

## 6.3 Demographic Profile of Study Area

The villages within the study area fall under the administrative jurisdiction of three Mandals, namely, Pargi, Pudur and Kondurg. Details concerning the socio-economic and demographic profile of the study area will include the two (02) districts, three (03) mandals and the fifteen (15<sup>18</sup>) villages which have been elaborated in the following sections of the report.

### 6.3.1 Population

#### Districts

The **Table 6-3** below highlights the demographic profile of the project districts.

**Table 6-3: Demographic Profile of the Districts within the Study Area**

S. No	District	2001			2011			Decadal Growth Rate (in %)
		Total Population	Total Male Population	Total Female Population	Total Population	Total Male Population	Total Female Population	
1	Rangareddy	3575064	1839227	1735837	5296741	2701008	2595733	48.15
2	Mahbubnagar	3513934	1782340	1731594	4053028	2050386	2002642	15.34

Source: 2001 and 2011 Census Data

It can be observed from the table above that there has been a decadal population growth of 48.15% in Rangareddy District between 2001 and 2011. In Mahbubnagar District, however, there has been only a 15.34% decadal population growth between the same time period. The population density of Rangareddy District in 2011 was 707 inhabitants per sq.km and in Mahbubnagar District during the same period it was 220 inhabitants per sq.km respectively.

#### Mandals

Below in **Table 6-4** the decadal growth of the population in the Mandals within the study area has been provided.

**Table 6-4: Demographic Profile of the Mandals within the Study Area**

S. No	District	Mandal	2001			2011			Decadal Growth Rate (in %)
			Total Population	Total Male Population	Total Female Population	Total Population	Total Male Population	Total Female Population	
1	Rangareddy	Pargi	55571	27831	27740	62984	31420	31564	13.33
2		Pudur	41319	20914	20405	44884	22712	22712	8.62
3	Mahbubnagar	Kondurg	54899	27793	27109	60518	30534	29984	10.23

Source: 2001 and 2011 Census Data

The table above depicts that there has been a slight increase of population in each of the three Mandals in terms of decadal growth with both the rate of male and female population increasing at equal par.

#### Villages

<sup>18</sup> Nagulapally village is a hamlet village under Madharam village. The Census Data of Madharam village consists of the data of Nagulapally village as well.

In reference to the villages that fall within the study area, the decadal growth of population have been provided in **Table 6-5**

**Table 6-5: Demographic Profile of the Villages within the Study Area**

S. No	Mandal	Village	2001			2011			Decadal Growth Rate (in %)
			Total Population	Total Male Population	Total Female Population	Total Population	Total Male Population	Total Female Population	
1	Pargi	Kadlapur	1177	585	592	1267	624	643	7.64
2		Madharam <sup>19</sup>	2227	1110	1117	2639	1309	1330	18.50
3		Raghavapur	629	317	312	751	384	367	19.39
4		Khudwanpur	1127	549	578	1239	601	638	9.93
5		Chityal	1564	783	781	1979	980	999	26.53
6		Rapole	2730	1391	1339	2857	1448	1409	4.65
7		Syedpally	1792	910	882	1729	860	869	0
8		Yabajiguda	673	344	329	879	431	448	30.60
9		Thondapally	1207	571	636	1316	645	671	9.03
10	Pudur	Kervelly	982	480	502	966	487	479	-1.62
11		Thurkayenkepalle	1125	570	555	1089	556	533	-3.2
12		Somangurthy	2173	1053	1120	2261	1135	1126	4.04
13	Kondurg	Padmaran	2246	1144	1102	2560	1321	1239	13.98
14		Vanampally	607	312	295	807	428	379	32.94
15		Thummalapally	1857	911	946	2236	1119	1117	0.06

Source: 2001 and 2011 Census Data

It can be inferred from the table above that some of the villages under Pargi and Kondurg Mandal have seen a significant increase in population between 2001 and 2011. Vanampally village has shown the highest decadal population growth amongst the villages falling within the study area at 32.94% followed by Yabajiguda village at 30.60% and Chityal village at 26.53% respectively. The lowest (negative) decadal trend has been observed in Thurkayenkepalle village at (-) 3.2% and Kervelly village at (-) 1.62%, both falling under Pudur Mandal.

### 6.3.2 Sex Ratio

#### Districts

According to the 2011 Census data, in Rangareddy district there are 961 females to every 1000 males while in Mahbubnagar, the rate is slightly higher at 977 females to every 1000 males.

#### Mandals

The sex ratio in the Mandals shows a healthy trend with the ratio of females in Pargi at 1004, Pudur at 1000 and Kondurg at 982 to every 1000 males.

#### Villages

The **Table 6-6** below shows the sex ratio that is present in the villages that fall within the study area.

**Table 6-6: Sex Ratio present in the Villages within the Study Area**

<sup>19</sup> Nagulapally village is a hamlet village under Madharam village. The Census Data of Madharam village consists of the data of Nagulapally village as well.

S. No	Mandal	Village	Sex Ratio (no. of female to every 1000 males)
1	Pargi	Kadlapur	1016
2		Madharam	1016
3		Raghavapur	956
4		Khudwanpur	1061
5		Chityal	1019
6		Rapole	973
7		Syedpally	1010
8		Yabajiguda	1039
9		Thondapally	1040
10	Pudur	Kervelly	983
11		Thurkayenkepalle	995
12		Somangurthy	992
13	Kondurg	Padmaran	938
14		Vanampally	885
15		Thummalapally	998

Source: 2001 and 2011 Census Data

As observed from the table above, Khudwanpur village has a higher sex ratio with 1061 females to every 1000 males followed by Thondapally village with 1040 females. Vanampally village has the lowest sex ratio at 885 females followed by Padmaran village with 938 females to every 1000 males.

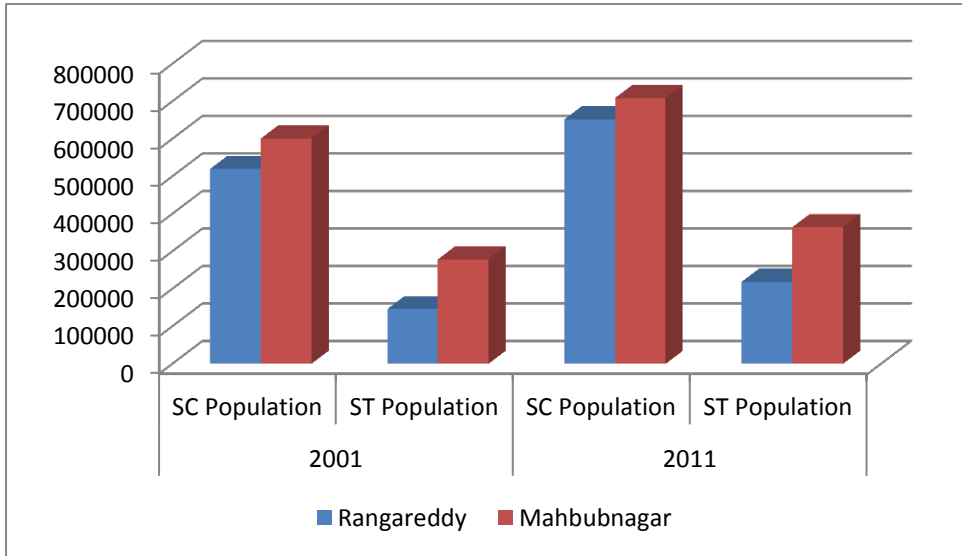
### 6.3.3 Social Stratification

Social stratification is a concept which classifies people into groups based on the hierarchical structures of class and status in any society. In India, the society is stratified along caste and tribe lineage. The terminology of Scheduled Caste (SC) and Tribe (ST) has been adopted in the Constitution of India and a sizeable amount of people fall within both these categories. These categories of people highlight the disadvantaged and oppressed classes.

#### Districts

The details pertaining to the SC and ST population in the two districts in 2001 and 2011 are provided in **Figure 6-1**

**Figure 6-1: Decadal Growth of SC and ST Population in the two Districts of the Study Area**



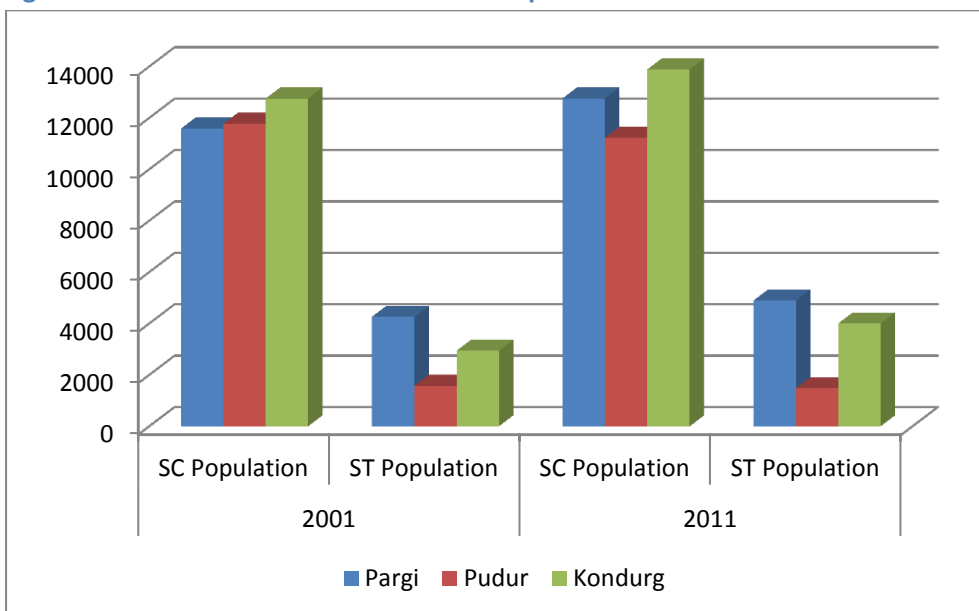
Source: 2001 and 2011 Census Data

The SC population in Mahbubnagar District grew to 708954 (17.49%) in 2011 from 600927 (17.10%) in 2001. During the same period, Rangareddy District saw a slight difference in SC population from 652042 (12.31%) in 2011 to 520045 (14.54%) in 2001. The ST population in Mahbubnagar District has shown a slight increase to 364269 (8.9%) in 2011 from 278702 (7.9%) in 2001. Similar trend can be observed in Rangareddy District as well wherein the ST population has seen a slight increase from 146057 (4%) in 2001 to 218757 (4%) in 2011.

**Mandals**

The SC and ST population in the Mandals within the study area has been provided in **Figure 6-2**.

**Figure 6-2: Decadal Growth of SC and ST Population in the Mandals within the Study Area**



Source: 2001 and 2011 Census Data

As observed from the above figure, the SC population of the three mandals in 2011 has shown a slight variation at 12758 (20.2%) in Pargi, 11225 (25%) in Pudur and 13889 (22.9%) in Kondurg as compared to the data available from 2001 which shows the SC population of Pargi as 11587 (20.8%), Pudur as 11774 (28.4%) and Kondurg as 12758 (23.2%) of the total population. The highest ST population in 2011 was observed to be in Pargi at 4891 (7.7%) belonging to this category followed by Kondurg at 4004 (6.6%) during the same period.

### Villages

Details of the SC and ST category of population residing in the villages within the study area have been depicted in **Table 6-7**

**Table 6-7: SC and ST Population in the villages falling within the Study Area**

S. No.	Mandal	Village Name	2001		2011	
			SC Population	ST Population	SC Population	ST Population
1	Pargi	Kadlapur	192	130	209	81
2		Madharam	546	0	602	0
3		Raghavapur	217	0	270	0
4		Khudwanpur	402	0	459	0
5		Chityal	538	0	699	2
6		Rapole	667	5	773	35
7		Syedpally	474	0	392	0
8		Yabajiguda	360	0	447	0
9		Thondapally	344	0	425	0
10	Pudur	Kervelly	143	0	140	0
11		Thurkayenkepalle	573	0	57	0
12		Somangurthy	468	45	524	34
13	Kondurg	Padmaran	664	20	766	24
14		Vanampally	217	4	263	15
15		Thummalapally	533	0	699	2

Source: 2001 and 2011 Census Data

The above table shows the SC and ST population of all the villages within the study area of the project. As depicted in the table, in 2011 the highest SC population was observed to be in Rapole village at 773 persons followed by Padmaran village at 766 persons. The highest ST population was observed to be residing in Kadlapur village at 81 persons while eight (08) villages do not have any ST category population.

### 6.3.4 Religious Demography

According to the 2011 Census Data, the religious demography of the population in the two districts within the Study Area has been provided in **Table 6-8**

**Table 6-8: Religious Demography of the Population in the two Districts within Study Area**

S. No.	Districts	Religion Wise Data as per the Census 2011 (in %)							
		Hindu	Muslim	Christianity	Sikh	Buddhist	Jain	Others	Not Stated
1	Rangareddy	84.18	11.66	2.72	0.15	0.04	0.07	0.03	1.15
2	Mahbubnagar	90.63	8.24	0.53	0.02	0.01	0.01	0.01	0.55

Source: www.census2011.co.in

As observed from the table above, most of the population in both districts have a large Hinduism following at 84.18% (Rangareddy) and 90.63% (Mahbubnagar) respectively. The highest Muslim followers can be observed in Rangareddy District at 11.66% and in Mahbubnagar district at 8.24%.

### 6.3.5 Status of Poverty Level

The level of poverty in an area highlights the economic status of the people and whether they are able to afford certain amenities for their survival. The Below Poverty Level (BPL) status is taken by the Government of India as an economic benchmark and poverty threshold to indicate the economic disadvantage and identify individuals and households in need of government assistance and aid<sup>20</sup>. As the State of Telegana was formed in June 2014, there is few data available in the public domain relevant to poverty level status in the new State. However, information pertaining to the poverty level of the Districts when the Districts were still a part of the State of Andhra Pradesh could be attained. As per information sourced from Indicus Anlytics, the poverty rate<sup>21</sup> of the Rangareddy District was 5.7% while that of Mahbubnagar District was 11.9% in 2011.

The Government of Telangana in 2014 had introduced various poverty alleviation schemes for BPL families. The Government relaxed the eligibility criteria for BPL families in obtaining food security cards by replacing the existing white ration cards with pink cards. Provision of rice grains which was part of the benefit provided by the Government would continue to be supplied to the BPL families at the existing rate of INR 1 per kg. However, the rice quota is now being enhanced to 6 kg per head with no maximum limit for a household.

The BPL status of households in the two districts within the study area as per the BPL Census 2002 has been provided in **Table 6-9**.

**Table 6-9: District wise BPL status of Households within the Study Area**

S. No.	District	No. of BPL Households				Total
		STs	SCs	OBCs	Others	
1	Rangareddy	28388	77646	165849	68305	340188
2	Mahbubnagar	130323	59009	248329	87028	524689

STs: Schedules Tribes, SCs: Scheduled Castes; OBCs: Other Backward Classes.

Source: <http://www.iiasia.in/may-discu.htm>

As observed in the table, the total number of households belonging to the Scheduled Tribe category is the highest in Mahbubnagar District while the poverty level is highest amongst the OBC households in both districts.

### 6.3.6 Status of Literacy Level

#### Districts

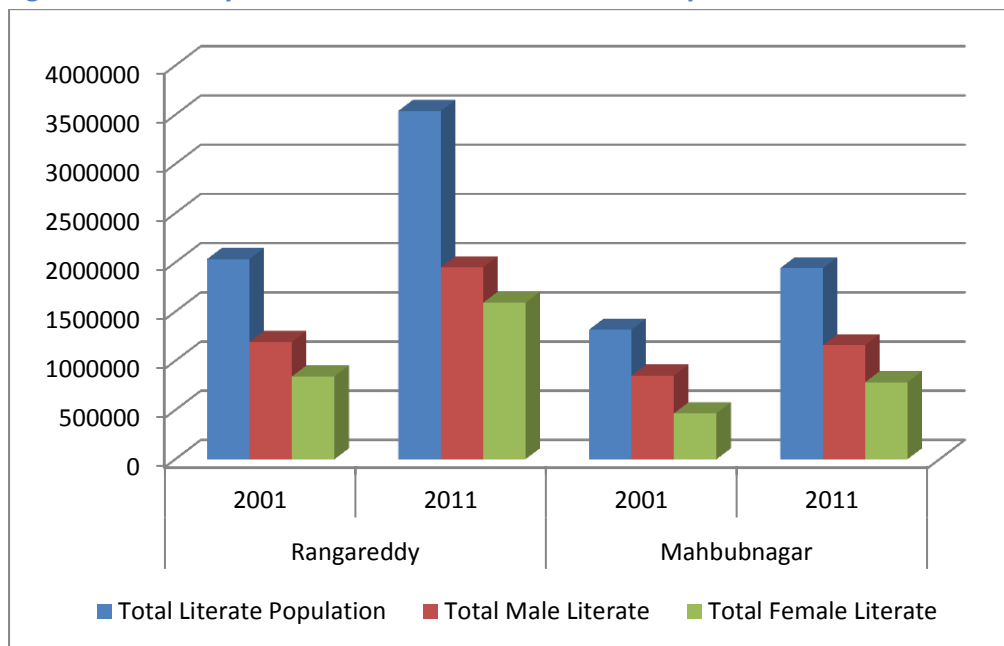
<sup>20</sup> Poverty: All India (Per capita per month) Rural Rs. 356.30 All India (Pre Capital per month) Urban Rs. 538.60

\* The poverty line (implicit) at all-India level is worked out from the expenditure class-wise distribution of persons (based on URP consumption i.e. consumption collected from 30 day recall period for all items) and the poverty ratio at All-India level. The poverty ratio at all is obtained as the weighted average of the state-wise poverty ratio.

<sup>21</sup> The poverty rate has been calculated as per Tendulkar poverty definition, 2011-12.

Below in **Figure 6-3**, the literacy levels of the districts in the study area have been provided as per the 2001 and 2011 Census Data.

**Figure 6-3: Literacy Level of the Districts within the Study Area**



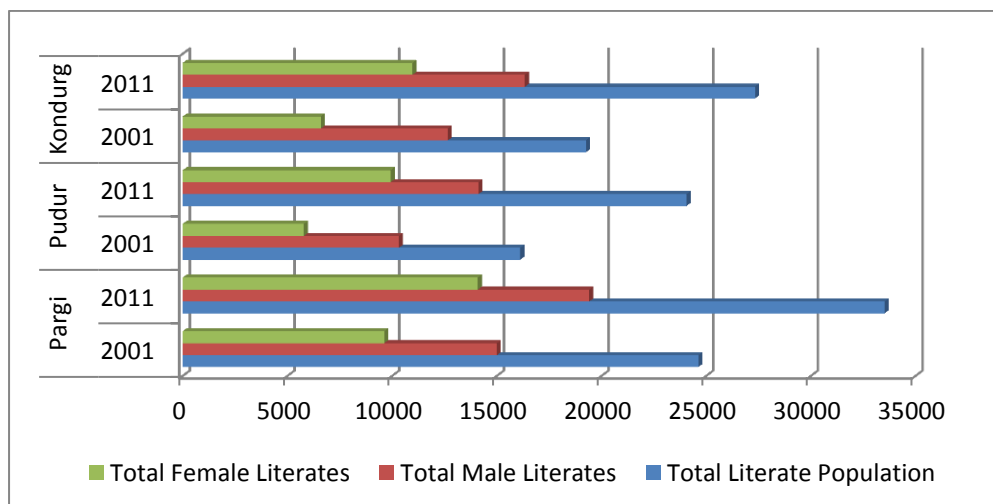
Source: 2001 and 2011 Census Data

It can be observed from the figure that in 2011, the total literate population in Rangareddy District accounted for the highest at 3538028 (66.79%) literates as compared to Mahbubnagar District at 1940646 (47.88%) literates. This has shown an increasing trend as compared to the 2001 data available wherein Rangareddy District had only 1158386 (56.90%) literates, while Mahbubnagar District had 1940646 (47.88%) literates respectively. Out of the total literate population in 2011, male literate accounts highest in Mahbubnagar District at 1158386 (59.69%) while female literate accounts highest in Rangareddy District at 1589244 (44.91%).

**Mandals**

The literate population in the Mandals within the study area as per the 2001 and 2011 Census Data have been provided in **Figure 6-4**.

**Figure 6-4: Decadal Growth of Literate Population in the Mandals within the Study Area**



Source: 2001 and 2011 Census Data

As observed in the figure above, among the mandals in the study area, the highest literate population as per the 2011 Census Data can be found in Pargi with 33526 (53.22%) of population being literates. The lowest literate population amongst these mandals has been recorded in Kondurg at 27332 (45.16%).

**Villages**

The details of the literate population of the villages within the study area are provided in **Table 6-10**.

**Table 6-10: Details of literate population in the villages within the Study Area**

S. No.	Mandal	Village Name	2001			2011		
			Total Literate Population	Total Male Literate	Total Female Literate	Total Literate Population	Total Male Literate	Total Female Literate
1	Pargi	Kadlapur	433	271	162	583	361	222
2		Madharam	864	553	311	1288	759	529
3		Raghavapur	261	163	98	399	246	153
4		Khudwanpur	572	339	233	652	371	281
5		Chityal	611	370	241	1054	601	453
6		Rapole	1338	856	482	1642	967	675
7		Syedpally	789	515	274	871	529	342
8		Yabajiguda	260	186	74	478	280	198
9		Thondapally	509	306	203	769	430	339
10	Pudur	Kervelly	391	246	145	501	297	204
11		Thurkayenkepalle	350	238	112	605	369	236
12		Somangurthy	902	582	320	1125	660	465
13	Kondurg	Padmaran	922	597	325	1231	738	493
14		Vanampally	179	128	51	371	242	130
15		Thummalapally	629	405	224	1039	600	439

Source: 2001 and 2011 Census Data

As observed from the table above, in 2011 the highest literate population rate amongst the total population can be observed in Thondapally village at 769 (87.48%) literates followed by Rapole village at 1642 (57.47%) literates. The least literate population as compared to the total population



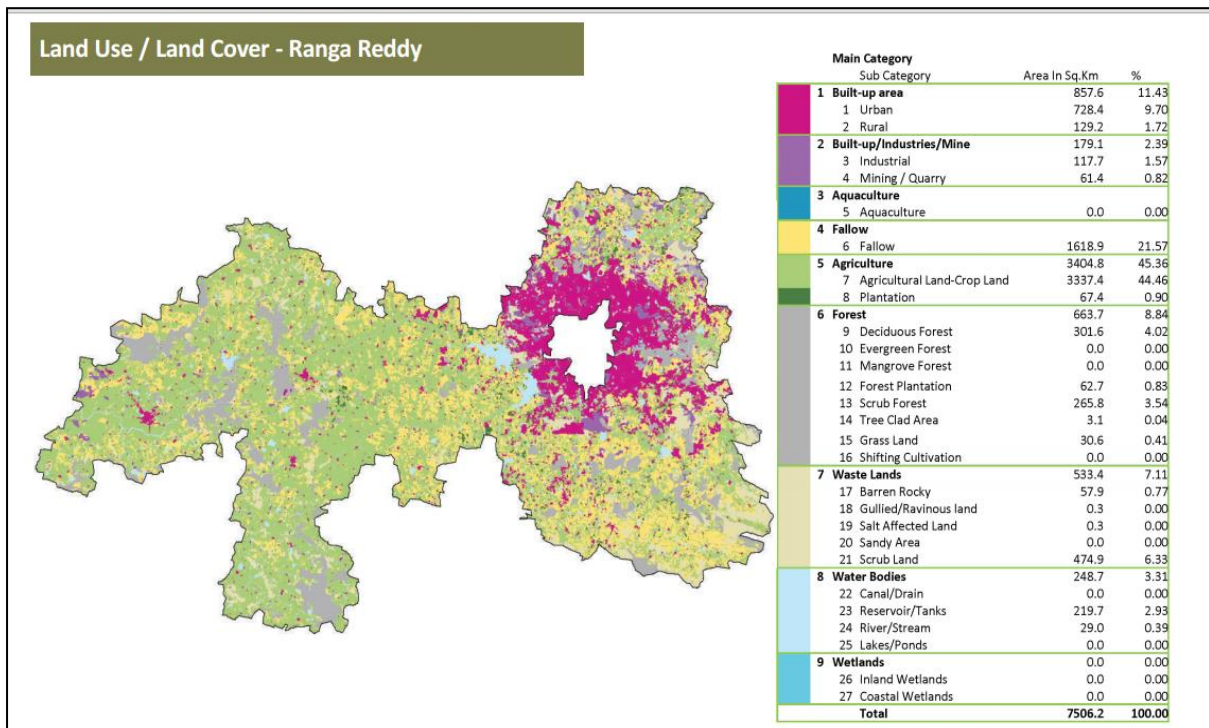
can be observed in Syedpally village at 871 (30.48%) of the population being literate. The highest male literate population amongst the total literate population can be observed at Vanampally village with 242 (65.22%) literates. The highest female literate population amongst the total literate population can be observed at Thondapally village with 339 (44.08%) of females being literate.

### 6.3.7 Land Use Pattern

#### Districts

The land use pattern of Rangareddy District has been provided in **Figure 6-5** which shows that the in the District 45.36% of the land area comprises of agricultural land, 21.57% fallow land, 8.84% forest land, 7.11% wasteland, 3.31% water bodies and 2.39% industries/mine.

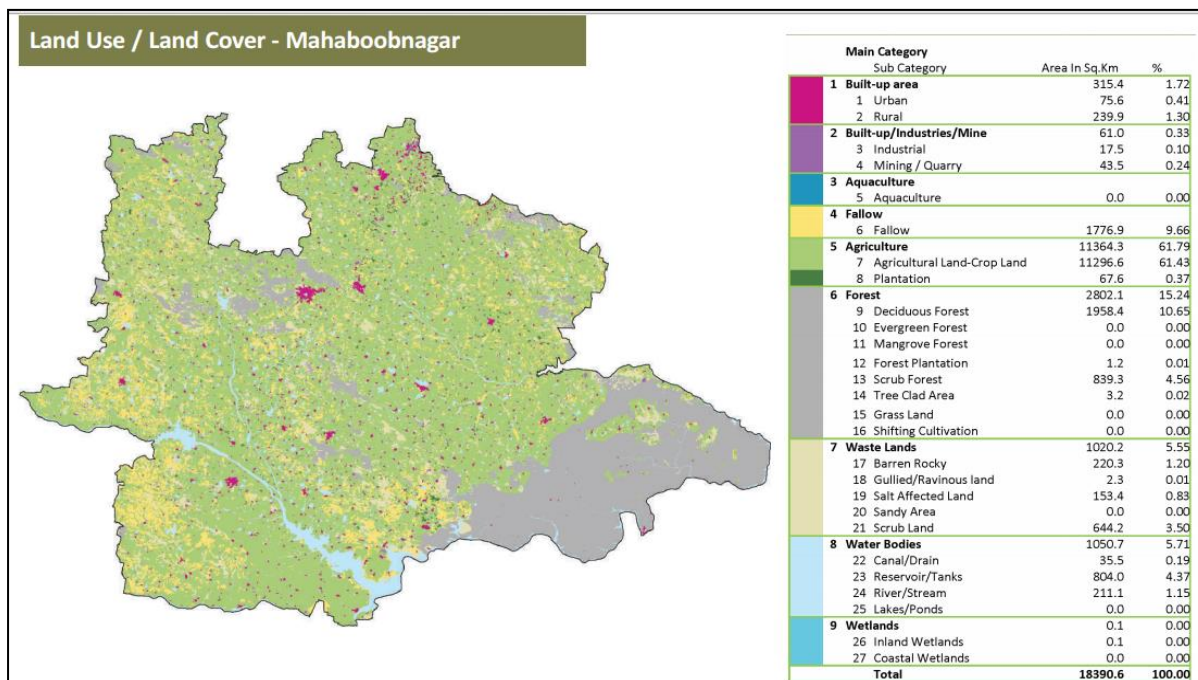
**Figure 6-5: Land Use Pattern of Rangareddy District**



Source: Andhra Pradesh State Remote Sensing Application Centre (2011-12)

The land use pattern of Mahbubnagar District has been provided in **Figure 6-6** which depicts that in the District 61.79% of the land area comprises agricultural land, 9.66% fallow land, 15.24% forest land, 5.55% wasteland, 5.71% water bodies and 0.33% industries/mine.

**Figure 6-6: Land Use Pattern of Mahbubnagar District**



Source: Andhra Pradesh State Remote Sensing Application Centre (2011-12)

**Mandals**

As per the Village Directory, 2001, the details of the land use classification of the five Mandals within the study area have been provided in **Table 6-11**.

**Table 6-11: Details of Land Use Classification of the Mandals within the Study Area**

S. No.	Mandal	Total Area (in hectares)	Total Irrigated Area (in hectares)	Unirrigated Area (in hectares)	Cultivable Waste (in hectares)	Area not available for cultivation (in hectares)
1	Pargi	2072	403.47	1118.95	244.41	305.17
2	Pudur	2217	359.90	302.70	794.69	759.71
4	Kondurg	1387	110.35	1259.76	0	16.74

Source: Village Directory 2001

As observed from the table above, the main land use pattern in all three Mandals have been in used in agricultural activities. The highest irrigated area can be found in Pargi at 403.47 hectares followed by Pudur at 359.90 hectares.

**Villages**

The details of the land use classification of the villages within the study area have been provided in **Table 6-12**.

**Table 6-12: Details of Land Use Classification of the Villages within the Study Area**

S. No.	Mandal	Village Name	Total Area (hectares)	Total Irrigated Area (in hectares)	Unirrigated Area (in hectares)	Cultivable Waste (in hectares)	Area not available for cultivation (in hectares)
1	Pargi	Kadlapur	559	5.26	308.77	165.92	119.05
2		Madharam	906	96.31	693.63	57.46	58.60

S. No.	Mandal	Village Name	Total Area (hectares)	Total Irrigated Area (in hectares)	Unirrigated Area (in hectares)	Cultivable Waste (in hectares)	Area not available for cultivation (in hectares)
3		Raghavapur	518	59.47	241.19	195.05	22.29
4		Khudwanpur	719	89.43	381.21	198.59	49.77
5		Chityal	923	76.07	717.91	97.05	31.97
6		Rapole	1578	188.17	1052	163.01	174.82
7		Syedpally	987	53.81	435.44	216.09	281.66
8		Yabajiguda	355	18.61	248.47	71.33	16.59
9		Thondapally	438	32.37	257.78	130.45	17.40
10	Pudur	Kervelly	516	45.72	227.83	78.10	164.35
11		Thurkayenkepalle	260	30.74	196.67	8.09	24.50
12		Somangurthy	913	61.90	461.74	288.19	101.19
13	Kondurg	Padmaran	935	39.06	870.07	0	25.09
14		Vanampally	357	13.07	296.17	13.40	34
15		Thummalapally	1056	39.60	985	0	31.04

Source: Village Directory 2001

The table above highlights that most of the land area in the villages within the study area is used for agricultural activities. The highest irrigated area can be observed in Rapole village while most of the cultivable area in the villages remains unirrigated and has to depend upon rainfall.

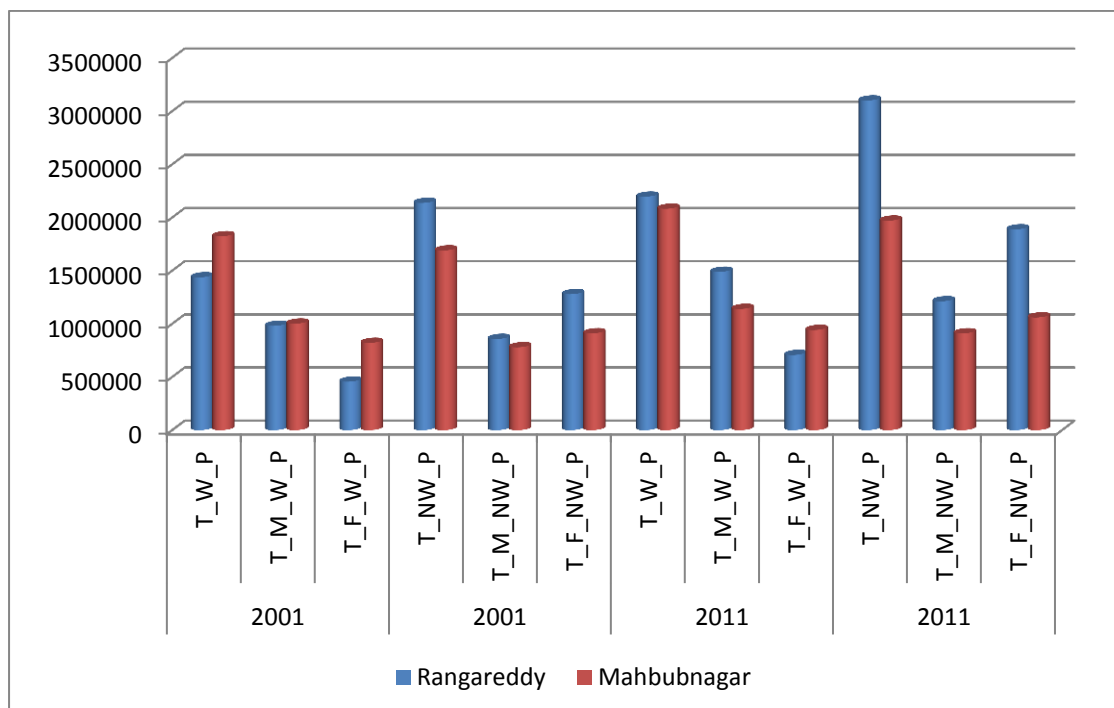
## 6.4 Socio-Economic Profile of the Study Area

### 6.4.1 Workforce Participation

#### Districts

Work force participation rate is defined as the percentage of total workers (main and marginal) as compared to the total population. Details of the workforce participation in the two districts within the study area as per the Census Data of 2001 and 2011 have been presented in **Figure 6-7**.

**Figure 6-7: Details of Workforce Participation in the Districts within the Study Area**



T\_W\_P: Total Working Population; T\_W\_M\_P: Total Working Male Population; T\_W\_F\_P: Total Working Female Population; T\_NW\_P: Total Non-Working Population; T\_NW\_M\_P: Total Non-Working Male Population and T\_NW\_F\_P: Total Non-Working Female Population  
 Source: 2001 and 2011 Census Data

As observed from the figure above, the rate of workforce participation has shown a slight increase in Rangareddy District with 2196078 (41.46%) of the population engaged in some form of work activity in 2011 as compared to 1437606 (40.21%) participation in 2001. In Mahbubnagar District, a similar trend can be witnessed with 2082501 (51.38%) of the population engaged in some form of work activity in 2011 as compared to 1823329 (51.88%) participation in 2001. The highest non-working population can be observed in Rangareddy District in 2011 at 3100663 (58.53%).

Main workers are considered as those workers who have been engaged in any economically productive activity for 183 days or more while marginal workers are those that have worked for less than 183 days in a year. The breakup of main and marginal workers in the districts as per the 2001 and 2011 Census Data have been provided in **Table 6-13**.

**Table 6-13: Breakup of Main and Marginal Workers in the Districts within the Study Area**

S. No.	Districts	2001			2011		
		Total Working Population	Total Main Workers	Total Marginal Workers	Total Working Population	Total Main Workers	Total Marginal Workers
1	Rangareddy	1437606	1264403	173203	2082501	1834777	361301
2	Mahbubnagar	1823329	1482426	340903	2196078	1815643	266858

Source: 2001 and 2011 Census Data

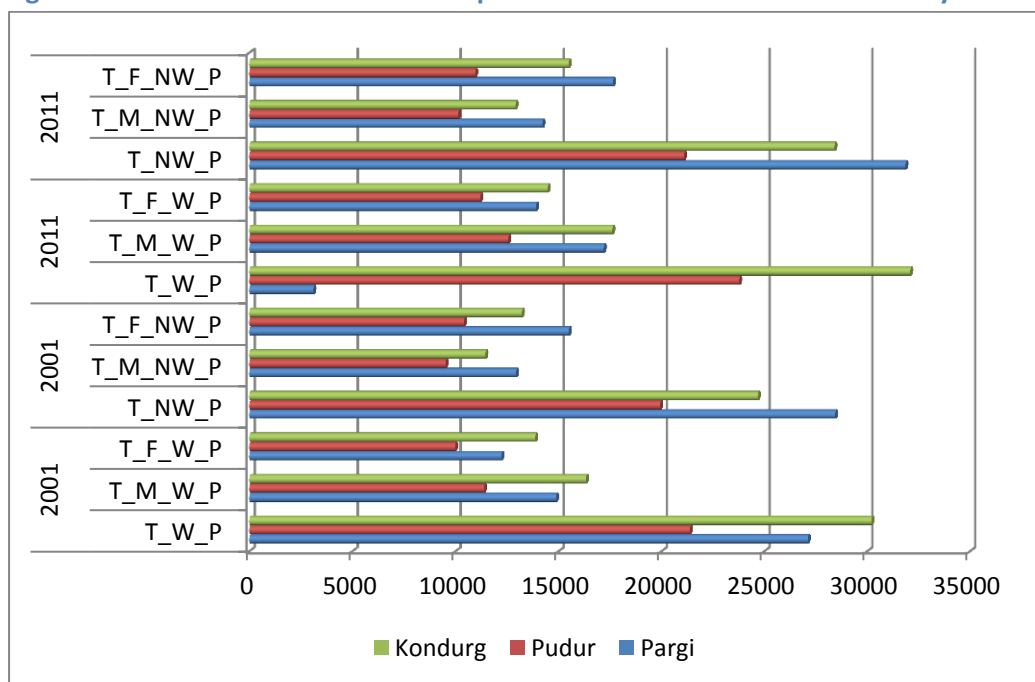
As observed from the table above, the total number of main workers is higher in both districts as compared to that of marginal workers. The total number of main workers in Rangareddy and

Mahabubnagar Districts comprise 1834777 (88.10%) and 1815643 (82.67%) of the total working population in 2011.

**Mandals**

The details of the workforce participation of the population residing in the Mandals within the study area have been presented in the **Figure 6-8**.

**Figure 6-8: Details of Workforce Participation in the Mandals within the Study Area**



T\_W\_P: Total Working Population; T\_W\_M\_P: Total Working Male Population; T\_W\_F\_P: Total Working Female Population; T\_NW\_P: Total Non-Working Population; T\_NW\_M\_P: Total Non-Working Male Population and T\_NW\_F\_P: Total Non-Working Female Population  
 Source: 2001 and 2011 Census Data

As observed from the figure above, the rate of workforce participation in 2011 is highest in Kondurg at 32103 (53.04%) compared to the total population in the area while it is the lowest in Pargi with 31114 (49.39%) of the population engaged in some sort of work activity. The total non-working population in 2011 can be observed to be the highest in Pargi with 31870 (50.60%) of the population not engaged in any sort of activity followed by Pudur at 21099 (47%) and Kondurg at 28415 (46.95%) respectively.

The breakup of main and marginal workers in the Mandals within the study area is presented in **Table 6-14**.

**Table 6-14: Breakup of Main and Marginal Workers in the Mandals within the Study Area**

S. No.	Districts	Mandals	2001			2011		
			Total Working Population	Total Main Workers	Total Marginal Workers	Total Working Population	Total Main Workers	Total Marginal Workers
1	Rangareddy	Pargi	27119	23895	3224	31114	26517	4597

2		Pudur	21379	17296	4083	23785	19172	4613
3	Mahbubnagar	Kondurg	30213	25425	4788	32103	28986	3117

Source: 2001 and 2011 Census Data

As depicted in the table above, in 2011 the total number of main workers was highest in Kondurg with 28986 (90.26%) of total working population engaged more than 183 days in a year as compared to Pargi at 26517 (85.22%) and Pudur at 19172 (80.60%) respectively. Amongst the mandals, the marginal workers in 2011 can be observed to be the highest in Pudur with 4613 (19.39%) of the working population engaged less than 183 days in a year.

### Villages

The details of the workforce participation of the population residing in the villages within the study area have been provided in **Table 6-15**.

**Table 6-15: Details of Workforce Participation in the Villages within the Study Area**

S. No.	Mandal	Village Name	T_W_P	T_M_W_P	T_F_W_P	T_NW_P	T_M_NW_P	T_F_NW_P
<b>2001</b>								
1	Pargi	Kadlapur	661	320	341	516	265	251
2		Madharam	1275	656	619	952	454	498
3		Raghavapur	306	167	139	323	150	173
4		Khudwanpur	551	294	257	576	255	321
5		Chityal	840	440	400	724	343	381
6		Rapole	1544	788	756	1186	603	583
7		Sydepally	1021	512	509	771	398	373
8		Yabajiguda	388	202	186	285	142	143
9		Thondapally	634	312	322	573	259	314
10	Pudur	Kervelly	503	240	263	479	240	239
11		Thurkayenkepalle	564	292	272	561	278	283
12		Somangurthy	1133	580	553	1040	473	567
13	Kondurg	Padmaran	1318	671	647	928	473	455
14		Vanampally	368	184	184	239	128	111
15		Thummalapally	752	522	230	1105	389	716
<b>2011</b>								
1	Pargi	Kadlapur	711	342	369	556	282	274
2		Madharam	1397	689	708	1242	620	622
3		Raghavapur	350	203	147	401	181	220
4		Khudwanpur	594	341	253	645	260	385
5		Chityal	1038	561	477	941	419	522
6		Rapole	1460	791	669	1397	657	740
7		Sydepally	1143	568	575	586	292	294
8		Yabajiguda	528	261	267	351	170	181
9		Thondapally	624	324	300	692	321	371
10	Pudur	Kervelly	519	262	257	447	225	222
11		Thurkayenkepalle	577	289	288	512	267	245
12		Somangurthy	1313	641	672	948	494	454
13	Kondurg	Padmaran	1495	802	693	1065	519	546
14		Vanampally	480	241	239	327	187	140
15		Thummalapally	1144	636	508	1092	483	609

*T\_W\_P: Total Working Population; T\_W\_M\_P: Total Working Male Population; T\_W\_F\_P: Total Working Female Population; T\_NW\_P: Total Non-Working Population; T\_NW\_M\_P: Total Non-Working Male Population and T\_NW\_F\_P: Total Non-Working Female Population*

*Source: 2001 and 2011 Census Data*

As observed from the table above, the highest total working population in 2011 is present in Padmaran village with 1495 individuals engaged in some sort of activities. The lowest working population can be witnessed in Raghavapur village with 350 individuals working. The highest non-working population is available in Rapole village with 1397 individuals unemployed.

The breakup of main and marginal workers in the villages within the study area is presented in **Table 6-16**.

**Table 6-16: Breakup of Main and Marginal Workers in the Villages within the Study Area**

S. No.	Mandal	Village Name	2001			2011		
			Total Working Population	Total Main Workers	Total Marginal Workers	Total Working Population	Total Main Workers	Total Marginal Workers
1	Pargi	Kadlapur	661	652	9	711	669	42
2		Madharam	1275	873	402	1397	1366	31
3		Raghavapur	306	304	2	350	349	1
4		Khudwanpur	551	508	43	594	341	253
5		Chityal	840	720	120	1038	896	142
6		Rapole	1544	1438	106	1460	817	643
7		Syedpally	1021	973	48	1143	765	378
8		Yabajiguda	388	368	20	528	522	6
9		Thondapally	634	322	4	624	522	102
10	Pudur	Kervelly	503	81	422	519	513	6
11		Thurkayenkepalle	564	561	3	577	536	41
12		Somangurthy	1133	583	550	1313	1123	190
13	Kondurg	Padmaran	1318	1093	225	1495	1478	17
14		Vanampally	368	334	34	480	474	6
15		Thummalapally	752	750	2	1144	592	552

*Source: 2001 and 2011 Census Data*

From the table above, it can be observed that in 2011, the highest main workers are present in Padmaran village at 1478 individuals engaged more than 183 days in a year. The highest marginal workers during the same period have been reported from Rapole village at 643 individuals engaged less than 183 days in a year.

### 6.4.2 Occupation Pattern

The growth of economy in Telangana is mainly attributed to contributions from agriculture, industry and service. The Agriculture sector consists of agriculture, livestock, forestry and fisheries. The Industry sector consists of mining and quarrying, manufacturing, electricity, gas and water supply and construction. The Services sector consist of trade, hotels and restaurants, transport by other means and storage, railways, communication, banking and insurance, real estate, ownership of dwellings and business services, public administration and other services.



The Agriculture sector is largely depended on the vagaries of seasonal conditions and receipt of rainfall and has shown a decelerating trend in the State in recent years, but it continues to remain a priority sector for the State because of its high potential of employment generation, food security, inclusiveness and sustainability of growth as 55.7 % of the workforce draws its sustenance fully or partially from agriculture in the State.<sup>22</sup>

**Districts**

The occupational pattern of the population refers to the choice of sector of employment that workers are dependent upon.<sup>23</sup> The occupational pattern of the population as recorded during the 2001 and 2011 Census of the districts within the study area have been provided in the following **Table 6-17,**

**Table 6-17: Occupation Pattern in the Districts within the Study Area**

District	Main Workers				Marginal Workers			
	Cultivators	Agricultural Labourers	Household Activities	Other Workers	Cultivators	Agricultural Labourers	Household Activities	Other Workers
<b>2001</b>								
Rangareddy	272584	211789	32061	747969	9760	87786	9174	66483

<sup>22</sup> Excerpts taken from ‘Reinventing Telangana, The First Steps: Socio Economic Outlook, 2015 published by the Planning Department, Government of Telangana

<sup>23</sup> A cultivator is defined as a person whose major share of yearly income comes from farming their own land while an agricultural labour is defined as a person between 15 and 59 years old whose major share of income is from wages earned by working on other’s farms. Household Industry is referred as an industry conducted by one or more members of the household at home or within the village in rural areas and only within the precincts of the house where the household lives in urban areas. The larger proportion of workers in the household industry consists of members of the household. Some of the typical industries that can be conducted on a household industry basis are: Foodstuffs, Beverages, Tobacco Products, Textile cotton, Jute, Wool or Silk, Manufacture of Wood and Wood Products, Paper and Paper Products, Leather and Leather Products, Petroleum and Coal Products, Service and Repairing of Transport Equipments etc. While all workers, i.e., those who have been engaged in some economic activity during the last one year, but are not cultivators or agricultural labourers or in Household Industry, are ‘Other Workers (OW)’. The type of workers that come under this category of ‘OW’ include all government servants, municipal employees, teachers, factory workers, plantation workers, those engaged in trade, commerce, business, transport banking, mining, construction, political or social work, priests, entertainment artists, etc.



District	Main Workers				Marginal Workers			
	Cultivators	Agricultural Labourers	Household Activities	Other Workers	Cultivators	Agricultural Labourers	Household Activities	Other Workers
Mahbubnagar	528915	527132	57170	369209	25869	252335	13756	48943
<b>2011</b>								
Rangareddy	250155	258878	54221	1271523	20770	90154	19166	231211
Mahbubnagar	548983	762853	46497	457310	20159	168231	11349	67119

Source: 2001 and 2011 Census Data

As observed from the table above, in 2011, 250155 (11.39%) of the working population (main workers) in Rangareddy District is engaged as cultivators which have shown a decrease from 272584 (18.96%) in 2001. In Mahbubnagar District as well, 26.36% of the working population (main workers) have been engaged as cultivators. In the marginal workers category, 90154 (4.10%) of the working population in 2011 has been engaged as agricultural labourers which have shown a slight increase from 87786 (3.99%) in 2001. The agricultural labourers in the marginal workers category of Mahbubnagar District in 2011 have shown a slight decrease to 168231 (8.07%) from 252335 (13.83%) in 2001.

### Mandals

The details of occupational pattern of the working population in the Mandals have been presented in **Table 6-18**.

**Table 6-18: Occupational Pattern in the Mandals within the Study Area**

District	Mandals	Main Workers				Marginal Workers			
		Cultivators	Agricultural Labourers	Household Activities	Other Workers	Cultivators	Agricultural Labourers	Household Activities	Other Workers
<b>2001</b>									
Rangareddy	Pargi	12992	5935	316	4652	252	2554	62	356
	Pudur	10031	5002	132	2131	138	3671	59	215
Mahbubnagar	Kondurg	14083	7592	347	3403	537	3472	371	408
<b>2011</b>									
Rangareddy	Pargi	11789	8804	453	5471	648	2762	185	1002
	Pudur	10443	6142	291	2296	1016	2682	74	841
Mahbubnagar	Kondurg	13535	11230	258	3963	407	1847	86	777

Source: 2001 and 2011 Census Data

The occupational pattern in the Mandals shows that cultivators are the highest category in which the majority of working population is engaged. Amongst the Mandals in 2011, Pudur engaged the highest cultivators amongst the total working population (main workers) in the respective area at 10443 (43.90%) followed by Kondurg at 13535 (42.16%) and Pargi at 11789 (37.88%) respectively. Amongst the agricultural labourers (main workers), Kondurg engages the highest workers at 11230 (34.98%).

### Villages

The details of the occupational pattern in villages within the study area are provided in **Table 6-19**.

**Table 6-19: Occupational Pattern in the Villages within the Study Area**

Mandal	Village Name	Main Workers				Marginal Workers			
		Cultivators	Agricultural Labourers	Household Activities	Other Workers	Cultivators	Agricultural Labourers	Household Activities	Other Workers
<b>2001</b>									
Pargi	Kadlapur	536	69	7	40	1	6	1	1
	Madharam	633	153	6	81	48	339	5	10
	Raghavapur	197	50	0	57	1	1	0	0
	Khudwanpur	248	176	1	83	6	32	1	4
	Chityal	331	328	11	50	4	103	1	12
	Rapole	1179	40	28	91	0	82	2	2
	Syedpally	524	340	15	94	7	30	2	9
	Yabajiguda	331	18	0	19	5	1	0	14
	Thondapally	407	176	3	44	0	3	0	1
Pudur	Kervelly	68	2	0	11	2	418	1	1
	Thurkayenke palle	218	294	1	48	0	2	1	0
	Somangurthy	288	155	0	140	35	491	6	18
Kondurg	Padmaran	723	213	17	140	38	159	6	22
	Vanampally	200	109	2	23	3	21	4	6
	Thummalapally	604	113	4	29	1	0	0	1
<b>2011</b>									
Pargi	Kadlapur	306	312	18	33	4	13	2	23
	Madharam	815	481	6	64	7	15	1	8
	Raghavapur	148	114	1	86	1	0	0	0
	Khudwanpur	162	61	0	118	18	191	16	28
	Chityal	377	272	50	197	18	191	16	28
	Rapole	539	98	16	164	141	402	31	69
	Syedpally	308	423	8	26	85	280	2	11
	Yabajiguda	183	315	2	22	2	2	0	2
	Thondapally	239	246	5	32	52	30	5	15
Pudur	Kervelly	265	188	15	45	1	2	0	3
	Thurkayenke palle	314	140	26	56	13	2	1	25
	Somangurthy	510	891	0	80	1	3	1	12
Kondurg	Padmaran	507	891	0	80	1	3	1	12
	Vanampally	176	241	13	44	0	2	1	3
	Thummalapally	266	174	0	152	14	514	0	24

Source: 2001 and 2011 Census Data

As observed from the table above in 2011, Madharam village has the highest individuals engaged as cultivators (main workers) at 815 workers followed by Rapole village at 539 workers. Significant number of employed persons can be observed to be engaged as agricultural labourers as well with Somangurthy and Padmaran villages leading with 891 individuals each in this trade. Amongst the marginal workers category, Thummalapally village engages the highest agricultural labourers at 514 workers.

## 6.5 Existing Social Infrastructure and Facilities

The availability and non-availability of social infrastructure amenities and facilities indicates the development pattern of the area and the well-being and quality of life of the population. The existing social infrastructure and facilities in the districts, mandals and villages within the study area have been provided in the subsequent sections through the interpretation of data available in the public domain particularly the Village Directory, 2001.<sup>24</sup>

### 6.5.1 Education Facilities

#### Districts

As per the District Elementary Education Report Card 2013-14, Rangareddy and Mahbubnagar District had a total of 5270 and 5141 schools respectively. The details of schools in the districts have been provided in **Table 6-20**.

**Table 6-20: Details of schools present in the District within the Study Area**

School Category	Total Schools		
	Government	Private	Unrecognized
<b>Rangareddy District</b>			
Primary only	1708	1085	33
Primary with Upper Primary	245	536	24
Primary with Upper Primary & Sec/Higher Secondary	13	6	0
Upper Primary Only	0	0	0
Upper Primary with Secondary and Higher Secondary	17	128	0
Upper Primary and Secondary	466	988	0
<b>Mahbubnagar District</b>			
Primary only	2611	436	46
Primary with Upper Primary	578	373	9
Primary with Upper Primary & Sec/Higher Secondary	9	0	0
Upper Primary Only	0	0	0
Upper Primary with Secondary and Higher Secondary	8	1	0
Upper Primary and Secondary	629	378	2

Source: District Report Card, 2013-14, Volume I; National University of Educational Planning and Administration

There are 137 colleges in Rangareddy District with 20 of them Government aided, one (01) under the tribal welfare category, eight (08) under the social welfare category, six (06) privately aided, 10 under the co-operative category, five (05) under the incentive category, three (03) Central Government aided and 84 privately unaided.<sup>25</sup>

In Mahbubnagar District, there are 162 colleges with 55 of them Government aided, one (01) under the tribal welfare category, 11 under the social welfare category, one (01) under the disabled

<sup>24</sup> It should be noted that due to non-availability of Village Directory Data, 2011 in the public domain, excerpts of data from Village Directory, 2001 has been utilised in the report wherever required.

<sup>25</sup> <http://bie.telangana.gov.in/Pdf/rangareddy.pdf>

welfare category, 74 privately aided, 15 under the incentive category and five (05) under the co-operative category.<sup>26</sup>

### Mandals

As per the Village Directory 2001, the list of educational facilities present in the mandals within the study area has been provided in the following **Table 6-21**.

**Table 6-21: Details of Educational Facilities in the Mandals within the Study Area**

S. No.	District	Mandal	Primary School	Middle School	Secondary School	Senior Secondary School	College within Range (km)	Other Schools
1	Rangareddy	Pargi	14	10	7	1	-	8
2		Pudur	3	1	1	-	< 10	-
3	Mahbubnagar	Kondurg	2	-	-	-	<10	5

Source: Village Directory, 2001

As observed in the table above, Pargi has the highest number of primary schools at 14 as compared to Pudur at a relatively lower number at 3 and Kondurg at 2. In terms of middle, secondary and senior secondary schools as well, Pargi has the highest number at 10, 7 and 1. None of these mandals have a college within its vicinity and students expecting to pursue their higher studies have to travel more than 10 km from their place of residence.

### Villages

The list of educational facilities present in the villages within the study area has been presented in **Table 6-22**.

**Table 6-22: Details of Educational Facilities in the Villages within the Study Area**

S. No.	Mandal	Village Name	Primary School	Middle School	Secondary School	Senior Secondary School	College within Range (km)	Other Schools
1	Pargi	Kadlapur	-	1	-	-	<10	1
2		Madharam	-	1	-	-	<10	1
3		Raghavapur	1	-	-	-	<10	-
4		Khudwanpur	1	1	-	-	<10	1
5		Chityal	1	1	1	1	<10	1
6		Rapole	-	1	1	-	<10	-
7		Syedpally	1	1	-	-	<10	1
8		Yabajiguda	1	-	-	-	<10	-
9		Thondapally	1	-	-	-	<10	-
10	Pudur	Kervelly	1	-	-	-	<10	1
11		Thurkayenkepalle	1	-	-	-	<10	1
12		Somangurthy	-	1	-	-	<10	-
13	Kondurg	Padmaran	-	1	-	-	<10	-
14		Vanampally	1	-	-	-	<10	-
15		Thummalapally	-	-	-	-	<10	-

Source: Village Directory, 2001

<sup>26</sup> <http://mahbubnagar.nic.in/JrColleges.php>

The table above depicts that nine villages within the study area have a primary school each, eight villages have a middle school each, two villages have a secondary schools, one village have a senior secondary school and seven villages have other schools each. In all these villages, students have to travel more than 10 km from their residence in order to pursue higher studies.

## 6.5.2 Health Care Facilities

### Districts

The details of health care facilities available in the districts within the study area are provided in **Table 6-23**.

**Table 6-23: Details of Health Care Facilities in the Districts within the Study Area**

District	General Hospitals	Hospitals for Special Treatment					Allied Hospitals	Primary Health Centres	Dispensaries	Regular Doctors	Contract Doctors
		T.B	Eye, ENT & Dental	Mental	I.D.C.D and Cancer	Women & Child Welfare					
Rangareddy	10	2	-	-	-	-	8	49	10	197	204
Mahbubnagar	11	-	-	-	-	-	9	85	4	170	75

Source: *Telangana Statistical Year Book, 2015*

As observed from the table above, in terms of (government medical facilities) general hospitals there are 10 in Rangareddy District and 11 in Mahbubnagar District respectively. In addition, there are 49 primary health centres in Rangareddy and 85 in Mahbubnagar. The number of regular doctors providing their services to these facilities are 197(Rangareddy) and 170 (Mahbubnagar).

### Mandals

Health Care Facilities present in the mandals within the study area are presented in **Table 6-24**.

**Table 6-24: Details of Health Care Facilities in the Mandals within the Study Area**

S. No.	District	Mandal	Allopathic Hospital	Public Health Centre	Public Health Sub Centre	Maternity Home	Maternal and Child Welfare Centre
1	Rangareddy	Pargi	1	-	1	-	1
2		Pudur	-	1	1	1	-
3	Mahbubnagar	Kondurg	-	-	-	-	-

Source: *Village Directory, 2001*

The table above presents a dismal picture in terms of availability of health care facilities in the mandals within the study area. Except for Pargi no other mandals have a hospital within their vicinity. Pudur has a public health centre, public health sub centre and maternity home each. Kondurg mandal has no health care facilities present in the mandal and inhabitants of the mandal have to travel more than 10 km away from their area of residence to avail the health care services.

### Villages

The health care facilities present in the villages within the study area are presented in **Table 6-25**.

**Table 6-25: Details of Health Care Facilities in the Villages within the Study Area**

S. No.	Mandal	Village Name	Allopathic Hospital	Public Health Centre	Public Health Sub Centre	Maternity Home	Maternal and Child Welfare Centre
1	Pargi	Kadlapur	-	-	-	-	-
2		Madharam	-	-	-	-	-
3		Raghavapur	-	-	-	-	-
4		Khudwanpur	-	-	-	-	-
5		Chityal	-	-	1	-	-
6		Rapole	-	-	1	-	-
7		Syedpally	-	-	-	-	-
8		Yabajiguda	-	-	-	-	-
9		Thondapally	-	-	-	-	-
10	Pudur	Kervelly	-	-	-	-	-
11		Thurkayenkepalle	-	-	-	-	-
12		Somangurthy	-	-	1	-	1
13	Kondurg	Padmaran	-	-	1	-	-
14		Vanampally	-	-	-	-	-
15		Thummalapally	-	-	-	-	-

Source: Village Directory, 2001

As observed from the table above, there are one public health sub centres each present in Chityal, Rapole, Somangurthy and Padmaran villages. In addition, there is one maternal and child welfare centre present in Somangurthy village as well.

### 6.5.3 Road and other Transport Connectivity

#### Districts

Rangareddy District is well connected with roads. The district is connected through a 150.37 km of black top or asphalt of national highway, 2063.16 km of roads and building department roads and 4363.49 km of panchayat raj department roads. In terms of railways, the district has 35 railway stations on broad-gauge with total rail length of 249.99 km.

Mahbubnagar District is connected through a 433.33 km of black top or asphalt of national highway, 3110.46 km of roads and building department roads and 10380.81 km of panchayat raj department roads. In terms of total rail length, the district is connected with a 195km rail line.

#### Mandals

As per the Village Directory, 2001 all three mandals are connected through paved roads and regular bus services.

#### Villages

As per the consultations carried out with the stakeholders from various villages within the study area during the site visit, it was gathered that all the village road are paved road maintained by the Panchayat. Regular bus services connect the villages with the towns and cities.

## 6.5.4 Communication Facilities

### Districts

As per the Telangana Statistical Year Book, 2015 Rangareddy District has a total of 401 post offices within the district while Mahbubnagar District has a total of 845 post offices.

In terms of telephone connectivity, Rangareddy District has about 4, 77,259 telephone connectivity (which include Hyderabad data as well) while Mahbubnagar District has about 32,382 telephone connectivity.

### Mandals

According to the Village Directory, 2001 all three mandals have a post office each. However, telephone exchange is available only in Kondurg.

### Villages

All the villages within the study area use the post office available at the mandal level. As per the consultations held with stakeholders during the site visit it was informed that all the inhabitants own a mobile each.

## 6.5.5 Banking Facilities

### Districts

As per the Telangana Statistical Year Book, 2015 Rangareddy District has a total of 762 scheduled banks within the district while Mahbubnagar District has a total of 337 scheduled banks present within the district.

### Mandals

As per the Village Directory, 2001 the details of the banking facilities within the mandals have been presented in **Table 6-26**.

**Table 6-26: Details of Banking Facilities in Mandals within the Study Area**

District	Mandal	Banking Facility	Commercial Bank	Co-operative Bank	Credit Society
Rangareddy	Pargi	Yes	-	1	1
	Pudur	Yes	1	-	1
Mahbubnagar	Kondurg	Yes	-	-	1

Source: Village Directory, 2001

The table above showcases that all mandals have banking facilities with Pargi having a co-operative bank and credit society, Pudur having a commercial bank and credit society and Kondurg having a credit society.

### Villages

The consultation held during the site visit revealed that the banking facilities are within the mandals itself and all inhabitants from the villages use these services. There are no banking facilities available within the vicinity of these villages.

### 6.5.6 Electricity Supply

In the villages, mandals and districts within the study area, electricity supply is available to all inhabitants for all kind of purpose (agriculture and domestic). As per consultations conducted during the site visit, it was informed by the stakeholders that electricity supply is provided daily phase wise in the villages with an average of 6 hours of supply for agricultural purposes and 3 hours of supply for domestic purposes.

### 6.5.7 Water Supply

In the villages, mandals and districts within the study area, water supply is available to all inhabitants. As per the consultations conducted during the site visit, it was informed that water supply is provided by the Panchayat to the villages on a daily basis. Some families mentioned that they also have bore well present on their land which they use to supplement the water requirement for the cultivation activities during the dry season.

### 6.5.8 Existing Traffic Conditions

The proposed project will involve transportation of components of Wind Turbine Generators (WTG) on trucks/trailers which may result in traffic congestions on village roads during peak phase. It is estimated that on an average, four trucks/trailers are required to bring the components of one turbine. Hence at peak phase, 20 trucks/trailers can be expected to ply on these roads considering a maximum of 5 WTGs will be setup at a time. In order to avoid adverse effects of such a situation and plan the transportation route accordingly, an estimation of the baseline traffic conditions is necessary.

The project villages are well connected internally by motor able roads which are further connected through arterial roads to the state and national highway network viz.

- **Khudwanpur Village Road:** It is a single lane undivided road.
- **State Highway (SH) 20 (Pargi Road):** SH 20 is 96.4 km long road passes through Mahbubnagar, Nagarkurnool, Achampet, Srisailam roads.

Assessment of existing traffic conditions in the project area was undertaken to identify the problems with respect to traffic movement and to formulate the possible alternative solutions and the need for organizing the same in an efficient and economical manner. A traffic volume count survey was conducted by Eco Services India Private Limited (Eco Services) at two locations on roads connecting the project site, which will be used for transportation of the turbine components. The two way traffic volume counts were recorded for morning peak hours (7:00 am to 11:00am) and evening peak hours (04:00 pm to 08:00 pm) once during the study period to assess the existing peak hour traffic and traffic composition. The details of the traffic monitoring locations have been provided in **Table 6-27**.



**Table 6-27: Traffic Monitoring Locations**

S. No	Traffic monitoring location	Location ID	Geographical Coordinates		Date of Monitoring
			Easting	Northing	
1.	State Highway/ SH-20 (Pargi Road)	T1	811253.00 m	1896485.00 m	10 <sup>th</sup> September 2015
2.	Khudwanpur Village Road	T2	811567.00 m	1896955.00 m	10 <sup>th</sup> September 2015

The traffic monitored has been divided into the following five categories/classes:

- Two wheelers (motor cycle, scooters);
- Three wheelers (auto rickshaw, motorized cart);
- Four Wheelers (cars, vans);
- Six Wheelers (light commercial vehicles, trucks and buses); and
- Bicycles and others (carts).

Since the vehicles are of different types, a factor needs to be accounted for each of them in order to express them at par in single unit terms. The factors, commonly known as Passenger Car Unit (PCU) factors that are generally adopted have been given in the following **Table 6-28**.

**Table 6-28: PCU factors adopted for traffic volume survey**

Vehicle Type	PCU Factor
Two Wheelers	0.75
Three Wheelers	1.2
Four Wheelers	1
Six Wheelers	3.7
Bicycles	0.5
Others (Carts)	2

Source: The Indian Roads Congress Code – IRC 109-1990

The traffic volume counts have been furnished in the following Tables.

**Table 6-29: Traffic Volume Survey at T 1 – State Highway – 20 (Pargi Road)**

Vehicle Class	Total Number of Vehicles		Percentage (%)	
	Morning Peak	Evening Peak	Morning Peak	Evening Peak
Two Wheeler	410	450	55	48
Three Wheeler	78	113	10	12
Four Wheeler	150	228	20	24
Six Wheeler	112	152	15	16
Bicycle & Others (Carts)	0	0	0	0

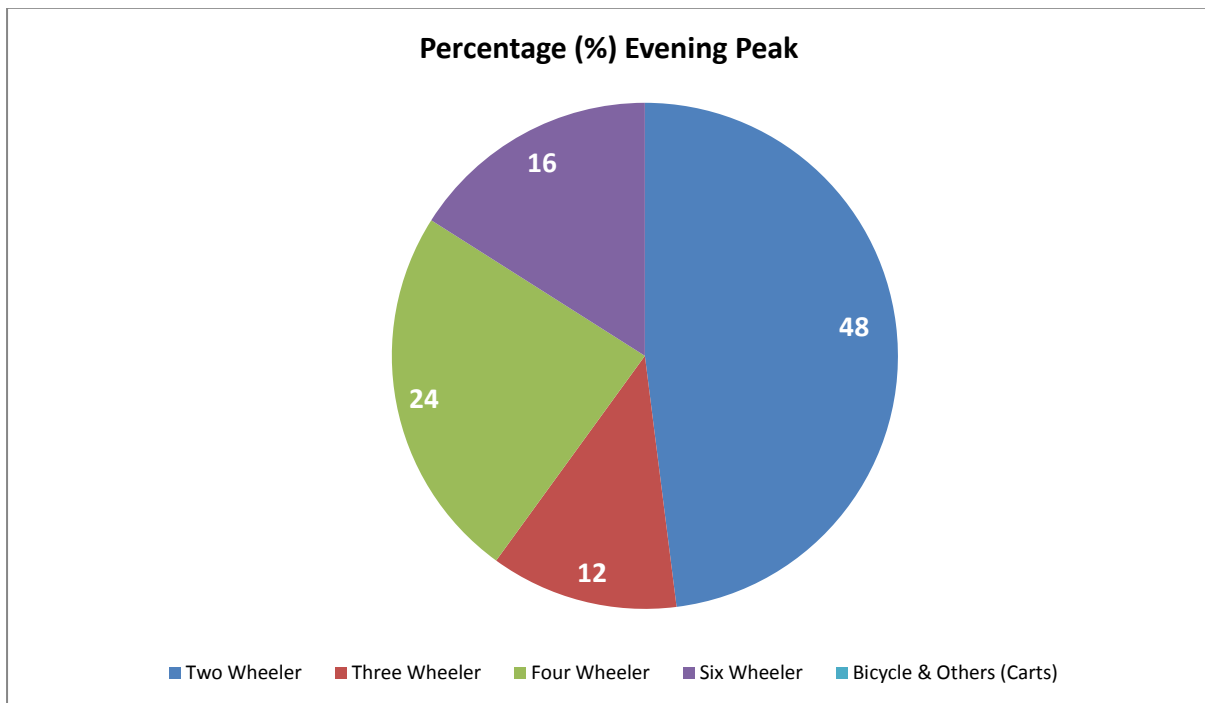
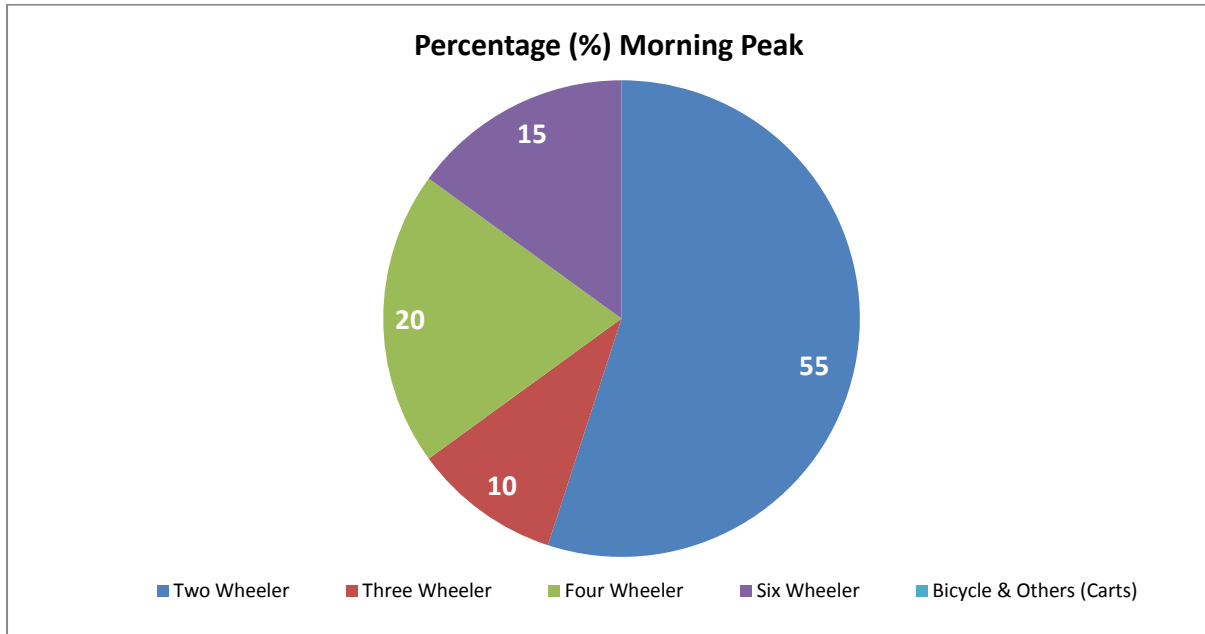
**Table 6-30: Traffic Volume Survey at T2 - Khudwanpur Village Road**

Vehicle Class	Total Number of Vehicles		Percentage (%)	
	Morning Peak	Evening Peak	Morning Peak	Evening Peak
Two Wheeler	60	53	65	56
Three Wheeler	14	20	15	21
Four Wheeler	19	22	20	23
Six Wheeler	0	0	0	0

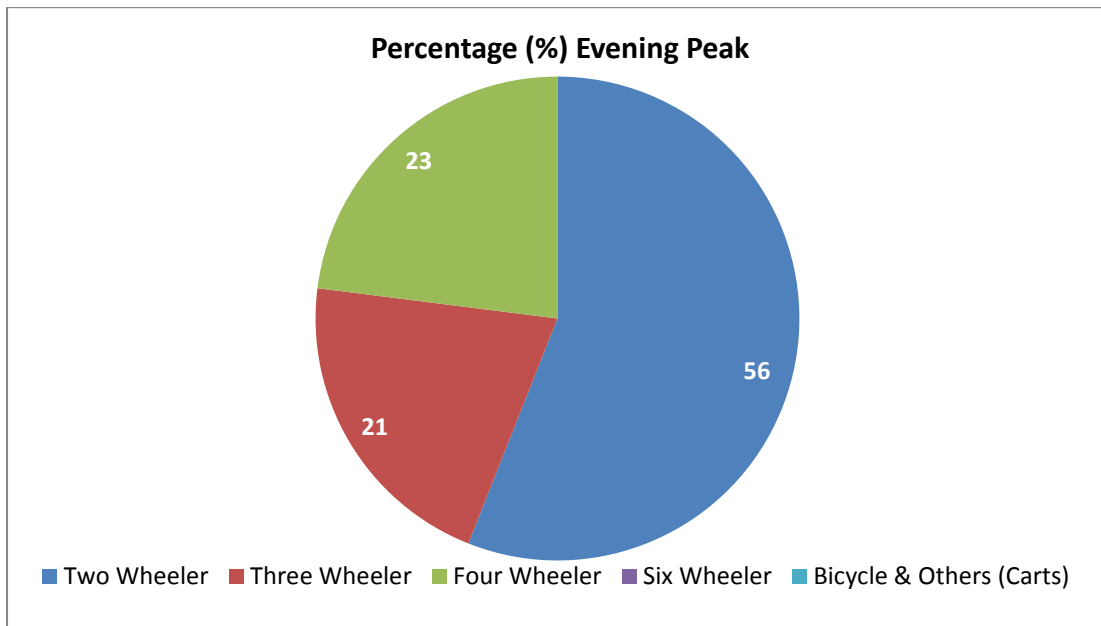
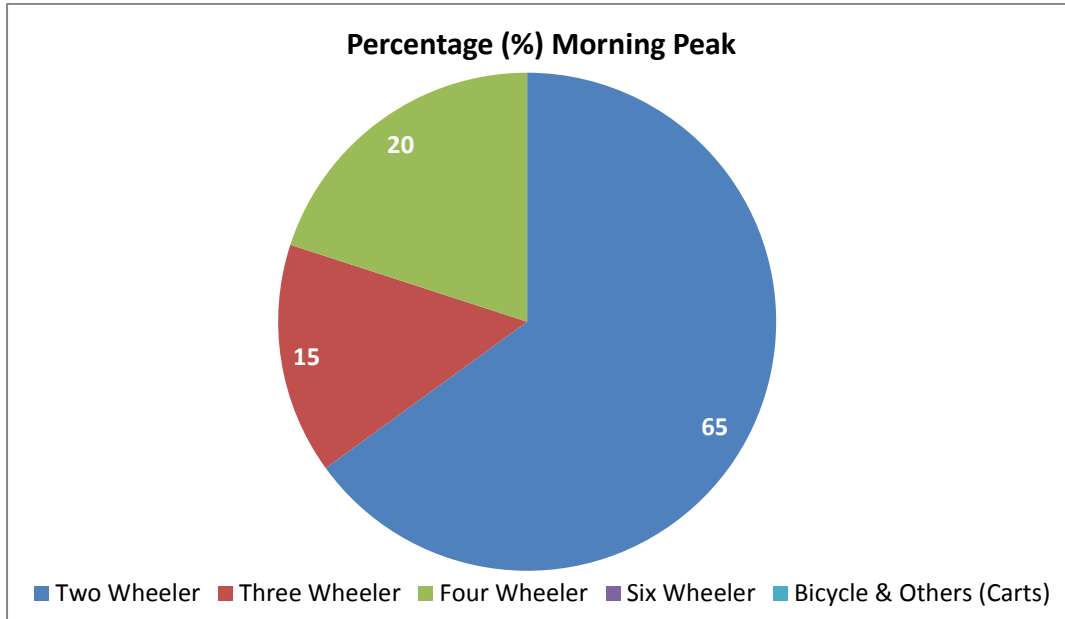
Bicycle & Others (Carts)	0	0	0	0
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The key observations and inference drawn from the traffic count survey have been illustrated and summarised in the following Figures.

**Figure 6-9: Percentage Composition at T1 – State Highway - 20 (Pargi Road)**



**Figure 6-10: Percentage Composition at T2 – Khudwanpur Village Road**



**Table 6-31: Key Observations of Traffic Count**

Location	Traffic Composition	Traffic flow at Peak Hour
T 1 – State Highway – 20 (Pargi Road)	The composition of vehicles at this stretch (two-way) indicates that of the total vehicles observed, highest % of vehicles observed is two wheelers followed by four wheelers, six wheelers and three wheelers. % of bicycles and others (carts) was observed to be zero Refer <b>Figure 6-9</b> .	The morning and evening peak flow traffic was observed to be between 09:30 hours and 11:00 hours and between 16:00 hours to 19:00 hours respectively.
T2 - Khudwanpur Village Road	The composition of vehicles at this stretch (two-way) indicates highest % of the vehicles observed is two wheelers followed by four wheelers and three	The morning and evening peak flow traffic was observed to be between 10:00 hours and 11:00 hours and between 18:00 hours to 19:30 hours respectively.

	wheelers. Number of six wheelers, bicycle and others (carts) was observed to be zero. <i>Refer Figure 6-10</i>	
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## 6.6 Stakeholder Identification and Consultation

Stakeholder consultations are an important process through which a two way dialogue is created between the project proponent and the stakeholders. Stakeholders are persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively.

A reconnaissance survey and site visit was undertaken to the study area from 1st to 3rd September 2015. The following schedule was adhered to while undertaking the survey and interviews. The following **Table 6-32** highlights the schedule as developed.

**Table 6-32: Schedule for the Socio-Economic Survey and Stakeholder Consultation**

S. No.	Places Visited	Districts	Tasks	Date
1	Kadlapur, Khudwanpur and Pargi	Rangareddy	Interviews with MVGoPL site representatives	1 <sup>st</sup> September 2015
2	Madharam, Kadlapur, Nagulapally, Thurkayenkepalle, Somangurthy, Kervelly	Rangareddy & Mahbubnagar	Social Survey & interviews with local stakeholders	2 <sup>nd</sup> September 2015
3	Syedpally and Yabajiguda	Rangareddy	Social Survey & interviews with local stakeholders	3 <sup>rd</sup> September 2015

### 6.6.1 Stakeholder Identification

The stakeholder for the project was prioritized by identifying the direct and indirect stakeholders. The key stakeholders that were consulted as part of the study included the following,

- Land Owners who sold their land for the project and its associated facilities
- Local Leader (Sarpanch) of Syedpally, Khudwanpur and Madharam Gram Panchayats
- Site representatives of MVGoPL

#### 6.6.1.1 Methodology Adopted

The stakeholder consultation comprised primarily of a socio-economic survey and consultation initiated by AECOM professionals. As wind projects are a novel concept in the area, the consultations revolved around getting information relating to the socio-economic status of the resident population within the study area, the concerns/issues of the local population and benefits/expectations from the project. The findings of the consultations are based mainly on the use of participatory methods like key informant interviews and natural interviews. These methods give an in depth and intensity to the discussion and incorporates the local population point of view within a short duration of time.

The process of stakeholder consultation included:

- identification of the relevant stakeholders including all those individuals, groups and organizations potentially influenced by or interested in the project
- imparting information about the project and its potential impacts on their lives in local and simple language

- verifying if the area proposed for the project does not infringe the formal or informal rights of the local population
- recording of their concerns and aspirations through discussions
- responding to their queries in a neutral manner

A questionnaire with a list of open-ended questions was used to initiate the discussion process. A total of 13 land owners from the villages within the study area were interviewed along with the Sarpanch of Syedpally, Khudwanpur and Madharam Gram Panchayat. In addition, the site representative from MVGoPL was also contacted to enhance the overall understanding of the project and its implications on the surrounding areas.

A sample of the questionnaire used for the consultation purposes has been attached as **Annexure I**.

### **6.6.2 Details of Land Procured for the Project**

The Project Proponent has procured land measuring 170.87 acres for the project and its associated facilities from 47 private land owners. All the land procured for the project is private agricultural land directly negotiated by the Proponent's Land Team with the individual buyers. By procuring the land on 'willing buyer/willing seller' basis, the Proponent's Land Team ensured that the negotiation took place with the seller's informed consent, the land markets or other opportunities for the productive investment of the sales income exist and the seller was provided with fair compensation based on prevailing market values. Details of the excerpts of consultations held with the land owners covering these aspects have been elaborated in **Section 6.6.3** of the report.

The details of the land procured for the project along with the landowners name have been presented in **Table 6-33**.

**Table 6-33: Details of Land Procured for Project**

S. No.	Location No.	Serial No.	Land Procured (acre & gunta)	Land Owner's Name	Village	Mandal	District	Sale Deed No. & Date	Mutation	Land Conversion
Sub Station	27 Part	27 Part	10.20	Posti Venkataiah	Kadlapur	Pargi	RR	1760/14, 27.08.2014	B/1000/2014 Dt:18.10.2014	C1/2893/2014 Dt:15.11.2014
1	4	20	3.05	Govu Sivamma	Kervelly	Pudur	RR	1938/14, 25.09.2014	B/769/2014 Dt:18.12.2014	C1/136/2015 Dt:20.01.2015
2	6	26/AA/3	1.10	Yelkicherla Anthamma	Madharam	Pargi	RR	1944/14, 25.09.2014	B/1162/2014 Dt:22.11.2014	C1/3001/2014 Dt:06.12.2014
			1.20	Yelkicherla Lakshamma	Madharam	Pargi	RR	1945/14, 26.09.2014		
3	27	111/A2	1.00	Pargi Venkatamma	Kadlapur	Pargi	RR	1977/14, 29.09.2014	B/1165/2014 Dt:22.11.2014	C1/2997/2014 Dt: 06.12.2014
		110	1.32	1.Juttu Jangaiah 2.Juttu Ramamma 3.Juttu Satyamma 4.Juttu Kristamma 5.Juttu Jangamma	Kadlapur	Pargi	RR	1979/14, 29.09.2014	B/1166/2014 Dt:22.11.2014	
4	29	51	2.30	Gandla Anjaneyulu	Raghavapur	Pargi	RR	1995/14, 30.09.2014	B/1163/2014 Dt:22.11.2014	C1/2999/2014 Dt:06.12.2014
5	31	132	3.17	Abdul Aziz	Khudwanpur	Pargi	RR	1987/14, 30.09.2014	B/1160/2014 Dt:22.11.2014	C1/2998/2014 Dt:06.12.2014
6	23	5/A/1	2.20	Pudur Jangaiah	Kadlapur	Pargi	RR	1997/14, 30.09.2014	B/1164/2014 Dt:22.11.2014	C1/2995/2014 Dt:06.12.2014
7	15	281/5/2	2.00	Rayees Fatima	Madharam	Pargi	RR	2006/14, 07.10.2014	B/1161/2014 Dt:22.11.2014	C1/3000/2014 Dt:06.12.2014
		281/1	1.05	1.Mohd Saleem & 2.Boini Ramulu	Madharam	Pargi	RR	2436/15, 01.07.2015	Applied on 01.07.2015, Due date 15.08.2015	After completion of Mutation
8	24	90/A	3.00	S.Hanamma	Kadlapur	Pargi	RR	2235/14, 05.11.2014	B/1158/2014 Dt:23.12.2014	C1/135/2015 Dt:20.01.2015

S. No.	Location No.	Serial No.	Land Procured (acre & gunta)	Land Owner's Name	Village	Mandal	District	Sale Deed No. & Date	Mutation	Land Conversion
9	56	298	6.00	1.A.Srikanth 2.A.Pandith Rao 3.A. Anand Rao	Padmaran	Kondurg	MBNR	6775/14, 13.10.2014	AR/B/43/2014 Dt:01.12.2014	Q/9844/2014 Dt:08.12.2014
10	57						MBNR		AR/B/43/2014 Dt:01.12.2014	Q/9844/2014 Dt:08.12.2014
11	22	27/ RUU1, 27/RUU2	1.19	S. Chinnaiah	Kadlapur	Pargi	RR	2139/14, 27.10.2014	B/459/2014 Dt:23.12.2014	C1/134/2015 Dt:20.01.2015
12	2	115	1.20	1.Syed Misbahuddin 2.Syed Shamshuddin	Somangurthy	Pudur	RR	2516/14, 03.12.2014	B/1128/2014 Dt:18.03.2015	C1/1259/2015 Dt:06.06.2015
			1.20	1.Syed Misbahuddin 2.Syed Shamshuddin	Somangurthy	Pudur	RR	1158/15, 04.04.2015	B/1044/2015 Dt:27.07.2015	Applied at MEE-SEVA on 04.08.2015.
13	19	17	3.20	1.S.Pullaiah 2.S.Umapathi 3.S.Ramesh	Nagulapally	Pargi	RR	2670/14, 18.12.2014	B/1389/2014 Dt:26.02.2015	C1/691/2015 Dt:01.04.2015
14	26	103/A, 103/AA	2.20	1.Pudur Srikanth 2.Sri Latha	Kadlapur	Pargi	RR	2719/14, 19.12.2014	B/1387/2014 Dt:26.02.2015	C1/693/2015 Dt:01.04.2015
15	34	122	4.00	1.Md.Yousuf 2.Md.Khaja Miya	Khudwanpur	Pargi	RR	2686/14, 19.12.2014	B/1388/2014 Dt:26.02.2015	C1/694/2015 Dt:01.04.2015
16	35	99	3.00	1.Madiga Sadanand 2.Bompalli Laxmaiah 3.Bompalli Anjaiah	Khudwanpur	Pargi	RR	14/15, 03.01.2015	B/105/2015 Dt:26.02.2015	C1/695/2015 Dt:01.04.2015
17	28	115	3.00	1.Kavali Rangaiah, 2.Venkatamma	Kadlapur	Pargi	RR	59/15, 06.01.2015	B/40/2015 Dt:26.02.2015	C1/696/2015 Dt:01.04.2015



S. No.	Location No.	Serial No.	Land Procured (acre & gunta)	Land Owner's Name	Village	Mandal	District	Sale Deed No. & Date	Mutation	Land Conversion
18	43	82/p & 88	2.34	Bompalli Pentamma	Khudwanpur	Pargi	RR	273/15, 29.01.2015	B/277/2015 Dt:17.03.2015	C1/1258/2015 Dt:06.06.2015
19	49	232	3.08	1.V. Santosh 2.J Naveen Reddy 3.N Pavan Reddy 4.M.Nagamani 5.P Srikanth Reddy	Chityal	Pargi	RR	291/15, 30.01.2015	B/282/2015 Dt:17.03.2015	C1/1257/2015 Dt:06.06.2015
20	41	75/1A & 75/1AA	2.20	1. Abdul Kareem 2. Abdul Hafeez	Khudwanpur	Pargi	RR	679/15, 24.02.2015	B/647/2015 Dt:28.04.2015	C1/1287/2015 Dt:06.06.2015
21	5	11	2.00	Asra Azher	Kervelly	Pudur	RR	651/15, 25.02.2015	B/815/2015 Dt:20.04.2015	C1/1384/2015 Dt:29.06.2015
		11/1/2.	1.00	Markala Kistaiah	Kervelly	Pudur	RR	2128/15, 11.06.2015	B/1581/2015, Due date 27.07.2015	After completion of Mutation
22	14	296	3.02	1.MVC Venkata Swamy & 2.Madusudan	Madharam	Pargi	RR	669/15, 26.02.2015	B/275/2015 Dt:16.04.2015	C1/1291/2015 Dt:06.06.2015
		297	0.14	1.MVC Venkata Swamy & 2.Madusudan	Madharam	Pargi	RR	668/15, 26.02.2015	B/276/2015 Dt:16.04.2015	
23	17	30	2.20	1.Somagari Jyothi 2.Dadive Narsimhulu	Nagulapally	Pargi	RR	692/15, 27.02.2015	B/278/2015 Dt:16.04.2015	C1/1289/2015 Dt:06.06.2015
24	39	46/A2	0.17	Errolla Sayanna	Khudwanpur	Pargi	RR	719/15, 03.03.2015	B/376/2015 Dt:06.05.2015	C1/1292/2015 Dt:06.06.2015
		46/AA	1.13	Errolla Ramulu	Khudwanpur	Pargi	RR	720/15, 03.03.2015		

S. No.	Location No.	Serial No.	Land Procured (acre & gunta)	Land Owner's Name	Village	Mandal	District	Sale Deed No. & Date	Mutation	Land Conversion
25	36	233	3.00	Avusula Veeramanamma & Veeramma	Rapole	Pargi	RR	832/15, 10.03.2015	B/578/2015 Dt:28.04.2015	C1/1288/2015 Dt:06.06.2015
26	20	46/AA	1.11	Somagari Anthaiah	Kadlapur	Pargi	RR	1072/15, 27.03.2015	B/374/2015 Dt:06.05.2015	C1/1290/2015 Dt:06.06.2015
		46/^A	1.12	Somagari Sathyamma	Kadlapur	Pargi	RR	1099/15, 31.03.2015		
		46/^O	1.01	Somagari Laxamma	Kadlapur	Pargi	RR	1198/15, 07.04.2015		
27	54	91/^A, 91/^F, 91/RU,91/R UU	2.30	Mohammad Jangir Bee	Syedpally	Pargi	RR	1093/15, 30.03.2015	B/375/2015 Dt:06.05.2015	C1/1293/2015 Dt:06.06.2015
28	16	43/^B1, 43/^B2, 43/^B3	3.00	1. Kethavath Tulsiram, 2. Ketavat Krishnaiah, 3. Kethavath Surya Naik	Nagulapally	Pargi	RR	1280/15, 13.04.2015	B/850/2015 Dt:08.06.2015	C1/1801/2015 Dt:16.07.2015
29	66	62/5, 62/6 & 62/3	3.15	1. Dargula Ramdev Reddy, 2. Dargula Kousalya, 3. Dargula Rajender Reddy	Yabajiguda	Pargi	RR	1383/15, 16.04.2015	B/849/2015 Dt:08.06.2015	C1/1805/2015 Dt:16.07.2015
30	71	153/^C2, 153/^C3 & 153/^C4	2.30	Surasani Sumalatha	Thondapally	Pargi	RR	1394/15, 20.04.2015	B/848/2015 Dt:08.06.2015	C1/1800/2015 Dt:16.07.2015
		153/^C	0.22	Chitoor RamReddy	Thondapally	Pargi	RR	1863/15, 25.05.2015	Applied on 25.05.2015, Due date 10.07.2015	After completion of Mutation

S. No.	Location No.	Serial No.	Land Procured (acre & gunta)	Land Owner's Name	Village	Mandal	District	Sale Deed No. & Date	Mutation	Land Conversion
31	63	30, 30^C & 30	3.00	1. Dargula Malla Reddy 2. Dargula Janardhan Reddy	Yabajiguda	Pargi	RR	1497/15, 27.04.2015	B/843/2015 Dt:08.06.2015	C1/1803/2015 Dt:16.07.2015
32	7	32/13^A,32/5^A, 32/13^B,32/5^B, 32/10/1& 32/10/1/2	3.04	1. Chilkamari Manemma 2. Chilkamari Sailamma 3. Chilkamari & Kurva Swarnalatha	Madharam	Pargi	RR	1523/15, 29.04.2015	B/851/2015 Dt:08.06.2015	C1/1804/2015 Dt:16.07.2015
33	44	303/^A	2.22	Bipashabee	Syedpally	Pargi	RR	1525/15, 29.04.2015	B/846/2015 Dt:08.06.2015	C1/1802/2015 Dt:16.07.2015
		303/^B	1.11	Md Jafar	Syedpally	Pargi	RR	1627/15, 07.05.2015		
34	62	82	2.30	Pakeer Babumiya	Thurkayenkepal le	Pudur	RR	1805/15, 21.05.2015	B/1407/2015, Due Dt: 05.07.2015	After completion of Mutation
35	68	116/^C	2.30	Kavali Narsamma	Vanampally	Kondurg	MBNR	4093/15, 21.05.2015	B/42/2015 Dt:23.07.2015	Q/9565/2015, Dt: 12.08.2015
36	64	58/^A2	2.05	Parshamoni shekar & Telugu shekar	Yabajiguda	Pargi	RR	1862/15, 25.05.2015	B/853/2015 Dt: 26.09.2015	Applied at MEE-SEVA on 29.09.2015
37	48	264/4 & 264/^B	4.11	1. Yerupala Srinivas Reddy & 2. Yerupala Laxma Reddy	Chityal	Pargi	RR	1995/15, 03.06.2015	B/1612/2015 Dt: 26.09.2015	Applied at MEE-SEVA on 29.09.2015
38	69	98/^A	2.30	Pottigari Narayana Reddy	Vanampally	Kondurg	MBNR	4597/15, 17.06.2015	B/45/2015 Dt: 03.09.2015	Q/12205/2015, Dt: 30.09.2015

S. No.	Location No.	Serial No.	Land Procured (acre & gunta)	Land Owner's Name	Village	Mandal	District	Sale Deed No. & Date	Mutation	Land Conversion
39	60	79/^A/1/1, 79/^A1/1, 79/^A/1/2, & 79/^A1	3.05	1.Shivagalla Yadaiah, 2.Shivagalla Jangamma, 3.Kallem Sharada & 4.Kallem Narayana	Madharam	Pargi	RR	2239/15, 20.06.2015	Applied on 20.06.2015, Due date 04.08.2015	After completion of Mutation
40	1	110/^A2 & 110/^C	2.00	1.Peddini Vishwanatham & 2.Thokala Anthaiah	Somangurthy	Pargi	RR	2390/15, 29.06.2015	B/1602/2015, Due date 14.08.2015	After completion of Mutation
41	58	291/^B2 & 291/^A	3.18	1. Jangir Bee & 2. Sharfuddin	Padmaran	Kondurg	MBNR	5276/15, 13.07.2015	B/68/2015 Dt: 03.09.2015	Q/12212/2015, Dt: 30.09.2015
42	72	292/^B2	3.00	Bommagalla Narsimlu & Narsaiah	Padmaran	Kondurg	MBNR	5412/15, 15.07.2015	B/69/2015 Dt: 03.09.2015	Q/12212/2015 Dt: 30.09.2015
43	67	184	1.30	1. Manti Cantaiah, 2. Manti Pentaiah & 3. Manti Laxmaiah	Thummalapally	Kondurg	MBNR	5413/15, 15.07.2015	B/127/2015 Dt: 03.09.2015	Q/12210/2015, Dt: 30.09.2015
44	3	24 & 24/P	2.00	1. Mir Firasath Ali Khan, 2. Mir Fazilath Ali Khan & 3. Zoheb Rizwan	Kervelly	Pudur	RR	8802/15, 16.07.2015	B/1751/2015, Due date 30.08.15	After completion of Mutation
45	40	230/^A	2.20	Patle Narayana Reddy	Rapole	Pargi	RR	2694/15, 23.07.2015	Applied on 23.07.2015, Due date 08.09.2015	After completion of Mutation

S. No.	Location No.	Serial No.	Land Procured (acre & gunta)	Land Owner's Name	Village	Mandal	District	Sale Deed No. & Date	Mutation	Land Conversion
46	18	24/^B1/2, 24/^B3, 24/^B/2/2& 24/^D/1	3.06	1. Somagari Manimala & 2. Chalvadi Mahalingam	Nagulapally	Pargi	RR	3163/15, 05.09.2015	Applied on 05.09.2015, Due date 20.10.2015	After completion of Mutation
47	30	-	-	-	-	-	-	-	-	-

RR: Rangareddy, MBNR: Mahbubnagar

The Project Proponent has obtained No Objection Certificates (NOCs) from the following respective Gram Panchayat:

- Kadlapur Gram Panchayat covering Kadlapur and Raghavapur villages;
- Madharam Gram Panchayat covering Madharam and Nagulapally villages;
- Rapole Gram Panchayat covering Rapole village;
- Chityal Gram Panchayat covering Chityal village;
- Syedpally Gram Panchayat covering Syedpally village;
- Khudwanpur Gram Panchayat covering Khudwanpur village;
- Thondapally Gram Panchayat covering Thondapally and Yabajiguda villages;
- Kervelly Gram Panchayat covering Kervelly and Somangurthy villages;
- Padmaran Gram Panchayat covering Padmaran village;
- Thummalapally Gram Panchayat covering Thummalapally village and
- Vanampally Gram Panchayat covering Thirkayenkepalle village.

The NOCs from the respective Gram Panchayats have been attached as **Annexure II**.

### **6.6.3 Views expressed by Land Owners**

A sample size of 13 land owners were consulted to assess the land procurement procedure adopted by the Project Proponent and verify whether the conditions of 'willing buyer/willing seller' were adhered to during the land purchase process. The consultations undertaken with the land owners have been presented in two separate sections in the following, one on general information of the landowners and second on the perception of the land owners on the Project.

#### **General Information about the Landowners**

Details of the general information gathered from the landowners during the site visit have been presented in **Table 6-34**.

#### **Perception about the Project**

Information on the perception of the Project gathered during the consultation process with the landowners has been broadly provided in **Table 6-35**.

#### **Indigenous Population**

Based on the consultations conducted with the landowners, it was noted that there are none of the landowners that belonged to the Scheduled Tribe (ST) category. In addition, there are minimal ST population residing in the vicinity of the study area.

#### **Cultural Heritage**

According to the consultations undertaken, it was learnt that neither were there any sites of cultural significance in any of the land parcels purchased nor around the vicinity of the land area.

**Table 6-34: Details of General Information provided by Land Owners**

S. No	Name of the Interviewee	WTG Location No.	Land Owner Name	Relationship of Landowner with Interviewee	Village	Total Land Area owned by Landowner (in acres and gunta)	Total Area sold for the Project (in acres and gunta)	Land Status prior to sale of land	Occupation of Landowner
1	Krishna	6	Yelkicherla Anthamma	Son	Madharam	6	1.10	Agriculture	Cultivator of maize and cotton
2	Kazia Miya	34	Md. Khaja Miya	Son	Khudwanpur	12.5	4	Barren	Business of crushing stones
3	Ram Chandra	4	Govu Sivamma	Grandson	Kervelly	10	3.05	Agriculture	Cultivator of maize and cotton
4	Jangaiah	5	Markala Kistaiah	Son	Kervelly	11	1	Agriculture	Cultivator of maize, cotton, jasmine and rice
5	Mahalingam	18	Chalvadi Mahalingam	Self	Nagulapally	12	3.06	Agriculture	Cultivator of cotton, maize and chillies
6	P. Vishwanathan	1	P. Vishwanathan	Self	Somangurthy	6	2	Agriculture	Cultivator of cotton and vegetables
7	P. Jangaiah	23	P. Jangaiah	Self	Kadlapur	11	2.20	Agriculture	Cultivator of cotton, maize and pulses
8	Parshamomi Shekhar	64	Parshamomi Shekhar	Self	Yabajiguda	3	2.05	Agriculture	Cultivator of cotton and maize
9	D. Janardhan Reddy	63	D. Janardhan Reddy	Self	Yabajiguda	8	3	Agriculture	Cultivator of cotton, maize and rice
10	S. Jangaiah Chinnaiah	22	S. Chinnaiah	Son	Kadlapur	1.19	1.19	Agriculture	Cultivator of cotton and maize
11	Sheikh Jameel	2, 5 & 3	1. Mir Firasath Ali Khan, 2. Mir Fazilath Ali Khan & 3. Zoheb Rizwan	Relative	Kervelly	No Information	2	Agriculture	Cultivator of cotton and maize
			4. Asra Azher 5. Markala Kistaiah	Relative	Kervelly	4.20	2 & 1		

S. No	Name of the Interviewee	WTG Location No.	Land Owner Name	Relationship of Landowner with Interviewee	Village	Total Land Area owned by Landowner (in acres and gunta)	Total Area sold for the Project (in acres and gunta)	Land Status prior to sale of land	Occupation of Landowner
			6. Syed Misbahuddin 7. Syed Shamshuddin	Relative	Somangurthy	No information	1.20 & 1.20		
12	Srikanth	56&57	Srikanth	Self	Padmaran	9	6	Barren	Bakery Business
13	Syed Palwanshaa	62	Pakeer Babumiya	Son	Yabajiguda	2.30	2.30	Agriculture	Cultivator of cotton and maize



**Table 6-35: Details on the Perception of the Project**

S. No.	Key Questions	Broad Replies received from Interviewee
1	Awareness of the Project?	All respondents consulted affirmed that they were aware about the project.
2	How was the land prices determined between the project proponent and landowners?	All respondents were uniform in their replies that land prices were determined on the basis of one to one negotiation with the Project Proponent's Land Team.
3	Was negotiation of the land prices undertaken? Was it above the prevailing market value? If so, how much?	All respondents replied in the affirmative. They were unison in their replies that the land was sold above the market value. The prevailing market value of the land as informed by Project Proponent's Land Team was INR 1.25Lac per acre. The land prices determined were three (03) to four (04) times higher than the prevailing market value.
4	Was the payment received adequate?	All respondents confirmed in the affirmative that they are satisfied with the payment received.
5	Has the entire amount transferred to your bank account?	All respondents consulted were in the affirmative that they received the entire amount.
6	What was the payment (income received from sale of land) used for?	The replies were cumulatively provided by the respondents i.e. one respondent might have provided two to three options and not strictly just one option, <ul style="list-style-type: none"> <li>• Six (06) respondents replied that they used the payment for clearing impending debts.</li> <li>• One (01) respondent replied that he used the money to open a bakery business.</li> <li>• Seven (07) respondents replied that they used the money for the purchase of new parcels of land in adjoining villages.</li> <li>• Two (02) respondents replied that they used the payment in purchase of a tractor.</li> <li>• Two (02) respondents replied that they used the payment in supplementing the expenses of their daughter's wedding ceremony.</li> <li>• One (01) respondent replied that he has not yet utilised the money but were planning to purchase new parcels of land.</li> <li>• One (01) respondent replied that he has used the money in renovation of his house.</li> </ul>
7	Has the land prices increased in the area with the coming of the project?	<ul style="list-style-type: none"> <li>• A total of five (05) respondents were of the opinion that the land prices in the area have marginally shown a difference.</li> <li>• A total of five (05) respondents believed that the land prices have definitely increased in the area.</li> <li>• A total of three (03) respondents replied that there was no difference in the land prices.</li> </ul>
8	Concerns/Issues relating to the Project	All respondents replied that they did not have any issues/concerns relating to the project.
9	Benefit/Expectation from the Project	The replies were cumulatively provided by the respondents i.e. one respondent might have provided two to three options and not strictly just one option, <ul style="list-style-type: none"> <li>• Eight (08) respondents replied that they expected that the supply of electricity would improve in the area with the project being set up in the vicinity of</li> </ul>

S. No.	Key Questions	Broad Replies received from Interviewee
		<p>their village.</p> <ul style="list-style-type: none"> <li>• Two (02) respondents were of the opinion that health services in the area would improve as more projects like this would come to the area.</li> <li>• Two (02) respondents were of the opinion that road conditions in the area would improve with the operation of the project.</li> <li>• Two (02) respondents replied that they did not have any expectations from the project.</li> <li>• Four (04) respondents replied that they expected the water supply in the area would improve with more projects of the similar nature coming to the area.</li> </ul>



**Photo 6-3: Consultations held with land owners**

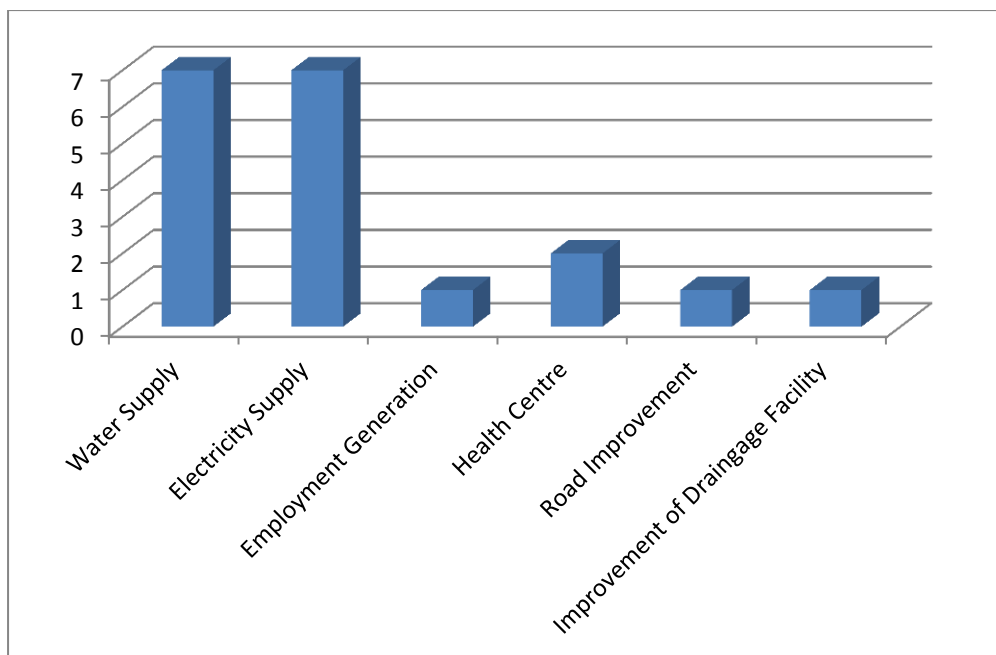


**Photo 6-4: Consultations held with land owners**

**Need Assessment**

A need assessment was undertaken amongst the respondents to highlight the expectations of the local population in the study area from the proposed project proponent. These views were collated in order to comprehend the need of the locals so that prioritising of welfare activities by the project proponents can be better chalked out in the future in case of implementation of Corporate Social Responsibility (CSR) activities. The detail of the areas wherein utmost priority needs to be given is provided in **Figure 6-11**.

**Figure 6-11: Details of the Need Assessment undertaken during the Socio-Economic Survey**



From the figure above, the following areas had been identified amongst the respondents which require utmost priority in terms of deliverance of activities:

- Water supply has been named as the main area which needs utmost attention due to the insufficient hours of water supply that is currently being provided by the Gram Panchayat. It was mentioned by the respondents that the quality of water was also poor and a bit salty. Moreover, the respondents who responded on owning a bore well also mentioned that the water level has been diminishing over the years due to erratic rainfall in the area.
- Electricity supply has also been named as an area which needs priority. The respondents were of the opinion that with coming of the project to the area, the electricity supply would improve.
- The respondents were of the opinion that employment opportunities would improve in the area and felt that the Project would up avenues for generation of employment for the local population.
- Road improvement was another area which the respondents felt needed attention. It was mentioned by the respondents that the internal village roads have not been repaired by the concerned authorities and were in poor condition and need to be improved.
- Development of health centres and provisions for free medicine was another need which was voiced by the respondents.
- Improvement of drainage facilities within the villages was another area which was highlighted as needed priority.

In June 2015, Mytrah engaged BAIF Development Research Foundation (BAIF) to undertake a Needs Assessment through Participatory Rural Appraisal method of the project area and the surrounding villages. The report submitted by BAIF highlights the area of concerns in terms of livelihoods, water availability, sanitation, women empowerment, skill building, infrastructure etc. which could be looked into as part of Mytrah's future Corporate Social Responsibility (CSR) plan. The report in addition, also proposes interventions to Mytrah in terms of 'Community Development Project' for the next three (03) years. The report is currently under review of Mytrah's Management Approval

and decision on the final intervention areas and villages. As an extension of the report BAIF has also submitted a proposal to Mytrah for a partnership project (as part of Mytrah’s CSR Plans) relating to enhancement of livelihood security through comprehensive improvement of natural resources in 22<sup>nd</sup> September 2015. This project is expected to spread across three (03) years and will directly benefit 3800 families within the project area. This proposal is also currently under consideration by Mytrah Management. The Need Assessment Report of BAIF has been attached as **Annexure IV**.

#### 6.6.4 Views expressed by Local Leaders of Gram Panchayats

Local Leaders (Sarpanch) of three Gram Panchayat, namely, Syedpally, Madharam and Khudwanpur were consulted during the site visit to gather their views regarding the socio-economic of the villages under their Gram Panchayat and their perception on the project. The details of their replies have been provided in **Table 6-36**.

**Table 6-36: Details of Responses received from the Local Leaders**

S. No.	Questions	Broad Responses
1	What is the main occupation pattern of the location population?	All three respondents replied that agriculture is the main occupation of the local population. Besides this, agricultural labourer as an occupation is also quite prominent in the area. Approximately, 10% of the local male population migrate to big metros like Delhi, Mumbai, Hyderabad etc. in search of employment opportunities.
2	What is the average family income of the local population per annum?	<ul style="list-style-type: none"> <li>The Sarpanch of Madharam replied the average family to be between INR 50,000-60,000 per annum</li> <li>The Sarpanch of Syedpally replied the income to be between INR 30,000 – 40,000 per annum</li> <li>The Sarpanch of Khudwanpur replied the income to be between INR 45,000-50,000 per annum.</li> </ul>
3	Are you aware of the project and about the land purchase for the project in the area?	All three respondents were in the affirmative that they were aware of the project and the land parcels that were sold for the project and its associated facilities.
4	What was the land use pattern of the area before it was sold to the project proponent?	All three respondents responded that the land was used for agricultural purposes.
5	Was any grazing activities undertaken in the land parcels that have been sold for the purpose of the project?	The respondents replied that grazing activities usually takes place in the dry season but not a frequent basis. However, they were uniform in their opinion that the land was agricultural land.
6	Do you think the land prices have increased with the coming of the project to the area?	All respondents were of the opinion that there has been only marginal increase in the land prices in the area.
7	Are there any cultural heritage/archaeological sites near the project area?	All respondents replied in the negative that the project area had any sites of cultural or archaeological significance.
8	Do you anticipate any risks associated with the project’s operation?	All respondents replied in the negative.

S. No.	Questions	Broad Responses
9	Any benefit/expectation from the Project.	The respondents were of the opinion that employment generation would increase in the area with the project, roads would see an improvement, drainage would improve and drinking water supply would improve.

### **General Profile (Socio-Economic Status of Women)**

To comprehend the existing living pattern of the local population residing across the study area, a look at the socio-economic status of women and the role that women have been playing both at the domestic and economic level needs to be taken into consideration. As the patriarchal values are entrenched in Indian society, women often play a more subordinated and dependent role. Even though they constitute almost half the population, various indicators pertaining to literacy level, labour force participation, mortality rate etc. reveal the dismal status of women to that of men.

According to the UN Gender Development Index, 2014 India ranks 132 out of 187 countries worldwide.<sup>27</sup> As per the 2011 Census data, Telangana has a total female population of 173.92 lakh with sex ratio of 988 females to every 1000 males. A total of 57.99% of the female population are literates in the State.

While interacting with the Sarpanch(s) of the Gram Panchayats, information relating to the gender profile in the area was also gathered. All the respondents were unison in their reply that no government schemes for women have been introduced in any of the Gram Panchayats. The main activities undertaken by women were mostly in the form of engagement of agriculture activities and household chores. As per their opinion, there are no issues faced by the women of their villages in terms of accessing health care services as hospitals are available within a distance of 8-10 km from their area of residence. There are no vocational centres catering to women however, women Self-Help Groups (SHGs) are prominent in the area. The SHGs usually consist of 20-25 members and funds collected within the SHGs are utilised in the agricultural activities or purchase and sale of cattle for milk and other dairy products.

The respondents were of the view that the need of the hour should be development of health care centres and employment opportunities for women. Medical health camps catering to women health issues should be held regularly to impart information and steps for necessary actions at times of emergencies. In addition, vocational centres catering to skills like stitching, knitting, handicraft making, pickle making etc. should be established so that women while sitting at their homes can take up steps to supplement their economic condition and raise their status in the society.

### **6.6.5 Views expressed by Site Representatives of MVGoPL**

The Project Proponent's Land Team and Site Representatives were also contacted and an interview was held to gather their viewpoints on the project which has been presented below in **Table 6-37**.

**Table 6-37: Key Questions and Responses from MVGoPL's Representative**

S. No.	Questions	Broad Response
1	<b>Land Procurement Process:</b>	<ul style="list-style-type: none"> <li>All land shortlisted and procured for the project</li> </ul>

<sup>27</sup> <http://hdr.undp.org/en/content/table-5-gender-related-development-index-gdi>

S. No.	Questions	Broad Response
	<ul style="list-style-type: none"> <li>What type of land has been purchased for the project activities?</li> <li>How has the price for the land purchase determined?</li> <li>Was the process of land purchase negotiated?</li> <li>Was all land sellers provided payments equivalent to the prevailing market value?</li> <li>Has all payments for the land disbursed to the land sellers?</li> <li>Have you obtained No Objection Certificates from the respective Gram Panchayats for the project activities?</li> </ul>	<p>activities is agricultural land.</p> <ul style="list-style-type: none"> <li>The price for the land purchase was determined based on the prevailing market value.</li> <li>All land parcels procured for the project were directly negotiated individually with the land owners.</li> <li>All land sellers have been provided payments higher than the prevailing market value.</li> <li>All payments have been disbursed to the land sellers.</li> <li>No Objection Certificates (NOC) from the respective Gram Panchayats has been obtained for the project activities.</li> </ul>
2	<p><b>Community Engagement:</b></p> <ul style="list-style-type: none"> <li>How was the community informed about the proposed project?</li> <li>Has any prior meeting been undertaken by MVGoPL with the local community?</li> <li>Was an information disclosure meeting conducted with the local authority?</li> </ul>	<ul style="list-style-type: none"> <li>The community around the vicinity of the project site has been informally informed about the proposed project. The community are aware of the Site Office premises and the concerned person to contact and are free to get in touch whenever required.</li> <li>There were no formal meetings conducted by MVGoPL with the local community.</li> <li>No Objection Certificates from the respective Gram Panchayats have been obtained for the project activities.</li> </ul>
3	<p><b>Corporate Social Responsibility (CSR)/Community Development Programme</b></p> <ul style="list-style-type: none"> <li>Activities undertaken (if any)</li> <li>CSR Plan for future</li> <li>Documented Records (if any)</li> </ul>	<ul style="list-style-type: none"> <li>No CSR or Community Development Programmes have been initiated till date by Mytrah as this is Mytrah's first project in the area. However, Mytrah had engaged BAIF-Hyderabad to undertake a needs analysis in Project Area.</li> <li>As per the report submitted by BAIF-Hyderabad, a list of activities on the proposed intervention for community development for the next three (03) years have been detailed out which can be planned for Mytrah's future CSR Plans.</li> <li>Need Analysis report by BAIF-Hyderabad is the only documented record with Mytrah.</li> </ul>
4	<p><b>Grievance Redressal Procedure</b></p> <ul style="list-style-type: none"> <li>Has any formal grievance redressal mechanism been set up by Mytrah for the community?</li> <li>Has Mytrah identified persons responsible as contact person for handling grievances?</li> </ul>	<ul style="list-style-type: none"> <li>Till date no formal grievance redressal mechanism has been set up for the project. However, there are plans for setting one up for the project.</li> <li>The identified person from the Community will be the Sarpanch(s) of the Gram Panchayats and from Mytrah it will be the Site Supervisor. However, formal decision on this aspect is yet to be finalised and implemented.</li> </ul>

## 6.7 Impact Assessment

This section describes the potential socio-economic impacts during various phases of the project viz.:

- Construction phase
- Operation phase

- Decommissioning phase

The mitigation measures for the identified potential impacts have also been discussed under this section.

### 6.7.1 Construction phase

#### *Impacts*

The following potential impacts have been identified to be associated with the construction phase of the project:

- Loss of land;
- Increase in traffic movement; and
- Migrant Labour Engagement

#### **Loss of Land**

The land identified for the WTGs and its associated facilities comprises of private agricultural land. Based on the consultation undertaken with the land owners, except for one land owner that sold his entire parcel for the project, others have sold sizeable amount of their land holdings as well. Even though agricultural activities used to be undertaken on these land parcels, due to lesser rainfall over the years, rising cost of cultivation activities and lesser profits, these land owners decided to sell their land parcels. This move has rendered one landowner landless, however, on the day of consultation it was confirmed that he was contemplating on purchasing a plot of land at the adjoining village.

#### **Increase in Traffic Movement**

The living standards of neighbouring community and local villagers from nearby villages are likely to be disturbed due to the increased road traffic movement during the construction phase of the project.

The traffic density on the roads in the proposed Project area is medium. However, with the commencement of the construction activities for the Project, the traffic movement will increase due to transportation of turbine components and site personnel. The turbine components such as blades, tower nacelle will be brought to the yard site and will then be sent to the individual turbine locations as per the requirement.

On an average, about 7-8 trucks/trailers will be required to bring the components of one turbine. Considering that at a particular instant of time, construction works for 10 turbines will be carried out simultaneously, a maximum of 70-80 trucks/trailers will ply on these roads. This kind of traffic movement may disturb the local population in the area and also pose increased risks of road accidents. The possible impacts associated with road traffic movement include the following:

- increase in traffic movement on the road network linked to the project leading to traffic congestion and delays;
- short term closure of existing transport routes during proposed construction/widening of access roads thereby causing disruption and delays in traffic;

- increase in traffic related noise and emissions;
- damage to existing roads and related structures due to heavy vehicular/ equipment movement;
- increase of probability of road accidents to livestock and people ; and
- parking of vehicles in open fields and other non-project locations.

As the existing panchayat roads (internal access roads) will be used, therefore the impact on community health and safety is assessed to be medium.

### **Migrant Labour Engagement**

It is anticipated that during the construction phase, the labour requirement will range from 40 -45 during normal operations and 85 – 90 workers for peak construction activities. Currently, there are 20 labourers employed at site, all of whom are contractual migrant workers.

The site management has not received any grievances involving migrant labour, from the communities. The local population consulted also reported that they did not have any issues with the migrant labour till date during the consultation process.

The basic issues related with migrant labour may include:

- Conflict amongst workers, and between workers and local community, based on cultural, religious or behavioural practices.
- Discontent amongst local community on engagement of outsiders.
- Mild outbreaks of certain infectious diseases due to interactions between the local and migrant populations. The most common of these are respiratory (TB), vector borne (Malaria, Dengue), water borne (Stomach infections, typhoid) and sexually transmitted diseases (HIV, Syphilis and Hepatitis).
- Security issues to local women from migrant workforce.
- Use of community facilities such as health centres, temples, transport facility etc. by migrant labour may lead to discontent with local community.
- Wherein contractors would be bringing in unskilled migrant labour, there stands the risk of exploitation of a labourer. This can happen in the form of hiring underage labourers, low and unequal wage payments, forced labour and discrimination on basis of the basis of caste, religion or ethnicity.

### **Mitigation Measures**

#### **Loss of Land**

The project will have minimal impact due to loss of land. The following mitigation measures will however be incorporated to reduce the impact due to loss of land:

- The site clearance for tower erection, access road and ancillary facilities should be restricted to the necessary footprint area. The remaining area should be accessible for grazing or cultivation once the construction activities are completed.
- A formal consultation should be undertaken to apprise the villagers of the project activities on a regular basis.



- The EPC contractor should map access roads and implement strict driving instructions to adhere to such roads without going off-road thus destroying agricultural activities.

### **Increase of Traffic Movement**

The following measures shall be adopted:

- Project transportation through community areas shall be avoided to the extent possible;
- The routes for transport of construction material for road development shall be finalised after conducting survey of the existing road conditions;
- The transportation of WTG components shall be avoided during peak traffic hours as identified during traffic volume survey;
- Routes shall be planned along wider and less-restrictive roads. Where road widths are insufficient, either temporary widening of the road with gravel or full depth widening of the pavement structure to be undertaken;
- Widening of shoulders and development of new roads will be discussed with the community and undertaken only after all concerns are addressed;
- All vehicles engaged for transportation shall be verified for fitness and valid Pollution Under Control (PUC) certificates issued by registered authorities;
- Any incidence of breakdown shall be attended immediately to ensure smooth flow of vehicle along the road. Movement of vehicle shall be restricted to the identified routes and only trained drivers shall be employed;
- High noise generating construction activities shall not be carried out during night time as far as possible;
- All public utilities like power transmission cables, telephone cables, water/sewerage lines, drains, tube wells etc. falling within road land width shall be inventoried, and arrange for relocation /shifting to adjacent areas in consultation with the respective agencies/authorities and community; and
- MVGoPL will develop and implement the **Traffic Management Plan** for minimising community disturbance due to WTG components and material transportation.

### **Migrant Labour Engagement**

The following measures shall be adopted:

- The project proponent shall ensure engagement of local population as workforce in the construction activity, as far as possible. Community expectations for employment and other local benefits should be addressed and managed. Regular updates on opportunities and skill requirements shall be provided to the community.
- MVGoPL through the contractor agreement shall ensure that the construction contractors commit and adhere to social obligations including community relations, handling complaints and grievances, adherence to labour laws and international commitments etc.
- The contractor shall provide adequate information to workers on expected social behaviour and hygiene practices to be followed at site.
- The water usage amongst the labourers shall be monitored and controlled to minimize generation of wastewater.

- MVGoPL shall ensure that no child or forced labour is engaged by contractors and all wage payments are done without any discriminations or delays by the contractors.
- MVGoPL to ensure that adequate sanitation and waste disposal facility shall be provided at project site.
- MVGoPL to ensure possible sourcing of construction labour from the local region to the extent possible.
- MVGoPL to ensure local contracting and vendor opportunities as far as possible
- MVGoPL should undertake medical test of the contract workers prior to engagement to identify any communicable disease.

### Impact Value

The impact on socio-economic components from loss of land will have a localised impact with short duration and a low intensity after mitigation measures are employed.

The impact on community issues like increase of traffic movement and migrant labour engagement is expected to be of local spread, short duration and low intensity with mitigation measures and the overall impact is assessed to be minor as listed below.

**Table 6-38: Impact Value of Construction Phase - Community/Social Issues**

Aspect	Scenario	Spread	Duration	Intensity	Overall
Social/Livelihood Pattern	<b>Loss of Land</b>				
	Without Mitigation	Medium	Short	Moderate	Moderate
	With Mitigation	Local	Short	Low	Minor
	<b>Increase of Traffic</b>				
	Without Mitigation	Medium	Short	Moderate	Moderate
	With Mitigation	Local	Short	Low	Minor
	<b>Migrant Labour Engagement</b>				
	Without Mitigation	Medium	Short	Moderate	Moderate
	With Mitigation	local	Short	Low	Minor

## 6.7.2 Operation phase

### Impacts

The following potential impacts have been identified to be associated with the operation phase of the project:

- Land Use;
- Visual Aesthetics;
- Electromagnetic Effects;
- Common Property Resource;
- Shadow Flickering Effects;
- Telecommunication services; and
- Blade Throw

### Land Use

Wind power projects can result in both temporary and permanent disturbance to land. The permanent disturbance is caused due to construction of wind turbine pads, access roads, substation and other infrastructure. Temporary disturbance is caused by temporary construction of access road, storage of equipment and lay down of storage facilities. Although the change in land use is irreversible, the land foot print of the project is limited and does not allow any restriction on access to the internal access roads and area outside the fencing built around the WTG and its transformer yard.

The land sellers who would be providing part of their land for transmission poles and towers are likely to face inconvenience in farming in those plots.

The land use of the project area will not be altered to a large extent as only small areas comprising of the WTG and the transformer will be utilized while the remaining area will be left open for use by locals of the area. Therefore, minimal impact on land use is expected. **Visual Aesthetics**

Visual and aesthetic impacts are among the most commonly expressed concerns about the development of wind energy projects. Determination of what constitutes an adverse visual impact is highly subjective because it depends on the values, beliefs, and experiences of individual viewers. Opinions about the aesthetic qualities of wind energy facilities can vary greatly among different segments of the population and from one location to another.

An adverse visual impact is defined as an unwelcome visual intrusion that diminishes the visual quality of an existing landscape. Changes that can be perceived as visual intrusions generally result from the introduction of visual contrast to the existing scene, based on differences in form, line, colour, and/or texture. Visual contrast with the existing landscape is often unavoidable because of the size and typical location of wind farms. Nevertheless, there are some measures that can be incorporated into the design of the project facilities to limit the degree of visual contrast and reduce the prospect that the contrast would be widely perceived as an adverse visual effect, or at least reduce the degree of the effect.

To avoid conflicts and problems with acceptance, visual aspects should play an important part in the planning and communication in the realization phase of wind parks. It is critical to recognize that wind turbines cannot be adjusted to meet visual criteria alone. The turbines must be located in the areas with appropriate wind resources in order for the project to be viable.

The layout for the wind turbines has been finalised based on a siting exercise which has accounted for visual impacts. All the wind turbines will have uniform visual characteristics such as colour, size, and design so that no significant impact is caused to the surrounding communities.

### **Electromagnetic Fields (EMF) Effects**

Electromagnetic Fields (EMF) emanate from any wire carrying electricity. Possible effects associated with the electric and magnetic fields from transmission lines (or similar electrical sources) fall into two categories:

- Short-term effects that can be perceived and may represent a nuisance;
- Possible long-term health effects.

The issue of whether there are long-term health effects associated with exposure to fields from transmission lines and other sources has been investigated for several decades. There is little evidence that electric fields cause long-term health effects. Estimates of magnetic-field exposures have been associated with certain health effects in studies of residential and occupational populations. Research in this area is continuing to determine whether such associations might reflect a causal relationship. The lists of exposure limits for general public/occupational exposure to electric and magnetic fields published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) is as given in the **Table 6-39** and **Table 6-40** below.

**Table 6-39: ICNIRP exposure limits for general public exposure**

Frequency	Electric Field (V/m)	Magnetic Field ( $\mu$ T)
50 Hz	5000	100
60 Hz	4150	83

Source: ICNIRP (1998): “Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz).”

**Table 6-40: ICNIRP exposure limits for occupational exposure**

Frequency	Electric Field (V/m)	Magnetic Field ( $\mu$ T)
50 Hz	10,000	500
60 Hz	8300	415

Source: ICNIRP (1998): “Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz).”

There are no specific standards or guidance on EMF in India though the Indian Electricity Act and Rules early stipulate the minimum clearances required. Hence the ICNIRP standards and guidelines have been considered. For the general public (up to 24 hours a day) an exposure level of 1,000 mG or 100  $\mu$ T is suggested. The EMF generated by 220KV unit will be lesser than the suggested value.

**Common Property Resource**

The land being procured for the proposed project predominantly comprises of private agricultural land which is being cultivated only during rainy season and for rest part of the year is used for grazing activity. Site surroundings also comprises of agricultural fields and fallow land (being used for cultivation only during rainy season and is used for grazing for remaining part of the year). Also, construction and land clearing activity for wind turbines will be restricted to the necessary footprint area around the WTGs, thus the project will not restrict the grazing activities in the area. Also the entire wind farm area will not be fenced/ barb wired and shall provide access to the movement of livestock in the area for grazing purpose and also locals to cultivate the surrounding area during rainy season. MVGoPL to ensure that all the transformer are locked and cables are insulated to avoid any electrical hazards.

**Shadow Flicker Effects**

Shadow flicker occurs when the shadow cast by the moving blades of a wind turbine passes through a window or a door. The effect of the shadow moving around with the blade makes it seem as if a shadow is flickering with each blade passing by (most large wind turbines have three blades, so three times per rotation) - comparable to someone turning on and off the light in rapid succession.

There is anecdotal evidence inter nationally that shadow flicker could lead to stress and headaches. There is also a fear that shadow flicker, especially in the range of 2.5-50 Hertz (2.5-50 cycles per second) could lead to seizures in epileptics and may also scare away livestock.

Shadow flicker is most pronounced at sunrise and sunset when shadows are the longest, and at high wind speeds (faster rotating blades leading to faster flicker). There are no uniform standards defining what distance from the turbine is regarded as an acceptable limit beyond which the shadow flicker is considered to be insignificant. There are also no uniform standards in India for the number of hours of flicker that are deemed to be acceptable. However, UK government report recommends that for inhabitants near wind turbines, shadow flicker should be limited to 30 hours in a year and 30 minutes in a day.

During the site survey, four (4) receptors identified within 350 m of the project turbines were identified as potential shadow receptors. The details of the shadow receptors are provided in the **Table 6-41**:

**Table 6-41: Details of Shadow Receptor Locations**

Receptor ID	Type of Receptor	UTM Coordinates		Nearest WTG	Distance from nearest WTG (metres)	Direction from nearest WTG
		Easting	Northing			
SF1	Farm House	813446.00 m	1906177.00 m	NRB 2	70	West
SF2	Farm House	811722.00 m	1902657.00 m	NRB 15	350	North
SF3	Farm House	810002.00 m	1897910.00 m	NRB 29	95	North
SF4	Settlement	811560.00 m	1896662.00 m	NRB 35	50	North

Source: Site Survey

Shadow flicker modelling was performed using EMD’s WindPRO Software version 2.7, a wind modelling software program. WindPRO is used to calculate detailed shadow flicker map across an area of interest with site-specific locations using shadow receptors.

Shadow maps, which indicate where shadows will be cast and for how long, can be calculated at varying resolutions. Normal resolution was used for this study; it represents shadow flicker calculations that determine the sun angle every 5 minutes, every 7<sup>th</sup> day, over the period of an entire year, over a grid resolution of 20 meters by 20 meters.

Shadow flicker at each shadow receptor location is calculated every minute of every day throughout the entire year. Shadow receptors can be configured to represent an omni-directional window of a specific size (greenhouse mode) or a window facing a single direction of a specific size (single direction mode). The shadow receptors used in this analysis were configured as single direction-mode receptors representing a 1.5 meter wide by 1.5 meter high window.

The inputs for the WindPRO shadow flicker model include the following:

- The geographic locations and characteristics of the proposed WTGs;
- The locations of identified shadow receptors;
- Turbine Model Specifications; and

- Topography was assumed to be flat as a *theoretical worst case* scenario.

The WindPRO software calculates the position of the sun throughout the day in accordance to the curvature of the earth, the time of year and the project site’s position. The software calculates the occurrences of shadow flicker at each of the identified receptor. Analysis was conducted to represent a *theoretical worst case* scenario, with the following conditions:

- The sun is shining all day, from sunrise to sunset with clear skies;
- There are no obstructing features such as trees and vegetation; and
- The wind turbines are always operating i.e. there is continuous wind of sufficient speed and no maintenance or down time.

The results of the modelling exercise have been presented in **Table 6-42** and **Figure 6-14**.

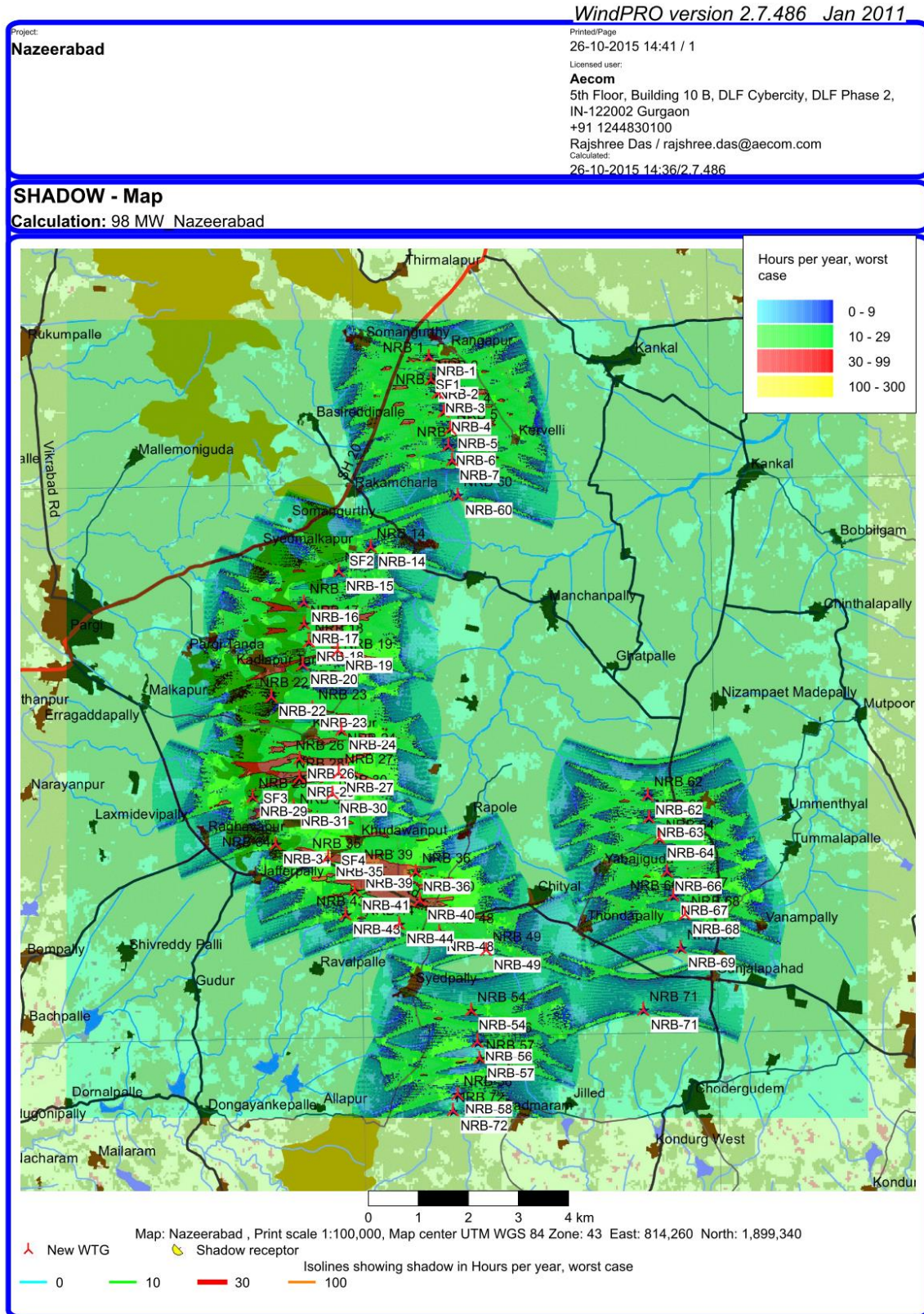
**Table 6-42: Results of Shadow Flicker Modeling**

Software Label	Shadow hours per year	Shadow days per year	Max shadow hours per day
	hr/yr	days/yr	hr/day
SF1	0:00	0	0:00
SF2	27:04	57	0:37
SF3	17:43	67	0:25
SF4	7:15	28	0:20

As discussed earlier, no national, state, county, or local standards exist for frequency or duration of shadow flicker from wind turbines. However, international regulations, studies, and guidelines from Europe and Australia have suggested **30 hours of shadow flicker per year** and **30 minutes of shadow flicker per day** as the threshold of significant impact, or the point at which shadow flicker is commonly perceived as an annoyance.

Accordingly, the above threshold parameters were used in this analysis to evaluate potential shadow flicker impacts on the farm houses present in near vicinity of the WTG locations. As seen in **Table 6-42**, shadow hours per year for the receptors are within the threshold limits i.e. 30 hours per year. The maximum number of shadow days per year for receptors; SF1, SF2, SF3 and SF 4 are 0, 57, 67 and 28 respectively. Thus impact of the proposed project due to shadow flickering effect is insignificant.

Figure 6-12: Effect of Shadow Flicker due to turbine operations



### **Impact on Telecommunication Services**

Like any other large structures, wind turbines have the potential to cause interference with telecommunication signals such as, television and radio broadcasts, mobile phone services and radio communication services which tend to occur in proximity to habitations and often utilise the same ridgelines that provide optimum locations for wind turbines.

In general, very high frequency (VHF, 30 MHz – 300 MHz) and ultra-high frequency (UHF, 300 MHz – 3 GHz) band radio signals and digital voice based technologies are essentially unaffected by wind turbines. This includes land mobile repeaters, radio, the audio component of analogue television and mobile phones.

For broadcast signals which are usually omni-directional (or point to area), interference can generally be avoided by locating wind turbines distant from the broadcast tower or transmitter antenna. A clearance distance of at least 100 m to > 200 m is recommended for frequencies ranging from 100 MHz to > 1000 MHz<sup>28</sup>

No broadcast or mobile communications towers were identified in close vicinity of the proposed project WTGs. Therefore the development of the proposed wind project is not expected to have any widespread adverse impact on the telecommunication services.

### **Impact due to Blade Throw**

Blade throw is a potential safety hazard which involves dropping of a rotor blade or the blade being thrown from the nacelle of the wind turbine in a high wind zone. The occurrence of blade throw can be due to two types of infrastructure failure:

- The whole blade detaching from the rotor and falling away from the turbine; or
- Part of the blade breaking off and falling away from the turbine;

Occurrences of these two scenarios could be caused by the factors such as:

- Design or manufacturing defect;
- Poor maintenance regime;
- Excessive winds during a storm;
- Exceeding maximum design loads;
- Rotor over-speed; or
- Lightning or fire.

Wind Energy specific EHS guidelines indicate that probability of rotor blade failure which may result in the 'throwing' of a rotor blade endangering public safety, is extremely low. The same document refers to Taylor and Rand (1991) indicating that the risk of being hit by turbine parts within a distance of 210 m is 1:10,000,000.

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<sup>28</sup> C. Salema and C. Fernandes, "Co-Siting Criteria for Wind Turbine Generators and Transmitter Antennas," Proceedings of Conf. de Telecomunicacoes, Sesimbra, Portugal, pp. 466-470, 1999



## *Mitigation Measures*

### **Land Use**

The following mitigation measures shall be incorporated:

- The entire land use in the project area shall not be altered since only a small area (0.1%) is occupied by WTGs;
- The land in the project area should be made available for alternative uses like agriculture, grazing and other activities;
- It has been observed that around 80 per cent of the land is required for construction of access roads. Thus, it is recommended that the project site should be set-up near the existing approach roads so that land footprint for access road construction is minimised; and
- MVGoPL shall hold negotiations with farmers providing area for transmission poles/ towers and consider possible adjustment of the pole/ tower locations towards convenience of the farmers.
- The layout for access roads and transmission lines shall be developed considering the minimum land requirement as needed.

### **Visual Aesthetics & Shadow Flicker**

The following mitigation measures shall be incorporated:

- Maintaining uniform size and design of turbines by having same direction of rotation, type of turbine and height on a wind farm or adjoining wind farm;
- Layout or adjustment should be such that turbine blades rotate in the same direction;
- Maintaining a minimum distance (based on the formula, '**Height of the turbine + ½ x rotor diameter + 5 m'**) from residential settlement/place, highways, schools/building etc. to minimize visual impacts and impacts due to shadow flicker and blade glint and prevent risks due to fall down of the turbines;
- Preference to be given to large turbines rather than too many small turbines. Flat landscape fit well the turbine distribution in rows;
- Reducing the occurrence of impacts due to blade glint by application of non-reflective paints;
- Ensuring absence of any auxiliary structures except the required ones such as access roads and transformer yards which accompany the turbines; and
- Use of underground cables only.

### **Grazing Activities and Common Property Resources**

The following measures shall be adopted:

- All transformers shall be fenced and cables insulated to avoid any electric hazards;
- Security personnel shall be deployed on the project site on a day-night shift basis to guard the project facilities;
- The project will engage with the affected community to understand the stakeholders on the common property resources (roads, grazing areas etc.) which would be impacted. It shall work

closely with the Panchayat and local administration to identify and develop alternate areas for common resources (fodder) if required;

- Grazing areas shall be demarcated to prevent straying of animals nearby transformer yards; Signboards in local language shall be put up around such areas to warn the herders about potential hazards; and
- Re-vegetation shall be implemented and native species to be planted.

### **Electromagnetic Interference (EMI)**

- Preventive measures should be taken, for instances avoid selecting a site close to an airport, an important radar system, a defence site and human settlements to avoid EMI issues. In case of unavoidable circumstances, obtain No Objection Permission (NOP) from the Civil Aviation Authority and Ministry of Defence;
- In order to avoid long-term impacts, a buffer distance of 9.2 km from Air Traffic Control (ATC) should be maintained;
- Avoid setting up wind turbines within defence air radar lines. To avoid EMI interference with defence radar, there is a restriction on height. The height of wind turbine is calculated by the equation given below:

$$\text{Maximum wind turbine height} = (R_{NM}/1.23 - (\text{Radar antenna height})^{1/2})^2$$

### **Television interference**

- A monitoring framework is required to investigate and rectify any interference to television reception;
- Complaints from neighbours regarding interference with TV or other electromagnetic signals must be addressed immediately;
- Modifications or replacement of antennas and if it not works, switch over to digital TV reception. If both methods are ineffective then provide installation of satellite or cable TV;
- Some other mitigation measures include:
  - Installation of higher quality or directional antenna
  - Direct antenna towards an alternative broadcast transmitter
  - Installation of an amplifier

### **Shadow Flicker Effects**

Although impacts due to shadow flicker from turbine blades during operation are assessed to be insignificant, it is recommended that MVGoPL should maintain a minimum distance of 173.5 m from receptors and should formulate a complaint resolution procedure for the local community so that any issues or concerns associated with shadow flicker are reported to the site staff. MVGoPL to ensure that appropriate and timely action is taken in case of receipt of such complaints.

### **Blade Throw**

MVGoPL to maintain setback distance and must provide an adequate buffer between wind generators and consistent public exposure to minimize the risk of damage or injury from component failures.

The following mitigation measures are recommended.

- Establishing safety setbacks and siting WTGs away from existing buildings and populated areas within possible trajectory range of the blade;
- WTGs may be equipped with vibration sensors to enable emergency shutdown of WTG if necessary;
- Regular blade maintenance; and
- Warning signs to the public.

### Impact Value

Land use and shadow flicker impacts due to operation of the wind turbines will be minor with employment of mitigation measures and will be insignificant for the other social / community aspects. Hence the overall significance of the impact with mitigation measures will be insignificant.

**Table 6-43: Impact Value of Operation phase – Community/ Social Issues**

Aspect	Scenario	Spread	Duration	Intensity	Overall
Land Use	Without Mitigation	Local	Long	Moderate	Moderate
	With Mitigation	Local	short	Low	Minor
Visual Impacts	Without Mitigation	Local	Short	Moderate	Minor
	With Mitigation	Local	Short	Low	Insignificant
Shadow Flicker	Without Mitigation	Medium	Short	Moderate	Moderate
	With Mitigation	Medium	Short	Low	Minor
Communication Facilities	Without Mitigation	Local	short	Low	Insignificant
	With Mitigation	Local	Short	Low	Insignificant
Blade Throw	Without Mitigation	Local	Short	Low	Insignificant
	With Mitigation	Local	Short	Low	Insignificant

### 6.7.3 Decommissioning Phase

#### Impacts

The key social issues associated with demobilisation phase will include:

- Issue of loss of job when the workers will be asked to leave after construction because wind farm project will not require more individual for operations phase;
- Improper disposal of construction waste and debris from deconstruction of campsites, storage area, etc. will lead to contamination of soil and discontent of community;
- Deconstruction activity will lead to generation of dust which can be carried downwind to habitations;
- Deconstruction activities are associated with health and safety issues such as structural collapse, trip and fall, electrical hazard etc.

#### Mitigation Measures

Construction demobilisation will require removal of machinery, workers and other temporary structures. The mitigation measures for demobilisation shall include:

- The contractor shall inform the workers and local community about the duration of work;
- The workers shall be clearly informed about the expected schedule and completion of each activity;
- Reduction of worker will be done phase wise and corresponding to completion of each activity;
- The reduction in workers shall be done based only on the requirement of his/her skill set and not guided by any other factor;
- A transparent mechanism shall be prepared wherever choice is to be made between individuals of similar capability;
- All waste generated from demobilisation shall be collected and disposed at the nearest municipal disposal site. Structures that can be reused will be carried back by the contractors or sold to vendors;
- All necessary Personal Protection Equipment (PPE) shall be used by the workers during demobilisation; and
- Workers shall be briefed about the use and requirements of PPE.

### Impact Value

The impacts will be of local spread, short duration, and moderate intensity. It is assessed that with mitigation measures, the impacts will be insignificant.

**Table 6-44: Impact Value of Decommissioning Phase- Community /Social issues**

Aspect	Scenario	Spread	Duration	Intensity	Overall
Decommissioning	Without Mitigation	Local	Short	Moderate	Minor
	With Mitigation	Local	Short	Low	Insignificant

## 7. NOISE ENVIRONMENT

This section presents the existing noise levels in the Project area, the potential noise sensitive areas identified during the field survey and the impacts on the noise levels during the construction and operation phase of the Project with the appropriate mitigation measures. The wind farm comprises of 47 WTGs of Suzlon S97, details of which are presented in **Table 3-2**.

### 7.1 Identified Noise Receptors

During the field survey, the project area was assessed to identify all noise sensitive receptors in the study area. In total six noise monitoring locations were identified, consisting primarily of built structures such as houses, places of worship and school near to the proposed WTGs. The identified noise receptors and their geographical coordinates are as presented in **Table 7-1**.

**Table 7-1: Description of the Identified Noise Receptors**

Receptor ID	Geographical Coordinates Zone: 43 Q		Description	Distance (km) from nearest WTG
	UTM (Easting)	UTM (Northing)		
NQ 1	813556.00 m	1906930.00 m	Near Upper Primary School, Rangapur Village	235m from NRB 1in North direction
NQ 2	811115.00 m	1899539.00 m	Kadlapur Village	190 m in South west direction from NRB 22
NQ 3	811224.00 m	1899119.00 m	Near Upper Primary School, Kadlapur Village	500 m in west direction from NRB 24
NQ 4	811530.00 m	1896664.00 m	Near Upper Primary School, Khudawanpur Village	35 m north from NRB 35
NQ 5	813311.00 m	1896049.00 m	Near Poultry Farm, Rapole Village	258 m in south west direction from NRB 36
NQ 6	813035.00 m	1895695.00 m	Near Upper Primary School Syedpully Village	960 m in South west direction from NRB 44

### 7.2 Ambient Noise Levels

At any given time, turbine noise impact depends on wind speed, wind direction and background noise. Primary noise monitoring was carried out for continuous 24 hours at the six (6) identified receptor locations by Eco Services India Private Limited (a NABL Accredited Laboratory) to evaluate the baseline noise levels at the project site. The ambient noise monitoring has been undertaken, taking into consideration factors like wind induced noise and human activities such as movement of vehicles. The baseline ambient noise levels represent the background noise levels that would be present in the absence of the wind farm.

Ambient noise level was monitored continuously for 24 hours using Sound Level Meter of Baseline Technologies make of range 30-134 dB with least count of 0.1 dB and accuracy of  $\pm 0.1$  dB. Sound pressure levels were recorded at every 10 minutes to calculate the Leq (hourly) values. The relevant statistic measured was the LA90 (10min) (The A-weighted sound pressure level exceeded for 90 % of the 10 minute interval). The noise levels obtained were analysed to arrive at the equivalent continuous noise level (Leq) for day and night time. The day and night time hours ranged from 06:00 to 22:00 hrs and 22:00 to 06:00 hrs respectively.

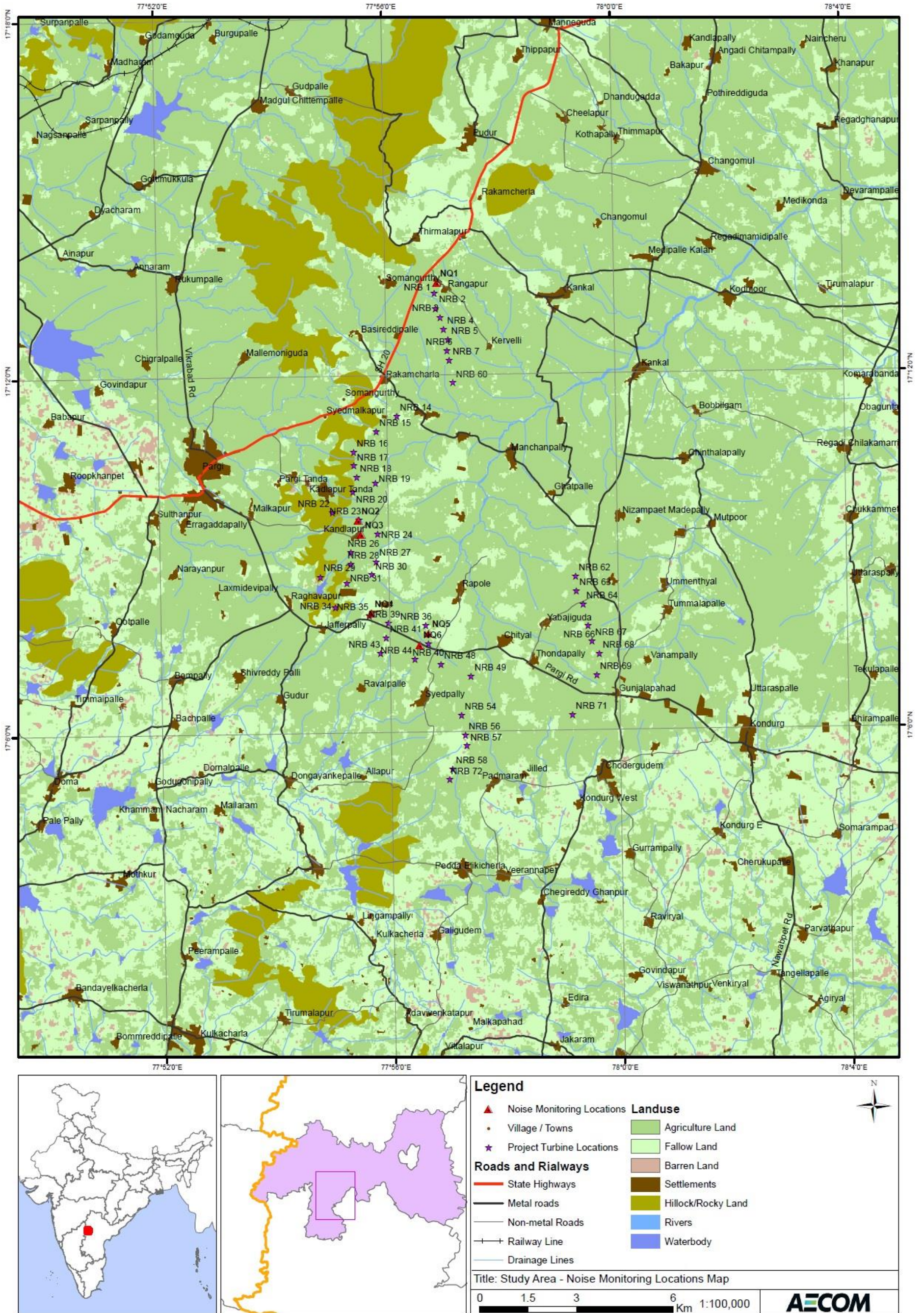
For noise levels measured over a given period of time, it is possible to describe important features of noise using statistical quantities. This is calculated using the percent of the time certain noise levels exceeds the time interval. The notation for the statistical quantities of noise levels is described below:

- Hourly Leq values have been computed by integrating sound level meter.
- Lday: As per the CPCB guidelines the day time limit is between 06:00 hours to 22.00 hours as outlined in Ministry of Environment and Forest Notification S.O. 123 (E) dated 14/02/2000.
- Lnight: As per the CPCB guidelines the night time limit is between 22:00 hours to 06.00 hours as outlined in Ministry of Environment and Forest Notification S.O. 123 (E) dated 14/02/2000.

It was observed that the baseline noise levels ranged from 49.0 to 50.6 dB (A) during day time and 35.6 to 39.1 dB (A) during night time (**Table 7-2**). The noise levels were observed to be within the prescribed CPCB standards for day time (55 dB (A)) and night time (i.e. 45 dB (A)) at all the locations. **Figure 7-1** illustrates the noise monitoring location and **Figure 7-2** illustrates the noise levels monitored at the sampling locations.

The results of the noise monitoring are presented in **Table 7-2**.

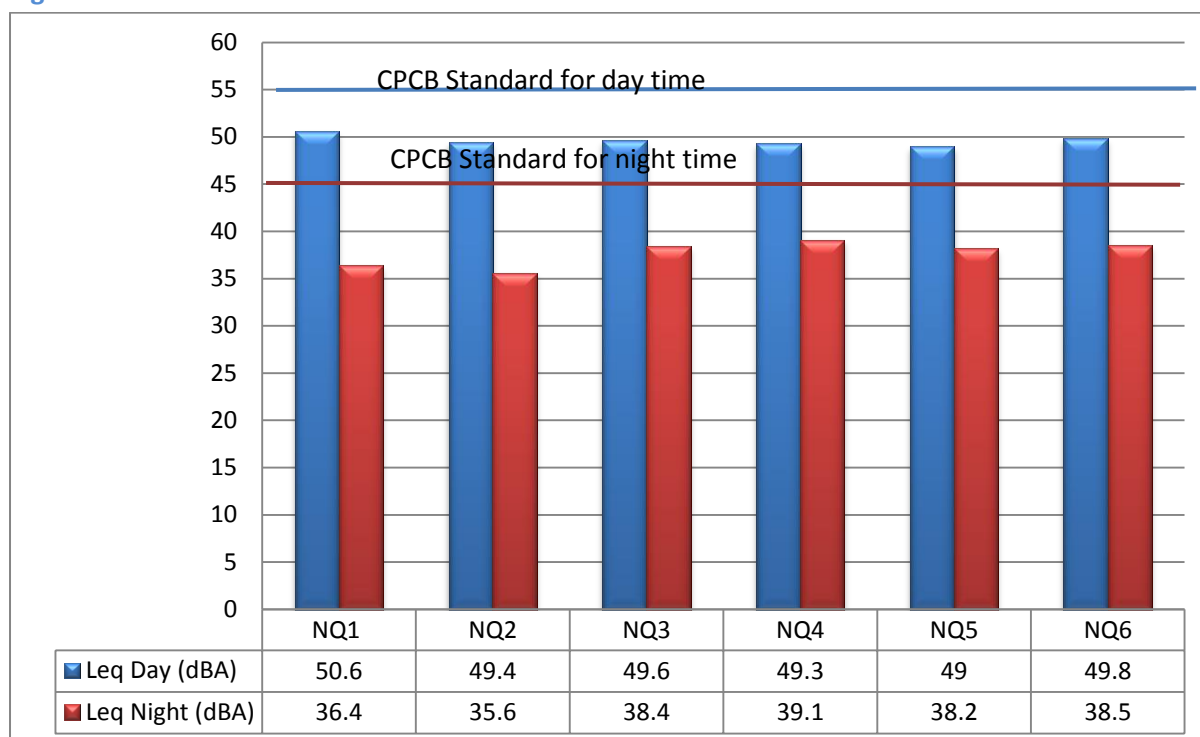
Figure 7-1: Map showing Noise Monitoring Locations



**Table 7-2: Results of Noise Level Monitoring**

Noise Monitoring Location	Day Time		Night Time	
	Leq (dBA)	Limit dB (A)	Leq (dBA)	Limit dB (A)
NQ1	50.6	55	36.4	45
NQ2	49.4	55	35.6	45
NQ3	49.6	55	38.4	45
NQ4	49.3	55	39.1	45
NQ5	49.0	55	38.2	45
NQ6	49.8	55	38.5	45

**Figure 7-2: Monitored Noise Levels**



## 7.3 Impact Assessment

### 7.3.1 Construction Phase

#### Impacts

The construction activities and sources which will lead to noise generation include the following:

- Site preparation and earthworks using bulldozers, trucks etc.;
- Foundation and construction using mobile equipment, cranes and concrete mixing;
- Heavy vehicles utilized to deliver construction materials and the turbine parts; and
- Use of diesel generator sets for power generation

The above mentioned activities and sources will generate noise and vibration which may affect the habitations lying in close proximity to the proposed locations and may even scare away the grazing animals around the site. **Table 7-3** below presents the various types of vehicles and equipments likely to be used on site during the construction works for the Project and the typical sound levels that they generate.



**Table 7-3: Typical sound level from various types of construction vehicles and equipment**

S. No	Type of Vehicle	Description	Typical Sound Power Level (dB)
1.	Passenger Vehicle	Passenger Vehicle	85
2.	Trucks	10 ton capacity	95
3.	Cranes	Overhead and mobile	109
4.	Mobile Construction Vehicles	Front end loaders	100
5.	Mobile Construction Vehicles	Excavators	108
6.	Mobile Construction Vehicles	Bull Dozer	111
7.	Mobile Construction Vehicles	Dump Truck	107
8.	Mobile Construction Vehicles	Water Tanker	95
9.	Stationary construction equipment	Concrete Mixer	110
10.	Compressor	Air compressor	100
11.	Compressor	Vibratory compactor	110

Source: Gold Coast Desalination Alliance (GCDA) – 2006

It is to be noted that ambient noise levels depend on various factors such as the exact number of vehicles/equipment being used at the construction site, number of hours of operation, etc. Due to unavailability of such information, the cumulative noise levels from simultaneous use of construction vehicles and equipment is difficult to ascertain. However, the construction activities will be temporary in nature and will not last for more than 15-20 days for a particular turbine site.

### Mitigation Measures

The following measures will be incorporated during construction phase for minimizing the impact of increased noise levels:

- Construction activities shall be planned in consultation with local communities, wherever potential impacts are predicted;
- Construction equipment will be maintained in good working order and properly muffled;
- Integral noise shielding to be used where practicable and fixed noise sources to be acoustically treated, for example with silencers, acoustic louvers and enclosures;
- Provision of rubber paddings/noise isolators at equipment/machinery used for construction;
- Idling time for vehicles and construction machinery should be minimized when not in use;
- Noise prone activities will be restricted to the extent possible during day time and no activities will be allowed during night time 2200 to 0600 hours;
- Site workers working near high noise equipment use personal protective equipment's (PPEs) to minimize their exposure to high noise levels.

### Impact Value

The impact due to the noise generation during construction phase is expected to be of local spread, short duration and low intensity with mitigation measures and has been assessed as insignificant impact.

**Table 7-4: Impact Value-Noise Quality during Construction Phase**

Aspect	Scenario	Spread	Duration	Intensity	Overall
Noise Quality	Without Mitigation	Local	Short	Moderate	Minor
	With Mitigation	Local	Short	Low	Insignificant

**7.3.2 Operation Phase**

*Impacts*

**Sources of Wind Turbine Noise**

The sources of noise generation from operating wind turbines can be divided into two categories: mechanical sounds, from the interaction of turbine components, and aerodynamic sounds, produced by the flow of air over the blades.

**Mechanical Sounds**

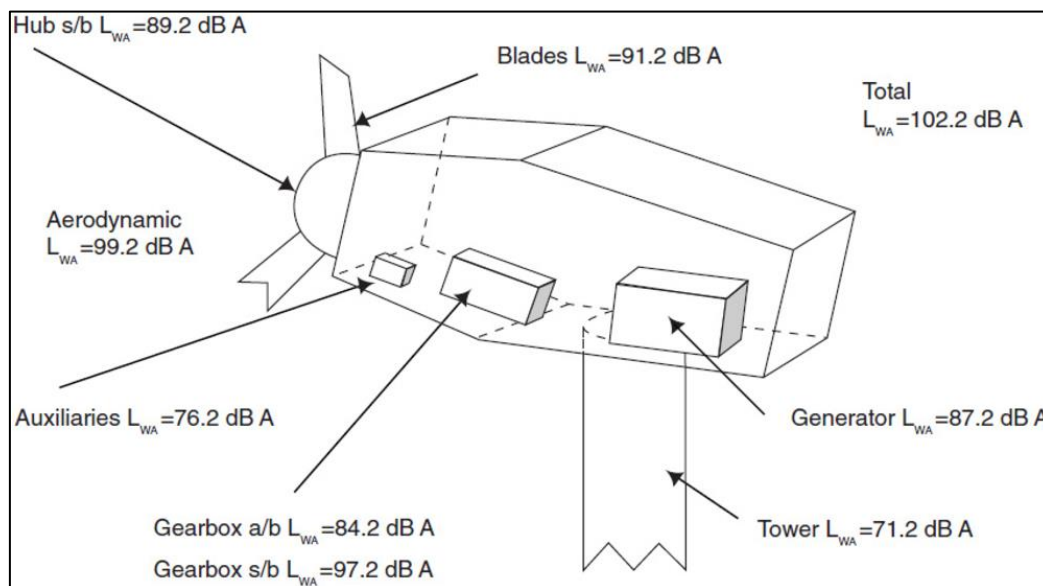
Mechanical sounds originate from the relative motion of mechanical components and the dynamic response among them. Sources of such sounds include:

- Gearbox;
- Generator;
- Yaw Drives;
- Cooling fans; and
- Auxiliary Equipment

Since the emitted sound is associated with the rotation of mechanical and electrical equipment, it tends to be tonal (i.e., of a common frequency), although it may have a broadband component.

**Figure 7-3** below illustrates the total sound power from components of a wind turbine.

**Figure 7-3: Components and Total Sound Power Level of a Wind Turbine**



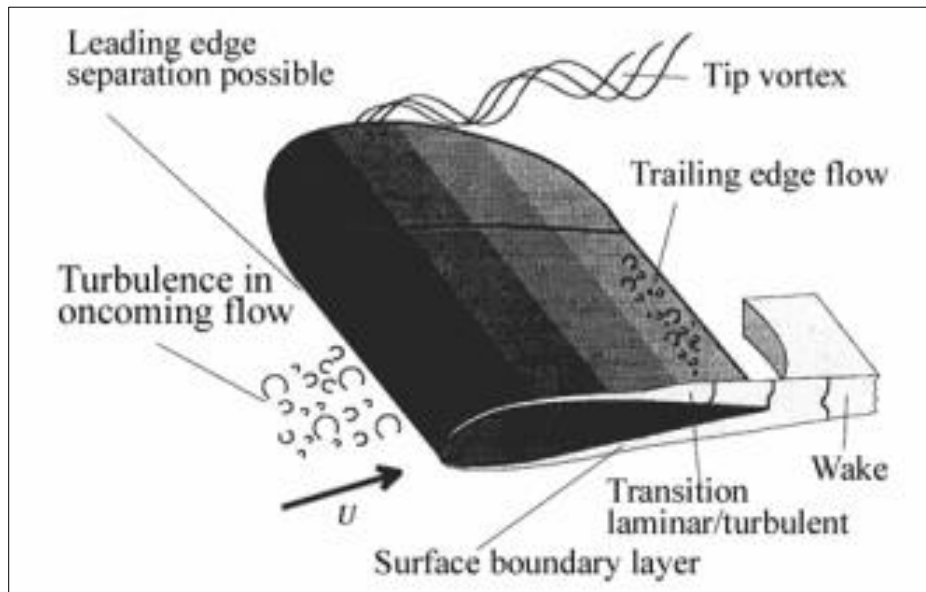
Source: Centre for Energy Efficiency and Renewable Energy. (2002)

**Aerodynamic Sounds**

Aerodynamic noise originates from the flow of air around the blades. It increases with the rotor speed and can be classified into three groups namely; Low Frequency, Inflow Turbulence and Air Foil Self Sounds. Low frequency sound is generated when the rotating blade encounters localized flow deficiencies such as wind speed changes, flow around the turbines etc. Inflow Turbulence depends on the amount of atmospheric turbulence which tends to result in local pressure fluctuations around

the blade. And finally, Air Foil Self Sounds includes the sound generated by the air flow right along the surface of the air foil with broadband characteristics. **Figure 7-4** below shows the schematic representation of flow around a rotor blade.

**Figure 7-4: Schematic of Flow around a Rotor Blade**



Source: Centre for Energy Efficiency and Renewable Energy. (2002).

### **Noise Modelling**

Noise impact due to operation of the proposed Project, was analysed using numerical model WindPro version 2.7 which is specifically designed for wind turbine noise assessment. WindPRO contains pre-configured noise calculation models in order to calculate predicted noise levels at each of the selected noise receptor plus a ready built catalogue of wind turbines and noise emission data. The ISO 9613-2 general noise calculation model was used which considers frequency dependant attenuation due to geometric divergence, atmospheric absorption, and ground effect. The model is valid for downwind propagation under a well-developed moderate ground based temperature inversion, which are conditions favourable to noise propagation from source to receiver.

The numerical results were then used to produce a noise map that visually indicates the extent of the incremental noise emissions from the site. The noise emissions were modelled for estimated wind speed of the area i.e. 6.8 m/s at a hub height of 120 m and rotor diameter of 97 m. The direction of the wind is not taken into consideration as the wind could blow from any direction at the speeds that were modelled. The data available for Suzlon S97 wind turbines from the WindPRO wind catalogue was used for the noise assessment.

Modelling has been undertaken to evaluate the resultant noise levels with the prescribed noise limit of 45 dB (A) for night time. Ground attenuation is mainly the result of sound reflected by the ground surface interfering with the sound propagating directly from the source to the receiver.

The resultant values have been calculated by taking the logarithmic addition of the incremental noise from WTG/WTGs and the baseline noise level. The additional exposure has thereafter been calculated as the absolute difference between the resultant and the baseline value. Since the night time baseline noise levels are generally lower than the incremental, the logarithmic addition tends

to be higher as compared to the values for daytime. The formula for calculating resultant noise level is:

$$\text{Resultant Noise Level} = 10 \log (10 (\text{Baseline noise}/10) + 10 (\text{Incremental Noise}/10))$$

### Identified Noise Receptors

During the site survey, households located within 500 m of the project turbines were identified as receptors since the impact of noise is usually limited within this distance range only. In total nine (9) receptors for noise were identified, consisting of cluster of households near WTG location, places of worship, school etc. Receptor PN-4 which is cluster of settlements/ houses at Khudwanpur village is at located at the least distance from a WTG, i.e. ~46 m from NRB 35. The co-ordinates of the identified receptors are presented in **Table 7-5**.

**Table 7-5: Description of the Identified Noise Receptors**

Name of the Noise Receptor	Reference WTG	Distance from WTG	Baseline Noise at the ref. WTG		Co-ordinates in UTM		Type of Receptor
			Day	Night	Northing	Easting	
PN1	NRB 1	235 m in N direction	50.6	36.4	1906930.00 m	813556.00 m	Cluster of houses/ settlements at Rangapur village
PN2	NRB 22	190 m in SW direction	49.4	35.6	1899539.00 m	811115.00 m	Cluster of houses/ settlements at Kadlapur Tanda village
PN3	NRB 24	466 m in W direction	49.6	38.4	1899119.00 m	811224.00 m	Cluster of houses/ settlements at Kadlapur village
PN4	NRB 35	46 m in N direction	49.3	39.1	1896664.00 m	811530.00 m	Cluster of houses/ settlements at Khudwanpur village
PN5	NRB 36	258 m in S direction	49.0	38.2	1896049.00 m	813311.00 m	House near Poultry Farm, Rapole village
PN6	NRB 44	961 m in SW direction	49.8	38.5	1895695.00 m	813035.00 m	Cluster of houses/ settlements at Sayedpally village
PN7	NRB 2	91 m in NW direction	49.4	35.6	1906177.00 m	813446.00 m	Farm House
PN8	NRB 15	353 m in N direction	49.4	35.6	1902657.00 m	811722.00 m	Farm House
PN9	NRB 29	120 m in N direction	49.3	39.1	1897910.00 m	810002.00 m	Farm House

Source: AECOM Site Survey

### Results and Analysis

The results of the modelling exercise have been presented in **Table 7-6** and illustrated in **Figure 7-5**. The main results are attached as **Annexure V**.

**Table 7-6: Resultant Noise Levels at Receptor Locations**

Software Label	Receptor ID	Baseline dB(A)		Incremental dB(A)	Resultant Noise Level dB(A)		Additional Exposure dB(A)	
		Day	Night	From WTG	Day	Night	Day	Night
A	PN1	50.6	36.4	49.1	52.9	<b>49.3</b>	2.3	12.9
B	PN2	49.4	35.6	47.6	51.6	<b>47.9</b>	2.2	12.3
C	PN3	49.6	38.4	47.5	51.7	<b>48.0</b>	2.1	9.6

Software Label	Receptor ID	Baseline dB(A)		Incremental dB(A)	Resultant Noise Level dB(A)		Additional Exposure dB(A)	
		Day	Night	From WTG	Day	Night	Day	Night
D	PN4	49.3	39.1	56.1	<b>56.9</b>	<b>56.2</b>	7.6	17.1
E	PN5	49.0	38.2	49.9	52.5	<b>50.2</b>	3.5	12.0
F	PN6	49.8	38.5	41.7	50.4	43.4	0.6	4.9
G	PN7	49.4	35.6	54.5	<b>55.7</b>	<b>54.6</b>	6.3	19.0
H	PN8	49.4	35.6	46.1	51.1	<b>46.5</b>	1.7	10.9
I	PN9	49.3	39.1	52.9	54.5	<b>53.1</b>	5.2	14.0
<b>CPCB Prescribed Limits</b>	--	<b>55</b>	<b>45</b>		<b>55</b>	<b>45</b>	--	--

**Note:** Figures in **bold** indicate resultant noise levels exceed the prescribed limits

### Inference

It is to be observed that the baseline noise levels in the area are within the prescribed CPCB standards both during the day and night at all the receptor locations. The results from the modelling exercise indicate that the incremental noise due to operation of WTGs at receptor locations is in the range of 41.7 - 56.1 dB (A). The additional exposure to noise due to the operation of the wind turbines will be in the range of 0.6 – 7.6 dB (A) and 4.9 – 19.0 dB (A) during the day and night time respectively.

The estimated resultant noise levels are within the CPCB day time standard of 55 dB (A) at all the locations except receptor location No. PN4 - Cluster of houses at Khudwanpur village and PN7 – a farm house in the field, where resultant noise levels exceeds the CPCB’s prescribed standards for both day and night time.

The estimated resultant noise levels of only one receptor PN – 6 are within the CPCB night time standard of 45 dB (A) and for all other identified receptor locations, the resultant noise levels exceeds CPCB’s prescribed standards for night time.

List of all the project turbines located within 2000 m from the identified noise receptors is detailed in the [Table 7-7](#) below.

**Table 7-7: List of WTGs within 2000 m of Receptor Locations**

Sr. No.	Receptor Location	WTG No.	Distance (m)
1	PN 1	NRB 1	235
		NRB 2	526
		NRB 3	751
		NRB 4	1101
		NRB 5	1428
		NRB 6	1768
2	PN 2	NRB 16	1256
		NRB 17	974
		NRB 18	865
		NRB 19	1305
		NRB 20	564
		NRB 22	290