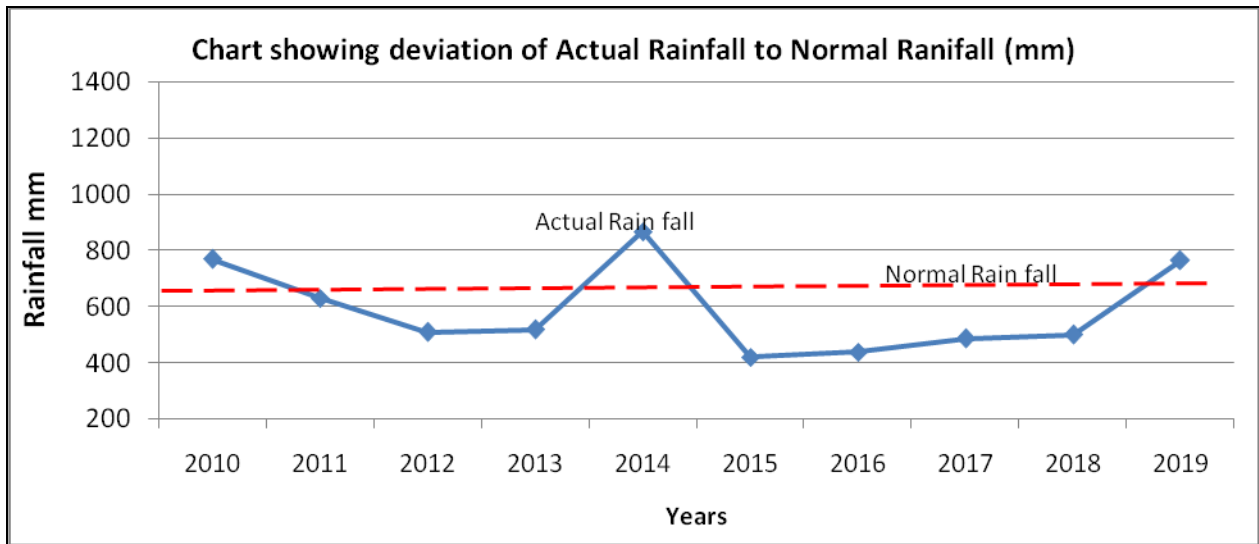
## 1.3 Rainfall

Shirahatti taluk is part of Northern Dry Zone of Karnataka. The zone has characteristics such as low annual rainfall, medium to deep black soil and mean maximum temperatures reaching 37-38° C during summer. The normal annual rainfall in Shirahatti taluk for the period 1961 to 2010 is 689 mm. The North-East monsoon contributes nearly 44% and prevails from October to early December. And about 56% precipitation takes place during South–West monsoon period from June to September. As the rainfall is bimodal and peak rainfall is during July and August. The Shirahatti taluk represents uniform rainfall pattern.

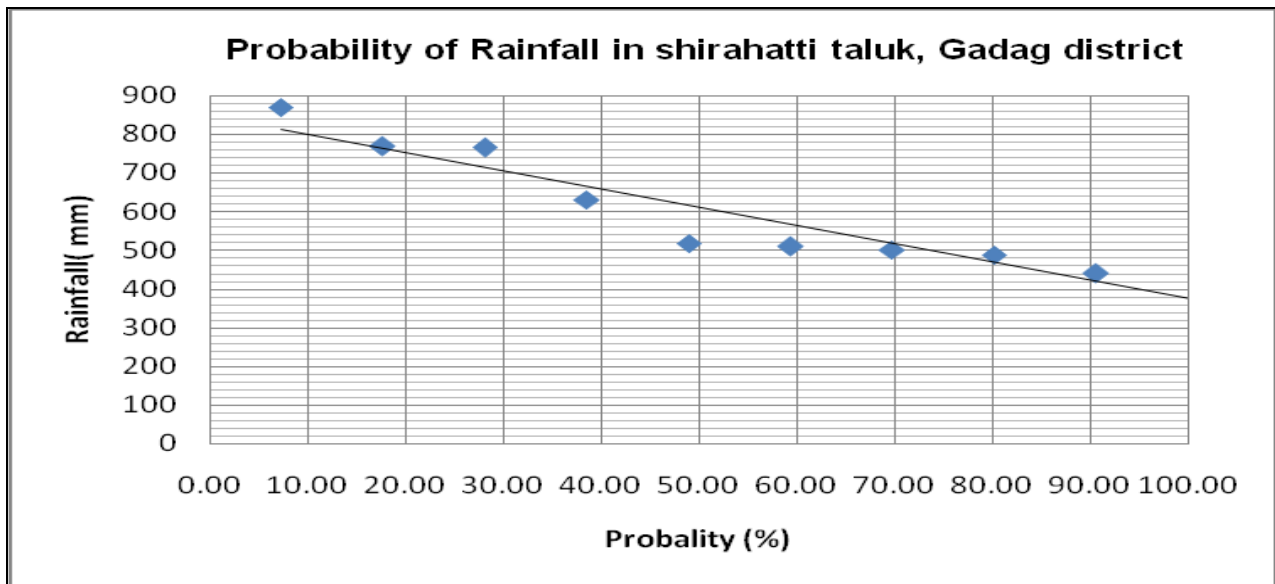
The annual rainfall data from 2010 to 2019 of the Shirahatti taluk is collected from the District statistical office, Gadag and is given in **Table.2**. The rainfall trend for the period from 2010 to 2019 and probability occurrence of rainfall of the taluk are shown in **Fig.2 & Fig-3** respectively.

**Table-2 Actual Annual Rainfall of Shirahatti taluk from 2010 to 2019**

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Rainfall (mm)	769	631	510	518	869	421	439	488	501	765



**Fig-2. Rainfall trend**



**Fig-3. Probability occurrences of Rainfall**

The rainfall pattern in the Shirahatti taluk reveals the irregularity of rainfall behavior (**Fig-2**) and the rainfall varies from 421 mm to 869 mm (**Table-2**) with a normal annual rainfall of 689 mm as mentioned above. Shirahatti taluk received rainfall above normal during the years 2010, 2014 and 2019.

Probability analysis of rainfall for the years from 2010 to 2019 (**Fig-3**), indicates that 70 % probability of incidence of rainfall is 500 mm. The dependable rainfall of 500 mm can be used for construction of any ground water recharge structures in this taluk area.

## 1.4 Agriculture & Irrigation

Agriculture is the main occupation in Shirahatti taluk. Major Khariff crops are Maize, Bajra, Jowar, Pulses, Paddy, Oilseeds, Cotton and Vegetables. Main crops of Rabi season are Maize, Bajra, Jowar and Sunflower (**Table-3**). Water intensive crops like sugarcane and paddy are grown in 7% of total crop area. Cereals are grown in 30%, Pulses are grown in 13% of total crop area and oil seeds in 14% of total crop area of the taluk. Fruits and vegetables account for 2% of total crop area.

**Table-3: Cropping pattern 2019-2020 (Ha)**

Paddy	Jowar	Bajra	Maize	Wheat	Minor millets	Green gram	Tur	H.Gram	Cowpea	Bengal gram	Fruits	Vegetables	Oil seeds	Sugarcane	Cotton
375	12366	13	24874	768	38464	7615	275	189	235	9191	451	1957	18037	414	11342

It is observed that net sown area accounts 77% and the area sown more than once is 25% of total geographical area in Shirahatti taluk (**Table-4**). Area not available for cultivation and Fallow land cover 7% & 1% of total geographical area respectively. 87% of net area irrigated is from bore wells and dug wells (**Table-5**).

**Table-4: Details of land use 2019-2020 (Ha)**

Taluk	Total Geographical Area	Area under Forest	Area not available for cultivation	Other Uncultivated land	Fallow land	Net sown area	Area sown more than once
Shirahatti	94913	12943	6797	1027	613	73533	23393

(Source: District at a glance 2019-20, Govt. of Karnataka)

**Table-5: Irrigation details in Shirahatti taluk**

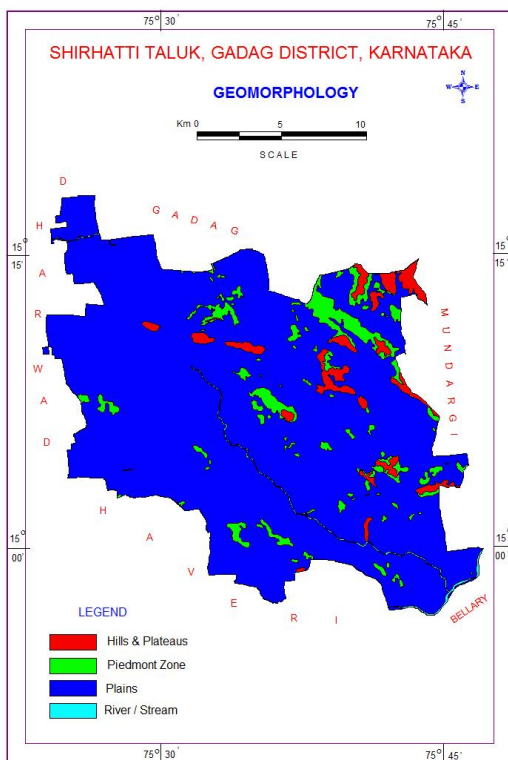
Source of Irrigation	Net area irrigated (Ha)
Canals	-
Tanks	-
Wells	309
Bore wells	9856
Lift Irrigation	-
Other Sources	1545
<b>Total</b>	<b>11710</b>

(Source: District at a glance 2019-20, Govt. of Karnataka)

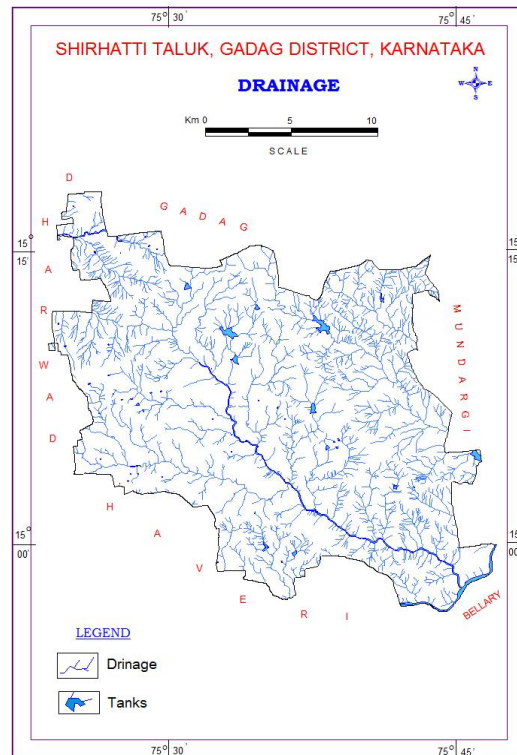


## 1.5 Geomorphology, Physiography & Drainage

Shirahatti taluk is a plain region formed of gneissic formation. Isolated area in Central and Northern part of the taluk covered by Piediment and hilly regions. The elevation in the plain area varies from 520 m amsl in the South Eastern part (Basapur) to 685 m amsl in the northern part (Khanapur) of the taluk (**Fig.4**). The master slope of the taluk is towards south east. The differential altitude is significant because it is likely to cause uneven ground water flow patterns on the micro level scale (**Fig.5**). The topography is dominantly controlled by geological structures. The entire taluk falls in Tungabhadra river sub basin of Krishna river basin. Doddahalla along with its tributaries drains the major part of the taluk to Tungabhadra River. The Godda halla flows in Northwest to south east direction. The Drainage pattern is dendritic to sub- dendritic.



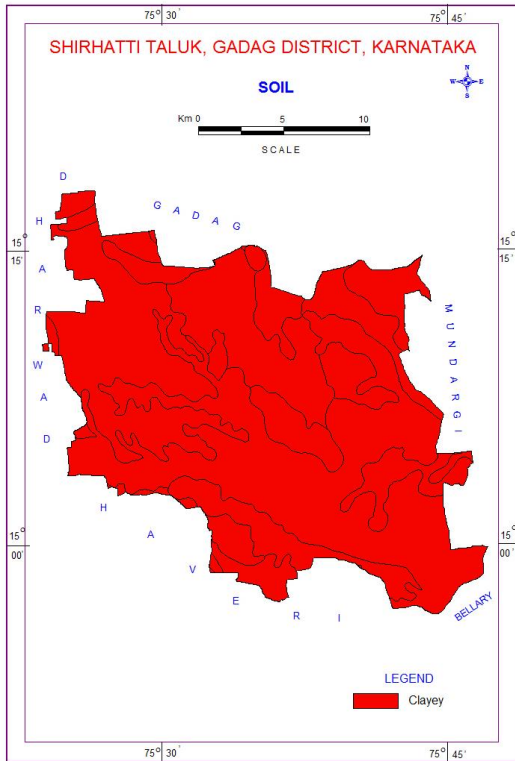
**Fig-4: Geomorphology Map**



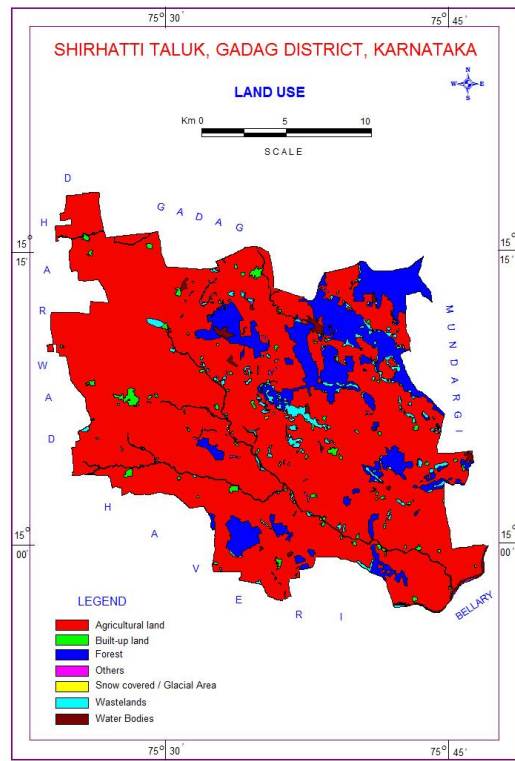
**Fig-5: Drainage Map**

## 1.6 Soil and Landuse:

The soils of Shirahatti taluk can broadly be classified into Black cotton soils. These soils clayey in nature and vary in depth and texture depending on the parent rock type, physiographic settings and climatic conditions. Black cotton soils are mature soils with high humus and are mildly alkaline in nature. Black cotton soils are the product of highly weathered and decomposed gneissic rocks. The soil texture is generally clayey (**Fig. 6**). The major part of the taluk is covered by agriculture land. Forests occupy a considerable part of the taluk (**Fig. 7**).



**Fig-6: Soil Map**



**Fig-7: Land use Map**

### 1.7 Ground water resource availability and extraction

Aquifer wise total ground water resources up to 200 m depth as on March 2017 is summarised in Table-6 below.

**Table-6: Total Ground Water Resources (2017) (Ham)**

Taluk	Annual replenishable GW resources	Fresh In-storage GW resources		Total availability of fresh GW resources
		Phreatic	Fractured (Down to 200m)	
SHIRAHATTI	5296	11693	2378	Dynamic + phreatic in-storage + fractured
				19368

### 1.8 Existing and future water demands (as per GEC-2017)

- Net ground water availability for future irrigation development : 1578 Ham
- Domestic (Industrial sector) demand for next 25 years : 463 Ham

## 1.9 Water level behavior

### (a) Depth to water level

#### Aquifer-I

- Pre-monsoon: 2.38 – 18.67 mbgl (**Fig.-8**)
- Post-monsoon: 062 – 10.27 mbgl (**Fig.-9**)

#### Aquifer-II

- Pre-monsoon: 17.35—20.75 mbgl
- Post-monsoon: 7.27-9.65 mbgl

The depth water level data is shown in **Table.7**. The long-term water level trend is shown in **Table.8**. The data shown both fall and rise in water levels. However, the fall in water levels is predominant in comparison with rise.

### (b) Water level fluctuation

#### Aquifer-I

- Seasonal Fluctuation: Rise ranges 0.76 – 8.86 m (**Fig.-10**).

#### Aquifer-II

- Seasonal Fluctuation: Rise ranges 7.70-13.48 m.

### (c) Long-Term Water level trend

- Pre-monsoon: Falling ranges 0.0131-0.6958 m  
Rising ranges 0.001-0.2154 m
- Post-monsoon: Falling ranges 0.0591-0.3666 m  
Rising ranges 0.2021-0.5932 m

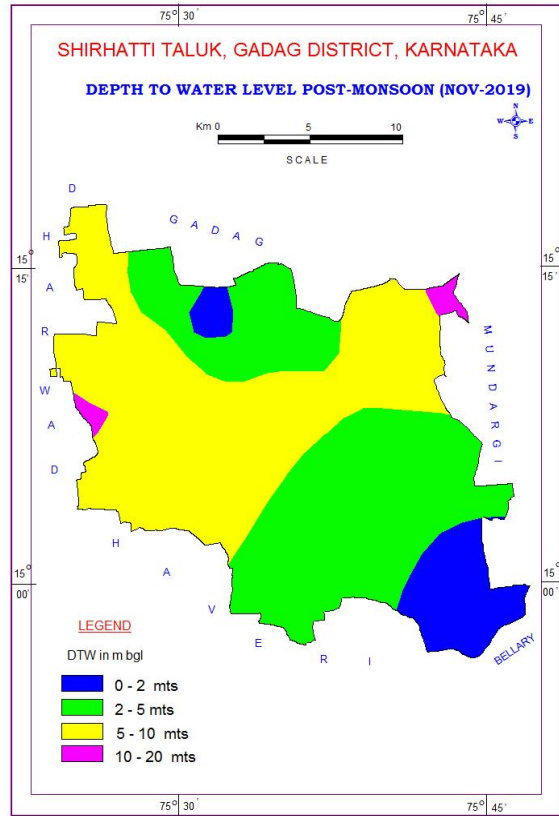
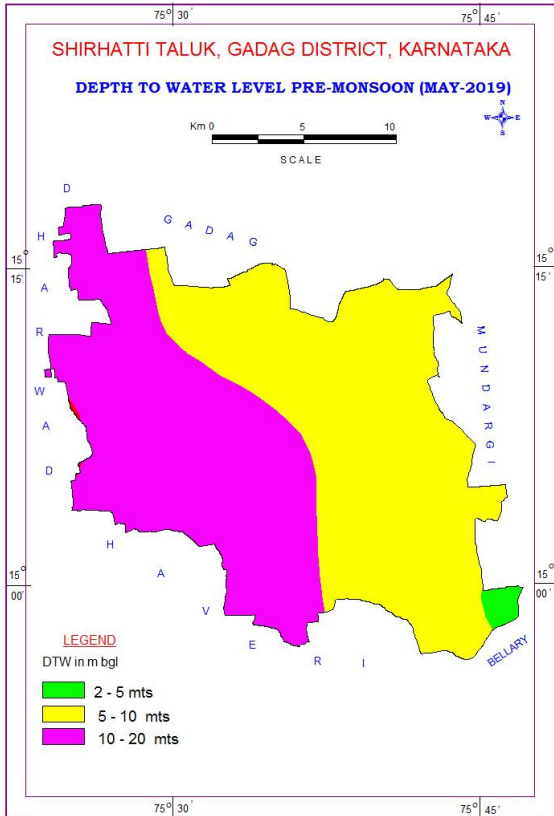
**Table-7: Depth to water level for pre-monsoon and post-monsoon**

Sr. No	Village	Source	Pre-monsoon Depth to water May-2019 (mbgl)	Post-monsoon Depth to water Nov-2019 (mbgl)	Water level Fluctuation
Aquifer-I					
1	Belhatti	Dug Well	5.78	5.02	0.76
2	Chabbi	Dug Well	8.90	5.11	3.79
3	Gojanur	Dug Well	9.64	5.88	3.76
4	Laxmeshwar	Dug Well	14.94	6.08	8.86

5	Magdi	Dug Well	9.12	0.62	8.50
6	Ramgeri	Dug Well	18.67	10.27	8.40
7	Shirhatti	Dug Well	7.49	3.27	4.22
8	Itagi	Dug Well	2.38	1.58	0.80
Aquifer-II					
10	Doddur	Bore well	20.75	7.27	13.48
11	Vadavihosur	Bore well	17.35	9.65	7.70

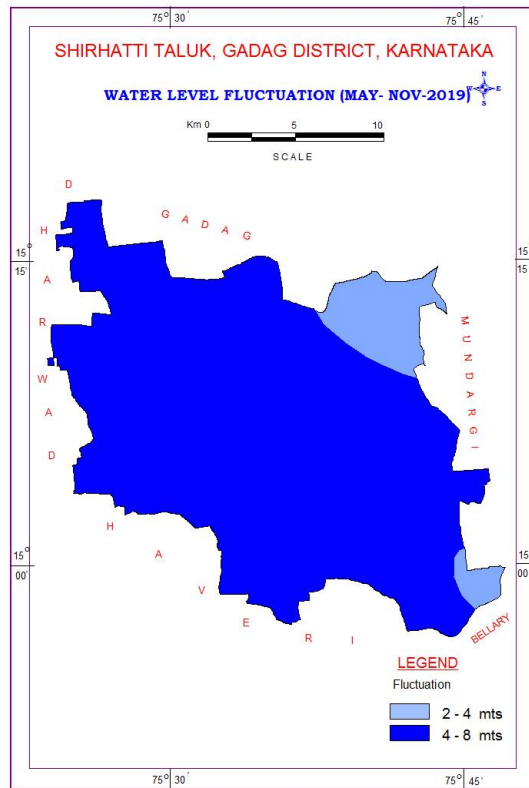
**Table-8: Long Term Water Level Trends (Based on CGWB's National Hydrograph Stations).**

Sl. No.	Location	Period of observation	Water level trend m/year				Aquifer
			Pre monsoon		Post monsoon		
			Fall	Rise	Fall	Rise	
1	Belhatti	2010-2019	0.0184	-	0.2031	-	Schist
2	Chabbi	2010-2019	0.4381	-	0.2429	-	Granitic Gneiss
3	Laxmeshwar	2010-2019	0.6958	-	0.3666	-	Granitic Gneiss
4	Magdi	2010-2019	0.0131	-	-	0.2021	Granitic Gneiss
5	Ramgeri	2010-2019	-	0.2154	-	0.5932	Granitic Gneiss
6	Shirhatti	2010-2019	0.0992	-	0.0591	-	Granitic Gneiss



**Fig-8: Pre-monsoon Depth to Water Level**

**Fig-9: Post-monsoon Depth to Water Level**



**Fig-10: Water Level Fluctuation (Aq-I)**

## 2 AQUIFER DISPOSITION

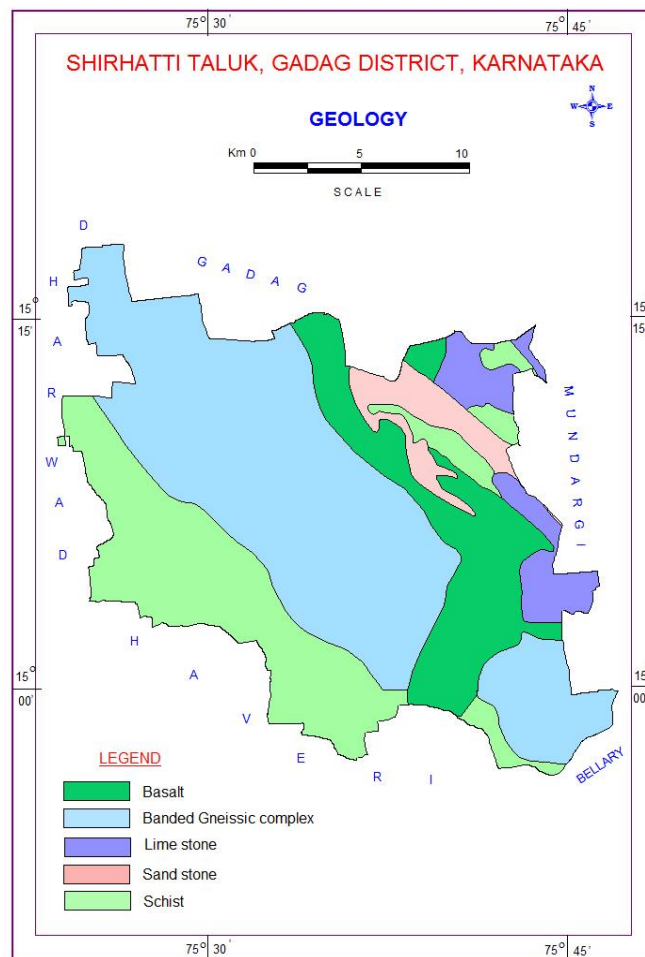
### 2.1 Aquifer Types

In Shirahatti taluk, there are two types aquifers Schist and Granitic Gneisses

- i. **Aquifer-I (Phreatic aquifer)** Weathered Schist and Granitic Gneisses
- ii. **Aquifer-II (Fractured aquifer)** Fractured Schist and Granitic Gneisses

Schist and Gneisses are the main water bearing formations. Basalt also found distributed in parts of the taluk. **(Fig-11)**. Ground water occurs within the weathered and fractured Schist and Granitic Gneiss under water table condition and semi-confined condition.

In Shirahatti taluk bore wells were drilled from 76.95 to a maximum of 196.95. Depth of weathered zone ranges from 13.80 mbgl to 36.50 mbgl. Ground water exploration reveals that aquifer-II i.e fractured formation has encountered between the depth of 40 to 120 mbgl **(Table-9)**. Yield range is from less than 1.00 to 6.50 lps. The basic characteristics of each aquifer are summarized in **Table-10**.



**Fig-11: Geology Map**

**Table-9: Details of Ground Water Exploration**

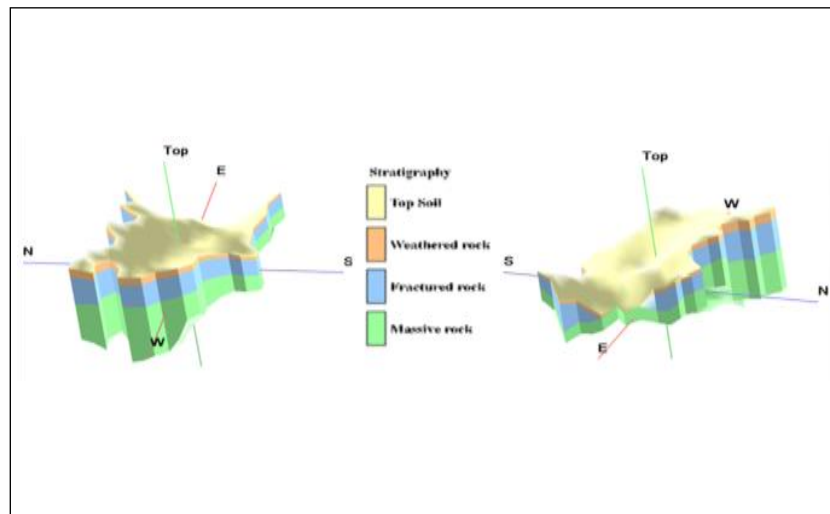
S.No	Location	Lat & Long	Depth m bgl	Casing (m)	Lithology	SWL (mbgl)	Q (lps)	DD (m)	T (m <sup>2</sup> /day)
1	BANNIKOPPA EW	15 <sup>0</sup> 06' 30 <sup>11</sup> 75 <sup>0</sup> 43' 30 <sup>11</sup>	196.95	13.80	Schist	5.77	0.20	-	-
2	ITGI -EW	15 <sup>0</sup> 44' 10 <sup>11</sup> 75 <sup>0</sup> 49' 15 <sup>11</sup>	76.95	36.50	Schist	2.78	6.5	8.68	45.0
3	MAGADI -EW	15 <sup>0</sup> 13' 30 <sup>11</sup> 75 <sup>0</sup> 30' 45 <sup>11</sup>	151.15	20.0	Granitic Gneiss	4.78	1.34	21.04	3.45
4	LAXMESWAR - EW	15 <sup>0</sup> 07' 00 <sup>11</sup> 75 <sup>0</sup> 28' 30 <sup>11</sup>	196.95	-	Granitic Gneiss	16.63	0.076	-	0.49

**Table-10: Basic characteristics of each aquifer**

Aquifers	Weathered Zone (Aq.-I)	Fractured Zone (Aq.-II)
Prominent Lithology	Weathered Schist and Granitic Gneisses	Fractured / Jointed Schist and Granitic Gneisses
Thickness range (mbgl)	5-25	Fractures upto 120.00mbgl
Depth range of occurrence of fractures (mbgl)	-	40.00-120.00
Range of yield potential (lps)	<1-2	<1 – 6.50
Specific Yield	2%	0.2%
T (m <sup>2</sup> /day)	-	0.49-45.0
Quality Suitability for Domestic & Irrigation	Suitable	Suitable

## 2.2 3 D aquifer disposition and Cross-Sections

Aquifer disposition – Rockworks output (Fig.-12 to Fig.-14)



**Fig-12: 3D Aquifer Disposition**

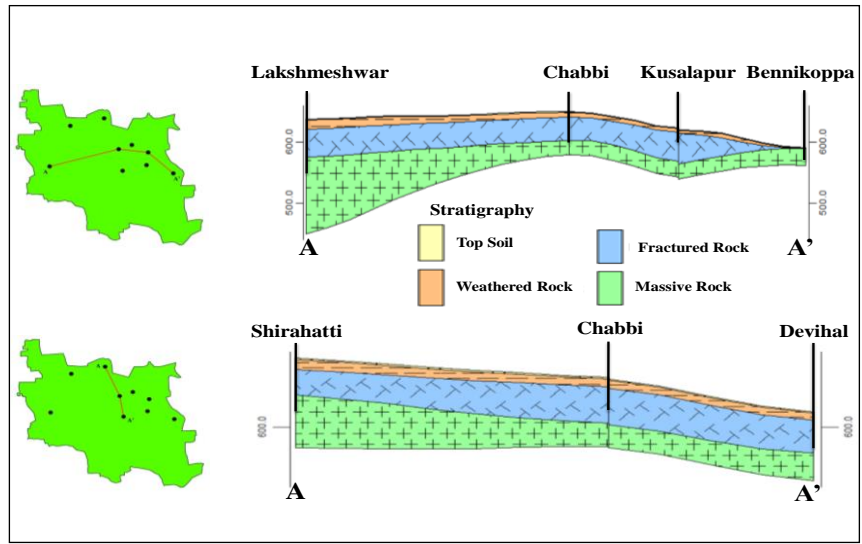


Fig-13: Cross sections in different directions

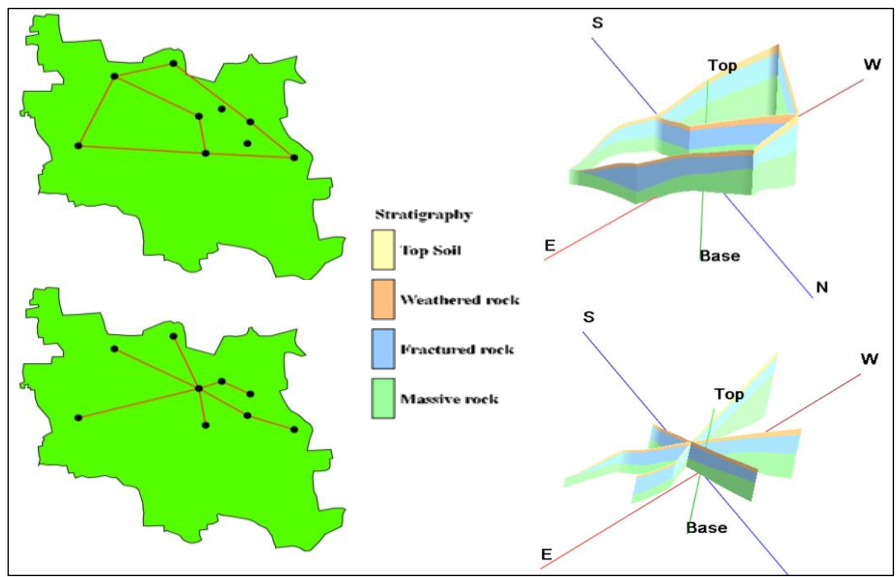


Fig-14: 3D Aquifer Fence Diagram



### 3 Ground water resource, extraction, contamination and other issues

#### 3.1 Aquifer wise resource availability and extraction

- a) Present Dynamic Ground Water Resource (2020). As the Shirhatti taluk is bifurcated into Shirhatti and Laxmeshwar taluks, the ground water resource estimation is shown for both these taluks

Taluk	ANNUAL EXTRACTABLE GROUND WATER RESOURCES	EXISTING GROSS GROUND WATER DRAFT FOR IRRIGATION	EXISTING GROSS GROUND WATER DRAFT FOR DOMESTIC AND INDUSTRIAL WATER SUPPLY	EXISTING GROSS GROUND WATER EXTRACTION FOR ALL USES	ALLOCATION FOR DOMESTIC AND INDUSTRIAL USE FOR NEXT 25 YEARS	NET GROUND WATER AVAILABILITY FOR FUTURE IRRIGATION DEVELOPMENT	EXISTING STAGE OF GROUND WATER EXTRACTION	Category
SHIRAHATTI	2803.55	1709.45	268.03	1977.49	284.01	810.08	70.54	SEMI-CRITICAL
LAXMESHWAR	2714.67	1440.79	188.43	1629.22	199.87	1074.01	60.02	SAFE

- b) Comparison of ground water availability and draft scenario in Shirahatti taluk

Taluk	GW availability (in ham)	GW draft (in ham)	Stage of GW development (%)	GW availability (in ham)	GW draft (in ham)	Stage of GW development (%)	GW availability (in ham)	GW draft (in ham)	Stage of GW development (%)
	2013			2017			2020		
SHIRAHATTI	5595	3595	64	5296	3685	70.0	2804	1709	70.54

It is seen that there is a marginal increase in the stage of ground water extraction during the period from 2013 to 2020 in the taluk.

#### 3.2 Chemical quality of ground water and contamination

Interpretation from Chemical Analysis results in Shirahatti taluk is mentioned as under:

**ELECTRICAL CONDUCTIVITY:** In general, EC values range from 545 to 3010  $\mu$ /mhos/cm in the aquifer-I at 25°C (Fig-15) and range from 1654 to 3310  $\mu$ /mhos/cm in the aquifer-II.

**CHLORIDE:** Chloride concentration in ground water ranges between 42 and 302 mg/l in the aquifer-I (Fig-16) and ranges between 56.30 and 128.0 mg/l in the aquifer-II.

**NITRATE:** Nitrate concentration in ground water ranges from 18 and 194 mg/l in the Aquifer –I (**Fig-17**) and ranges from 35 and 44 mg/l in the Aquifer –II .

**FLUORIDE:** Fluoride concentration in ground water ranges between 0.003 and 2.18 mg/l in the aquifer-I (**Fig-18**) and ranges between 0.004 and 0.17 mg/l in the aquifer-II .  
The details are given in **Table.11**.

**Table-11: Quality of ground water in Shirahatti taluk of Gadag district**

Sr_No	LOCATION	PH	EC	Cl	NO3	F
<b>Aquifer-I</b>						
1	Belhatti	8.36	1110	174	57	1.25
2	Chabbi	8.13	2080	302	194	0.70
3	Gojanur	8.76	1150	82	52	2.18
4	Laxmeswar	8.40	748	92	27	0.61
5	Magdi	8.13	1359	92	10	0.71
6	Shirhatti	8.63	1524	167	106	0.74
7	Bannikoppa	8.17	545	42.6	18	0.003
8	Devihal	8.06	3010	117	44	0.17
<b>Aquifer-II</b>						
8	Dodduru	8.02	1654	56.3	42	0.004
9	Lakshmeswara	7.38	3310	128	35	0.17
10	Balehosuru	7.94	2950	117	44	0.006

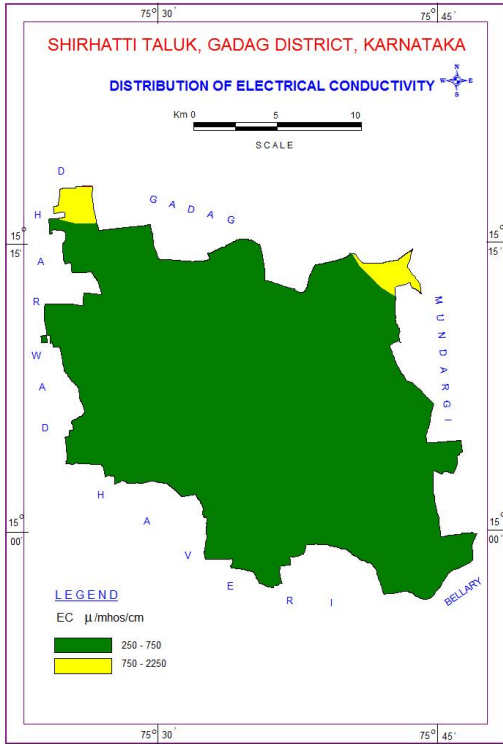


Fig-15 Distribution of Electrical Conductivity

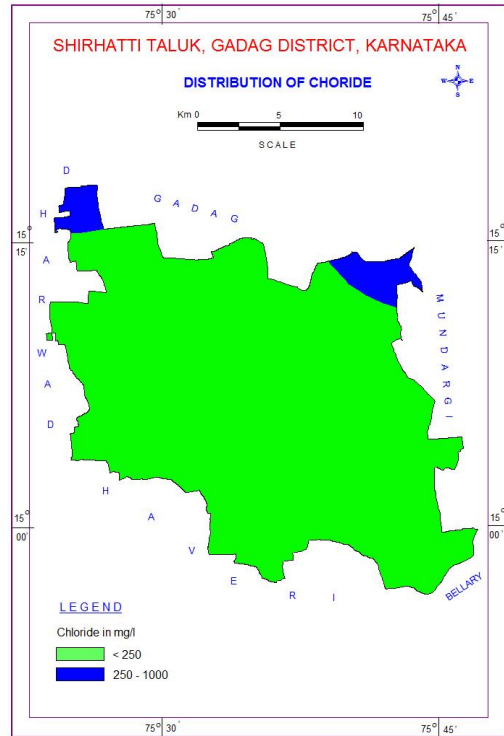


Fig-16 Distribution of Chloride

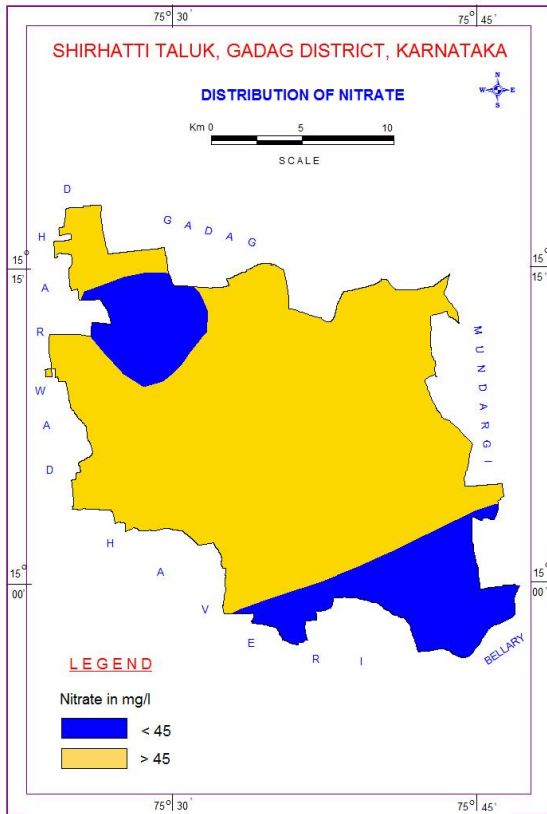


Fig-17 Distribution of Nitrate

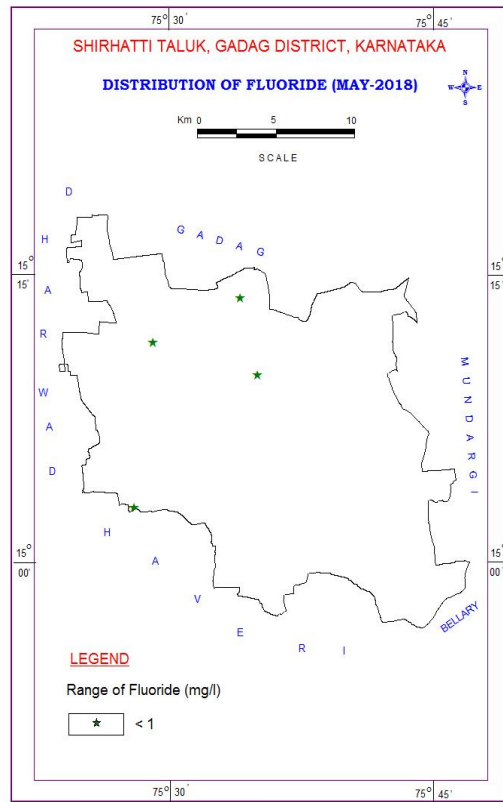


Fig-18 Distribution of Fluoride

## 4 GROUND WATER RESOURCE ENHANCEMENT

### 4.1 Resource Enhancement by Supply Side Interventions

There is a scope to augment ground water recharge through artificial recharge structures in the area through construction of artificial recharge structures, viz; check dams, percolation tanks & Sub surface dyke (**Table-12**) as per the studies carried out by CGWB. The choice of recharge structures should be site specific and such structures need to be constructed in areas already identified as feasible for artificial recharge. The area feasible for artificial recharge is arrived based on the more than 3mbgl post monsoon water level, command area, hilly area and slope less than 3%. The area feasible for artificial recharge are given in **Fig.19**. The tentative locations of sites proposed for artificial recharge is shown in **Fig.20**. The tentative list of the proposed Percolation tanks and Check dams are listed in **Annexure 1**. The improvement in ground water availability as a result of the implementation of artificial recharge structures in the taluk is detailed in **Table.13**.

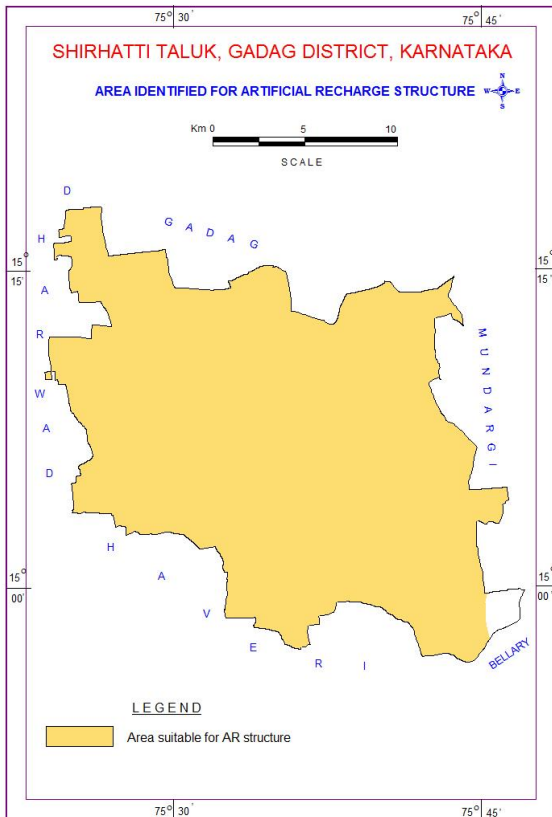
**Table-12: Quantity of non-committed surface runoff & expected recharge through AR structures**

Artificial Recharge Structures Proposed	Shirahattl taluk
Non committed monsoon runoff available (MCM)	120.47
Total no. of existing Artificial Recharge Structures	315
Number of Check Dams	668
Number of Percolation Tanks	117
Number of Sub surface dyke	3
Tentative total cost of the project (Rs. in lakhs)	9074.627
Excepted recharge (MCM)	97.00

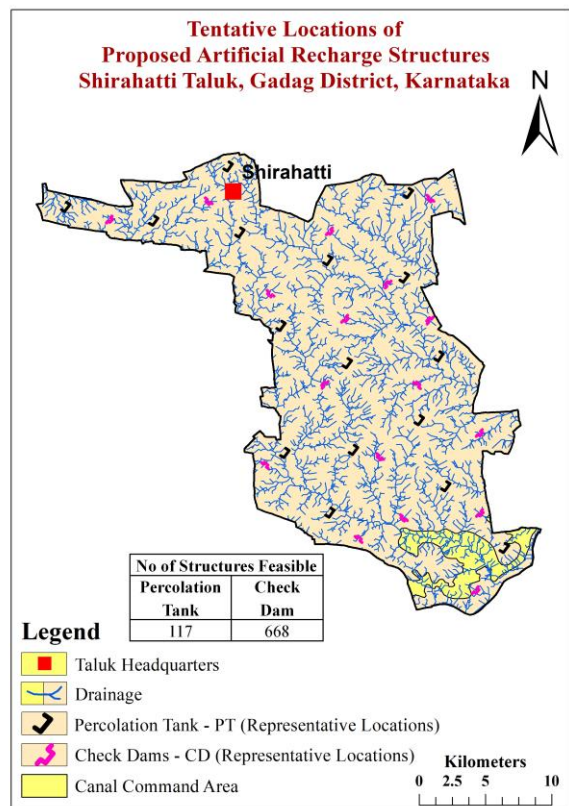
**Table-13 Improvement in GW availability due to Recharge, Shirahatti taluk**

Taluk	Net annual ground water availability	Existing gross ground water draft for all uses	Existing stage of ground water development	Expected recharge from proposed artificial recharge structures	Expected improvement in stage of ground water development after the implementation of the project	Expected improvement in overall stage of ground water development
	HAM	HAM	%	HAM	%	%
SHIRAHATTI	5296	3684	71	9700	45	26

After implementation of Artificial Recharge structures to augment ground water recharge, the annual ground water availability will increase from 5038 to 14996 ham and the expected improvement in stage of development is 45% from 71% to 26%.



**Fig.19: Artificial Recharge Feasibility**



**Fig.20 Tentative Locations of AR Structures**

## 4.2 Resource Savings By Demand Side Interventions

### 4.2.1 Advanced irrigation practices

It is observed that dug wells and bore wells contribute 87% of the source for irrigation in Shirahatti taluk. Thus, by adopting the below mentioned techniques will contribute in ground water resource enhancement in the long run.

- Efficient irrigation practices like Drip irrigation & sprinkler needs to be adopted by the farmers in the existing 10165 ha of gross irrigated area by borewells and dugwells.
- Irrigation draft is 3150 ham.
- Efficient irrigation techniques will contribute in saving ground water by 2554 ham and thus will improve stage of development by 4% from 26% to 22% (Table-14).

**Table-14: Improvement in GW availability due to saving by adopting water use efficiency**

Taluk	Cumulative annual ground water availability after implementing ar structures & irrigation development schemes	Existing gross ground water draft for all uses	Stage of ground water development after implementing AR structures & proposed irrigation development schemes through interbasin transfer	Saving due to adopting WUE measures	Cumulative annual ground water availability	Expected improvement in stage of ground water development after adopting WUE measures and implementation of the project	Expected improvement in overall stage of ground water development
Shirahatti	HAM	HAM	%	HAM	HAM	%	%
	14996	3684	26	2554	19947	4	22

### 4.2.2 Ground Water Development Plan

In Shirahatti taluk, the present stage of ground water extraction (2020) is 70.54 % with net ground water availability of 810.08 ham and total extraction of 1977.49 ham. The ground water draft for irrigation purpose is 1709.45 ham, thus indicating that ground water irrigation is predominant in the taluk and the stage of extraction is just crossed the threshold level of safe category into semi-critical category. Hence, future ground water development is to be exercised with caution to avoid further deterioration in the stage of ground water extraction.

In view of the mentioned measures like artificial recharge schemes and water use efficiency measures, it is expected that the stage of development will improve from the existing 70.54% to about 22%. In such a case, there is scope to construct additional ground water abstraction structures in the future. As per the conservative estimate, there is feasibility to have an additional 1100 wells (about 10% of this dug wells and the remaining bore wells) in the taluk. The design of the dug wells and bore wells may be decided based upon the prevailing hydro-geological conditions in the area.

#### **4.2.3 Regulation and Control**

Taluk is categorized as "**Semi-Critical**". The mandatory guidelines like rainwater harvesting and artificial recharge issued by Karnataka Ground Water Authority needs to be strictly implemented. Considering the current existing ground water draft for all use, it is mandatory to plan to augment the ground water through artificial recharge besides use of ground water judiciously.

#### **4.2.4 Other interventions proposed**

- Periodical maintenance of artificial recharge structures should also be incorporated in the Recharge Plan.
- Excess nitrate concentration is found in ground water samples require remedial measures viz.
  - Dilution of nitrate rich ground water through artificial recharge & water conservation.
  - Roof top rain water harvesting.
  - Improving quality by proper drainage and limited usage of Nitrogenous fertilizers
- Excess fluoride concentration is found in ground water samples require remedial measures viz.
  - Alternate source
  - Removal technology

## 5 Summary of the ground water management plan

The summary of Management plan of Shirahatti taluk is given in **Table-15**.

**Table-15: Summary of Management plan of Shirahatti taluk**

Shirahatti taluk is Semi-Critical & present stage of Ground water Extraction as per GEC-2020(%)	70.54
Annual Extractable Ground Water Availability (MCM)	52.96
Existing Gross Ground Water Extraction for all uses	36.84
Area Feasible for Artificial Recharge (Sq.Km)	874
Total Ground water Resources (Dynamic & Static upto the depth of 200 mbgl) (MCM)	195.89
Expected additional recharge from monsoon surplus runoff (MCM)	97.00
Expected improvement in stage of ground water extraction after the implementation of the project (%)	71 to 26
Expected Saving due to adopting WUE measures (MCM)	25.54
Expected improvement in stage of ground water extraction after adopting WUE measures and implementation of the project (%)	26 to 22
Excess Nitrate concentration	<ul style="list-style-type: none"> <li>• Dilution of nitrate rich ground water through artificial recharge &amp; water conservation.</li> <li>• Roof top rain water harvesting</li> <li>• Improving quality by controlling usage of Nitrogenous fertilizers in agriculture field and maintaining the proper domestic drainage network system</li> </ul>
Excess Fluoride concentration	<ul style="list-style-type: none"> <li>• Alternate source</li> <li>• Removal technology</li> </ul>
Water Use efficiency measures	<ul style="list-style-type: none"> <li>• Government to take initiative to encourage at least 70% farmers to adopt water use efficiency irrigations practices like dip &amp; sprinkler irrigation</li> </ul>



## (a) Tentative Locations of Proposed Percolation tanks

S.No	Longitude	Latitude	Village	Grama Panchayat
1	75.74917	14.96445	Sasarawada	Itigi
2	75.72101	14.97758	Itagi	Itigi
3	75.71078	14.97829	Itagi	Itigi
4	75.76098	14.98734	Kalliganura	Hebbal
5	75.65510	14.99543	Ankali	Koganur
6	75.68318	14.99614	Thangoda	Koganur
7	75.70658	15.00476	Kanakawada	Hebbal
8	75.74290	15.00494	Hebbala	Hebbal
9	75.62678	15.00732	Nagaramadavu	Koganur
10	75.72696	15.01113	Hebbala	Hebbal
11	75.64369	15.01256	Ankali	Koganur
12	75.73695	15.01803	Hebbala	Hebbal
13	75.69840	15.02041	Thangoda	Koganur
14	75.66081	15.02089	Govinakoppa	Koganur
15	75.61822	15.02219	Kokkaragundhi	Konchigeri
16	75.60230	15.02410	Kokkaragundhi	Konchigeri
17	75.68151	15.02612	Alagilawada	Vadavi
18	75.72125	15.03028	Ballaghatti	Vadavi
19	75.65581	15.03385	Konchigeri	Konchigeri
20	75.59656	15.03933	Boodhihala	Hullura
21	75.63630	15.03956	Konchigeri	Konchigeri
22	75.70435	15.04087	Vadavi	Vadavi
23	75.68032	15.04373	Hosura	Vadavi
24	75.71762	15.05082	Arikoppa	Tarikoppa
25	75.59778	15.05241	Boodhihala	Hullura
26	75.73124	15.05265	Arikoppa	Tarikoppa
27	75.61230	15.05294	Konchigeri	Konchigeri
28	75.64455	15.05339	Konchigeri	Konchigeri
29	75.63008	15.05342	Konchigeri	Konchigeri
30	75.65938	15.05551	Konchigeri	Konchigeri
31	75.70530	15.05622	Vadavi	Vadavi
32	75.68103	15.05979	Hosura	Vadavi
33	75.63916	15.06708	Bellatti	Bellatti
34	75.61655	15.06812	Chikkasavanura	Konchigeri
35	75.76170	15.06907	Kerehalli	Tarikoppa
36	75.67033	15.07002	Narayanapura	Bellatti
37	75.74338	15.07121	Arikoppa	Tarikoppa
38	75.72179	15.07302	Arikoppa	Tarikoppa
39	75.69055	15.07454	Suganahalli	Bannikoppa
40	75.70507	15.07573	Bannikoppa	Bannikoppa

41	75.64867	15.07978	Bellatti	Bellatti
42	75.67532	15.08406	Suganahalli	Bannikoppa
43	75.62654	15.08858	Bellatti	Bellatti
44	75.72676	15.09018	Bannikoppa	Bannikoppa
45	75.64320	15.09310	Bellatti	Bellatti
46	75.66652	15.09370	Suganahalli	Bannikoppa
47	75.68103	15.09655	Suganahalli	Bannikoppa
48	75.70346	15.09682	Bannikoppa	Bannikoppa
49	75.69983	15.10702	Hadagali	Bannikoppa
50	75.73009	15.11040	Bannikoppa	Bannikoppa
51	75.65534	15.11273	Ranathura	Ranatur
52	75.61417	15.11321	Devihala	Ranatur
53	75.63064	15.11426	Ranathura	Ranatur
54	75.71703	15.11878	Hadagali	Bannikoppa
55	75.68127	15.12273	Suganahalli	Bannikoppa
56	75.64415	15.12868	Ranathura	Ranatur
57	75.69531	15.13153	Bhavanura	Machanahalli
58	75.62294	15.13221	Devihala	Ranatur
59	75.71078	15.13677	Bhavanura	Machanahalli
60	75.68393	15.13682	Navebavanura	Machanahalli
61	75.66370	15.13753	Machenahalli	Machanahalli
62	75.60989	15.14033	Chabbi	Chabbi
63	75.65030	15.14083	Machenahalli	Machanahalli
64	75.62631	15.14462	Chabbi	Chabbi
65	75.64415	15.15033	Majjura	Majjooru
66	75.66462	15.15556	Thegginabhavanuru	Machanahalli
67	75.61227	15.15866	Chabbi	Chabbi
68	75.64391	15.16746	Majjura	Majjooru
69	75.58324	15.16972	Chabbi	Chabbi
70	75.67017	15.17035	Kusalapura	Majjooru
71	75.60248	15.17162	Chabbi	Chabbi
72	75.69412	15.17234	Kadakola	Kadkol
73	75.61645	15.17436	Chabbi	Chabbi
74	75.64178	15.18383	Majjura	Majjooru
75	75.57638	15.18478	Chabbi	Chabbi
76	75.59037	15.18506	Chabbi	Chabbi
77	75.60273	15.18552	Chabbi	Chabbi
78	75.67770	15.18709	Kadakola	Kadkol
79	75.61690	15.18944	Chabbi	Chabbi
80	75.65307	15.19067	Majjura	Majjooru
81	75.56474	15.19094	Chabbi	Chabbi
82	75.55490	15.19770	Parasapura	Magadi
83	75.66635	15.19777	Kadakola	Kadkol
84	75.59450	15.19819	Varavi	Chabbi

85	75.63786	15.20210	Guddadhapura	Chabbi
86	75.58253	15.20300	Shirahatti	Shirahatti
87	75.54582	15.20602	Parasapura	Magadi
88	75.49335	15.20708	Magadi	Magadi
89	75.64871	15.20994	Jalligeri	Kadkol
90	75.52501	15.21130	Magadi	Magadi
91	75.47406	15.21205	Magadi	Magadi
92	75.45250	15.21296	Magadi	Magadi
93	75.61118	15.21311	Varavi	Chabbi
94	75.48386	15.21507	Magadi	Magadi
95	75.56120	15.21522	Shirahatti	Shirahatti
96	75.51145	15.21612	Magadi	Magadi
97	75.68889	15.21636	Kadakola	Kadkol
98	75.63500	15.21672	Jalligeri	Kadkol
99	75.53708	15.21703	Parasapura	Magadi
100	75.66973	15.21850	Jalligeri	Kadkol
101	75.49260	15.21853	Magadi	Magadi
102	75.58223	15.21929	Shirahatti	Shirahatti
103	75.46494	15.22004	Magadi	Magadi
104	75.52245	15.22381	Holalapura	Magadi
105	75.65655	15.22652	Jalligeri	Kadkol
106	75.67616	15.22730	Jalligeri	Kadkol
107	75.56934	15.22833	Shirahatti	Shirahatti
108	75.53255	15.22848	Holalapura	Magadi
109	75.54808	15.23014	Shirahatti	Shirahatti
110	75.69698	15.23040	Kadakola	Kadkol
111	75.57642	15.23044	Shirahatti	Shirahatti
112	75.56301	15.23120	Shirahatti	Shirahatti
113	75.72339	15.23373	Kadakola	Kadkol
114	75.50557	15.23587	Holalapura	Magadi
115	75.55622	15.24145	Khanapura	Khanapura
116	75.57507	15.24778	Shirahatti	Shirahatti
117	75.57235	15.25261	Shirahatti	Shirahatti

**Village Name: Source - KRSAC**

***(Source: Master Plan, CGWB, 2020. It is likely that the number of structure proposed may vary depending upon the ground truth verification and feasibility criteria)***

**(b) Tentative Locations of Proposed Check Dams, Shirahatti Taluk, Gadag District**

S.No	Longitude	Latitude	Village	Grama Panchayat
1	75.73719	14.94814	Itagi	Itigi
2	75.73469	14.94969	Itagi	Itigi
3	75.70720	14.95076	Itagi	Itigi
4	75.70292	14.95159	Itagi	Itigi
5	75.74521	14.95237	Sasarawada	Itigi
6	75.72230	14.95327	Itagi	Itigi
7	75.71502	14.95936	Itagi	Itigi
8	75.75015	14.95992	Sasarawada	Itigi
9	75.74055	14.96045	Sasarawada	Itigi
10	75.74587	14.96064	Sasarawada	Itigi
11	75.75487	14.96422	Basapura	Itigi
12	75.74849	14.96777	Sasarawada	Itigi
13	75.71458	14.96825	Itagi	Itigi
14	75.69638	14.96873	Itagi	Itigi
15	75.72246	14.97123	Itagi	Itigi
16	75.70637	14.97170	Itagi	Itigi
17	75.72588	14.97182	Itagi	Itigi
18	75.69547	14.97605	Itagi	Itigi
19	75.72921	14.97634	Itagi	Itigi
20	75.70120	14.97673	Itagi	Itigi
21	75.69305	14.97842	Itagi	Itigi
22	75.75908	14.97943	Basapura	Itigi
23	75.71839	14.98058	Itagi	Itigi
24	75.76360	14.98181	Kalliganura	Hebbal
25	75.68627	14.98294	Thangoda	Koganur
26	75.68317	14.98354	Thangoda	Koganur
27	75.69170	14.98404	Itagi	Itigi
28	75.76931	14.98562	Kalliganura	Hebbal
29	75.68718	14.98857	Thangoda	Koganur
30	75.70618	14.98894	Kabberahalli	Hebbal
31	75.71232	14.98961	Kanakawada	Hebbal
32	75.67226	14.99007	Koganura	Koganur
33	75.70911	14.99020	Kanakawada	Hebbal
34	75.67723	14.99068	Koganura	Koganur
35	75.75515	14.99121	Tholali	Hebbal
36	75.64787	14.99260	Ankali	Koganur
37	75.63829	14.99481	Ankali	Koganur
38	75.75261	14.99505	Chavadala	Hebbal
39	75.66194	14.99532	Koganura	Koganur
40	75.63508	14.99572	Nagaramadavu	Koganur
41	75.67889	14.99603	Thangoda	Koganur

42	75.63659	14.99817	Nagaramadavu	Koganur
43	75.68918	14.99865	Thangoda	Koganur
44	75.74278	14.99972	Hebbala	Hebbal
45	75.66743	15.00048	Koganura	Koganur
46	75.62684	15.00091	Nagaramadavu	Koganur
47	75.73766	15.00126	Hebbala	Hebbal
48	75.72970	15.00221	Hebbala	Hebbal
49	75.64564	15.00271	Ankali	Koganur
50	75.70947	15.00281	Kanakawada	Hebbal
51	75.73647	15.00388	Hebbala	Hebbal
52	75.67538	15.00400	Koganura	Koganur
53	75.62232	15.00412	Nagaramadavu	Koganur
54	75.65175	15.00440	Ankali	Koganur
55	75.70316	15.00462	Kanakawada	Hebbal
56	75.71221	15.00492	Hebbala	Hebbal
57	75.73392	15.00508	Hebbala	Hebbal
58	75.64934	15.00545	Ankali	Koganur
59	75.73063	15.00569	Hebbala	Hebbal
60	75.64475	15.00599	Ankali	Koganur
61	75.66245	15.00599	Koganura	Koganur
62	75.73457	15.00721	Hebbala	Hebbal
63	75.72007	15.00784	Hebbala	Hebbal
64	75.62018	15.00793	Nagaramadavu	Koganur
65	75.70364	15.00807	Kanakawada	Hebbal
66	75.63481	15.00888	Nagaramadavu	Koganur
67	75.67146	15.00909	Govinakoppa	Koganur
68	75.69192	15.00930	Thangoda	Koganur
69	75.64891	15.00985	Ankali	Koganur
70	75.65277	15.01066	Ankali	Koganur
71	75.73326	15.01162	Hebbala	Hebbal
72	75.74492	15.01186	Hebbala	Hebbal
73	75.64020	15.01186	Nagaramadavu	Koganur
74	75.66276	15.01193	Govinakoppa	Koganur
75	75.70573	15.01216	Kanakawada	Hebbal
76	75.74550	15.01416	Hebbala	Hebbal
77	75.73362	15.01427	Hebbala	Hebbal
78	75.72089	15.01446	Hebbala	Hebbal
79	75.62279	15.01459	Nagaramadavu	Koganur
80	75.65582	15.01563	Govinakoppa	Koganur
81	75.70398	15.01658	Kanakawada	Hebbal
82	75.69030	15.01662	Thangoda	Koganur
83	75.65396	15.01673	Bijjura	Konchigeri
84	75.60633	15.01696	Kokkaragundhi	Konchigeri
85	75.72110	15.01759	Hebbala	Hebbal

86	75.73385	15.01768	Hebbala	Hebbal
87	75.68483	15.01811	Thangoda	Koganur
88	75.60848	15.01879	Kokkaragundhi	Konchigeri
89	75.62468	15.01940	Nagaramadavu	Koganur
90	75.60411	15.01970	Kokkaragundhi	Konchigeri
91	75.70784	15.02008	Hebbala	Hebbal
92	75.71688	15.02045	Hebbala	Hebbal
93	75.72422	15.02084	Hebbala	Hebbal
94	75.61137	15.02090	Kokkaragundhi	Konchigeri
95	75.67100	15.02145	Govinakoppa	Koganur
96	75.65175	15.02151	Bijjura	Konchigeri
97	75.69246	15.02173	Thangoda	Koganur
98	75.71970	15.02238	Hebbala	Hebbal
99	75.63306	15.02241	Nagaramadavu	Koganur
100	75.63648	15.02244	Nagaramadavu	Koganur
101	75.66939	15.02369	Govinakoppa	Koganur
102	75.67696	15.02481	Alagilawada	Vadavi
103	75.74268	15.02495	Ballaghatti	Vadavi
104	75.61387	15.02506	Kokkaragundhi	Konchigeri
105	75.62690	15.02569	Nagaramadavu	Koganur
106	75.71387	15.02573	Hebbala	Hebbal
107	75.74028	15.02607	Ballaghatti	Vadavi
108	75.63909	15.02694	Bijjura	Konchigeri
109	75.73610	15.02748	Ballaghatti	Vadavi
110	75.66810	15.02770	Govinakoppa	Koganur
111	75.59523	15.02777	Boodhihala	Hullura
112	75.60025	15.02784	Kokkaragundhi	Konchigeri
113	75.69216	15.02814	Vadavi	Vadavi
114	75.64480	15.02827	Bijjura	Konchigeri
115	75.67271	15.02889	Alagilawada	Vadavi
116	75.63411	15.02965	Bijjura	Konchigeri
117	75.68498	15.03000	Alagilawada	Vadavi
118	75.60542	15.03006	Kokkaragundhi	Konchigeri
119	75.70172	15.03146	Vadavi	Vadavi
120	75.66502	15.03153	Govinakoppa	Koganur
121	75.60073	15.03253	Kokkaragundhi	Konchigeri
122	75.65040	15.03323	Konchigeri	Konchigeri
123	75.70505	15.03342	Vadavi	Vadavi
124	75.73504	15.03392	Ballaghatti	Vadavi
125	75.60376	15.03401	Kokkaragundhi	Konchigeri
126	75.70949	15.03402	Hebbala	Hebbal
127	75.66661	15.03439	Alagilawada	Vadavi
128	75.62803	15.03446	Konchigeri	Konchigeri
129	75.68457	15.03456	Alagilawada	Vadavi

130	75.64859	15.03523	Konchigeri	Konchigeri
131	75.69201	15.03523	Vadavi	Vadavi
132	75.67429	15.03572	Alagilawada	Vadavi
133	75.68884	15.03580	Vadavi	Vadavi
134	75.72541	15.03666	Ballaghatti	Vadavi
135	75.60734	15.03704	Kokkaragundhi	Konchigeri
136	75.65126	15.03723	Konchigeri	Konchigeri
137	75.72267	15.03892	Ballaghatti	Vadavi
138	75.70037	15.03908	Vadavi	Vadavi
139	75.62658	15.03990	Konchigeri	Konchigeri
140	75.73307	15.04066	Ballaghatti	Vadavi
141	75.68481	15.04094	Alagilawada	Vadavi
142	75.66614	15.04141	Alagilawada	Vadavi
143	75.64835	15.04156	Konchigeri	Konchigeri
144	75.71379	15.04165	Vadavi	Vadavi
145	75.60613	15.04186	Boodihala	Hullura
146	75.67576	15.04205	Hosura	Vadavi
147	75.71886	15.04237	Ballaghatti	Vadavi
148	75.65261	15.04286	Konchigeri	Konchigeri
149	75.73678	15.04292	Ballaghatti	Vadavi
150	75.72766	15.04391	Ballaghatti	Vadavi
151	75.66103	15.04413	Konchigeri	Konchigeri
152	75.71108	15.04482	Vadavi	Vadavi
153	75.73257	15.04487	Ballaghatti	Vadavi
154	75.59868	15.04500	Boodihala	Hullura
155	75.64478	15.04504	Konchigeri	Konchigeri
156	75.69678	15.04527	Vadavi	Vadavi
157	75.72840	15.04532	Ballaghatti	Vadavi
158	75.60935	15.04562	Boodihala	Hullura
159	75.63032	15.04608	Konchigeri	Konchigeri
160	75.71786	15.04617	Ballaghatti	Vadavi
161	75.66256	15.04632	Konchigeri	Konchigeri
162	75.74387	15.04636	Ballaghatti	Vadavi
163	75.62608	15.04663	Konchigeri	Konchigeri
164	75.62194	15.04694	Konchigeri	Konchigeri
165	75.65065	15.04708	Konchigeri	Konchigeri
166	75.59314	15.04844	Boodihala	Hullura
167	75.68573	15.04850	Hosura	Vadavi
168	75.71212	15.04850	Vadavi	Vadavi
169	75.67828	15.04859	Hosura	Vadavi
170	75.63508	15.04865	Konchigeri	Konchigeri
171	75.63907	15.04904	Konchigeri	Konchigeri
172	75.64880	15.04940	Konchigeri	Konchigeri
173	75.67610	15.05020	Hosura	Vadavi

174	75.70899	15.05034	Vadavi	Vadavi
175	75.66814	15.05145	Hosura	Vadavi
176	75.69806	15.05216	Vadavi	Vadavi
177	75.71100	15.05231	Vadavi	Vadavi
178	75.68617	15.05320	Hosura	Vadavi
179	75.60870	15.05430	Boodhihala	Hullura
180	75.69282	15.05483	Hosura	Vadavi
181	75.67010	15.05537	Hosura	Vadavi
182	75.59567	15.05540	Chikkamallapura	Hullura
183	75.63222	15.05608	Konchigeri	Konchigeri
184	75.72184	15.05611	Arikoppa	Tarikoppa
185	75.72541	15.05754	Arikoppa	Tarikoppa
186	75.67462	15.05763	Hosura	Vadavi
187	75.73564	15.05825	Arikoppa	Tarikoppa
188	75.64474	15.05826	Konchigeri	Konchigeri
189	75.67181	15.05827	Hosura	Vadavi
190	75.61836	15.05863	Konchigeri	Konchigeri
191	75.70044	15.05871	Hosura	Vadavi
192	75.60251	15.05897	Chikkamallapura	Hullura
193	75.59175	15.05902	Chikkamallapura	Hullura
194	75.76038	15.05955	Sevanagara	Tarikoppa
195	75.71786	15.05985	Arikoppa	Tarikoppa
196	75.76431	15.06016	Sevanagara	Tarikoppa
197	75.61893	15.06110	Chikkasavanura	Konchigeri
198	75.65986	15.06121	Narayanapura	Bellatti
199	75.63880	15.06147	Bellatti	Bellatti
200	75.74122	15.06177	Arikoppa	Tarikoppa
201	75.67443	15.06192	Narayanapura	Bellatti
202	75.75864	15.06252	Sevanagara	Tarikoppa
203	75.65072	15.06282	Narayanapura	Bellatti
204	75.74650	15.06286	Sevanagara	Tarikoppa
205	75.62921	15.06301	Bellatti	Bellatti
206	75.71619	15.06305	Arikoppa	Tarikoppa
207	75.70045	15.06312	Hosura	Vadavi
208	75.65423	15.06335	Narayanapura	Bellatti
209	75.73040	15.06396	Arikoppa	Tarikoppa
210	75.62084	15.06472	Chikkasavanura	Konchigeri
211	75.76550	15.06480	Sevanagara	Tarikoppa
212	75.64498	15.06492	Bellatti	Bellatti
213	75.68891	15.06497	Hosura	Vadavi
214	75.71160	15.06503	Vadavi	Vadavi
215	75.69222	15.06516	Hosura	Vadavi
216	75.67219	15.06550	Narayanapura	Bellatti
217	75.74387	15.06629	Kerehalli	Tarikoppa



218	75.69638	15.06644	Hosura	Vadavi
219	75.65605	15.06662	Narayanapura	Bellatti
220	75.62476	15.06716	Chikkasavanura	Konchigeri
221	75.63389	15.06748	Bellatti	Bellatti
222	75.72338	15.06777	Arikoppa	Tarikoppa
223	75.68936	15.06822	Hosura	Vadavi
224	75.75171	15.06900	Kerehalli	Tarikoppa
225	75.73445	15.06979	Arikoppa	Tarikoppa
226	75.68342	15.07023	Suganahalli	Bannikoppa
227	75.65890	15.07059	Narayanapura	Bellatti
228	75.63992	15.07097	Bellatti	Bellatti
229	75.75765	15.07134	Kerehalli	Tarikoppa
230	75.70869	15.07158	Vadavi	Vadavi
231	75.66496	15.07159	Narayanapura	Bellatti
232	75.71574	15.07315	Bannikoppa	Bannikoppa
233	75.72675	15.07357	Arikoppa	Tarikoppa
234	75.65283	15.07360	Narayanapura	Bellatti
235	75.73221	15.07413	Arikoppa	Tarikoppa
236	75.76586	15.07467	Kerehalli	Tarikoppa
237	75.61557	15.07470	Chikkasavanura	Konchigeri
238	75.62943	15.07477	Bellatti	Bellatti
239	75.67970	15.07518	Suganahalli	Bannikoppa
240	75.72678	15.07599	Arikoppa	Tarikoppa
241	75.75024	15.07616	Kerehalli	Tarikoppa
242	75.66357	15.07616	Narayanapura	Bellatti
243	75.64007	15.07685	Bellatti	Bellatti
244	75.68332	15.07707	Suganahalli	Bannikoppa
245	75.66884	15.07796	Narayanapura	Bellatti
246	75.61464	15.07800	Chikkasavanura	Konchigeri
247	75.69834	15.07800	Suganahalli	Bannikoppa
248	75.69504	15.07806	Suganahalli	Bannikoppa
249	75.75495	15.07836	Kerehalli	Tarikoppa
250	75.65486	15.07863	Bellatti	Bellatti
251	75.66433	15.07918	Narayanapura	Bellatti
252	75.62573	15.07963	Chikkasavanura	Konchigeri
253	75.73655	15.08020	Bannikoppa	Bannikoppa
254	75.61292	15.08069	Chikkasavanura	Konchigeri
255	75.68565	15.08168	Suganahalli	Bannikoppa
256	75.72342	15.08168	Bannikoppa	Bannikoppa
257	75.71741	15.08178	Bannikoppa	Bannikoppa
258	75.61843	15.08243	Chikkasavanura	Konchigeri
259	75.69855	15.08250	Suganahalli	Bannikoppa
260	75.64036	15.08280	Bellatti	Bellatti
261	75.73078	15.08341	Bannikoppa	Bannikoppa

262	75.72659	15.08370	Bannikoppa	Bannikoppa
263	75.72134	15.08376	Bannikoppa	Bannikoppa
264	75.66222	15.08446	Bellatti	Bellatti
265	75.66750	15.08451	Bellatti	Bellatti
266	75.70488	15.08502	Bannikoppa	Bannikoppa
267	75.68891	15.08605	Suganahalli	Bannikoppa
268	75.66483	15.08614	Bellatti	Bellatti
269	75.60001	15.08627	Chikkasavanura	Konchigeri
270	75.63508	15.08642	Bellatti	Bellatti
271	75.69637	15.08741	Suganahalli	Bannikoppa
272	75.67957	15.08801	Suganahalli	Bannikoppa
273	75.72207	15.08806	Bannikoppa	Bannikoppa
274	75.70850	15.08838	Bannikoppa	Bannikoppa
275	75.71665	15.08855	Bannikoppa	Bannikoppa
276	75.65921	15.08887	Bellatti	Bellatti
277	75.63736	15.08996	Bellatti	Bellatti
278	75.65427	15.09001	Bellatti	Bellatti
279	75.63433	15.09067	Bellatti	Bellatti
280	75.70293	15.09133	Bannikoppa	Bannikoppa
281	75.65739	15.09154	Bellatti	Bellatti
282	75.70929	15.09165	Bannikoppa	Bannikoppa
283	75.69073	15.09234	Suganahalli	Bannikoppa
284	75.72252	15.09275	Bannikoppa	Bannikoppa
285	75.65273	15.09339	Bellatti	Bellatti
286	75.71439	15.09344	Bannikoppa	Bannikoppa
287	75.71816	15.09344	Bannikoppa	Bannikoppa
288	75.60351	15.09399	Chikkasavanura	Konchigeri
289	75.70736	15.09403	Bannikoppa	Bannikoppa
290	75.73350	15.09430	Bannikoppa	Bannikoppa
291	75.61637	15.09472	Chikkasavanura	Konchigeri
292	75.74064	15.09490	Bannikoppa	Bannikoppa
293	75.64926	15.09513	Bellatti	Bellatti
294	75.65914	15.09523	Bellatti	Bellatti
295	75.62612	15.09531	Bellatti	Bellatti
296	75.60891	15.09663	Chikkasavanura	Konchigeri
297	75.73354	15.09721	Bannikoppa	Bannikoppa
298	75.64987	15.09791	Bellatti	Bellatti
299	75.67788	15.09829	Suganahalli	Bannikoppa
300	75.67188	15.09850	Suganahalli	Bannikoppa
301	75.70151	15.09929	Bannikoppa	Bannikoppa
302	75.62431	15.09950	Devihala	Ranatur
303	75.63818	15.09972	Bellatti	Bellatti
304	75.72779	15.10013	Bannikoppa	Bannikoppa
305	75.61925	15.10013	Devihala	Ranatur

306	75.69148	15.10037	Suganahalli	Bannikoppa
307	75.65471	15.10057	Bellatti	Bellatti
308	75.65211	15.10059	Bellatti	Bellatti
309	75.67732	15.10146	Suganahalli	Bannikoppa
310	75.67382	15.10187	Suganahalli	Bannikoppa
311	75.73435	15.10212	Bannikoppa	Bannikoppa
312	75.66689	15.10353	Suganahalli	Bannikoppa
313	75.71393	15.10376	Bannikoppa	Bannikoppa
314	75.68001	15.10428	Suganahalli	Bannikoppa
315	75.64073	15.10429	Ranathura	Ranatur
316	75.68260	15.10458	Suganahalli	Bannikoppa
317	75.63863	15.10470	Ranathura	Ranatur
318	75.66098	15.10554	Suganahalli	Bannikoppa
319	75.60878	15.10560	Devihala	Ranatur
320	75.66568	15.10609	Suganahalli	Bannikoppa
321	75.73956	15.10674	Bannikoppa	Bannikoppa
322	75.66282	15.10756	Machenahalli	Machanahalli
323	75.60607	15.10862	Devihala	Ranatur
324	75.60816	15.10957	Devihala	Ranatur
325	75.64518	15.11061	Ranathura	Ranatur
326	75.68605	15.11148	Suganahalli	Bannikoppa
327	75.67338	15.11163	Machenahalli	Machanahalli
328	75.62289	15.11166	Devihala	Ranatur
329	75.69524	15.11187	Hadagali	Bannikoppa
330	75.71535	15.11268	Hadagali	Bannikoppa
331	75.64678	15.11322	Ranathura	Ranatur
332	75.73663	15.11325	Bannikoppa	Bannikoppa
333	75.64307	15.11348	Ranathura	Ranatur
334	75.62175	15.11374	Devihala	Ranatur
335	75.67181	15.11376	Machenahalli	Machanahalli
336	75.70535	15.11440	Hadagali	Bannikoppa
337	75.73449	15.11468	Bannikoppa	Bannikoppa
338	75.70334	15.11518	Hadagali	Bannikoppa
339	75.66474	15.11530	Machenahalli	Machanahalli
340	75.73142	15.11544	Bannikoppa	Bannikoppa
341	75.69115	15.11551	Suganahalli	Bannikoppa
342	75.69555	15.11570	Hadagali	Bannikoppa
343	75.66945	15.11604	Machenahalli	Machanahalli
344	75.68130	15.11638	Machenahalli	Machanahalli
345	75.63564	15.11643	Ranathura	Ranatur
346	75.67382	15.11663	Machenahalli	Machanahalli
347	75.72495	15.11691	Bannikoppa	Bannikoppa
348	75.71212	15.11760	Hadagali	Bannikoppa
349	75.62196	15.11792	Devihala	Ranatur

350	75.67590	15.11812	Machenahalli	Machanahalli
351	75.73167	15.11916	Bannikoppa	Bannikoppa
352	75.68718	15.11925	Suganahalli	Bannikoppa
353	75.64100	15.11940	Ranathura	Ranatur
354	75.64608	15.11981	Ranathura	Ranatur
355	75.67096	15.12026	Machenahalli	Machanahalli
356	75.71092	15.12098	Bhavanura	Machanahalli
357	75.64302	15.12107	Ranathura	Ranatur
358	75.66479	15.12113	Machenahalli	Machanahalli
359	75.72418	15.12192	Bannikoppa	Bannikoppa
360	75.63056	15.12267	Devihala	Ranatur
361	75.61488	15.12282	Devihala	Ranatur
362	75.69013	15.12321	Suganahalli	Bannikoppa
363	75.60999	15.12354	Devihala	Ranatur
364	75.65539	15.12381	Machenahalli	Machanahalli
365	75.69623	15.12392	Bhavanura	Machanahalli
366	75.71846	15.12430	Hadagali	Bannikoppa
367	75.72188	15.12489	Bannikoppa	Bannikoppa
368	75.70361	15.12603	Bhavanura	Machanahalli
369	75.66026	15.12614	Machenahalli	Machanahalli
370	75.68965	15.12674	Navebavanura	Machanahalli
371	75.63812	15.12689	Ranathura	Ranatur
372	75.62160	15.12694	Devihala	Ranatur
373	75.68533	15.12746	Navebavanura	Machanahalli
374	75.63517	15.12769	Ranathura	Ranatur
375	75.66879	15.12777	Machenahalli	Machanahalli
376	75.71119	15.12880	Bhavanura	Machanahalli
377	75.70346	15.12920	Bhavanura	Machanahalli
378	75.61396	15.12979	Devihala	Ranatur
379	75.66610	15.12984	Machenahalli	Machanahalli
380	75.68654	15.13024	Navebavanura	Machanahalli
381	75.63095	15.13146	Devihala	Ranatur
382	75.66027	15.13237	Machenahalli	Machanahalli
383	75.61506	15.13249	Devihala	Ranatur
384	75.65091	15.13323	Ranathura	Ranatur
385	75.70845	15.13332	Bhavanura	Machanahalli
386	75.70015	15.13387	Bhavanura	Machanahalli
387	75.64501	15.13534	Ranathura	Ranatur
388	75.67738	15.13553	Navebavanura	Machanahalli
389	75.60622	15.13583	Chabbi	Chabbi
390	75.69954	15.13598	Bhavanura	Machanahalli
391	75.70483	15.13648	Bhavanura	Machanahalli
392	75.62860	15.13708	Devihala	Ranatur
393	75.69293	15.13797	Navebavanura	Machanahalli

394	75.69035	15.13870	Navebavanura	Machanahalli
395	75.62024	15.13900	Chabbi	Chabbi
396	75.67494	15.13953	Navebavanura	Machanahalli
397	75.63402	15.14137	Ranathura	Ranatur
398	75.66674	15.14175	Machenahalli	Machanahalli
399	75.63863	15.14186	Ranathura	Ranatur
400	75.67847	15.14284	Thegginabhavanuru	Machanahalli
401	75.60320	15.14292	Chabbi	Chabbi
402	75.67449	15.14310	Thegginabhavanuru	Machanahalli
403	75.71083	15.14320	Thegginabhavanuru	Machanahalli
404	75.65838	15.14322	Machenahalli	Machanahalli
405	75.61449	15.14327	Chabbi	Chabbi
406	75.65272	15.14370	Machenahalli	Machanahalli
407	75.63267	15.14403	Ranathura	Ranatur
408	75.59352	15.14667	Chabbi	Chabbi
409	75.65085	15.14670	Machenahalli	Machanahalli
410	75.70579	15.14695	Thegginabhavanuru	Machanahalli
411	75.66900	15.14717	Thegginabhavanuru	Machanahalli
412	75.67180	15.14729	Thegginabhavanuru	Machanahalli
413	75.68371	15.14736	Thegginabhavanuru	Machanahalli
414	75.62024	15.14850	Chabbi	Chabbi
415	75.60214	15.14885	Chabbi	Chabbi
416	75.66477	15.14926	Thegginabhavanuru	Machanahalli
417	75.61554	15.14951	Chabbi	Chabbi
418	75.66934	15.15002	Thegginabhavanuru	Machanahalli
419	75.63562	15.15061	Majjura	Majjooru
420	75.61858	15.15121	Chabbi	Chabbi
421	75.68076	15.15170	Thegginabhavanuru	Machanahalli
422	75.58786	15.15173	Chabbi	Chabbi
423	75.70678	15.15204	Thegginabhavanuru	Machanahalli
424	75.60560	15.15254	Chabbi	Chabbi
425	75.69999	15.15288	Thegginabhavanuru	Machanahalli
426	75.65673	15.15302	Majjura	Majjooru
427	75.67543	15.15326	Thegginabhavanuru	Machanahalli
428	75.69342	15.15366	Thegginabhavanuru	Machanahalli
429	75.63667	15.15392	Majjura	Majjooru
430	75.63034	15.15438	Majjura	Majjooru
431	75.58180	15.15505	Chabbi	Chabbi
432	75.70542	15.15671	Thegginabhavanuru	Machanahalli
433	75.67663	15.15814	Kusalapura	Majjooru
434	75.69219	15.15849	Thegginabhavanuru	Machanahalli
435	75.70126	15.15969	Thegginabhavanuru	Machanahalli
436	75.65603	15.15984	Majjura	Majjooru
437	75.58026	15.16015	Chabbi	Chabbi

438	75.63035	15.16015	Majjura	Majjooru
439	75.64460	15.16043	Majjura	Majjooru
440	75.60171	15.16128	Chabbi	Chabbi
441	75.64910	15.16149	Majjura	Majjooru
442	75.59311	15.16194	Chabbi	Chabbi
443	75.61869	15.16218	Chabbi	Chabbi
444	75.67107	15.16236	Kusalapura	Majjooru
445	75.60584	15.16253	Chabbi	Chabbi
446	75.59702	15.16289	Chabbi	Chabbi
447	75.66668	15.16327	Kusalapura	Majjooru
448	75.58632	15.16365	Chabbi	Chabbi
449	75.61595	15.16444	Chabbi	Chabbi
450	75.64903	15.16479	Majjura	Majjooru
451	75.60524	15.16551	Chabbi	Chabbi
452	75.68860	15.16572	Kusalapura	Majjooru
453	75.58776	15.16693	Chabbi	Chabbi
454	75.69293	15.16727	Kadakola	Kadkol
455	75.68163	15.16823	Kusalapura	Majjooru
456	75.62273	15.16824	Chabbi	Chabbi
457	75.63297	15.16994	Majjura	Majjooru
458	75.71083	15.17003	Kadakola	Kadkol
459	75.65468	15.17163	Majjura	Majjooru
460	75.60720	15.17299	Chabbi	Chabbi
461	75.60371	15.17412	Chabbi	Chabbi
462	75.68537	15.17480	Kadakola	Kadkol
463	75.70369	15.17538	Kadakola	Kadkol
464	75.67301	15.17541	Kusalapura	Majjooru
465	75.63628	15.17552	Majjura	Majjooru
466	75.70786	15.17633	Kadakola	Kadkol
467	75.59366	15.17641	Chabbi	Chabbi
468	75.60334	15.17784	Chabbi	Chabbi
469	75.70301	15.17797	Kadakola	Kadkol
470	75.67003	15.17864	Kusalapura	Majjooru
471	75.61947	15.17924	Chabbi	Chabbi
472	75.58180	15.17963	Chabbi	Chabbi
473	75.59672	15.18000	Chabbi	Chabbi
474	75.56511	15.18013	Chabbi	Chabbi
475	75.67678	15.18038	Kadakola	Kadkol
476	75.62892	15.18106	Majjura	Majjooru
477	75.57109	15.18144	Chabbi	Chabbi
478	75.70919	15.18204	Kadakola	Kadkol
479	75.62541	15.18212	Majjura	Majjooru
480	75.70632	15.18259	Kadakola	Kadkol
481	75.56199	15.18273	Chabbi	Chabbi

482	75.69502	15.18340	Kadakola	Kadkol
483	75.58187	15.18426	Chabbi	Chabbi
484	75.61330	15.18452	Chabbi	Chabbi
485	75.63108	15.18476	Majjura	Majjooru
486	75.66185	15.18519	Kusalapura	Majjooru
487	75.67180	15.18536	Kadakola	Kadkol
488	75.64950	15.18546	Majjura	Majjooru
489	75.59586	15.18562	Chabbi	Chabbi
490	75.70290	15.18578	Kadakola	Kadkol
491	75.62571	15.18641	Majjura	Majjooru
492	75.70067	15.18727	Kadakola	Kadkol
493	75.60764	15.18764	Chabbi	Chabbi
494	75.56783	15.18820	Chabbi	Chabbi
495	75.66622	15.18822	Kadakola	Kadkol
496	75.61255	15.18837	Chabbi	Chabbi
497	75.64443	15.18848	Majjura	Majjooru
498	75.58080	15.18915	Chabbi	Chabbi
499	75.60969	15.19018	Chabbi	Chabbi
500	75.59478	15.19034	Chabbi	Chabbi
501	75.63352	15.19047	Guddadhapura	Chabbi
502	75.71024	15.19081	Kadakola	Kadkol
503	75.56009	15.19117	Parasapura	Magadi
504	75.68520	15.19121	Kadakola	Kadkol
505	75.70422	15.19169	Kadakola	Kadkol
506	75.65697	15.19333	Jalligeri	Kadkol
507	75.63555	15.19418	Guddadhapura	Chabbi
508	75.60486	15.19425	Chabbi	Chabbi
509	75.70368	15.19429	Kadakola	Kadkol
510	75.65240	15.19490	Jalligeri	Kadkol
511	75.55139	15.19493	Parasapura	Magadi
512	75.65929	15.19546	Jalligeri	Kadkol
513	75.57809	15.19621	Shirahatti	Shirahatti
514	75.61738	15.19666	Guddadhapura	Chabbi
515	75.56852	15.19721	Shirahatti	Shirahatti
516	75.69569	15.19745	Kadakola	Kadkol
517	75.55867	15.19849	Parasapura	Magadi
518	75.60787	15.19857	Varavi	Chabbi
519	75.54727	15.19894	Parasapura	Magadi
520	75.68163	15.19894	Kadakola	Kadkol
521	75.55189	15.19926	Parasapura	Magadi
522	75.67516	15.19932	Kadakola	Kadkol
523	75.52184	15.19938	Magadi	Magadi
524	75.67025	15.20036	Kadakola	Kadkol
525	75.51601	15.20057	Magadi	Magadi

526	75.62959	15.20119	Guddadhapura	Chabbi
527	75.64665	15.20152	Jalligeri	Kadkol
528	75.56569	15.20164	Shirahatti	Shirahatti
529	75.57342	15.20176	Shirahatti	Shirahatti
530	75.70381	15.20176	Kadakola	Kadkol
531	75.53768	15.20192	Parasapura	Magadi
532	75.50370	15.20221	Magadi	Magadi
533	75.62127	15.20246	Guddadhapura	Chabbi
534	75.59243	15.20275	Shirahatti	Shirahatti
535	75.63368	15.20426	Guddadhapura	Chabbi
536	75.64226	15.20432	Jalligeri	Kadkol
537	75.61210	15.20450	Varavi	Chabbi
538	75.52212	15.20478	Magadi	Magadi
539	75.67195	15.20586	Kadakola	Kadkol
540	75.52994	15.20593	Magadi	Magadi
541	75.48983	15.20665	Magadi	Magadi
542	75.70896	15.20699	Kadakola	Kadkol
543	75.50352	15.20699	Magadi	Magadi
544	75.48657	15.20706	Magadi	Magadi
545	75.62952	15.20711	Guddadhapura	Chabbi
546	75.47872	15.20749	Magadi	Magadi
547	75.50808	15.20757	Magadi	Magadi
548	75.59917	15.20757	Varavi	Chabbi
549	75.65627	15.20827	Jalligeri	Kadkol
550	75.60857	15.20846	Varavi	Chabbi
551	75.67699	15.20861	Kadakola	Kadkol
552	75.51239	15.20935	Magadi	Magadi
553	75.66448	15.20936	Jalligeri	Kadkol
554	75.54261	15.20973	Parasapura	Magadi
555	75.58787	15.21032	Shirahatti	Shirahatti
556	75.58413	15.21068	Shirahatti	Shirahatti
557	75.56854	15.21084	Shirahatti	Shirahatti
558	75.68542	15.21084	Kadakola	Kadkol
559	75.64046	15.21092	Jalligeri	Kadkol
560	75.49342	15.21120	Magadi	Magadi
561	75.66058	15.21122	Jalligeri	Kadkol
562	75.55636	15.21141	Shirahatti	Shirahatti
563	75.54996	15.21234	Parasapura	Magadi
564	75.69299	15.21235	Kadakola	Kadkol
565	75.51976	15.21242	Magadi	Magadi
566	75.53368	15.21263	Magadi	Magadi
567	75.49424	15.21288	Magadi	Magadi
568	75.45845	15.21306	Magadi	Magadi
569	75.46438	15.21306	Magadi	Magadi



570	75.61702	15.21318	Guddadhapura	Chabbi
571	75.60765	15.21362	Varavi	Chabbi
572	75.46236	15.21419	Magadi	Magadi
573	75.46712	15.21437	Magadi	Magadi
574	75.57584	15.21453	Shirahatti	Shirahatti
575	75.56752	15.21463	Shirahatti	Shirahatti
576	75.67650	15.21471	Kadakola	Kadkol
577	75.70060	15.21483	Kadakola	Kadkol
578	75.56966	15.21543	Shirahatti	Shirahatti
579	75.59099	15.21605	Shirahatti	Shirahatti
580	75.46844	15.21648	Magadi	Magadi
581	75.50142	15.21720	Magadi	Magadi
582	75.72781	15.21739	Kadakola	Kadkol
583	75.54249	15.21806	Parasapura	Magadi
584	75.69870	15.21811	Kadakola	Kadkol
585	75.52669	15.21820	Magadi	Magadi
586	75.50412	15.21835	Magadi	Magadi
587	75.71333	15.21841	Kadakola	Kadkol
588	75.50757	15.21847	Magadi	Magadi
589	75.51423	15.21847	Magadi	Magadi
590	75.45616	15.21877	Magadi	Magadi
591	75.55624	15.21950	Shirahatti	Shirahatti
592	75.47782	15.21966	Magadi	Magadi
593	75.47458	15.22005	Magadi	Magadi
594	75.66453	15.22006	Jalligeri	Kadkol
595	75.45391	15.22026	Magadi	Magadi
596	75.52399	15.22026	Magadi	Magadi
597	75.52994	15.22051	Magadi	Magadi
598	75.58980	15.22051	Shirahatti	Shirahatti
599	75.68778	15.22116	Kadakola	Kadkol
600	75.72223	15.22131	Kadakola	Kadkol
601	75.66077	15.22150	Jalligeri	Kadkol
602	75.45272	15.22169	Magadi	Magadi
603	75.52652	15.22170	Holalapura	Magadi
604	75.53768	15.22177	Magadi	Magadi
605	75.63592	15.22192	Jalligeri	Kadkol
606	75.54987	15.22259	Shirahatti	Shirahatti
607	75.68190	15.22282	Kadakola	Kadkol
608	75.47854	15.22288	Magadi	Magadi
609	75.57437	15.22362	Shirahatti	Shirahatti
610	75.66648	15.22397	Jalligeri	Kadkol
611	75.46391	15.22408	Magadi	Magadi
612	75.59277	15.22408	Shirahatti	Shirahatti
613	75.56362	15.22423	Shirahatti	Shirahatti

614	75.47009	15.22430	Magadi	Magadi
615	75.55967	15.22434	Shirahatti	Shirahatti
616	75.63833	15.22448	Jalligeri	Kadkol
617	75.46673	15.22462	Magadi	Magadi
618	75.45131	15.22505	Magadi	Magadi
619	75.68160	15.22523	Kadakola	Kadkol
620	75.70059	15.22527	Kadakola	Kadkol
621	75.71046	15.22549	Kadakola	Kadkol
622	75.51041	15.22591	Magadi	Magadi
623	75.54249	15.22591	Holalapura	Magadi
624	75.66728	15.22599	Jalligeri	Kadkol
625	75.65091	15.22670	Jalligeri	Kadkol
626	75.58742	15.22675	Shirahatti	Shirahatti
627	75.51863	15.22740	Holalapura	Magadi
628	75.71731	15.22797	Kadakola	Kadkol
629	75.45998	15.22823	Magadi	Magadi
630	75.45082	15.22847	Magadi	Magadi
631	75.69110	15.22930	Kadakola	Kadkol
632	75.58358	15.22959	Shirahatti	Shirahatti
633	75.50996	15.22976	Holalapura	Magadi
634	75.71464	15.22995	Kadakola	Kadkol
635	75.65115	15.23006	Jalligeri	Kadkol
636	75.44963	15.23013	Magadi	Magadi
637	75.55667	15.23019	Shirahatti	Shirahatti
638	75.55383	15.23036	Shirahatti	Shirahatti
639	75.70316	15.23066	Kadakola	Kadkol
640	75.68430	15.23222	Kadakola	Kadkol
641	75.57064	15.23254	Shirahatti	Shirahatti
642	75.64343	15.23257	Jalligeri	Kadkol
643	75.69049	15.23293	Kadakola	Kadkol
644	75.67367	15.23363	Jalligeri	Kadkol
645	75.54539	15.23390	Khanapura	Khanapura
646	75.54905	15.23434	Shirahatti	Shirahatti
647	75.70986	15.23454	Kadakola	Kadkol
648	75.66230	15.23482	Jalligeri	Kadkol
649	75.51387	15.23489	Holalapura	Magadi
650	75.52498	15.23490	Holalapura	Magadi
651	75.51769	15.23547	Holalapura	Magadi
652	75.53931	15.23583	Holalapura	Magadi
653	75.70603	15.23609	Kadakola	Kadkol
654	75.67581	15.23616	Jalligeri	Kadkol
655	75.66996	15.23642	Jalligeri	Kadkol
656	75.58944	15.23673	Shirahatti	Shirahatti
657	75.66572	15.23746	Jalligeri	Kadkol

658	75.57088	15.23830	Shirahatti	Shirahatti
659	75.57403	15.23895	Shirahatti	Shirahatti
660	75.72541	15.24076	Kadakola	Kadkol
661	75.54939	15.24090	Khanapura	Khanapura
662	75.57930	15.24172	Shirahatti	Shirahatti
663	75.58980	15.24252	Shirahatti	Shirahatti
664	75.58281	15.24386	Shirahatti	Shirahatti
665	75.56036	15.24567	Khanapura	Khanapura
666	75.56688	15.24587	Shirahatti	Shirahatti
667	75.56545	15.24958	Shirahatti	Shirahatti
668	75.58330	15.24972	Shirahatti	Shirahatti

***Village Name: Source - KRSAC***

***(Source: Master Plan, CGWB, 2020. It is likely that the number of structure proposed may vary depending upon the ground truth verification and feasibility criteria)***